NOVOSENSE
Product Selection Guide

- Signal Sensing
- System Interconnection
- Power and Driver

www.novosns.com
About NOVOSENSE

NOVOSENSE Microelectronics (NOVOSENSE, SSE Code 688052) is a highly robust & reliable analog and mixed signal IC company. Since its establishment in 2013, the company has been focusing on sensor, signal chain, and power management, providing comprehensive semiconductor products and solutions such as sensor, signal chain, isolator, interface, power driver, power management, which are widely used in automotive, industrial control, information communication and consumer electronics markets.

With the mission of "Sense and Drive the Future, Build a Green, Smart and Connected World with Semiconductors", the company is committed to providing chip-level solutions to link the digital world and the real world.

For more information and sample application, please visit: www.novosns.com
“Sense and Drive the Future, Build a Green, Smart and Connected World with Semiconductors”
## Signal Sensing

### Temperature Sensor

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NST1001</td>
<td>D-NTC® Digital Pulse Output Temperature Sensor</td>
</tr>
<tr>
<td>NST1002</td>
<td>D-NTC Single Bus-type Digital Temperature Sensor</td>
</tr>
<tr>
<td>NST175</td>
<td>Digital Temperature Sensor with I²C Port in Industrial-qualified Package</td>
</tr>
<tr>
<td>NST1075</td>
<td>Small-size high-precision Digital Temperature Sensor</td>
</tr>
<tr>
<td>NST118</td>
<td>Small Ultra-high-precision Digital Temperature Sensor with I²C Port</td>
</tr>
<tr>
<td>NST117</td>
<td>Small-size high-precision Digital Temperature Sensor with I²C Port</td>
</tr>
<tr>
<td>NST112</td>
<td>High-precision Low-power I²C Port Digital Temperature Sensor with Ultra-small SOT563 and DSBGA Package</td>
</tr>
<tr>
<td>NST103</td>
<td>Digital Temperature Sensor with I²C Port in Wafer-level Package</td>
</tr>
<tr>
<td>NST461</td>
<td>Small-size high-precision I²C Interface Remote and Local Digital Temperature Sensor</td>
</tr>
<tr>
<td>NST1412/NST1413</td>
<td>High-precision Remote and Local Temperature Sensors with Digital Interface in Industrial-qualified Package</td>
</tr>
<tr>
<td>NST7719</td>
<td>High-precision Remote and Local Temperature Sensors with Digital Interface in Industry-standard Package</td>
</tr>
<tr>
<td>NST20/NST60/NST235/NST86</td>
<td>High-precision and Low-power Analog Output Temperature Sensor</td>
</tr>
<tr>
<td>N5HT30</td>
<td>High-precision, Low-power I²C Digital Interface Temperature and Humidity Sensor</td>
</tr>
</tbody>
</table>

### MEMS Pressure Sensor

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSPGM1</td>
<td>Automotive-qualified Integrated Differential Pressure Sensor Module</td>
</tr>
<tr>
<td>NSPGM2</td>
<td>Automotive-qualified Integrated Differential Pressure Sensor Module</td>
</tr>
<tr>
<td>NSPAS3M</td>
<td>Automotive-qualified Integrated Absolute Pressure Sensor</td>
</tr>
<tr>
<td>NSPAS3</td>
<td>Automotive-qualified Integrated Absolute Pressure Sensor</td>
</tr>
<tr>
<td>NSPAS1</td>
<td>Automotive-qualified Integrated Absolute Pressure Sensor</td>
</tr>
<tr>
<td>NSPGS2</td>
<td>Integrated Gauge Pressure Sensor with Air Nozzle in SOP Package</td>
</tr>
<tr>
<td>NSPGD1</td>
<td>Integrated Gauge Pressure Sensor with Air Nozzle in DIP8 Package</td>
</tr>
<tr>
<td>NSPDx</td>
<td>Dual-nozzle Integrated Differential Pressure Sensor</td>
</tr>
<tr>
<td>NSPGSS</td>
<td>Single-nozzle Integrated Gauge Pressure Sensor</td>
</tr>
<tr>
<td>NSPF15</td>
<td>x: High-performance and High-reliability MEMS Differential Pressure Sensor Wafer</td>
</tr>
<tr>
<td>NSPF16</td>
<td>x: High-performance and High-reliability MEMS Absolute Pressure Sensor Wafer</td>
</tr>
</tbody>
</table>

### Current Sensor

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSC6272/NSC6273</strong>: Analog Output MEMS Microphone Signal Conditioning Chip</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>NSC6280</strong>: Analog Output MEMS Microphone Signal Conditioning Chip</td>
<td></td>
</tr>
<tr>
<td><strong>NSC6360</strong>: Digital PDM Output MEMS Microphone Signal Conditioning Chip</td>
<td></td>
</tr>
<tr>
<td><strong>NSC6362</strong>: Digital PDM Output MEMS Microphone Signal Conditioning Chip</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2200</strong>: Digital Output Pressure Sensor Interface Chip</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2300</strong>: Pressure Sensor Interface Signal Conditioning Chip Compatible with Analog and Digital Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Resistive Bridge Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSM3011/3012/3013</strong>: Hall-based Angle Sensor Magnetic Position Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSM2031</strong>: Linear Hall Current Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSM2032</strong>: Linear Hall Current Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSM2033</strong>: Linear Hall Current Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSC2860X</strong>: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2302</strong>: Pressure Sensor Interface Signal Conditioning Chip Compatible with Analog and Digital Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2862X</strong>: Analog Front-end Chip for Low-power Digital Industrial Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSC2860X</strong>: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9260(X)</strong>: Signal Conditioning Chip for Resistive Bridge Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2302</strong>: Pressure Sensor Interface Signal Conditioning Chip Compatible with Analog and Digital Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2862X</strong>: Analog Front-end Chip for Low-power Digital Industrial Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2862X</strong>: Analog Front-end Chip for Low-power Digital Industrial Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
<td></td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
<td></td>
</tr>
<tr>
<td><strong>NSA9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
<td></td>
</tr>
</tbody>
</table>

**MEMS Microphone Signal Conditioning Chip**

<table>
<thead>
<tr>
<th><strong>NSC6272/NSC6273</strong>: Analog Output MEMS Microphone Signal Conditioning Chip</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSA2200</strong>: Digital Output Pressure Sensor Interface Chip</td>
</tr>
<tr>
<td><strong>NSA2300</strong>: Pressure Sensor Interface Signal Conditioning Chip Compatible with Analog and Digital Output</td>
</tr>
<tr>
<td><strong>NSM2031</strong>: Linear Hall Current Sensor</td>
</tr>
<tr>
<td><strong>NSM2032</strong>: Linear Hall Current Sensor</td>
</tr>
<tr>
<td><strong>NSM2033</strong>: Linear Hall Current Sensor</td>
</tr>
<tr>
<td><strong>NSA2860/NSA2860X</strong>: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
</tr>
<tr>
<td><strong>NSC2860X</strong>: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output</td>
</tr>
<tr>
<td><strong>NSA9260(X)</strong>: Signal Conditioning Chip for Resistive Bridge Automobile Pressure Sensor</td>
</tr>
<tr>
<td><strong>NSC9260(X)</strong>: Signal Conditioning Chip for Capacitive Automobile Pressure Sensor</td>
</tr>
<tr>
<td><strong>NSA9262</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS</td>
</tr>
<tr>
<td><strong>NSC9264</strong>: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS</td>
</tr>
</tbody>
</table>
NSIC0364: i2S Interface Digital MEMS Microphone Signal Conditioning Chip

Infrared PIR Sensor Signal Conditioning Chip
NSA3162T: Common External PIR Sensor Signal Conditioning Chip
NSA3180T: Built-in PIR Sensor Signal Conditioning Chip
NSA3182: External PIR Sensor Signal Conditioning Chip Integrated with LDO
NSA3166: Digital Output PIR Sensor Signal Conditioning Chip

Thermopile Sensor Signal Conditioning Chip
NSA3300: Thermopile Sensor Signal Conditioning Chip

Magnetic Sensor Signal Conditioning Chip
NSA3312: Magnetic Sensor Signal Conditioning Chip/Programmable Instrumentation Amplifier

Industrial and Automotive SoC
NSUC1610: Motor drives SoC for Automotive Electronic Actuators

General Signal Chain
NSRFC0300x: High-precision, Low-tempo, Low-noise, Low-power Voltage Reference
System Interconnection

- **Isolated RS-485 Transceiver**
  - NSI8308xC: Isolated Half-Duplex/Full-Duplex 485 Transceiver with High Reliability
  - NIRS485: Cost-optimized Isolated 485 Transceiver

- **Isolated CAN Transceiver**
  - NSI1050C: High-Performance Isolated CAN Transceiver
  - NSI1042/1052: High-Performance Isolated CAN Transceiver
  - NSI1042C: Isolated CAN Transceiver

- **Isolated I²C**
  - NSI100NC/NSI100: High Reliability Bidirectional I²C Isolators

- **I²C Interface**
  - NCA9511: I²C Hot-swappable BUS and SMBUS Buffer
  - NCA9306: I²C and SMBUS Voltage Level Converter
  - NCA9617A: I²C and SMBUS Dual Bidirectional Buffer
  - NCA9545: 4-channel I²C-BUS Switch with Interrupt Logic and Reset
  - NCA9546: 4-channel I²C Switch with Reset
  - NCA9548: 8-channel I²C Switch with Reset
  - NCA9555: I²C 16-bit GPIO Expansion

- **RS-485 Transceiver**
  - NCA34xx: High robust RS485 half/full duplex transceiver
  - NCA3176: High Robust Half-Duplex 485 Transceiver
  - NCA3085: High Robust Half-Duplex 485 Transceiver

- **CAN Transceiver**
  - NCA1042B: Fail-Safe CAN Transceiver Supporting CAN FD and BUS Wakeup
  - NCA1042B-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and BUS Wakeup
  - NCA1051A/N: Fail-Safe CAN Transceiver Supporting CAN FD
  - NCA1051B-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Battery Back-up
  - NCA1145-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Local Interconnect

- **LIN Transceiver**
  - NCA1021S-Q1: Low Power Consumption LIN Transceiver with Multiple Wake-up Functions

- **High-Performance Isolated CAN Transceiver**
  - NSI1042B-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Battery Back-up
<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1306</td>
<td>Isolated Current Sampling ADC with High Reliability</td>
</tr>
<tr>
<td>NSI1305</td>
<td>Isolated Current Sampling ADC with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1200</td>
<td>Isolated Current Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1303</td>
<td>Isolated ADC with Integrated Internal Clock with High Reliability</td>
</tr>
<tr>
<td>NSI1311</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>NSI1312</td>
<td>Isolated Voltage Sampling Amplifier with High Reliability</td>
</tr>
<tr>
<td>Product Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NSI6611/NSI6651</td>
<td>Smart Isolated Gate Driver</td>
</tr>
<tr>
<td>NSI68515</td>
<td>Optocoupler-compatible Single-Channel Isolated Gate Driver with Miller Clamp</td>
</tr>
<tr>
<td>NSI6801</td>
<td>Optocoupler Compatible Single-Channel Isolated Gate Driver</td>
</tr>
<tr>
<td>NSI6801M</td>
<td>Optocoupler-compatible Single-Channel Isolated Gate Driver with Miller Clamp</td>
</tr>
<tr>
<td>NSI6601/NSI6601M</td>
<td>Isolated Single-Channel Gate Driver</td>
</tr>
<tr>
<td>NSI6602V/NSI6602N</td>
<td>Second-generation High-performance Isolated Dual-channel Gate Driver</td>
</tr>
<tr>
<td>NSI6602M</td>
<td>Isolated Dual-channel Gate Driver with Integrated Miller Clamp</td>
</tr>
<tr>
<td>NSI6602V/NSI6602N-M</td>
<td>Second-generation High-performance Isolated Dual-channel Gate Driver with Integrated Miller Clamp</td>
</tr>
<tr>
<td>NSD1025V</td>
<td>High Speed Dual Low-side Driver</td>
</tr>
<tr>
<td>NSD12409</td>
<td>Automotive 40V Dual-channel 90mΩ Intelligent Low-Side Switch</td>
</tr>
<tr>
<td>NSG65N15K</td>
<td>High-voltage Half-bridge GaN Power Stage IC</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
<tr>
<td>NSD1015T</td>
<td>Non-isolated Low-side Gate Driver</td>
</tr>
<tr>
<td>NSD1624</td>
<td>High Voltage Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD2621</td>
<td>High Voltage Half-bridge GaN Driver IC</td>
</tr>
<tr>
<td>NSD1224</td>
<td>120V Half-bridge Gate Driver</td>
</tr>
<tr>
<td>NSD731x/NSD731x-Q1</td>
<td>40V Peak Current 3.6A Brushed DC Motor Driver IC</td>
</tr>
<tr>
<td>NSD8312/NSD8310/NSD8308/NSD8306</td>
<td>40V 12/10/8/6-Channel Half-bridge Driver</td>
</tr>
</tbody>
</table>
NSD11/12416– Q1 Automotive 40V
Single/Dual-channel 160mΩ Intelligent
Low-side Switch

SiC Diode

Automotive 40V Single Channel 90mΩ
Intelligent Low Side Switch

LDO Linear Regulator

Automotive 40V 150/300/500mA
LDO NSR31/33/35 Series with Ultra Low-Quiescent Current

Voltage Monitoring

Automotive and Industrial grade low-Iq Programmable-delay Voltage Monitoring Reset IC Series

Smart High and Low Side Switch

Automotive 40V Single Channel 90mΩ Intelligent Low Side Switch NSE11409 series

LED Driver

Automotive-qualified Three-channel High-side LED Driver with Heat Sharing Function NSL2163X Series
<table>
<thead>
<tr>
<th>Part number</th>
<th>Product description</th>
<th>Package</th>
<th>Temperature range</th>
<th>Supply voltage</th>
<th>Working current</th>
<th>Port type</th>
<th>Temp. resolution</th>
<th>Max. precision</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NST1001</td>
<td>High-precision dual-pin digital pulse output temperature sensor</td>
<td>TO-92S/DFN-2</td>
<td>-50°C~150°C</td>
<td>1.65V~5.5V</td>
<td>30μA</td>
<td>Pulse count output</td>
<td>0.0625°C</td>
<td>±0.5°C</td>
<td>NTC replacement, quick response probe, 2-wire temperature probe, gas meter temperature compensation, wearable and IoT temperature measurement</td>
</tr>
<tr>
<td>NST1001HA</td>
<td>High-precision dual-pin digital pulse output temperature sensor with maximum accuracy of ±0.2°C</td>
<td>DFN-2</td>
<td>-50°C~150°C</td>
<td>1.65V~5.5V</td>
<td>30μA</td>
<td>Pulse count output</td>
<td>0.0625°C</td>
<td>±0.1°C</td>
<td>NTC replacement, quick response probe, 2-wire temperature probe, gas meter temperature compensation, wearable and IoT temperature measurement</td>
</tr>
<tr>
<td>NST1002</td>
<td>High-precision single-BUS digital temperature sensor</td>
<td>TO-92S/DFN-2</td>
<td>-40°C~125°C</td>
<td>1.7V~5.5V</td>
<td>30μA</td>
<td>One wire protocol</td>
<td>0.0078125°C</td>
<td>±0.1°C</td>
<td>NTC replacement, quick response probe, 2-wire temperature probe, glucometer, wearable and IoT temperature measurement</td>
</tr>
<tr>
<td>Part number</td>
<td>Product description</td>
<td>Package</td>
<td>Temperature range</td>
<td>Supply voltage</td>
<td>Working current</td>
<td>Port type</td>
<td>Max. indication</td>
<td>Max. tolerance</td>
<td>Typical applications</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------</td>
<td>---------</td>
<td>------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>NST175</td>
<td>Digital temperature sensor with ±0.5°C accuracy in industrial-qualified package</td>
<td>MSOP-10</td>
<td>-50°C~125°C</td>
<td>1.62V~5.5V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>TMP75 replacement, server temperature measurement, battery temperature measurement, SSD temperature measurement, board-level temperature measurement</td>
</tr>
<tr>
<td>NST176</td>
<td>Digital temperature sensor</td>
<td>SC70-5</td>
<td>-50°C~125°C</td>
<td>1.62V~5.5V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>TMP75 replacement, server temperature measurement, battery temperature measurement, SSD temperature measurement, board-level temperature measurement</td>
</tr>
<tr>
<td>NST118</td>
<td>Digital temperature sensor with FCOSMBUS port</td>
<td>DFN-4</td>
<td>-40°C~125°C</td>
<td>1.75V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>xH711 substitution, wearable temperature monitoring, medical thermometer, battery temperature measurement, industrial IoT, environmental monitoring, etc.</td>
</tr>
<tr>
<td>NST116</td>
<td>Digital temperature sensor with FCOSMBUS port</td>
<td>DFN-4</td>
<td>-50°C~125°C</td>
<td>1.62V~5.5V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>xH711 series substitution, wearable temperature monitoring, medical thermometer, battery temperature measurement, industrial Internet of Things, environmental monitoring, etc.</td>
</tr>
<tr>
<td>NST136</td>
<td>SOT763 is a high-accuracy and low-power digital temperature sensor with a FCOSMBUS port</td>
<td>SOT763</td>
<td>-40°C~125°C</td>
<td>1.71V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>120 series substitution, board level temperature measurement, server temperature measurement, battery temperature measurement, SSD temperature measurement, IoT temperature monitoring, etc.</td>
</tr>
<tr>
<td>NST163</td>
<td>WLCSP is a high-accuracy and low-power digital temperature sensor with FCOSMBUS port</td>
<td>DSBGA-4</td>
<td>-40°C~125°C</td>
<td>1.62V~5.5V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>120 series substitution, board level temperature measurement, server temperature measurement, battery temperature measurement, SSD temperature measurement, IoT temperature monitoring, etc.</td>
</tr>
<tr>
<td>NST163</td>
<td>WLCSP is a low-power digital temperature sensor with FCOSMBUS port</td>
<td>DSBGA-4</td>
<td>-40°C~125°C</td>
<td>1.62V~5.5V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>1°C</td>
<td>±1°C</td>
<td>X163 series substitution, mobile phone, laptop, SOLR-state disk, server, telecommunication, setup box, sensor, low-power environment</td>
</tr>
<tr>
<td>NST461</td>
<td>High-precision and high-accuracy FCOSMBUS remote and local temperature sensors (1L+2R)</td>
<td>WQFN-10</td>
<td>-40°C~125°C</td>
<td>2.1V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>XH4015I substitution, 4x4x10 compatibility, laptop, desktop, solar-grade drive, server, telecommunication, industrial Internet of Things, etc.</td>
</tr>
<tr>
<td>NST1412</td>
<td>High-precision FCOSMBUS remote and local temperature sensors (1L+1R)</td>
<td>MSOP-10</td>
<td>-40°C~125°C</td>
<td>3V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>EMC1412 series substitution, laptop, desktop, solar-grade drive, server, telecommunication, Industrial Internet of Things, etc.</td>
</tr>
<tr>
<td>NST1412</td>
<td>High-precision FCOSMBUS remote and local temperature sensors (2L+1R)</td>
<td>MSOP-10</td>
<td>-40°C~125°C</td>
<td>3V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>EMC1412 series substitution, laptop, desktop, solar-grade drive, server, telecommunication, Industrial Internet of Things, etc.</td>
</tr>
<tr>
<td>NST7719</td>
<td>High-precision FCOSMBUS remote and local temperature sensors (1L+2R)</td>
<td>WQFN-10</td>
<td>-40°C~125°C</td>
<td>3V~3.6V</td>
<td>±3μA</td>
<td>FCOSMBUS</td>
<td>0.90μV</td>
<td>±0.5°C</td>
<td>NCT7719 substitution, laptop, desktop, server, telecommunication, industrial Internet of Things, etc.</td>
</tr>
<tr>
<td>NST29</td>
<td>High-precision, low-power analog output temperature sensor (negative temperature coefficient)</td>
<td>SC75-6</td>
<td>-50°C~130°C</td>
<td>2.4V~5.5V</td>
<td>25μA</td>
<td>Analog output</td>
<td>-117.7m°C</td>
<td>±0.5°C</td>
<td>XII series substitution, laptop temperature monitoring, smart phone temperature measurement, temperature monitoring of portable medical devices, industrial Internet of Things and power system, power module temperature measurement, environmental monitoring</td>
</tr>
<tr>
<td>NST86</td>
<td>High-precision, low-power analog output temperature sensor (positive temperature coefficient)</td>
<td>SC75-6</td>
<td>-50°C~130°C</td>
<td>2.4V~5.5V</td>
<td>25μA</td>
<td>Analog output</td>
<td>+10.5m°C</td>
<td>±0.5°C</td>
<td>XII series substitution, laptop temperature monitoring, smart phone temperature measurement, temperature monitoring of portable medical devices, industrial Internet of Things and power system, power module temperature measurement, environmental monitoring</td>
</tr>
<tr>
<td>NST235</td>
<td>High-precision, low-power analog output temperature sensor (negative temperature coefficient)</td>
<td>GST75-3 (GST25-3)</td>
<td>-60°C~125°C</td>
<td>2.3V~5.5V</td>
<td>25μA</td>
<td>Analog output</td>
<td>-10m°C</td>
<td>±0.5°C</td>
<td>X120 series substitution, laptop temperature monitoring, smart phone temperature measurement, temperature monitoring of portable medical devices, industrial Internet of Things and power system, power module temperature measurement, environmental monitoring</td>
</tr>
<tr>
<td>NST83</td>
<td>High-precision, low-power analog output temperature sensor (positive temperature coefficient)</td>
<td>GST75-3 (GST25-3)</td>
<td>-60°C~125°C</td>
<td>2.4V~5.5V</td>
<td>25μA</td>
<td>Analog output</td>
<td>0.25m°C</td>
<td>±0.5°C</td>
<td>X120 series substitution, laptop temperature monitoring, smart phone temperature measurement, temperature monitoring of portable medical devices, industrial Internet of Things and power system, power module temperature measurement, environmental monitoring</td>
</tr>
</tbody>
</table>
NST1001 is a high-precision double-pin digital output temperature sensor. NST1001 features pulse counting digital output and high precision in a wide temperature range, which can be directly connected with MCU, while ensuring measurement accuracy and reducing overhead. The NST1001 device supports a maximum accuracy of ±0.75 °C over temperatures ranging from -50 °C to 150 °C, while providing extremely high resolution (0.0625 °C) without system calibration or hardware/software compensation. The pulse-counting digital port is designed for direct connection to GPIO or comparator inputs to simplify component implementation. Simple two-pin architecture is adopted. So the NST1001 device can be easily converted into a two-wire temperature probe.

**Product feature**
- Operating temperature range: -50°C~150°C
- High accuracy in full temperature range
  - 25°C~45°C: ±0.2°C (typical) @ NST1001
  - 25°C~45°C: ±0.2°C (max.) @ NST1001HA
  - Accuracy within range -20 °C~85°C: ±0.5°C (max.)
  - Accuracy within range 85°C~150°C: ±0.75°C (max.)
- High resolution: 0.0625°C (1 LSB)
- Quick temperature response: silicone oil τ63%=0.21S
- Single temperature conversion time: 50mS
- Ultra-low power consumption: 30µA operating current, zero standby power consumption
- Supply voltage range: 1.65V to 5.5V
- Pulse count type digital output to reduce the AD conversion port on master side
- Support dual pin simplified temperature measurement solution
- DFN2L ultra small packaging, with same resistance size as 0603

**Package**
- TO-92S (4mm x 3mm)
- DFN2L (1.6mm x 0.8mm)

**Functional block diagram**

**Application**
- Power metering
- Gas meter temperature measurement
- Smart closestool
- Digital temperature probes
- Smart wearable devices
- Industrial Internet of things
- Battery temperature detection
NST1002: D-NTC single bus-type digital temperature sensor

◆ Product introduction

NST1002 is a high-precision dual-pin single bus-type temperature sensor. NST1002 has a single bus protocol output interface and high precision in a wide temperature range. It can be directly connected with MCU to ensure the measurement accuracy and reduce the overhead.

The NST1002 device supports a maximum accuracy of ±0.5°C over temperatures ranging from -40°C to 125°C, while providing extremely high resolution (0.0078125°C) without system calibration or hardware/software compensation. The digital interface of the single bus protocol is designed to connect directly to GPIO, simplifying hardware design. The simple dual-pin architecture enables the NST1002 device to be easily converted into a two-wire temperature probe.

◆ Product feature

- Operating temperature range: -50°C to 150°C
- High accuracy over -40°C to 125°C
- DFN-2L
  - 0°C~85°C: ±0.1°C (typical) ±0.25°C (max.)
  - -40°C~125°C: ±0.5°C (max.)
- TO-92S-2L
  - 0°C~85°C: ±0.2°C (typical)
- -20°C~85°C: ±0.35°C (max.)
- -40°C~125°C: ±0.7°C (max.)
- -40°C~125°C: ±0.7°C (max.) @3.3V

- High resolution: 0.0078125°C (1 LSB)
- Quick temperature response: 0.27S (DFN2L)
- Single temperature conversion time: 32ms
- Ultra-low power consumption: 30µA operating current, zero standby
- Supply voltage range: 1.7V to 5.5V
- Single bus protocol digital output, without AD conversion port
- Support dual pin simplified temperature measurement solution
- DFN2L ultra small packaging, with same size as 0603 resistance

◆ Functional block diagram

- TO-92 (4mm x 3mm)
- DFN2L (1.6mm x 0.8mm)

◆ Package

- TO-92 (4mm x 3mm)
- DFN2L (1.6mm x 0.8mm)

◆ Application

- Ammeter
- Gas meter temperature measurement
- Intelligent closestool
- Home appliances
- Glucometer
- Digital temperature probe
- Intelligent wearables
- Industrial Internet of Things
- Battery temperature detection

The NST175 is a low-power, high-precision digital temperature sensor ideal as an alternative to negative temperature coefficient (NTC) and positive temperature coefficient (PTC) thermistors. The device provides typical accuracy of ±0.5 °C without calibration or signal adjustment from external components. NST175 temperature sensor is a highly linear product, which can sense the temperature without complex calculation or lookup. The on-chip 12-bit analog-to-digital converter (ADC) provides resolution as low as 0.0625 °C. The NST175 is compatible with SMBUS and I2C, allowing a maximum of 27 devices to be connected to one BUS and supporting the SMBUS alarm function. The NST175 has a rated operating range of -55 °C to 125 °C and is ideal for extended temperature measurement in a wide range of communications, computing, consumer products, Internet of Things, environmental, industrial and instrumentation applications. NST175 comes in industry-qualified MSOP8 and SOP8 packages.

**Product Introduction**

- Maintain high accuracy in full temperature range:
  - -20°C~ 85°C: ±0.5°C (typical)
  - -55°C to -20°C: ±2°C (max.)
  - 85°C to 125°C: ±2°C (max.)
- Maximum resolution 0.0625°C, optional
- Up to 27 device addresses supported
- Wide supply voltage range: 1.62V to 5.5V
- Working current: 30μA (typical)
- Turn-off current: 0.1μA (typical)
- Digital port: compatible with SMBus, I2C

**Functional block diagram**

**Application**

- System temperature monitoring
- Computer peripherals overheating protection
- Communication device
- Power supply temperature monitoring
- Laptop
- Thermostat control
- IoT application
- Environmental monitoring, heating ventilation air conditioning (HVAC)
NST1075: Small-size high-precision digital temperature sensor

Product introduction

The NST1075 is a low-power, high-precision digital temperature sensor ideal as an alternative to negative temperature coefficient (NTC) and positive temperature coefficient (PTC) thermistors. The device provides typical accuracy of ±0.5°C without calibration or signal adjustment from external components. NST1075 temperature sensor is a highly linear product, which can sense the temperature without complex calculation or lookup. The on-chip 12-bit analog-to-digital converter (ADC) provides resolution as low as 0.0625 °C. The NST1075 is compatible with SMBUS and PC interface, allowing a maximum of 27 devices to be connected to one bus and supporting the SMBus alarm function. The NST1075 has an operating temperature range of -35 °C to 125 °C and is ideal for extended temperature measurement in a wide range of communications, computing, consumer products, Internet of Things, environmental, industrial and instrumentation applications. NST1075 is packaged with WSON8 and the size is 2.0mm×2.0mm, which can better meet the temperature measurement requirements of miniaturized devices such as routers.

Product feature

- Maintain high accuracy in full temperature range:
  - -20°C ~ 85°C: ±0.5°C (typical)
  - -55°C ~ -20°C: ±1.5°C (max.)
  - 85°C ~ 125°C: ±1.5°C (max.)
- Maximum resolution: 0.0625°C, optional
- Up to 27 device addresses supported
- Wide supply voltage range: 1.62V to 5.5V
- Working current: 30μA (typical)
- Turn-off current: 0.2μA (typical)
- Digital port: Compatible with SMBUS, PC

Functional block diagram

Package

- WSON8 (2.0mm×2.0mm)

Application

- System temperature monitoring
- Computer peripherals overheating protection
- Communication device
- Power supply temperature monitoring
- Server
- IoT application
- Thermostat control
- Environmental monitoring, heating ventilation air conditioning (HVAC)
NST118 is a low power-consumption ultra-high-precision digital temperature sensor. It is an ideal substitute for negative temperature coefficient (NTC) and positive temperature coefficient (PTC) thermistors. The NST118 has I2C and SMBUS compatible ports, supports up to four device addresses, and has programmable alarm and SMBUS reset capabilities. It achieves accuracy up to ±0.2 °C (Max) in the range of 25 °C to 45 °C without calibration. The NST118 has low power consumption, which minimizes the impact of spontaneous heat on measurement accuracy. The NST118 temperature sensor is highly linear and does not require recombination calculations or lookup to derive the temperature. The 12-bit on-chip analog-to-digital conversion provides resolution up to 0.0625 °C. The NST118 temperature sensor operates from -40°C to 125°C and is suitable for consumer products, industrial equipment, Internet of Things and automotive markets. The NST118’s DFN(2mm x 2mm) package is also compatible with the NST117.

Product feature
- High accuracy in -40°C ~125°C wide temperature range
- Ultra precision at 25°C ~45°C ±0.2°C (maximum)
- I2C/SMBUS compatible port
- 12-bit ADC, maximum resolution: 0.0625 °C
- User programmable over-temperature alarm threshold
- Low static current: Working current 2.9μA@1Hz in operating mode (typical)
- Input voltage range: 1.71 V to 3.6 V
- Digital port: compatible with SMBUS, I2C

Package
- DFN6(2mmx2mm)

Functional block diagram

Application
- Wearable devices (TWS, watches, bracelets, etc.)
- Laptop
- Industrial Internet of Things (IoT)
- Communication infrastructure
- Power system monitor
- Environmental monitoring and HVAC
**NST117: Small-size High-precision Digital Temperature Sensor with I²C Port**

**Product introduction**

The NST117 is a low-power, high-precision digital temperature sensor ideal as an alternative to negative temperature coefficient (NTC) and positive temperature coefficient (PTC) thermistors. The device provides typical accuracy of ±0.2°C without calibration or signal adjustment from external components. NST117 temperature sensor is a highly linear product, which can sense the temperature without complex calculation or lookup. The on-chip 12-bit analog-to-digital converter (ADC) provides resolution as low as 0.0625 °C. The NST117 is compatible with SMBUS and I²C, allowing a maximum of 3 devices to be connected to one BUS and supporting the SMBUS alarm function. The NST117 has a rated operating range of -55 °C to 125 °C and is ideal for extended temperature measurement in a wide range of communications, computing, consumer products, Internet of Things, environmental, industrial and instrumentation applications. NST117 comes in industry-standard DFN-6 packages.

**Product feature**

- Maintain high accuracy in full temperature range:
  - 30°C~45°C: ±0.2°C (typical)
  - -20°C~85°C: ±0.5°C (typical)
  - -55°C~125°C: ±2°C (max.)
- Maximum resolution 0.0625 °C, optional
- Up to 3 device addresses supported

**Package**

- DFN6 (2mm*2mm)

**Functional block diagram**

![NST117 Functional Block Diagram](image)

**Application**

- Communication device
- Smart wearable
- Medical thermometer
- Industrial automation
- Power temperature measurement
- Server
- Electronic temperature control
- Laptop
- Hard disk

**Communication Device**

- Computer
- Server
- Notebook
- Laptop
- Smartphone

**Temperature Sensor**

- MEMS Pressure Sensor
- Current Sensor
- Linear Hall Current Sensor
- Magnetic Position Sensor
- Industrial Pressure Transmitter
- Signal Conditioning Chip
- Temperature Sensor Signal Conditioning Chip
- MEMS Microphone Signal Conditioning Chip
- Infrared PIR Sensor Signal Conditioning Chip
- Thermopile Sensor Signal Conditioning Chip
- Magnetic Sensor Signal Conditioning Chip
- Industrial and Automotive SoC

**General Signal Chain**

- General Signal Chain

---

*Server*
NST112 is a low power-consumption high-precision digital temperature sensor. It is suitable for substitution of negative temperature coefficient and positive temperature coefficient thermistor. The NST112 has an I 2 C and SMBUS compatible port, programmable alarm and SMBUS reset functions, and supports up to four devices on a single BUS. In addition, it achieves accuracy up to ±0.5 °C in the range of -20 °C to 85 °C without calibration. The NST112 temperature sensor can operate normally in the temperature range of -40 °C to 125 °C, which makes it suitable for operation in communications, computers, consumer products, environmental, industrial and instrumentation. The NST112 is an extremely low-power sensor that can be used for temperature measurement applications in the Internet of Things. The NST112 is available in both SOT563 and DSBGA4 packages, with the DSBGA4 achieving output accuracy up to ±0.1 °C at temperature range.

**Product feature**
- Operating temperature range: -40°C~150°C
- High accuracy in -40°C~125°C wide temperature range
  - 25 °C ~ 45 °C: ±0.1°C (typ.)@DSBGA
  - -40°C~125°C: ±0.5°C (max.)@DSBGA
- Temperature sensor can operate normally in the temperature range of -40 °C to 125 °C, which makes it suitable for operation in communications, computers, consumer products, environmental, industrial and instrumentation.
- The NST112 is an extremely low-power sensor that can be used for temperature measurement applications in the Internet of Things. The NST112 is available in both SOT563 and DSBGA4 packages, with the DSBGA4 achieving output accuracy up to ±0.1 °C at temperature range.

**Application**
- Portable and battery-powered applications
- Power system monitor
- Communication infrastructure
- General system thermal management
- Storage devices such as solid state disks (SSDs)
- Smart wearable devices
- Industrial Internet of Things
- Computer peripheral thermal protection
- Laptop
- Used in power system monitors and general system thermal management applications.

**Functional block diagram**

**Package**
- SOT563(6) (1.6mm x 1.2mm)
- DSBGA4 (0.75mm x 0.75mm)
The NST103 is a digital output temperature sensor in a 4-pins wafer chip scale package (WCSP). The resolution of NST103 reading temperature can reach 1°C. The NST103 has a two-wire port compatible with both I2C and SMBUS ports. In addition, the port supports multiple device access (MDA) commands, allowing the master to simultaneously communicate with multiple devices on the BUS without having to send commands individually to each NST103 on the BUS. It can connect up to 8 NST103s in parallel and be easily read by the host. The NST103 is particularly ideal for space-constrained, power-sensitive applications that have multiple temperature measurement areas that must be monitored. The specified operating temperature range of NST103 is -40°C to 125°C.

- **Product feature**
  - Multiple device access (MDA)
  - Global read/write operations
  - I2C/SMBUS compatible
  - 8-bit ADC, resolution: 1°C
  - Precision: The typical value is ±1°C (-10°C to 100°C)
  - Maximum error in the whole temperature range: ±3°C
  - Low static current: In operating mode, the current is 3 μA at 0.25Hz
  - The turn-off current in shutdown mode is 1.8μA
  - Input voltage range: 1.5V to 3.6V
  - Digital output

- **Package**
  - WLCSP (CSPBGA) (0.75mm x 0.75mm)

- **Application**
  - Cellphone
  - Solid-state drive
  - Laptop
  - Server
NST461 is a remote temperature sensor monitor with built-in local temperature sensor. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors or substrate thermal transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. On-chip 12-bit analog-to-digital conversion provides resolution up to 0.0625°C for local and remote temperature sensors. The NST461 is compatible with I²C and SMBus interfaces, supports programmable pin addresses for up to nine devices, and has programmable alarm and SMBUS reset capabilities. NST461 includes series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limit, programmable digital filter, diode fault detection and temperature alarm, improving output accuracy and noise performance, and providing a reliable solution for thermal monitoring. With an operating voltage range of 2.1V to 3.6V and a temperature range of -40 °C to 125 °C, the NST461 is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry.

**Product introduction**

NST461 is a remote temperature sensor monitor with built-in local temperature sensor. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors or substrate thermal transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. On-chip 12-bit analog-to-digital conversion provides resolution up to 0.0625°C for local and remote temperature sensors. The NST461 is compatible with I²C and SMBus interfaces, supports programmable pin addresses for up to nine devices, and has programmable alarm and SMBUS reset capabilities. NST461 includes series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limit, programmable digital filter, diode fault detection and temperature alarm, improving output accuracy and noise performance, and providing a reliable solution for thermal monitoring. With an operating voltage range of 2.1V to 3.6V and a temperature range of -40 °C to 125 °C, the NST461 is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry.

**Product feature**

- Remote temperature detector: ±1.6°C max. accuracy error
- Local temperature monitor: ±1.5°C max. accuracy error
- 12-bit ADC, resolution: 0.0625°C
- Power supply and logic voltage range: 2.1 V to 3.6 V
- 37µA working current
- 4µA shutoff current
- Series resistance error elimination
- η factor and offset correction
- Programmable digital filter
- Diode fault detection
- SMBUS and I²C serial interface
- Compatible with programmable pin addresses

**Functional block diagram**

![Functional block diagram](image)

**Package**

- WQFN(10) (2.0mm x 2.0mm)

**Application**

- Processor and FPGA/temperature monitoring
- Communication device
- Servers and personal computers
- Test and measurement equipment
- LED lighting and projector thermal control
- Industrial control unit
- Storage device
NST1412 and NST1413 are remote temperature sensor monitors with built-in local temperature sensors. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. For local and remote temperature sensors, 11-bit on-chip analog-to-digital conversion provides resolution up to 0.125 °C. The NST141x two-wire serial interface is compatible with I2C and SMBUS interfaces and can use up to nine different pin programmable addresses. In addition, NST141x integrates additional features such as series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limits, programmable digital filters, diode fault detection and temperature alarm to improve accuracy and noise resistance, achieving a reliable thermal monitoring solution. With an operating voltage range of 3V to 3.6V and a temperature range of -40 °C to 125 °C, the NST141x is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry. The NST1412 supports single channel local and single channel remote temperature monitoring, and the NST1413 supports single channel local and dual-channels remote temperature monitoring.

- **Product introduction**
  NST1412 and NST1413 are remote temperature sensor monitors with built-in local temperature sensors. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. For local and remote temperature sensors, 11-bit on-chip analog-to-digital conversion provides resolution up to 0.125 °C. The NST141x two-wire serial interface is compatible with I2C and SMBUS interfaces and can use up to nine different pin programmable addresses. In addition, NST141x integrates additional features such as series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limits, programmable digital filters, diode fault detection and temperature alarm to improve accuracy and noise resistance, achieving a reliable thermal monitoring solution. With an operating voltage range of 3V to 3.6V and a temperature range of -40 °C to 125 °C, the NST141x is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry. The NST1412 supports single channel local and single channel remote temperature monitoring, and the NST1413 supports single channel local and dual-channels remote temperature monitoring.

- **Product feature**
  - Remote temperature detector:
    - ±1°C max precision (±1°C-Td Max<105°C)
    - 11-bit ADC, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
  - Local temperature monitor:
    - ±1°C precision (±1°C-Td Max<105°C)
    - 11-bit ADC, resolution: 0.125°C
  - Automatic remote diode type identification and optimization setting
  - Series resistance cancellation
  - Programmable temperature threshold alarm
  - I2C/SMBUS digital output

- **Functional block diagram**

- **Package**
  - NST1412 - MSOP(8) (3.0mm x 3.0mm)
  - NST1413 - MSOP(10) (3.0mm x 3.0mm)

- **Application**
  - Processor and FPGA temperature monitoring
  - Communication device
  - Servers and personal computers
  - Test and measurement equipment
  - LED lighting and projector thermal control
  - Industrial control unit
  - Storage device

- **Diagram**

---

**NST1412/NST1413: High-precision Remote and Local Temperature Sensors with Digital Interface in Industrial-qualified Package**

- Remote temperature detector:
  - ±1°C max precision (±1°C-Td Max<105°C)
  - 11-bit ADC, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
- Local temperature monitor:
  - ±1°C precision (±1°C-Td Max<105°C)
  - 11-bit ADC, resolution: 0.125°C

- Automatic remote diode type identification and optimization setting
- Series resistance cancellation
- Programmable temperature threshold alarm
- I2C/SMBUS digital output

- **NST1412** - MSOP(8) (3.0mm x 3.0mm)
- **NST1413** - MSOP(10) (3.0mm x 3.0mm)

- Processor and FPGA temperature monitoring
- Communication device
- Servers and personal computers
- Test and measurement equipment
- LED lighting and projector thermal control
- Industrial control unit
- Storage device

---

**Product introduction**

NST1412 and NST1413 are remote temperature sensor monitors with built-in local temperature sensors. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. For local and remote temperature sensors, 11-bit on-chip analog-to-digital conversion provides resolution up to 0.125 °C. The NST141x two-wire serial interface is compatible with I2C and SMBUS interfaces and can use up to nine different pin programmable addresses. In addition, NST141x integrates additional features such as series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limits, programmable digital filters, diode fault detection and temperature alarm to improve accuracy and noise resistance, achieving a reliable thermal monitoring solution. With an operating voltage range of 3V to 3.6V and a temperature range of -40 °C to 125 °C, the NST141x is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry. The NST1412 supports single channel local and single channel remote temperature monitoring, and the NST1413 supports single channel local and dual-channels remote temperature monitoring.

- **Product feature**
  - Remote temperature detector:
    - ±1°C max precision (±1°C-Td Max<105°C)
    - 11-bit ADC, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
  - Local temperature monitor:
    - ±1°C precision (±1°C-Td Max<105°C)
    - 11-bit ADC, resolution: 0.125°C
  - Automatic remote diode type identification and optimization setting
  - Series resistance cancellation
  - Programmable temperature threshold alarm
  - I2C/SMBUS digital output

- **Functional block diagram**

- **Package**
  - NST1412 - MSOP(8) (3.0mm x 3.0mm)
  - NST1413 - MSOP(10) (3.0mm x 3.0mm)

- **Application**
  - Processor and FPGA temperature monitoring
  - Communication device
  - Servers and personal computers
  - Test and measurement equipment
  - LED lighting and projector thermal control
  - Industrial control unit
  - Storage device

---

**NST1412/NST1413: High-precision Remote and Local Temperature Sensors with Digital Interface in Industrial-qualified Package**

- Remote temperature detector:
  - ±1°C max precision (±1°C-Td Max<105°C)
  - 11-bit ADC, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
- Local temperature monitor:
  - ±1°C precision (±1°C-Td Max<105°C)
  - 11-bit ADC, resolution: 0.125°C

- Automatic remote diode type identification and optimization setting
- Series resistance cancellation
- Programmable temperature threshold alarm
- I2C/SMBUS digital output

- **NST1412** - MSOP(8) (3.0mm x 3.0mm)
- **NST1413** - MSOP(10) (3.0mm x 3.0mm)

- Processor and FPGA temperature monitoring
- Communication device
- Servers and personal computers
- Test and measurement equipment
- LED lighting and projector thermal control
- Industrial control unit
- Storage device
NST7719 is a remote temperature sensor monitor with built-in local temperature sensor. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. For local and remote temperature sensors, 11-bit on-chip analog-to-digital conversion provides resolution up to 0.125°C. The NST7719 two-wire serial interface is compatible with I²C and SMBUS interfaces with up to six different pin-programmable addresses. In addition, NST7719 integrates personalized features such as series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limits, programmable digital filters, diode fault detection and temperature alarm to improve accuracy and noise resistance, achieving a reliable thermal monitoring solution. With an operating voltage range of 3V to 3.6V and a temperature range of -40°C to 125°C, the NST7719 is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry. It supports one-way local and two-way remote temperature monitoring.

**Product introduction**

NST7719 is a remote temperature sensor monitor with built-in local temperature sensor. The transistors connected to its remote temperature sensors are usually low-cost NPN or PNP type transistors and diodes, which are essential components of microcontrollers, microprocessors or FPGAs. For local and remote temperature sensors, 11-bit on-chip analog-to-digital conversion provides resolution up to 0.125°C. The NST7719 two-wire serial interface is compatible with I²C and SMBUS interfaces with up to six different pin-programmable addresses. In addition, NST7719 integrates personalized features such as series resistance cancellation, programmable non-ideal factor (η factor), programmable offset, programmable temperature limits, programmable digital filters, diode fault detection and temperature alarm to improve accuracy and noise resistance, achieving a reliable thermal monitoring solution. With an operating voltage range of 3V to 3.6V and a temperature range of -40°C to 125°C, the NST7719 is ideal for multi-position, high-precision temperature measurements in a wide range of applications, including communications, computing, instrumentation and industry. It supports one-way local and two-way remote temperature monitoring.

**Product feature**

- Remote temperature detector:
  - ±1°C max precision (-10°C < T<sub>Diode</sub> < 105°C)
  - 11-bit ADC, resolution 0.125°C
  - Support diode filter capacitors up to 1nF
- Local temperature monitor:
  - ±1.5°C max precision (-10°C < T<sub>Diode</sub> < 105°C)

**Functional block diagram**

**Package**

- MSOP-10 (3.0mm × 3.0mm)

**Application**

- Processor and FPGA temperature monitoring
- Communication device
- Servers and personal computers
- Measuring equipment
- LED lighting and projector thermal control
- Industrial control unit
- Storage device
NST20/NST60/NST235/NST86: High-precision and Low-power Analog Output Temperature Sensor

- **Product introduction**
  NST20/NST60/235/86 is a series of precision CMOS integrated-circuit linear analog output temperature sensor. Input voltages range is from 2.4V to 5.5V. The maximum temperature error in the whole temperature range is within ±2.5°C(excluded NST60). 20μA typical static current and 0.1μA typical shutdown static current can greatly reduce the power loss of battery-powered equipment. Class-AB output drivers provide a powerful maximum output of 500µA, which can drive capacitive loads up to 1000pF, and can be directly connected to the ADC sample-hold input end. With excellent accuracy and a powerful linear output driver, the NST20/NST60/235/86 analog output temperature sensor is an extremely cost-effective alternative to passive thermistors.

- **Product feature**
  - Operating temperature range:
    - NST20: -55°C~130°C
    - NST60: -40°C~125°C
    - NST235: -40°C~150°C
    - NST86: -55°C~150°C
  - High accuracy: ±1.5°C (typical)
  - Wide input voltage range: 2.4V~5.5V
  - Output drive capacity: 500µA
  - Output short circuit protection
  - Analog output parameter:
    - NST20: -11.77mV/°C negative slope output
    - NST60: 6.25mV/°C positive slope output
    - NST235: 10 mV/°C positive slope output
    - NST86: -10.9mV/°C negative slope output
  - Low static current:
    - Operating mode current 20μA (typical)
    - Turn-off current 0.1μA (typical)

- **Package**
  - SOT23(3) (2.9mmx1.3mm)
  - SC70(5) (2.0mmx1.25mm)

- **Functional block diagram**

- **Application**
  - Smart phones, computers, fax machines, printers, etc.
  - Automotive infotainment system
  - Portable medical device
  - Industrial automation and control
  - Environmental monitoring and HVAC
  - Grid infrastructure
  - Wireless and telecommunications infrastructure
  - Electronic testing equipment

- **Diagram**
NSHT30 is a CMOS-MEMS-based relative humidity (RH) and temperature sensor. NSHT30 integrates a complete sensor system on a single chip, including capacitive relative humidity sensor, CMOS temperature sensor and signal processor and I2C digital communication interface, in the DFN and LGA packages of 2.5mm×2.5mm×0.9mm. The communication mode of its I2C interface, extremely small package and low power consumption characteristics allow NSHT30 to be more widely integrated into a variety of applications. In addition, NSHT30’s I2C interface features two unique, selectable I2C addresses, communication rates up to 1MHz, and a wide voltage operating range, making NSHT30 more compatible in a variety of application environments. It also has programmable interrupt thresholds that can provide alarms and system awakenings without the need for a microcontroller to continuously monitor the system.

**Product introduction**

NSHT30 is a CMOS-MEMS-based relative humidity (RH) and temperature sensor. NSHT30 integrates a complete sensor system on a single chip, including capacitive relative humidity sensor, CMOS temperature sensor and signal processor and I2C digital communication interface, in the DFN and LGA packages of 2.5mm×2.5mm×0.9mm. The communication mode of its I2C interface, extremely small package and low power consumption characteristics allow NSHT30 to be more widely integrated into a variety of applications. In addition, NSHT30’s I2C interface features two unique, selectable I2C addresses, communication rates up to 1MHz, and a wide voltage operating range, making NSHT30 more compatible in a variety of application environments. It also has programmable interrupt thresholds that can provide alarms and system awakenings without the need for a microcontroller to continuously monitor the system.

**Product feature**

- Relative humidity (RH) sensor:
  - Working range: 0%RH~100%RH
  - Accuracy: ±3%RH (typ.)

- Temperature sensor:
  - Operating temperature range: -40°C~125°C
  - Accuracy: ±0.3°C (typ.)

- Digital output for relative humidity and temperature compensation
- Wide supply voltage range: 2.0V~5.5V
- I2C digital interface, communication rate up to 1MHz
- 2 optional addresses
- Data protection with CRC check
- Low-power: average current: 2.5μA

- 8-Pin LGA and DFN package available

**Functional block diagram**

**Package**

- DFN-8 (2.5mm×2.5mm×0.9mm)
- LGA-8 (2.5mm×2.5mm×0.9mm)

**Application**

- Humidifier/dehumidifier
- White goods
- Intelligent constant temperature and humidity controller
- Ventilators
- Smart agriculture
- Cold chain logistics
- Hygrograph
- Automobile intelligent fog removal system
MEMS Pressure Sensor
MEMS Pressure Sensor

### product description

<table>
<thead>
<tr>
<th>Product number</th>
<th>Product description</th>
<th>Package</th>
<th>Minimum range</th>
<th>Maximum range</th>
<th>Resolution (ppm)</th>
<th>Linearity (%)</th>
<th>Accuracy (%)</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>N7F901</td>
<td>Automotive integrated gas pressure sensor (range can be customized)</td>
<td>-40°C~105°C</td>
<td>50~5.5V</td>
<td>0~40kPa</td>
<td>2.5mA</td>
<td>±0.05% F.S.</td>
<td>Automotive GPF differential pressure detection, TMAP intake manifold pressure detection, BPS turbo boost pressure detection, BPS turbo boost pressure detection, etc.</td>
<td></td>
</tr>
<tr>
<td>N7F902</td>
<td>Automotive integrated gas pressure sensor (range can be customized)</td>
<td>-40°C~105°C</td>
<td>3.6V~5.5V</td>
<td>0~40kPa</td>
<td>2.5mA</td>
<td>±0.05% F.S.</td>
<td>Automotive GPF differential pressure detection, TMAP intake manifold pressure detection, BPS turbo boost pressure detection, BPS turbo boost pressure detection, etc.</td>
<td></td>
</tr>
<tr>
<td>N7F903</td>
<td>Automotive integrated gas pressure sensor (range can be customized)</td>
<td>-40°C~105°C</td>
<td>4.5V~5.5V</td>
<td>0~40kPa</td>
<td>2.5mA</td>
<td>±0.05% F.S.</td>
<td>Automotive GPF differential pressure detection, TMAP intake manifold pressure detection, BPS turbo boost pressure detection, BPS turbo boost pressure detection, etc.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1: Typical applications

- **Automotive GPF differential pressure detection**
- **TMAP intake manifold pressure detection**
- **BPS turbo boost pressure detection**
- **BPS turbo boost pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automotive GPF differential pressure detection**
- **Automative...
NSPGM1 series is a calibrated differential pressure sensor launched by NOVOSENSE for automotive fuel vapor pressure detection and exhaust differential pressure detection. The product adopts automotive-qualified signal conditioning chip to calibrate and compensate the MEMS die output, which can convert pressure signals in a specific range into analog output voltage. This product can provide standard output in the temperature range from -40°C to 90°C without customer calibration, which can accelerate the process of product development and mass production. The NSPGM1 series has an optional pressure range from -6kPa to 6kPa, support analog ratio-metric/absolute output. The module package is convenient for usage and flexible for multi-applications. It is not only suitable for automobile fuel steam pressure detection, but also suitable for industrial control and instrumentation and other fields.

**Product feature**
- Operating temperature range: -40°C~90°C
- Pressure range: -6kPa ~ 6kPa, which can be customized
- The comprehensive accuracy in the full temperature range is better than ±2.5%FS.
- Support 5V power supply and direct power supply within 18V in absolute voltage output mode
- Support 24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible with oil and gas environment
- Support absolute output/proportional output, with output curve customized
- It can be calibrated many times, with the function of factory reset adjustment
- Package: ceramic substrate module package (13.1mm x 23.1mm)

**Application**
- Automotive: FTPS fuel steam pressure detection, Crankcase ventilation pressure sensor
- Industrial: Negative pressure, vacuum detection, Gas pressure monitoring

**Package**
- Ceramic substrate module package (13.1mm x 23.1mm)
NSPGM2 series is a calibrated differential pressure sensor launched by NOVOSENSE for automotive fuel vapor pressure detection and exhaust differential pressure detection. The product adopts automotive-qualified signal conditioning chip to calibrate and compensate the precious metal MEMS die output, which can convert pressure signals in a specific range into analog output voltage. Its unique ceramic substrate packaging process makes the product resistant to oil vapor and other media corrosion, MEMS die is independent packaging and flexible design. This product can provide standard output in the temperature range from -40°C to 130°C without customer calibration, which can accelerate the process of product development and mass production. The module package is convenient for usage and flexible for multi-applications. It is not only suitable for automobile fuel steam pressure detection and engine exhaust emission SCR system (National V and VI emission standards), but also suitable for industrial control and instrumentation and other fields.

**Product feature**
- Operating temperature range: -40°C~130°C
- Pressure range ±5kPa~±100kPa, which can be customized
- The comprehensive accuracy in the full temperature range is better than ±2.5%F.S. (±0.18kPa)
- Support 5V power supply and direct power supply within 18V in absolute voltage output mode
- Support -24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible with oil and gas environment
- Support absolute output/proportional output, with output curve customized
- It can be calibrated many times, with the function of factory reset adjustment
- Package: ceramic substrate module package (13.1mm x 23.1mm)

**Package**

**Application**

- **Automotive**
  - FTPS fuel steam pressure detection
  - GPF/DPF exhaust differential pressure detection
  - VBS vacuum boosting system sensor
  - EGR system differential pressure detection
  - Crankcase ventilation pressure sensor

- **Industrial**
  - Negative pressure vacuum detection
  - Gas pressure monitoring
**NSPAS3M series: Automotive-qualified Integrated Absolute Pressure Sensor**

**Product introduction**

The NSPAS3M series is a submillisecond responsive absolute pressure sensor product for the motorcycle intake manifold pressure sensor market. The product adopts automotive-qualified signal conditioning chips to calibrate and compensate the MEMS die output, which can convert pressure signals from 10kPa to 400kPa into analog output signals with a customized output range from 0 to 5V. While ensuring excellent reliability of the product, it integrates two chips into one package, greatly reducing the package size. At the same time, this product can provide standard output within the accuracy range in its operation temperature range without customer calibration, which can accelerate the process of product development and mass production; this product complies with the AEC-Q100 reliability standard.

**Product feature**

- Width operating temperature range: -40°C~125°C
- High accuracy in full temperature range:
  - Better than ±1.5%F.S. in the range of 0°C~85°C
  - Better than ±1.5%F.S. in the range of -40°C~125°C
- Support -24V to 28V over voltage and reverse voltage protection
- Support 5V power supply and direct power supply within 18V in absolute voltage output mode
- Fluorinated gel protection, compatible with oil and gas environment
- Faster response time less than 1ms
- Support absolute output/ratio-metric output, with output curve customized
- Pressure range: 10kPa~400kPa, which can be customized
- AEC-Q100 qualified

**Functional block diagram**

**Package**

SOP-8 (7.0mm x 7.0mm)

**Application**

- **Automotive**
  - Motorcycle intake manifold pressure sensor
  - ECU/VCU atmospheric pressure detection
  - Seat air bag pressure detection
  - VBS vacuum boosting system sensor
  - Canister desorption pressure detection
  - Pressure transmitter
  - Industrial vacuum degree testing

- **Industrial**
  - Gas/refrigerant leak detection
  - Pressure transmitter
  - Industrial vacuum degree testing

---

**Diagram of Functional Block Diagram**

**Diagram of Package**

**Diagram of Application**
The NSPAS3 series is a calibrated absolute pressure sensor launched by NOVOSENSE for the automotive intake manifold pressure sensor. The product adopts automotive-qualified signal conditioning chips to calibrate and compensate the MEMS die output, which can convert pressure signals from 10kPa to 400kPa into analog output signals with a customized output range from 0 to 5V. While ensuring excellent reliability of the product, it integrates two chips into one package, greatly reducing the package size. At the same time, this product can provide standard output within the accuracy range in its operation temperature range without customer calibration, which can accelerate the process of product development and mass production; this product complies with the AEC-Q100 reliability standard.

**Product feature**
- Width operating temperature range: -40°C~130°C
- High accuracy in full temperature range:
  - Better than ±1%F.S. in the range of 0°C~85°C
  - Better than ±1.5%F.S. in the range of -40°C~130°C
- Support -24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible with oil and gas environment
- Faster response time less than 0.8ms
- Support absolute output/ratio-metric output, with output curve customized
- Disconnection detection, output clamping, output alarm function
- Pressure range: 10kPa~400kPa, which can be customized
- AEC-Q100 qualified

**Application**
- **Automotive**
  - Motorcycle three-in-one sensor
  - Vehicle TMAP intake pressure detection
  - EGR-TMAP exhaust gas recirculation pressure detection
  - BPS battery pack thermal runaway pressure detection
- **Industrial**
  - EGR-TMAP exhaust gas recirculation pressure detection
  - Gas/refrigerant leak detection
  - Pressure transmitter
  - Industrial vacuum degree testing

**Package**
- SOP-8 (7.0mm x 7.0mm)
NSPAS1 series: Automotive-qualified Integrated Absolute Pressure Sensor

Product introduction

NSPAS1 is a calibrated absolute pressure sensor launched by NOVOSENSE for vehicle intake pressure, NEV vacuum boosting system and motorcycle electronic injection. The product adopts automotive-qualified signal conditioning chip to calibrate and compensate the output of MEMS piezoresistive die, ensuring excellent reliability of the product while integrating the two chips to greatly reduce the package size. At the same time, this product can provide standard output in its operation temperature range without customer calibration, which can accelerate the process of product development and mass production; the product complies with the AEC-Q100 reliability standard.

Product feature

- Operating temperature range: -40°C~125°C
- High accuracy in full temperature range:
  - Better than ±0.5%FS in the range of -40°C~125°C
  - Better than ±1%FS in the range of 0°C~85°C
- Support -24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible with oil and gas environment
- Faster response time less than 0.8ms
- Support absolute output/ratio-metric output, with output curve customized
- Disconnection detection, output clamping, output alarm function
- Pressure range 10kPa~400kPa, which can be customized
- AEC-Q100 qualified

Functional block diagram

Package

SOP-8 (7.3mm x 7.3mm)

Application

Automotive
- Motorcycle three-in-one sensor
- Canister desorption pressure detection
- Vehicle TMAP intake pressure detection
- VBS vacuum boosting system sensor
- BPS battery pack thermal runaway pressure detection
- EC/VCU atmospheric pressure detection
- EGR-TMAP exhaust gas recirculation pressure detection
- Seat air bag pressure detection

Industrial
- Gas/Refillant leak detection
- Pressure transmitter
- Industrial vacuum degree testing
NSPGS2 series: Integrated Gauge Pressure Sensor with Air Nozzle in SOP Package

Product introduction

NSPGS2 is a calibrated gauge pressure sensor launched by NOVOSENSE for the market of small household appliances and healthcare equipment. This series of products adopts high-performance signal conditioning chip to calibrate and compensate the temperature and pressure of MEMS piezoresistive die. It comes in SOP6 package form with vertical air nozzle for easy soldering and use. This series of pressure sensors can convert pressure signals from -100kPa to +250kPa into analog/digital output signals with a customized output range. They are suitable for pressure detection of non-corrosive gases compatible with the structural materials of pressure sensitive components, especially for small household appliances, healthcare, industry and the IoT.

Product feature

- Customizable range: -100kPa ~ +250kPa
- Wide temperature range: -40°C~70°C
- The comprehensive accuracy in the full temperature range is better than ± 2.5%
- Analog voltage output/ I2C digital output/SPI
- High stability, 100% calibration, temperature compensation
- Packaging with single air nozzle, easy to install and seal
- Front air intake for chips avoid blockage

Functional block diagram

Package

SOP-6 (6.3mm x 7.0mm)

Application

- Industrial: Pressure transmitter, Pressure switch, Negative pressure vacuum detection
- Medical: Sphygmomanometer, Oxygen generator, Biosafety cabinet
- Home appliances: Coffee machine, Health pot, Vacuum cleaner, Sweeper, Vacuum juicer
- Consumption: Air mattress, Massage chair, Infator
NSPGD1 series: Integrated Gauge Pressure Sensor with Air Nozzle in DIP8 Package

◆ Product introduction

NSPGD1 is a series of calibrated gauge pressure sensors launched by NOVOSENSE for the home appliance and medical market. The series of products adopts high-performance signal conditioning chip to calibrate and compensate the temperature and pressure of MEMS piezoresistive die output. The NSPGD1 series integrated pressure sensor has an optional pressure range from -10kPa to +10kPa. It adopts DIP8 package form with air nozzle, which is convenient for soldering and use. It is suitable for gauge pressure detection of non-corrosive gases compatible with pressure sensitive components, especially for non-contact liquid level detection. It is also suitable for industrial, IoT and other fields. This series pressure sensor supports analog output /I2C digital output and unique frequency output, which is more flexible for multi-applications.

◆ Product feature

- Customizable range: -10kPa ~ +10kPa
- Wide temperature range: 0°C~70°C
- The comprehensive accuracy in the full temperature range is better than ±2.5%
- Analog voltage /I2C digital output/frequency output
- High stability, 100% calibration, temperature compensation
- DIP package with air nozzle, easy to install and seal
- Front air intake for chips avoid blockage
- Internal waterproof moisture-proofing treatment

◆ Functional block diagram

◆ Package

DIP-8 (10.4mm x 10.4mm)

◆ Application

**Home appliances**
- Washing machine
- Dishwasher
- Coffee machine
- Water purifier

**Industrial**
- Pressure switch
- Negative pressure
- Gas pressure detection
- Vacuum detection

**Medical**
- Ventilator
- Oxygen generator
- Anesthesia apparatus
- Biosafety cabinet

---

24
The NSPDSx is a calibrated pressure sensor launched by NOVOSENSE for the differential pressure monitoring market. The series of products adopts high-performance signal conditioning chips to calibrate and compensate the temperature and pressure of advanced MEMS piezoresistive die. JEDC-standard SOIC-16 package with double vertical barb air nozzle is adopted for convenient soldering and use. The NSPDSx series integrated pressure sensors have an optional pressure range from ±125Pa to ±250kPa, which are suitable for the pressure detection of non-corrosive gases compatible with the structural materials of pressure sensing elements, and also for consumer, medical, industrial and IoT fields. This pressure sensors supports analog output / I2C digital output and can be installed directly on standard printed circuit boards for multi-applications.

**Product introduction**

- Supply voltage: 3V~5.5V
- Operating temperature range: -20°C~70°C
- High accuracy in full temperature range, and customizable pressure range
  - NSPDS9: ±125Pa~±1kPa, ±1%F.S.
  - NSPDS5/7: ±500Pa~±250kPa, ±1%F.S.

**Package**

- Optional output mode (analog / I2C digital output)
- High stability, 100% calibration, temperature compensation
- Dual vertical bar air nozzle package, easy to install and seal
- SOIC-16 (7.5mm x 10.3mm)

**Application**

- Industrial: Fire residual pressure monitoring, HVAC/VAV
- Medical: Ventilator, Oxygen generator, Anesthesia apparatus, Biosafety cabinet, Sphygmomanometer
- Consumer: Pressure switch, Negative pressure/vacuum detection, Gas pressure monitoring

**Functional block diagram**
The NSPGS5 series is a calibrated pressure sensor launched by NOVOSENSE for the gauge pressure monitoring market. The series of products adopts high-performance signal conditioning chips to calibrate and compensate the temperature and pressure of advanced MEMS piezoresistive die. JEDC-standard SOIC-16 package with single nozzle is adopted for convenient soldering and use. The NSPGS5 series integrated pressure sensors have an optional pressure range from -10kPa to +10kPa, supporting analog output. They are suitable for the pressure detection of non-corrosive gases compatible with the structural materials of pressure sensing elements, and also for consumer, medical, industrial and IoT fields.

**Product introduction**

- Supply voltage: 3V~5.5V
- Operating temperature range: -20°C~70°C
- Customizable range: -10kPa~+10kPa
- The comprehensive accuracy in the full temperature range is better than ±1%F.S.

**Product feature**

- Output mode optional (analog / I2C digital output)
- High stability, 100% calibration, temperature compensation
- Single vertical nozzle package, easy to install and seal

**Functional block diagram**

**Application**

- Industrial: Gas pressure detection, Pressure switch, Negative pressure vacuum detection, Sphygmomanometer, Oxygen generator, Anesthesia apparatus, Biosafety cabinet
- Medical: Ventilator, Sphygmomanometer, Oxygen generator, Anesthesia apparatus, Biosafety cabinet
NOVOSENSE NSP183x series MEMS differential pressure sensor wafer is mainly made via the piezoresistive effect of silicon with NOVOSENSE independent R&D MEMS micro machining process design. The sensor wafer manufacturing platform is qualified by IATF16949, and the front/back side of every wafer pass AOI tested which compiles with AEC-Q103 standards. This series of MEMS wafers can realize differential pressure detection, which can be widely used in automotive electronics, medical electronics, white household appliances and industrial control fields. Meanwhile, NOVOSENSE also launched unique precious metal differential pressure MEMS series products, which mainly adopts precious metal double-pad structure design and stability enhanced shielding layer technology, and specially used in automotive exhaust system and other harsh environment.

Product introduction

- Operating temperature range: -40°C~85°C, -40°C~125°C and -40°C~150°C
- Pressure range: 0kPa~±1kPa, 0kPa~±6kPa/±10kPa and 0kPa~±100kPa/±500kPa
- The accuracy and stability in the life cycle are better than 1% F.S.
- Automotive-qualified IATF16949-certified process platform
- Comply with RoHS & REACH and halogen-free requirements
- Complies with AEC-Q103 standard

Product feature

- Operating temperature range: -40°C~85°C, -40°C~125°C and -40°C~150°C
- Pressure range: 0kPa~±1kPa, 0kPa~±6kPa/±10kPa and 0kPa~±100kPa/±500kPa
- The accuracy and stability in the life cycle are better than 1% F.S.
- Automotive-qualified IATF16949-certified process platform
- Comply with RoHS & REACH and halogen-free requirements
- Complies with AEC-Q103 standard

Functional block diagram

- Application
  - Automotive
    - FTPS fuel steam pressure detection
    - EGR system differential pressure detection
    - Crankcase ventilation pressure sensor
  - Industrial
    - Fire residual pressure monitoring
    - Gas flow monitoring
  - Medical
    - Ventilator
    - Oxygen generator
    - Biosafety cabinet
  - Home appliances
    - Washing machine
    - Dishwasher
    - Vacuum cleaner
    - Water purifier
  - Consumption
    - Air mattress
    - Massage chair
    - Air pump
NOVOSENSE NSP163x series MEMS absolute pressure sensor wafer is mainly designed by using the piezoresistive effect of silicon with independently developed MEMS micromachining process. The sensor wafer manufacturing platform is qualified by IATF16949, and the front/back side of every wafer pass AOI tested which complies with AEC-Q103 standards. This series of MEMS wafers can realize absolute pressure detection, which can be widely used in automotive electronics, medical electronics, white household appliances and industrial control fields. Meanwhile, NOVOSENSE also launched a unique series of precious metal MEMS products, which are specially used in harsh environment such as automotive exhaust system.

**Product feature**
- Operating temperature range: -40°C~125°C, -40°C~150°C
- Pressure range: 0kPa~100kPa/200kPa/500kPa
- The accuracy and stability in the life cycle are less than 1% F.S.
- Automotive-qualified IATF16949-certified process platform
- Comply with RoHS & REACH and halogen-free requirements
- Complies with AEC-Q103 standard

**Product introduction**

**Package**

---

**Application**

**Automotive**
- Motorcycle three-in-one sensor
- Canister desorption pressure detection
- Vehicle TMAP intake pressure detection
- VBS vacuum assist sensor
- ECU/VCU atmospheric pressure detection
- EGR-TMAP exhaust gas recirculation pressure detection
- Seat air bag pressure detection
- EV/HEV vacuum boosting system sensor

**Industrial**
- Pressure transmitter
- Industrial vacuum degree testing
- Altimeter
- Barometer

**Consumption**

---
Current Sensor

- MEMS Pressure Sensor
- Temperature Sensor
- Current Sensor
- Linear Hall Current Sensor
- Magnetic Position Sensor
- Industrial Pressure Transmitter
- Signal Conditioning Chip
  - Pressure Sensor Signal Conditioning Chip
  - Infrared PIR Sensor Signal Conditioning Chip
  - Thermopile Sensor Signal Conditioning Chip
  - Magnetic Sensor Signal Conditioning Chip
- Industrial and Automotive SoC
- MEMS Microphone Signal Conditioning Chip

...
## Current Sensor

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product feature</th>
<th>Package</th>
<th>Range voltage</th>
<th>Supply voltage</th>
<th>Isolation voltage</th>
<th>Operating voltage</th>
<th>Minimum distance</th>
<th>Maximum distance</th>
<th>Protection range</th>
<th>Survival temperature</th>
<th>Response time</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSM2011</td>
<td>Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Support proportional output or fixed output Reference voltage output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOW-16</td>
<td>10~100A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>4mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>240kHz / 2.2μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2012</td>
<td>Wide current range available AC/DC measurement Support proportional output or fixed output Reference voltage output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOP-8</td>
<td>2.5~65A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (624VAC)</td>
<td>600VDC (424VAC)</td>
<td>4mm/4mm</td>
<td>-40°C ~ 125°C</td>
<td>600VDC (424VAC)</td>
<td>493kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2013</td>
<td>Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Support proportional output or fixed output Reference voltage output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOW-16</td>
<td>10~100A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>240kHz / 2.2μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2015</td>
<td>Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Support proportional output or fixed output Reference voltage output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOW-16</td>
<td>10~100A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2016</td>
<td>Wide current range available AC/DC measurement Fixed output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2017</td>
<td>Wide current range available AC/DC measurement Fixed output Integrate current protection +/-2% current measurement accuracy</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2018</td>
<td>Wide current range available AC/DC measurement Support proportional output or fixed output Integrate current protection</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2019</td>
<td>Wide current range available AC/DC measurement Support proportional output or fixed output Integrate current protection</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2020</td>
<td>Wide current range available AC/DC measurement Support proportional output or fixed output Integrate current protection</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSM2021</td>
<td>Wide current range available AC/DC measurement Support proportional output or fixed output Integrate current protection</td>
<td>SOP-8</td>
<td>20~50A</td>
<td>3.3V/5V</td>
<td>5000Vrms@1min (1097VAC)</td>
<td>1550VDC (1097VAC)</td>
<td>8mm/8mm</td>
<td>-40°C ~ 125°C</td>
<td>1550VDC (1097VAC)</td>
<td>338kHz / 7.3μs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Applications

- Photovoltaic inverter
- Automotive OBC, DCDC, charging gun, PTC heater
- Industrial inverter
- Power supply
- Service robot
- Unmanned aerial vehicle
- Two-wheeled vehicle

---

**Notes:**

- Wide current range available
- AC/DC measurement
- Conduction resistance as low as 0.85mOhm
- Support proportional output or fixed output
- Reference voltage output
- Integrate current protection
- +/-2% current measurement accuracy

---

**Current Sensor Applications:**

- Photovoltaic inverter
- Automotive OBC, DCDC, charging gun, PTC heater
- Industrial inverter
- Power supply
- Service robot
- Unmanned aerial vehicle
- Two-wheeled vehicle

**Product introduction**

NSM201x series is a chip-level current sensor under 200A launched by NOVOSENSE which is mainly used for isolation measurement of current under 200A.

**Product feature**

- Wide current range available 2.5A~200A
- AC/DC input
- 3.3V/5V single power supply
- Input conduction impedance as low as to 0.27mOhm
- ±2% current measurement accuracy
- Withstand up to 20kA surge current (8μs /20μs surge current waveform)
- Multiple output type
  - Single-end proportional output
  - Pseudo difference fixed output
- Two types of package
  - SOP8 package: 600VDC working isolation voltage / 3000 Vrms @ 1min withstand isolation voltage (NSM2012/NSM2016)
  - SOW10 package: 1550VDC working insulation voltage / 5000 Vrms @ 1min withstand isolation voltage (NSM2011/NSM2013/NSM2015/NSM2017)
- Overcurrent protection OCD output
  - Overcurrent protection threshold is configurable

**Safety certificate**

- UL62368/EN62368 safety certification

**Package**

- NSM2012/2016: SOP8
- NSM2011/2013/2015/2017: SOW16
- NSM2019: SOW10

**Application**

- **Automotive**
  - OBC
  - DC/DC
  - PTC heater
  - Charging gun
  - PDU
- **Industrial**
  - PV inverter
  - Industrial frequency converter
  - Power supply (UPS, SMPS)
  - PDU
- **Consumer**
  - Service robots
  - Drones
  - Two-wheeled vehicles
  - Vacuum cleaners
Linear Hall Current Sensor
## Linear Hall Current Sensor

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product feature</th>
<th>Package</th>
<th>Package thickness</th>
<th>Pin forms</th>
<th>Sensitivity range</th>
<th>Supply voltage</th>
<th>Temperature range</th>
<th>Signal bandwidth</th>
<th>Response time</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSM2031</td>
<td>AGGC measurement</td>
<td>TO94</td>
<td>1.0mm</td>
<td>L-shaped bend (LS, BS)</td>
<td>0.5~15mV/G</td>
<td>3.3V/5V</td>
<td>-47°C ~+150°C</td>
<td>240kHz</td>
<td>2.2μs</td>
<td>Electric drive system for electric vehicle</td>
</tr>
<tr>
<td></td>
<td>Support proportional output</td>
<td></td>
<td></td>
<td>V-shaped bend (BV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open-loop current sensor module Electric two-wheeled vehicle</td>
</tr>
<tr>
<td></td>
<td>Support fixed output</td>
<td></td>
<td></td>
<td>Multiple pin bending forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overcurrent protection output</td>
<td></td>
<td></td>
<td>Sensitivity drift &lt;±2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zero drift &lt;±10mV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product feature</th>
<th>Package</th>
<th>Package thickness</th>
<th>Pin forms</th>
<th>Sensitivity range</th>
<th>Supply voltage</th>
<th>Temperature range</th>
<th>Signal bandwidth</th>
<th>Response time</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSM2031</td>
<td>AGGC measurement</td>
<td>TO94</td>
<td>1.0mm</td>
<td>L-shaped bend (LS, BS)</td>
<td>0.5~30mV/G</td>
<td>3.3V/5V</td>
<td>-47°C ~+150°C</td>
<td>400kHz</td>
<td>1.5μs</td>
<td>Electric drive system for electric vehicle</td>
</tr>
<tr>
<td></td>
<td>Support proportional output</td>
<td></td>
<td></td>
<td>V-shaped bend (BV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open-loop current sensor module Electric two-wheeled vehicle</td>
</tr>
<tr>
<td></td>
<td>Support fixed output</td>
<td></td>
<td></td>
<td>Multiple pin bending forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overcurrent protection output</td>
<td></td>
<td></td>
<td>Sensitivity drift &lt;±1.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zero drift &lt;±5mV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Multiple pin bending forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Supports overvoltage, undervoltage, and open ground diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product feature</th>
<th>Package</th>
<th>Package thickness</th>
<th>Pin forms</th>
<th>Sensitivity range</th>
<th>Supply voltage</th>
<th>Temperature range</th>
<th>Signal bandwidth</th>
<th>Response time</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSM2031</td>
<td>AGGC measurement</td>
<td>TO94</td>
<td>1.0mm</td>
<td>L-shaped bend (LS, BS)</td>
<td>0.5~30mV/G</td>
<td>3.3V/5V</td>
<td>-47°C ~+150°C</td>
<td>400kHz</td>
<td>1.5μs</td>
<td>Electric drive system for electric vehicle</td>
</tr>
<tr>
<td></td>
<td>Support proportional output</td>
<td></td>
<td></td>
<td>V-shaped bend (BV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Open-loop current sensor module Electric two-wheeled vehicle</td>
</tr>
<tr>
<td></td>
<td>Support fixed output</td>
<td></td>
<td></td>
<td>Multiple pin bending forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overcurrent protection output</td>
<td></td>
<td></td>
<td>Sensitivity drift &lt;±1.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Zero drift &lt;±5mV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Multiple pin bending forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Supports overvoltage, undervoltage, and open ground diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NSM2031: Linear Hall Current Sensor

◆ Product introduction

NSM2031 linear Hall effect current sensor chip can provide a high-precision solution for large range current detection based on magnetic ring. It is widely used in the phase current detection of electric vehicle electric drive system and the large current detection of current module in industrial system.

◆ Product feature

- Automotive qualified meet AEC-Q100 Grade 0 requirements
- Working environment temperature: -40 °C ~ 150 °C
- Wide programmable sensitivity range: 0.5 ~ 15 mV/G
- High precision, low temperature drift
- Zero drift <±10 mV in the whole temperature range
- Industry-leading noise performance
- High bandwidth and fast response
- 3dB 240kHz bandwidth model, response time 2.2μs
- Industry-leading ESD performance
- HBM: ±8kV
- CDM: ±2kV
- 1 mm, TO94 package and a variety of pin bent form
- Support proportional output or fixed output
- Overcurrent protection output, users can configure over-current protection output threshold for the current range of 50% to 200%
- Different models the optional power supply, 3.3 V or 5 V single power supply work
- Comply with RoHS standard packaging

◆ Functional block diagram

---

◆ Application

Automotive
- Traction motor inverter
- DC/DC converters
- PDU

Industrial
- Industrial motor control
- Photovoltaic inverter
NSM2032: Linear Hall Current Sensor

**Product introduction**

NSM2032 linear Hall effect current sensor chip can provide a high-precision solution for large range current detection based on magnetic ring. It is widely used in the phase current detection of electric vehicle electric drive system and the large current detection of current module in industrial system.

**Product feature**

- Automotive-qualified meet AEC-Q100 Grade0 requirements
- Working environment temperature: -40 °C ~ 150 °C
- Wide programmable sensitivity range: 0.5 ~ 30 mV/G
- High precision, low temperature drift
  - Sensitivity error <±1.5% over the whole temperature range
  - Zero drift <±5 mV in the whole temperature range
- Industry-leading noise performance
- High bandwidth and fast response
  - 3dB 400kHz bandwidth model, response time 1.5μs
- Various diagnostic modes, overvoltage, undervoltage, open circuit and so on
- Industry leading ESD performance
  - HBM: ±8kV
  - CDM: ±2kV
- 1 mm TO94 package and a variety of pin bent form
- Support proportional output or fixed output
- Optional reference voltage output
- Different models the optional power supply, 3.3 V or 5 V single power supply work
- Comply with RoHS standard packaging

**Functional block diagram**

**Package**

- Automotive-qualified meet AEC-Q100 Grade0 requirements
- Working environment temperature: -40 °C ~ 150 °C
- Wide programmable sensitivity range: 0.5 ~ 30 mV/G
- High precision, low temperature drift
  - Sensitivity error <±1.5% over the whole temperature range
  - Zero drift <±5 mV in the whole temperature range
- Industry-leading noise performance
- High bandwidth and fast response
  - 3dB 400kHz bandwidth model, response time 1.5μs
- Various diagnostic modes, overvoltage, undervoltage, open circuit and so on
- Industry leading ESD performance
  - HBM: ±8kV
  - CDM: ±2kV
- 1 mm TO94 package and a variety of pin bent form
- Support proportional output or fixed output
- Optional reference voltage output
- Different models the optional power supply, 3.3 V or 5 V single power supply work
- Comply with RoHS standard packaging

**Application**

- **Automotive**
  - Traction motor inverter
  - DC/DC converters
  - PDU
- **Industrial**
  - Industrial motor control
  - Photovoltaic inverter

**Diagram**
**NSM2033: Linear Hall Current Sensor**

**Product introduction**

NSM2033 linear Hall effect current sensor chip can provide a high-precision solution for large range current detection based on magnetic ring. It is widely used in the phase current detection of electric vehicle electric drive system and the large current detection of current module in industrial system.

**Product feature**

- Automotive-qualified meet AEC-Q100 Grade0 requirements
- Working environment temperature: -40 °C ~ 150 °C
- Wide programmable sensitivity range: 0.5 ~ 30 mV/G
- High precision, low temperature drift
  - Sensitivity error <±1.5% over the whole temperature range
  - Zero drift <±5 mV in the whole temperature range
- Industry-leading noise performance
  - High bandwidth and fast response
  - 3dB 240kHz bandwidth model, response time 1.5μs
- Various diagnostic modes, overvoltage, undervoltage, open circuit and so on
- Industry entering ESD performance
  - HBM: ±8kV
  - CDM: ±2kV
- 1 mm TO94 package and a variety of pin bent form
- Support proportional output or fixed output
- Optional reference voltage output
- Different models the optional power supply, 3.3 V or 5 V single power supply work
- Comply with RoHS standard packaging

**Functional block diagram**

**Package**

**Application**

- **Automotive**
  - Traction motor inverter
  - DC/DC converters
  - PDU
- **Industrial**
  - Industrial motor control
  - Photovoltaic inverter
Magnetic Position Sensor

Temperature Sensor

MEMS Pressure Sensor

Current Sensor

Linear Hall Current Sensor

Industrial Pressure Transmitter

Signal Conditioning Chip

Pressure Sensor Signal Conditioning Chip

Infrared PIR Sensor Signal Conditioning Chip

Thermopile Sensor Signal Conditioning Chip

MEMS Microphone Signal Conditioning Chip

Industrial and Automotive SoC

General Signal Chain
### Magnetic Position Sensor

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product feature</th>
<th>Package</th>
<th>Range ability</th>
<th>Supply voltage</th>
<th>Interface form</th>
<th>Accuracy of angle measurement</th>
<th>Response time</th>
<th>Temperature range</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSM3011</td>
<td>The axial angle is measured based on planar Hall</td>
<td>SOIC-8</td>
<td>0~360°</td>
<td>3.3V/5V</td>
<td>14-bit linear DAC</td>
<td>±1° after four-section calibration</td>
<td>120μs</td>
<td>-40°C to 150°C</td>
<td>Automotive: Valve angle sensor (throttle, EGR, ball valve, expansion valve, etc.) Accelerator pedal angle sensor</td>
</tr>
<tr>
<td></td>
<td>Differential Hall detection can resist external stray magnetic field</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Industrial: Industrial steering gear angle sensor</td>
</tr>
<tr>
<td></td>
<td>Provide SPI and OWI user-programmable communication interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-contact rotary button switch</td>
</tr>
<tr>
<td></td>
<td>Automotive qualified model and industrial qualified model available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Home printer, hand-held marking gun, blowing curtain angle detector</td>
</tr>
<tr>
<td>NSM3012</td>
<td>The axial angle is measured based on planar Hall</td>
<td>SOIC-8</td>
<td>0~360°</td>
<td>3.3V/5V</td>
<td>14-bit linear DAC</td>
<td>±1° after four-section calibration</td>
<td>120μs</td>
<td>-40°C to 150°C</td>
<td>Automotive: Valve angle sensor (throttle, EGR, ball valve, expansion valve, etc.) Accelerator pedal angle sensor</td>
</tr>
<tr>
<td></td>
<td>Differential Hall detection can resist external stray magnetic field</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Industrial: Industrial steering gear angle sensor</td>
</tr>
<tr>
<td></td>
<td>Provide SPI and OWI user-programmable communication interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-contact rotary button switch</td>
</tr>
<tr>
<td></td>
<td>Automotive qualified model and industrial qualified model available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Home printer, hand-held marking gun, blowing curtain angle detector</td>
</tr>
<tr>
<td>NSM3013</td>
<td>The axial angle is measured based on planar Hall</td>
<td>SOIC-8</td>
<td>0~360°</td>
<td>3.3V/5V</td>
<td>14-bit linear DAC</td>
<td>±1° after four-section calibration</td>
<td>120μs</td>
<td>-40°C to 150°C</td>
<td>Automotive: Valve angle sensor (throttle, EGR, ball valve, expansion valve, etc.) Accelerator pedal angle sensor</td>
</tr>
<tr>
<td></td>
<td>Differential Hall detection can resist external stray magnetic field</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Industrial: Industrial steering gear angle sensor</td>
</tr>
<tr>
<td></td>
<td>Provide SPI and OWI user-programmable communication interfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-contact rotary button switch</td>
</tr>
<tr>
<td></td>
<td>Automotive qualified model and industrial qualified model available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Home printer, hand-held marking gun, blowing curtain angle detector</td>
</tr>
</tbody>
</table>
The NSM301x is a non-contact rotation angle sensor that supports accurate rotation angle measurement of 360° in ambient temperatures ranging from -40°C to 150°C. This series is based on planar Hall array, which converts the angle position information of bipolar magnet into analog voltage, PWM, SPI and other output forms through internal DSP. The NSM301x provides SPI and OWI interfaces for signal path configuration as well as erasable programming register blocks (MTP). It has an automatic gain (AGC) adjustment module that can adjust the gain of the signal path to accommodate different mechanical constraints and magnetic fields. This approach provides maximum flexibility in system design because it can be integrated directly into existing architectures, providing high accuracy. The chip supports 3.3V, 5V power supply voltage (different power supply versions).

**Product introduction**
- Operating temperature: -40°C to 150°C
- Various output interface forms: 14-bit linear DAC analog output or 12-bit resolution PWM output, SPI output UVW output, Z-direction programmable threshold judgment switch output (SON)
- Provide SPI and OWI user-programmable communication interfaces
- Provide angle output with accuracy of ±1°
- Support four-section fitting one by one, with fit accuracy up to ±0.2°
- Built-in automatic gain compensation circuit to compensate the gain loss caused by the temperature characteristics of the magnet and the Z-direction installation position tolerance

**Product feature**
- It has abnormal diagnosis function
- Differential Hall detection can resist external stray magnetic field
- NOVOSENSE’s new chopper and spin current excitation technology make angular temperature drift very small
- Automotive-qualified and industrial-qualified model available, with automotive-qualified model meeting AEC - Q100 reliability standard

**Functional block diagram**

**Package**
SDP8

**Application**
- **Automotive**
  - Valve angle sensor (throttle, EGR, ball valve, expansion valve, etc.)
  - Accelerator pedal angle sensor
  - Electronic gear shifter
  - Wiper position sensor
  - Body height sensor
- **Industrial**
  - Industrial steering sensor
  - Non-contact rotary button switch
- **Consumer**
  - Home printer
  - Hand-held marking gun
  - Moving curtain angle detection
Industrial Pressure Transmitter Signal Conditioning Chip
# Industrial Pressure Transmitter Signal Conditioning Chip

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product description</th>
<th>Sensor input type supported</th>
<th>Package</th>
<th>Temperature range</th>
<th>Supply voltage</th>
<th>Output type</th>
<th>Power Shunt Down function supported</th>
<th>Non-volatile memory</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSA2860_SSDP16</td>
<td>General industrial resistance pressure transmitter signal conditioning chip</td>
<td>Wheatstone bridge pressure sensor, Strain gage, General voltage output sensor</td>
<td>SSOP16</td>
<td>-40~105°C</td>
<td>3<del>5.5V with external JFET can support 4</del>20mA (compatible with 24V industrial power supply)</td>
<td>Analog voltage output</td>
<td>0~5V (I2C, SPI, PWM)</td>
<td>No</td>
<td>EEPROM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Analog output industrial pressure transmitter, Analog output industrial RTD temperature transmitter, BLU-type industrial pressure transmitter, BLU-type industrial RTD temperature transmitter</td>
</tr>
<tr>
<td>NSA2860_TSSDP20</td>
<td>General industrial resistance pressure transmitter signal conditioning chip</td>
<td>Wheatstone bridge pressure sensor, Strain gage, General voltage output sensor</td>
<td>TSSOP20</td>
<td>-40~105°C</td>
<td>3<del>5.5V with external JFET can support 4</del>20mA (compatible with 24V industrial power supply)</td>
<td>Analog voltage output</td>
<td>0~5V (I2C, SPI, PWM)</td>
<td>No</td>
<td>EEPROM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Analog output industrial pressure transmitter, Analog output industrial RTD temperature transmitter, BLU-type industrial pressure transmitter, BLU-type industrial RTD temperature transmitter</td>
</tr>
<tr>
<td>NSA2862_AQNR</td>
<td>General EMC-resistant industrial resistance pressure transmitter signal conditioning chip</td>
<td>Wheatstone bridge pressure sensor, Strain gage, General voltage output sensor</td>
<td>QFN30</td>
<td>-40~125°C</td>
<td>3<del>5.5V with external JFET can support 4</del>20mA (compatible with 24V industrial power supply)</td>
<td>Analog voltage output</td>
<td>0~5V (I2C, SPI, PWM)</td>
<td>No</td>
<td>EEPROM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Analog output industrial pressure transmitter, Analog output industrial RTD temperature transmitter, BLU-type industrial pressure transmitter, BLU-type industrial RTD temperature transmitter</td>
</tr>
<tr>
<td>NSC2860_XQNR</td>
<td>General industrial capacitive pressure transmitter signal conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>QFN30</td>
<td>-40~125°C</td>
<td>3<del>5.5V with external JFET can support 4</del>20mA (compatible with 24V industrial power supply)</td>
<td>Analog voltage output</td>
<td>0~5V (I2C, SPI, PWM)</td>
<td>No</td>
<td>EEPROM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capacitive industrial pressure transmitter</td>
</tr>
</tbody>
</table>
NSA2860/NSA2860X: Industrial Transmitter Signal Processing Chip Supporting 4~20mA Output

◆ Product introduction

NSA2860 (X) is a specially developed ASSP chip for 4~20mA current output or 0~5V/0~10V voltage output industrial transmitter. NSA2860 (X) has an internal integrated bridge drive, dual constant current source drive, PGA and 24-bit high-precision ADC, which can be easily used for interface bridge pressure sensors or temperature sensors such as RTD/TC. The chip integrates the customer programmable digital calibration logic, and also provides a convenient OWI interface that can communicate directly with the analog line of 4~20mA, making it convenient for the customer to calibrate the sensor after assembly and save the calibration coefficient. In addition, the NSA2860 (X) also integrates with an external JFET controller, which can be used directly under standard industrial loop power supply conditions of 24V without the need for an additional power controller. In the past few years, this chip has been widely used in industrial pressure transmitters, industrial temperature transmitters and other field instruments, and its reliability and stability has been fully verified by a large number of shipments in the industrial field.

◆ Product feature

- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support 4 to 20mA output or 0 to 5V/0 to 10V analog output
- Support SPI BUS or PC digital interface, which can also be used as digital transmitter analog front-end
- OWI interface, which can support customer calibration after assembly in the case of two-wire 4-20mA connection
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Low static current, with 1.5mA working current perfectly supporting 4-20mA loop power supply
- The power pin VDDH can withstand high voltage shocks up to 28V to achieve high reliability in industrial field applications

◆ Functional block diagram

[Functional block diagram image]

◆ Package

- NSA2860_SSOP16: SSOP16
- NSA2860_TSSOP: TSSOP20
- NSA2860X_QFN: QFN20

◆ Application

- Industrial pressure transmitter and temperature transmitter
- Industrial field instrument analog front-end
- PLC/DCS analog input/output
**NSA2862X: Analog Front-end Chip for Low-power Digital Industrial Sensor**

**Product introduction**

The NSA2862X is an analog front-end chip specially developed for digital industrial transmitters or IIoT industrial sensors requiring low sleep power consumption. NSA2862X has an internal integrated bridge drive, dual constant current source drive, PGA and 24-bit high-precision ADC, which can be easily used for interface bridge pressure sensors or temperature sensors such as RTD/TSC. Its integrates customer-programmable digital calibration logic and EEPROM, so that customers can easily carry out sensor assembly calibration and calibration coefficient saving. The NSA2862X has a dedicated PD pin that can be used in industrial wireless sensor applications to set the chip to a low-power off state with 100nA static sleep current. Over the past few years, the chip has been widely used in industrial pressure IoT meters, and its reliability and stability has been fully verified in the industrial field by a large number of shipments.

**Product feature**

- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support SPI BUS or I2C digital interface, which is used as digital transmitter analog front-end
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Power Down mode is supported. The static current in sleep mode is at 100nA level at room temperature

**Functional block diagram**

**Package**

- NSA2862X_DQNR: QFN20

**Application**

- Industrial pressure transmitter and temperature transmitter
- Industrial field instrument analog front-end
- PLC/DCS analog input and output
NSC2860X: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4~20mA Output

◆ Product introduction
NSC2860X is an ASSP chip specially developed for 4~20mA current output or 0~5V voltage output industrial transmitter. NSC2860X has an integrated capacitive voltage conversion circuit, which specially designed for Interface capacitive pressure sensors. It integrates the customer programmable digital calibration logic, and also provides a convenient OWI interface that can communicate directly with the analog line of 4~20mA, making it convenient for the customer to calibrate the sensor after assembly and save the calibration coefficient. In addition, the NSC2860X also integrates with an external JFET controller, which can be used directly under standard industrial loop power supply conditions of 24V without the need for an additional power controller. Over the past few years, the chip has been widely used in application of industrial capacitive pressure transmitter, and its reliability and stability has been fully verified in the industrial field by a large number of shipments.

◆ Product feature
- Integrated capacitive voltage conversion circuit, supporting capacitive pressure sensor interface
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support 4 to 20mA output or 0 to 5V/0 to 10V analog output
- Support SPI BUS or PC digital interface, which can also be used as digital transmitter analog front-end
- OWI interface, which can support customer calibration after assembly in the case of two-wire 4~20mA connection
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Low static current, with 1.5mA working current perfectly supporting 4-20mA loop power supply
- The power pin VDDH can withstand high-voltage shocks up to 28V to achieve high reliability in industrial field applications

◆ Functional block diagram
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Low static current, with 1.5mA working current perfectly supporting 4-20mA loop power supply
- The power pin VDDH can withstand high-voltage shocks up to 28V to achieve high reliability in industrial field applications

◆ Package
- NSC2860X: DQNR: QFN20

◆ Application
- Industrial capacitive pressure transmitter
## Pressure Sensor Signal Conditioning Chip

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product description</th>
<th>Sensor input type supported</th>
<th>Package</th>
<th>Temperature range</th>
<th>Supply voltage</th>
<th>Output type</th>
<th>Minimum memory</th>
<th>Key words of services</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSA280</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>KDG</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>SPI</td>
<td>64-bit EEPROM</td>
<td>Low-cost, digital output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA282</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>MSOP10</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA283</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SOP8</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA284</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>MSOP10</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA285</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>MSOP10</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA286</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA287</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>MSOP10</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA288</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA289</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA290</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA291</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA292</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA293</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA294</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA295</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA296</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA297</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA298</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA299</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA300</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA301</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA302</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA303</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA304</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA305</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA306</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA307</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA308</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA309</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA310</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA311</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA312</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA313</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA314</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA315</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA316</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA317</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA318</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA319</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
<tr>
<td>NSA320</td>
<td>General low-cost Capacitive pressure sensor conditioning chip</td>
<td>Capacitive pressure sensor</td>
<td>SSOP16</td>
<td>-40~125°C</td>
<td>1.8~5.5V</td>
<td>Analog voltage SPI OR SPI</td>
<td>OTP</td>
<td>Low-cost, analog voltage output</td>
<td>AllWinner</td>
</tr>
</tbody>
</table>

*Pressure Sensor Signal Conditioning Chip*
NSA2200: Digital Output Pressure Sensor Interface Chip

- **Product introduction**
  NSA2200 is an interface chip for low-cost pressure sensors. It integrates pressure sensor bridge driver, high precision PGA, 24-bit ADC, customer programmable digital calibration logic and customer-erwritable OTP. NSA2200 supports sensor nonlinear fitting calibration as well as temperature compensation for sensor sensitivity and bias errors. The supply method of this chip is wafer Know Good Die. Customers can choose to seal NSA2200 with their own pressure sensor sensitive source in one package. After calibration, it can be used as digital output pressure sensor.

- **Product feature**
  - Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
  - Support sensor diagnosis and output clamp function
  - Excellent noise performance: 600nV@OSR = 1024X, Gain = 32X (equivalent to input noise) Calibration accuracy: 0.05% FSO (support second order temperature coefficient and third order nonlinear calibration)
  - High-precision internal temperature sensor, (absolute accuracy < 0.5°C, resolution < 0.01°C); support a variety of external temperature sensors (diode, two-terminal thermistor, three terminal thermistor, etc.)
  - Support 1.8V to 5.5V power supply
  - Support sleep working mode to greatly reduce MCU load. The static current under sleep is at 200nA level at room temperature, and supports Power Down of external bridge power supply
  - Support SPI BUS or I2C digital interface output

- **Functional block diagram**

- **Package**
  - KDG

- **Application**
  - Consumer/Industrial pressure sensor modules (washing machine level/pressure cooker/coffee machine/soybean milk machine, etc.)
  - Barometer
  - Altimeter
  - Weather forecaster
  - Electronic weight scale
NSA2300: Pressure Sensor Interface Signal Conditioning Chip
Compatible with Analog and Digital Output

◆ Product introduction
NSA2300 is a low-cost pressure sensor interface chip, with both analog output and digital output supported. It integrates pressure sensor bridge driver, high precision PGA, 24-bit ADC, customer programmable digital calibration logic and customer-writable OTP. NSA2300 supports sensor nonlinear fitting calibration as well as temperature compensation for sensor sensitivity and bias errors. The packaging mode of this chip is SO8 or MSOP10, and the shipment mode of wafer Known Good Die can also be provided.

◆ Product feature
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- Excellent noise performance: 600nV@OSR = 1024X, Gain = 32X (equivalent to input noise; Calibration accuracy: 0.05% FSO (support second order temperature coefficient and third order nonlinear calibration)
- High-precision internal temperature sensor, (absolute accuracy < 0.5°C, resolution < 0.01°C), support a variety of external temperature sensors (diode, two-terminal thermistor, three terminal thermistor, etc.)
- Support 1.8V to 5.5V power supply
- Support sleep working mode to greatly reduce MCU load. The static current under sleep is at 200nA level at room temperature, and supports Power Down of external bridge power supply.
- Support SPI BUS or I2C digital interface output, with analog proportional/fixed output mode.

◆ Package
- SO8, MSOP10, KDG

◆ Functional block diagram

◆ Application

Consumer/Industrial pressure sensor modules
- Barometer
- Weather forecaster
- Electronic weight scale
- Automobile additional pressure sensor module
NSA2302: Pressure Sensor Interface Signal Conditioning Chip
Compatible with Analog and Digital Output

Product introduction
The NSA2302 is a highly integrated, low-cost, high-precision interface chip designed for bridge sensors to collect, amplify and calibrate sensor signals. The NSA2302 integrates a low-noise gauge amplifier (PGA), a low-power 24-bit Σ-Δ ADC, a DSP for digital calibration, and a 12-bit DAC. The NSA2302 supports second-order temperature drift calibration for sensor zero temperature, sensitivity and up to third-order nonlinear calibration, with digital calibration accuracy up to 0.1%. The calibration logic is based on the calibration parameters stored in the internal EEPROM and calculated by the built-in DSP. The NSA2302 also supports direct high-voltage supply applications with an internal JFET controller. The NSA2302 supports both I2C/SPI digital output and analog output, and supports one-wire interface (OWI) multiplexing analog pins for post-sensor calibration.

Product feature
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- Excellent noise performance: 600nV@OSR = 1024X, Gain = 32X (equivalent to input noise) Calibration accuracy: 0.05% FSO (support second order temperature coefficient and third order nonlinear calibration)
- High-precision internal temperature sensor, (absolute accuracy < 0.5°C, resolution < 0.01°C), support a variety of external temperature sensors (diode, two-terminal thermistor, three terminal thermistor, etc.)
- VDD supports 3V to 5.5V power supply and external high-voltage power supply through JFET controller
- Support sleep working mode to greatly reduce MCU load. The static current under sleep is at 200nA level at room temperature, and supports Power Down of external bridge power supply.
- Support SPI BUS or I2C digital interface output, with analog proportional output

Functional block diagram

Package
- SO8, MSOP10, KDG

Application
- Automobile additional pressure sensor (A/C pressure sensor/TMAP sensor)
- Consumer/industrial pressure sensor modules (washing machine level/pressure cooker/coffee machine/soybean milk machine, etc.)
**NSA2860/NSA2860X: Industrial Transmitter Signal Processing Chip Supporting 4–20mA Output**

**Product introduction**
NSA2860 (X) is a specially developed ASSP chip for 4–20mA current output or 0–5V/0–10V voltage output industrial transmitter. NSA2860 (X) has an internal integrated bridge drive, dual constant current source drive, PGA and 24-bit high-precision ADC, which can be easily used for interface bridge pressure sensors or temperature sensors such as RTD/TC. The chip integrates the customer programmable digital calibration logic, and also provides a convenient SPI interface that can communicate directly with the analog line of 4–20mA, making it convenient for the customer to calibrate the sensor after assembly and save the calibration coefficient. In addition, the NSA2860 (X) also integrates with an external JFET controller, which can be used directly under standard industrial loop power supply conditions of 24V without the need for an additional power controller. In the past few years, this chip has been widely used in industrial pressure transmitters, industrial temperature transmitters and other field instruments, and its reliability and stability has been fully verified by a large number of shipments in the industrial field.

**Product feature**
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input.
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input.
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply.
- Support 4 to 20mA output or 0 to 5V/10V analog output.
- Support 4 to 20mA output or 0 to 5V/10V analog output.

**Functional block diagram**

**Package**
- NSA2860: SSOP16, SSOP16
- NSA2860X: TSSOP20
- NSA2860X: QFN20

**Application**
- Industrial pressure transmitter and temperature transmitter
- Industrial field instrument analog front-end
- PLC/DCCS analog input/output

**Support 4 to 20mA output or 0 to 5V/10V analog output**
- Support SPI BUS or I2C digital interface, which can also be used as digital transmitter analog front-end.
- Support customer calibration after assembly in the case of two-wire 4–20mA connection.
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration.
- Low static current, with 1.5mA working current perfectly supporting 4–20mA loop power supply.
- The power pin VDDHV can withstand high voltage shock up to 28V to achieve high reliability in industrial field applications.

**Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration.**

**Low static current, with 1.5mA working current perfectly supporting 4–20mA loop power supply.**

**The power pin VDDHV can withstand high voltage shock up to 28V to achieve high reliability in industrial field applications.**
**NSA2862X: Analog Front-end Chip for Low-power Digital Industrial Sensor**

**Product introduction**

The NSA2862X is an analog front-end chip specially developed for digital industrial transmitters or IIoT industrial sensors requiring low sleep power consumption. NSA2862X has an internal integrated bridge drive, dual constant current source drive, PGA and 24-bit high-precision ADC, which can be easily used for interface bridge pressure sensors or temperature sensors such as RTD/TC. Its integrates customer-programmable digital calibration logic and EEPROM, so that customers can easily carry out sensor assembly calibration and calibration coefficient saving. The NSA2862X has a dedicated PD pin that can be used in industrial wireless sensor applications to set the chip to a low-power off state with 100nA static sleep current. Over the past few years, the chip has been widely used in industrial pressure IoT meters, and its reliability and stability has been fully verified in the industrial field by a large number of shipments.

**Product feature**

- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Support SPI BUS or I2C digital interface, which is used as digital transmitter analog front-end
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Power Down mode is supported. The static current in sleep mode is at 100nA level at room temperature

**Functional block diagram**

**Package**

- NSA2862X_DQNR: QFN20

**Application**

- Industrial pressure transmitter and temperature transmitter
- Industrial field instrument analog front-end
- PLC/DCI analog quantity input and output
NSC2860X: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4~20mA Output

**Product introduction**

NSC2860X is an ASSP chip specially developed for 4~20mA current output or 0~5V voltage output industrial transmitter. NSC2860X has an integrated capacitive voltage conversion circuit, which specially designed for interface capacitive pressure sensors. It integrates the customer programmable digital calibration logic, and also provides a convenient SPI interface that can communicate directly with the analog line of 4~20mA, making it convenient for the customer to calibrate the sensor after assembly and save the calibration coefficient. In addition, the NSC2860X also integrates with an external JFET controller, which can be used directly under standard industrial loop power supply conditions of 24V without the need for an additional power controller. Over the past few years, the chip has been widely used in application of industrial capacitive pressure transmitter, and its reliability and stability has been fully verified in the industrial field by a large number of shipments.

**Product feature**

- Integrated capacitive voltage conversion circuit, supporting capacitive pressure sensor interface
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support 4 to 20mA output or 0 to 5V analog output
- Support SPI BUS or I2C digital interface, which can also be used as digital transmitter analog front-end
- SPI interface, which can support customer calibration after assembly in the case of two-wire 4~20mA connection
- Digital sensor calibration mode, supporting up to the third-order sensor nonlinear calibration and second-order temperature coefficient calibration
- Low static current, with 1.5mA working current perfectly supporting 4-20mA loop power supply
- The power pin VDDHV can withstand high voltage shocks up to 28V to achieve high reliability in industrial field applications

**Package**

- NSC2860X-DQNR: QFN20

**Application**

Industrial capacitive pressure transmitter
NSA9260(X): Signal Conditioning Chip for Resistive Bridge Automobile Pressure Sensor

◆ Product introduction

NSA9260 (X) is an EMC enhanced AECQ100 compliant high integration chip for signal conditioning of resistance bridge automotive pressure sensors. The NSA9260 (X) adopts a high-precision variable gain instrument amplifier and a 24-bit ADC to form the main signal measurement channel, and a 24-bit ADC to form the auxiliary temperature measurement channel. With built-in digital processing engine, the NSA9260X supports second-order temperature drift calibration and the highest third-order nonlinear calibration for sensor zero temperature and sensitivity of the sensor. The calibration accuracy can be up to 0.1%, and its calibration coefficients are stored in a set of programmable EEPROMs. NSA9260X supports over-voltage and reverse-voltage protection, analog voltage output and PWM output, as well as sensor diagnosis.

◆ Product feature

- Support -24V to 28V over voltage and reverse voltage protection for automotive sensor applications
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- High-precision 1X ~ 256X variable gain instrument amplifier, up to 8x digital gain
- Built-in digital processor-based sensor calibration logic, supporting post-customer calibration, up to third-order nonlinear calibration and second-order temperature sensitivity and offset calibration
- Calibration data can be stored in EEPROM, programmable multiple times
- Ratio-metric or absolute voltage output, supporting PWM output as well
- Enhanced EMC performance
- Proprietary OWI communication mode, supporting PWM output as well
- Operating temperature range: -40°C ~ 150°C, compatible with AECQ100 standard

◆ Functional block diagram

◆ Package

- SSOP16

◆ Application

Auto pressure sensor module (TMAP, automotive air conditioning pressure, oil pressure sensor, brake pressure sensor, etc.)
NSC9260(X): Signal Conditioning Chip for Capacitive Automobile Pressure Sensor

Product introduction
NSC9260 (X) is an EMC enhanced AECQ100 compliant high integration chip for signal conditioning of capacitive automotive pressure sensors. The NSC9260 (X) adopts a capacitance voltage conversion circuit and a 24-bit ADC to form the main signal measurement channel, and a 24-bit ADC to form the auxiliary temperature measurement channel. With built-in digital processing engine, the NSC9260X supports second-order temperature drift calibration and the highest third-order nonlinear calibration for sensor zero temperature and sensitivity of the sensor. The calibration accuracy can be up to 0.1%, and its calibration coefficients are stored in a set of programmable EEPROMs. NSC9260 (X) employs a second-order temperature drift calibration and the highest third-order nonlinear calibration for sensor zero temperature and sensitivity of the sensor. The calibration accuracy can be up to 0.1%, and its calibration coefficients are stored in a set of programmable EEPROMs. NSC9260 (X) supports over-voltage and reverse-voltage protection, analog voltage output and PWM output, which is mainly used in automotive pressure capacitive pressure sensors for measuring pressure values above 1MPa.

Product feature
- Support -24V to 28V over voltage and reverse voltage protection for automotive sensor applications
- It integrates CV capacitance voltage conversion circuit and 24-bit high-precision ADC, which can easily measure capacitance of capacitive pressure sensor, calculate and convert it to pressure.
- Built-in digital processor-based sensor calibration logic, supporting post-customer calibration, up to third-order nonlinear calibration and second-order temperature sensitivity and offset calibration
- Calibration data can be stored in EEPROM, multiple times programmable
- Ratio-metric or absolute voltage output, supporting PWM output
- Enhanced EMC performance
- Proprietary OWI communication mode, supporting calibration after sensor assembly
- Operating temperature range: -40°C ~ 150°C, compatible with AECQ100 standard

Functional block diagram

Package
- SSOP16

Application
Auto capacitive pressure sensor module (automotive air conditioning pressure, brake pressure, etc.)
NSC9262 is an EMC enhanced AECQ100 compliant high integration chip for signal conditioning of capacitive automotive pressure sensors, with LIN BUS interface provided. NSC9262 adopts a capacitance voltage conversion circuit and a 24-bit ADC to form the main signal measurement channel, and a 24-bit ADC to form the auxiliary temperature measurement channel. With built-in digital processing engine, the NSC9262 supports second-order temperature drift calibration and the highest third-order nonlinear calibration for sensor zero temperature and sensitivity of the sensor. The calibration accuracy can be up to 0.1%, and its calibration coefficients are stored in a set of programmable EEPROMs. NSC9262 supports over voltage and reverse voltage protection, supports LIN BUS interface and meets LIN BUS specifications. It is mainly used in the application of capacitive pressure sensors for measuring pressure values above 1MPa in automobiles.

**Product feature**

- Support -40V to 40V over voltage and reverse voltage protection for automotive sensor applications
- It integrates C/V capacitive voltage conversion circuit and 24-bit high-precision ADC, which can easily measure capacitance of capacitive pressure sensor, calculate and convert it to pressure.
- Built-in digital processor-based sensor calibration logic, supporting customer calibration, up to third-order nonlinear calibration and second-order temperature sensitivity and offset calibration
- Calibration data can be stored in EEPROM, programmable multiple times
- Meet the LIN BUS specification 1.3/2.0/2.1
- Proprietary OWI communication mode, supporting calibration after sensor assembly
- Operating temperature range: -40°C ~ 150°C, compatible with AEC-Q100 standard

**Functional block diagram**

**LIN BUS certification**

- LIN BUS certification LIN1.3/2.0/2.1

**Package**

- SSOP16

**Application**

Automotive capacitive air conditioning pressure sensor module
NSC9264: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting SENT BUS

**Product introduction**

The NSC9264 is an EMC-enhanced AECQ100 high-integration chip for signal conditioning of capacitive automotive pressure sensors with a SENT BUS interface. NSC9264 adopts a capacitance voltage conversion circuit and a 24-bit ADC to form the main signal measurement channel, and a 24-bit ADC to form the auxiliary temperature measurement channel. With built-in digital processing engine, the NSC9264 supports second-order temperature drift calibration and the highest third-order nonlinear calibration for sensor zero temperature and sensitivity of the sensor. The calibration accuracy can be up to 0.1%, and its calibration coefficients are stored in a set of programmable EEPROMs. NSC9264 supports over voltage and reverse voltage protection, supports SENT BUS interface and meets SAE J2716 BUS specifications. It is mainly used in the application of capacitive pressure sensors for measuring pressure values above 1MPa in automobiles.

**Product feature**

- Support -24V to 24V over voltage and reverse voltage protection for automotive sensor applications
- It integrates C/V capacitive voltage conversion circuit and 24-bit high-precision ADC, which can easily measure capacitance of capacitive pressure sensor, calculate and convert it to pressure.
- Built-in digital processor-based sensor calibration logic, supporting customer calibration, up to third-order nonlinear calibration and second-order temperature sensitivity and offset calibration.
- Calibration data can be stored in EEPROM, programmable multiple times
- Meet SAE J2716 protocol specification, meet fast and slow channel output and provide diagnostic function
- Proprietary OWI communication mode, supporting calibration after sensor assembly
- Operating temperature range: -40°C ~ 150°C, compatible with AECQ100 standard

**Functional block diagram**

![Functional block diagram](image)

**Package**

- SSOP16

**Application**

Automotive capacitive pressure sensor module
MEMS Microphone Signal Conditioning Chip
### MEMS Microphone Signal Conditioning Chip

<table>
<thead>
<tr>
<th>Part number</th>
<th>Product description</th>
<th>Product feature</th>
<th>Supply voltage/current</th>
<th>Bias range</th>
<th>Gain range</th>
<th>Noise</th>
<th>Output mode</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSC6272</td>
<td>Analog output MEMS microphone signal conditioning chip</td>
<td>Low cost analog output MEMS microphone signal conditioning chip</td>
<td>1.6V~3.6V</td>
<td>4μVrms</td>
<td>128dBV</td>
<td>Analog</td>
<td>TWS headset, Smart television</td>
<td>Smart household appliance, Smart speaker</td>
</tr>
<tr>
<td>NSC6273</td>
<td>Analog output MEMS microphone signal conditioning chip</td>
<td>2.3V~3.6V</td>
<td>4μVrms</td>
<td>130dBV</td>
<td>Analog</td>
<td>TWS headset, Smart television</td>
<td>Smart household appliance, Smart speaker</td>
<td></td>
</tr>
<tr>
<td>NSC6380</td>
<td>Analog output MEMS microphone signal conditioning chip</td>
<td>Enhanced analog output MEMS microphone signal conditioning chip</td>
<td>1.6V~3.6V</td>
<td>4μVrms</td>
<td>120dBV</td>
<td>Analog</td>
<td>TWS headset, Smart television, Mobile/FNO</td>
<td></td>
</tr>
<tr>
<td>NSC6360</td>
<td>Digital output MEMS microphone signal conditioning chip</td>
<td>Enhanced digital output MEMS microphone signal conditioning chip</td>
<td>1.62V~3.6V</td>
<td>4μVrms</td>
<td>132dBV</td>
<td>Digital</td>
<td>Laptop, Speaker</td>
<td></td>
</tr>
<tr>
<td>NSC6364</td>
<td>Digital output MEMS microphone signal conditioning chip with I2S interface</td>
<td>I2S interface</td>
<td>1.62V~3.6V</td>
<td>4μVrms</td>
<td>124dBV</td>
<td>Digital</td>
<td>Wearable devices, Internet of Things, Game controller</td>
<td></td>
</tr>
</tbody>
</table>

**Part number**
- NSC6272
- NSC6273
- NSC6380
- NSC6360
- NSC6364
NSC6272/NSC6273: Analog Output MEMS Microphone Signal Conditioning Chip

**Product introduction**

NSC6272/NSC6273 is a MEMS microphone preamplifier. The NSC6272/NSC6273 features an integrated low-noise offset MEMS microphone circuit, as well as a high-performance analog preamplifier that provides true sound quality and supports flexible microphone systems. The bias voltage and analog preamplifier gain can be adjusted via an internal fuse bank (OTP), so the NSC6272/NSC6273 can support MEMS sensors with different parameters. It can also increase yields and provide better sensitivity consistency. The NSC6272/NSC6273 has two output pads for bias voltage at different positions, one of which can be selected as required at the top plate of the MEMS microphone. The AOP performance of NSC6273 is 130dBV, which is improved compared to 128dBV of NSC6272.

**Product feature**

- Working voltage: 1.6V~3.6V for NSC6272, 2.3V~3.6V for NSC6273
- Current drain: 125μA typ
- Equivalent input noise: 4μVrms (≤-108dBV)
- Gain adjustment (OTP): -4dB~11dB with 0.5dB/Step
- Frequency response: 20Hz~20kHz
- Bias voltage: 7.5V~16V with 0.3V/Step
- Working temperature: -40°C~85°C

**Functional block diagram**

**Package**

- KGD

**Application**

- TWS headset
- Smart television
- Smart household appliances
- Smart speaker
NSC6280: Analog Output MEMS Microphone Signal Conditioning Chip

**Product introduction**
NSC6280 is a MEMS microphone preamplifier. The NSC6280 features an integrated low-noise offset MEMS microphone circuit, as well as a high-performance analog preamplifier that provides true sound quality and supports flexible microphone systems. The bias voltage and analog preamplifier gain can be adjusted via an internal fuse bank (OTP), so the NSC6280 can support MEMS sensors with different parameters. It can also improve yields and provide better sensitivity consistency. The NSC6280 has two output pads for bias voltage at different positions, one of which can be selected as required at the top plate of the MEMS microphone. In addition, the NSC6280 is used for relatively high-end mobile phone applications. This chip has been subjected to optimization in respect of high-frequency EMI interference and yield in mass production.

**Product feature**
- Working voltage: 1.6V ~ 3.6V
- Current drain: 120μA typ
- Equivalent input noise: 4μVrms (-108dBV)
- Gain adjustment (OTP): -4dB ~ 11dB with 0.5dB/Step
- Frequency response: 20Hz ~ 20kHz
- Bias voltage: 6V ~ 15.5V with 0.3V/Step
- Working temperature: -40°C ~ 85°C

**Functional block diagram**

![Functional block diagram](image)

**Package**
- KGD

**Application**
- Cellphone
- PAD products

---

**Product feature**
- Working voltage: 1.6V ~ 3.6V
- Current drain: 120μA typ
- Equivalent input noise: 4μVrms (-108dBV)
- Gain adjustment (OTP): -4dB ~ 11dB with 0.5dB/Step
- Frequency response: 20Hz ~ 20kHz
- Bias voltage: 6V ~ 15.5V with 0.3V/Step
- Working temperature: -40°C ~ 85°C

---

**Package**
- KGD

**Application**
- Cellphone
- PAD products
The NSC6360 is a PDM output preamplifier for MEMS digital microphones. The chip integrates a low noise bias circuit for MEMS microphones and a high performance analog pre-amplifier circuit to provide high quality audio signal output and high flexibility for MEMS microphones. The built-in OTP is adjustable for bias and gain, so the NSC6360 supports MEMS microphone sensors with different parameters for better sensitivity consistency. Customers can integrate the chip into the MEMS digital microphone chip for audio signal conditioning. The NSC6360 chip has an extremely low startup and wake time of 20ms, programmable gain bias voltage, and left and right channel polarity. The NSC6360 supports dynamic current adjustment based on the input clock frequency, so it can be used in different power modes. The operating voltage of the chip ranges from 1.6V to 3.6V, and its operating modes include sleep mode, low voltage mode and normal mode.

**Product feature**
- Working voltage: 1.62V~3.6V
- Working mode: sleep mode, low voltage mode and normal mode
- Current drain: 300μA at 768kHz, 750μA at 2.4MHz
- Equivalent input noise: 4.5μVrms (-107dBV)
- Gain adjustment (OTP): 9dB–17dBFS with 0.6dB/Step
- Bias voltage: 7.6V–15.9V with 1.18V/Step
- Working temperature: -40°C~85°C

**Functional block diagram**

**Package**
- KGD

**Application**
- Laptop
- Cellphone
- Smart speaker
The NSC6362 is a PDM output preamplifier for MEMS digital microphones. The chip integrates a low noise bias circuit for MEMS microphones and a high-performance analog pre-amplifier circuit to provide high quality audio signal output and high flexibility for MEMS microphones. The built-in OTP is adjustable for bias voltage and gain, so the NSC6362 supports MEMS microphone sensors with different parameters for better sensitivity consistency. Customers can integrate the chip into the MEMS digital microphone chip for audio signal conditioning. The NSC6362 chip has an extremely low startup and wake time of 20ms, programmable gain, bias voltage and left and right channel polarity. The NSC6362 supports dynamic current adjustment based on the input clock frequency, so it can be used in different power modes. The operating voltage of the chip ranges from 1.62V to 3.6V, and its operating modes include sleep mode, low voltage mode and normal mode.

- **Product feature**
  - Working voltage: 1.62V – 3.6V
  - Working mode: sleep mode, low voltage mode, and normal mode
  - Current drain: 330μA @768kHz, 780μA @2.4MHz
  - Equivalent input noise: 3μVrms (-110dBV)
  - Gain adjustment (OTP) 0dB – 23dBFS with 0.5dB Step
  - Bias voltage: 7.5V – 19.2V with 1.3V Step
  - Working temperature: -40°C – 85°C

- **Package**
  - KGD

- **Function block diagram**

- **Application**
  - Laptop
  - Cellphone
  - Smart speaker
NSC6364 is an I2S interface silicon microphone conditioning chip for wearable devices, smart home appliances and the Internet of Things. Depending on specific MEMS microphones, the SNR can reach more than 63dB, and it has sleep, low power consumption and performance modes to meet the needs of Always Listening to the system in real time. Compared with the traditional PDM interface silicon microphone +ADC solution, this product can significantly reduce the system cost and power consumption of acoustic acquisition channel.

**Product feature**
- I2S output, SNR up to 67dB
- Operating voltage range: 1.65V~3.6V
- Ultra-low power consumption
- BIAS adjustable, 4.7V~12.7V
- Analog gain adjustable, 4.9dB~+15.7dB
- Digital gain adjustable, -1.9dB~+3.8dB
- Grain size, 600um x 900um
- HBM ESD, ±4kV
- Operating temperature, -40°C~85°C
- Three working modes: Sleep, low power consumption and performance
- Good RF resistance

**Functional block diagram**

**Package**
- KGD

**Application**
- Wearables
- Remote control
- IoT
- Intelligence appliance
- Game machine
## Infrared PIR Sensor Signal Conditioning Chip

<table>
<thead>
<tr>
<th>Part number</th>
<th>Probe fitting mode</th>
<th>Output mode</th>
<th>Product feature</th>
<th>Package</th>
<th>Temperature range</th>
<th>Supply voltage/current</th>
<th>Start (minimum) trigger threshold</th>
<th>Product order No./Order No.</th>
<th>Output mode</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSA3162T</td>
<td>External type</td>
<td>Switching value output</td>
<td>Resistance adjustment for judging the threshold and opening time</td>
<td>SOP8</td>
<td>-25~85°C</td>
<td>1.8V~4.5V/13μA</td>
<td>55μV</td>
<td>NSA3162T</td>
<td>Binary</td>
<td>Smart lighting, Smart doorbell, Smart security (camera)</td>
</tr>
<tr>
<td>NSA3163T</td>
<td>Internal type</td>
<td>Switching value output</td>
<td>Resistance adjustment for judging the threshold and opening time</td>
<td>DFN8</td>
<td>-40~85°C</td>
<td>1.5V~4.5V/13μA</td>
<td>55μV</td>
<td>NSA3163FTD10</td>
<td>Binary</td>
<td>Smart lighting, Smart doorbell, Smart security (camera)</td>
</tr>
<tr>
<td>NSA3180T</td>
<td>Internal type</td>
<td>Switching value output</td>
<td>Resistance adjustment for judging the threshold and opening time</td>
<td>DFN8</td>
<td>-25~85°C</td>
<td>1.8V~4.5V/13μA</td>
<td>55μV</td>
<td>NSA3180T</td>
<td>Binary</td>
<td>Smart lighting, Smart doorbell, Smart security (camera)</td>
</tr>
<tr>
<td>NSA3182T</td>
<td>Internal type</td>
<td>Switching value output</td>
<td>Resistance adjustment for judging the threshold and opening time</td>
<td>SOP8</td>
<td>-40~85°C</td>
<td>3.1V~12V/13μA</td>
<td>55μV</td>
<td>NSA3182FTD10</td>
<td>Binary</td>
<td>Smart lighting</td>
</tr>
<tr>
<td>NSA3166C</td>
<td>External type</td>
<td>Digital switching output</td>
<td>Digital switching output</td>
<td>SO8</td>
<td>-40~85°C</td>
<td>1.65V~4.5V/6μA</td>
<td>55μV</td>
<td>NSA3166_C</td>
<td>Digital and Binary</td>
<td>Smart lighting, Smart doorbell, Smart security (camera)</td>
</tr>
</tbody>
</table>

### Infrared PIR Sensor Signal Conditioning Chip

- **Feature**: Resistance adjustment for judging the threshold and opening time
- **Packaging**: Various options including SOP8 and DFN8
- **Applications**: Smart lighting, Smart doorbell, Smart security (camera)

![Infrared PIR Sensor Signal Conditioning Chip Diagram](image)
**NSA3162T: Common External PIR Sensor Signal Conditioning Chip**

◊ **Product introduction**

NSA3162T is a highly integrated signal processing chip for pyroelectric infrared sensor (PIR). A single NSA3162T integrates all the necessary components for pyroelectric passive infrared mobile detection, and the analog front end can be directly connected to the analog PIR detector via AC coupling. Built-in high-precision analog-to-digital converter can convert the detector signal into digital signal. The digital engine can detect the movement of human body, reduce the interference from external and support binary output. The sensor sensitivity threshold and alarm maintenance time can be adjusted by an external resistor.

◊ **Product feature**

- Suitable for PIR external signal conditioning applications, with SOP8 package
- Sensitivity and response time adjustable through an external resistor
- Power supply ranges from 1.8V to 4.5V
- Binary output
- Low power consumption, static current 15μA

◊ **Functional block diagram**

◊ **Package**

- SOP8

◊ **Application**

- Smart lighting
- Smart security
- Building automation
NSA3180T: Built-in PIR Sensor Signal Conditioning Chip

◆ Product introduction
NSA3180T is a highly integrated control chip for pyroelectric infrared sensor (PIR). A single NSA3180 integrates all the necessary components for pyroelectric passive infrared mobile detection, and the analog front-end can be directly connected to the analog PIR detector. Built-in high-precision analog-to-digital converter can convert the detector signal into digital signal. The digital engine can detect the movement of human body, reduce the interference from external, and support binary output. The sensor sensitivity threshold and alarm maintenance time can be adjusted by an external resistor. Compared with NSA3180, NSA3180T has a slightly larger static current and a slightly higher minimum operating voltage, which is the low-cost version of NSA3180.

◆ Product feature
- Suitable for PIR internal signal conditioning applications, with DFN8 package
- Sensitivity and response time adjustable through an external resistor
- Binary output
- Low power consumption, static current 15μA (NSA3180T: 15μA)
- Power supply voltage range is 1.8V~4.5V (NSA3180T: 1.8V~4.5V)

◆ Functional block diagram

◆ Package
- DFN8

◆ Application
- Smart lighting
- Smart security
- Building automation
NSA3182: External PIR Sensor Signal Conditioning Chip Integrated with LDO

◆ Product introduction

NSA3182 is a highly integrated control chip for pyroelectric infrared sensor (PIR). A single NSA3182 integrates all the necessary components for pyroelectric passive infrared mobile detection, and the analog front end can be directly connected to the analog PIR detector via AC coupling. Built-in 3V output LDO supplies power to the PIR detector. Built-in high-precision analog-to-digital converter can convert the detector signal into digital signal. The digital engine can detect the movement of human body, reduce the interference from external and support binary output. The sensor sensitivity threshold and alarm maintenance time can be adjusted by an external resistor.

◆ Product feature

- Suitable for PIR external signal conditioning applications, with SOP8 package
- Sensitivity and response time adjustable through an external resistor
- Built-in LDO for direct power supply with high voltage of 12V for smart lighting applications
- Binary output
- Low power consumption, static current 13μA

◆ Functional block diagram

◆ Package

- SOP8

◆ Application

- Smart lighting
- Smart security
- Building automation
NSA3166: Digital Output PIR Sensor Signal Conditioning Chip

◆ Product introduction
The NSA3166 is a highly integrated signal processing chip for pyroelectric infrared sensors (PIR) for smart security applications. A single NSA3166 integrates all the necessary components for pyroelectric passive infrared mobile detection, and the analog front end can be directly connected to the analog PIR detector via AC coupling. Built-in high-precision analog-to-digital converter can convert the detector signal into digital signal. The digital engine can detect the movement of human body, reduce the interference from external and support binary output and digital output. The sensor sensitivity threshold and alarm maintenance time can be dynamically adjusted by writing registers through the digital communication interface. In addition, users can also configure and adjust the logic judgment mode of human body recognition inside the chip.

◆ Product feature
- Suitable for PIR external signal conditioning applications, with DFN8 package
- Sensitivity and response time are adjustable through digital interface
- Power supply ranges from 1.6V to 4.5V
- Support digital output and binary output
- Low-power consumption, low static current of 6μA
- Built-in temperature sensor to facilitate customers to adjust sensitivity according to temperature

◆ Functional block diagram

◆ Application
- Smart lighting
- Smart security
- Smart camera
- Building automation and smart doorbell
Thermopile Sensor
Signal Conditioning Chip
N
SA3166
Antenna
Temperature Sensor
MEMS Pressure Sensor
Current Sensor
Linear Hall Current Sensor
Magnetic Position Sensor
Industrial Pressure Transmitter
Signal Conditioning Chip
Pressure Sensor Signal Conditioning Chip
Infrared PIR Sensor Signal Conditioning Chip
Thermopile Sensor Signal Conditioning Chip
Magnetic Sensor Signal Conditioning Chip
Industrial and Automotive SoC
General Signal Chain
MEMS Microphone Signal Conditioning Chip
69
NSA3300: Thermopile Sensor Signal Conditioning Chip

**Product introduction**
NSA3300 is a signal conditioning chip for thermopile sensor, which is mainly used to interface thermopile sensor and convert the sensor output into digital. The internal digital engine can automatically calculate the voltage output of the thermopile sensor into temperature value. Based on the data of the LUT which is programed by the user, the end customer can directly read the temperature value through the I²C interface from the IC. The chip has low-noise instrument amplifier PGA, 24bit Σ‑ΔADC and DSP calibration algorithm. It can measure the target temperature within the range of -70 °C to 380 °C and meet the accuracy error of 1% in the whole temperature range, accuracy of ±0.2 °C in the range of 35 °C to 42 °C for human body temperature measurement, and the highest resolution of 0.01 °C/LSB. The chip also can support ADC raw data to be readout without any DSP processing. The internal ambient temperature sensor on the chip can offer a high precision temperature measurement within ±0.2 °C error in the range between 0 °C to 40 °C. The NSA3300 supports two differential signal inputs and has four working modes: continuous single-channel sensor and ambient temperature combined output, continuous dual-channel sensor and ambient temperature combined output, continuous dual-channel sensor output, and sleep mode. In the dual-channel application scenario, the application is mainly NDIR.

**Product feature**
- High-precision signal amplification PGA, adjustable gain from 8x to 128x, and equivalent input noise less than 3μVrms
- Integrated high-precision temperature sensor, with accuracy up to ±0.2 °C in room temperature range from 0 °C to 40 °C
- Built-in EEPROM for 32-point LUT input, with digital linear interpolation between two points
- Support client sensor post-calibration, with sensitivity, offset and non-linearity compensation
- Support direct I²C reading of the target temperature, which can be configured as the temperature binary output mode
- Low power consumption, with sleep current of 3μA
- Wafer-level supply, with small die size: 1mm x 1.5mm

**Functional block diagram**

**Package**
- KGD

**Application**
- Forehead thermometer/ear thermometer
- Industrial temperature measurement
- White household appliances
- Kitchen household appliances
- Security
- NDIR gas sensor
Magnetic Sensor Signal Conditioning Chip
The NSA5312 is a user programmable instrumentation amplifier. It is mainly used to provide voltage type drive signal for Wheatstone bridge sensors (such as TMR sensors) and amplify, calibrate and compensate the output signal to ensure that the sensor can get high linear output accuracy in a wide temperature range.

- **Product feature**
  - Provide 2.5V / 4.096V voltage excitation
  - Provide 0.9456~1843x programmable gain setting
  - Provide 14-bit sensor sensitivity and offset calibration
  - Provide sensor temperature calibration based on lookup table
  - Programmable output signal bandwidth, with maximum signal bandwidth is about 600kHz
  - Fast response time <1μs
  - Proportional output and fixed output are available. The output reference voltage is available in 0.5V/1.65V/2.5V.
  - Provide user programmable interface OWI, and support customer module level post-calibration

- **Application**
  - Current sensor module
  - Pressure sensor module
  - Industrial transmitter

- **Package**
  - KGD
Industrial and Automotive SoC

MEMS Pressure Sensor
Current Sensor
Linear Hall Current Sensor
Magnetic Position Sensor
Industrial Pressure Transmitter
Signal Conditioning Chip
Pressure Sensor Signal Conditioning Chip
Infrared PIR Sensor Signal Conditioning Chip
Thermopile Sensor Signal Conditioning Chip
Magnetic Sensor Signal Conditioning Chip
MEMS Microphone Signal Conditioning Chip
NSUC1610: Motor Drives SoC for Automotive Electronic Actuators

◆ Product introduction
NSUC1610 is an integrated drive and 4-way half-bridge microcontroller, mainly used to control low-power DC motor, can support the drive of DC brush motor, DC brushless motor, stepper motor, etc., widely used in new energy vehicles. The chip adopts advanced high temperature and high pressure process, the maximum temperature can be supported to 175°C, the maximum voltage withstand to 40V, and has overvoltage protection function. LIN port can support -40V~40V voltage, BVD2 pin can support -0.3~40V voltage. The chip uses the ARM Cortex-M3 core, which uses separate data buses and address buses to improve the efficiency of fetching instructions and data.

◆ Product feature
- Cortex M3 processor, the compiler environment uses Keil standard compiler and development tools, common programmer resources, easy development and debugging
- Car battery 12V direct power supply, chip power supply can withstand 40V short-term overvoltage
- Integrated power level MOSFETs (4 half-bridges), drive current up to 1A (500mOhm Rdson), integrated the corresponding gate drive and upper tube drive required charge pump power supply
- Integrated configurable DAC to configure comparator thresholds for overcurrent protection and microstep control of stepper motor
- Supports the 4-wire LIN bus, and the LIN interface meets the requirements of ±40V over-voltage resistance. In addition, there is a GPIO that can support high voltage (12V), which is convenient for customers to use high voltage PWM directly to do motor control
- Dual temperature sensor: one on the power side for overtemperature shutdown, and the other on the low-voltage side for chip temperature detection
- Wafer junction temperature up to 175°C meets the vehicle Grade 0 application target

◆ Functional block diagram

◆ Package
- SOP8

◆ Application
- Automotive electronic actuators
- Electronic air outlet
- Electronic water valve
- AGS controller
- Electronic charging door control

Temperatue Sensor
MEMS Pressure Sensor
Current Sensor
Linear Hall Current Sensor
Magnetic Position Sensor
Industrial Pressure Transmitter
Signal Conditioning Chip
Infrared PIR Sensor Signal Conditioning Chip
Thermopile Sensor Signal Conditioning Chip
Magnetic Sensor Signal Conditioning Chip
Industrial and Automotive SoC General Signal Chain
MEMS Microphone Signal Conditioning Chip
74
General Signal Chain

- Temperature Sensor
- MEMS Pressure Sensor
- Current Sensor
- Linear Hall Current Sensor
- Magnetic Position Sensor
- Industrial Pressure Transmitter
- Signal Conditioning Chip
- MEMS Microphone Signal Conditioning Chip
- Infrared PIR Sensor Signal Conditioning Chip
- Thermopile Sensor Signal Conditioning Chip
- Magnetic Sensor Signal Conditioning Chip
- Industrial and Automotive SoC
The NSREF30/31XX is a family of precision, low power, low dropout, series voltage references available in the tiny 3-pin SOT-23 package. The NSREF30XX offers 0.2% initial accuracy, 35 ppm/°C maxim tempco. The NSREF31XX offers 0.2% initial accuracy, 15 ppm/°C maxim tempco.

The NSREF30/31XX does not require a load capacitor, but is stable with any capacitive load and can sink or source up to ±10 mA of output current, can operate on supplies down to 1 mV above the output voltage, and output only 20μVpp noise (2.5V version), and consume only 130μA, All models are specified for the wide temperature range of -40°C to +125°C, and could offer both industry and auto grade versions. The NSREF30/31XX family is widely used in solar, digital power, industry sensor and control system, portable battery power system.

**Product feature**
- Auto and industry grade
- Supply voltage: 1.8V~5.5V
- Low dropout voltage: 1mV
- Initial accuracy: 0.2%
- Temp drift: NSREF31xx—5ppm/°C Type, 15ppm/°C Max, 
  NSREF30xx—10ppm/°C Type, 35ppm/°C Max
- Output Noise@2.5V: 20μVpp
- Quiescent Current @2.5V: 140 μA
- Line regulation @2.5V: 20ppm/V
- Load regulation:3ppm/mA(source); 9ppm/mA(sink)
- -40°C to 125°C

**Product introduction**
The NSREF3031XX is a family of precision, low power, low dropout, series voltage references available in the tiny 3-pin SOT-23 package. The NSREF30XX offers 0.2% initial accuracy, 35 ppm/°C maxim tempco. The NSREF31XX offers 0.2% initial accuracy, 15 ppm/°C maxim tempco.

The NSREF30/31XX does not require a load capacitor, but is stable with any capacitive load and can sink or source up to ±10 mA of output current, can operate on supplies down to 1 mV above the output voltage, and output only 20μVpp noise (2.5V version), and consume only 130μA.

All models are specified for the wide temperature range of -40°C to +125°C, and could offer both industry and auto grade versions. The NSREF30/31XX family is widely used in solar, digital power, industry sensor and control system, portable battery power system.

**Package**
- SOT23-3

**Function block diagram**

**Application**
- Industry automation
- Field Instruments
- Solar/UPS/BMS
- Smart grid
- Portable Instruments
- Medical
## Isolated RS-485 Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Duplex</th>
<th>ISO Rating (kVrms)</th>
<th>ESD</th>
<th>Max Data Rate (Mbps)</th>
<th>No. of Nodes</th>
<th>Isolation Grade</th>
<th>Operating Temperature Range (°C)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI83085C</td>
<td>Half</td>
<td>5</td>
<td>16</td>
<td>0.5</td>
<td>256</td>
<td>Reinforced</td>
<td>-40~105</td>
<td>SOW-16</td>
</tr>
<tr>
<td>NSI83086C</td>
<td>Full</td>
<td>5</td>
<td>16</td>
<td>16</td>
<td>256</td>
<td>Reinforced</td>
<td>-40~105</td>
<td>SOW-16</td>
</tr>
<tr>
<td>NIRS485</td>
<td>Half</td>
<td>3</td>
<td>8</td>
<td>1</td>
<td>256</td>
<td>Basic</td>
<td>-40~105</td>
<td>SSOP-16</td>
</tr>
</tbody>
</table>

**Isolated RS-485 Transceiver**
NSI8308xC is a family of isolated RS-485 transceivers based on NOVOSENSE digital isolated transceiver technology, where the NSI83085C is a half-duplex RS-485 transceiver and the NSI83086C is a full-duplex RS-485 transceiver. Both devices are safety certified by UL1577 support 5kVrms insulation withstand voltages, and feature low emission, low power consumption and high immunity to electromagnetic interference. The BUS pins on the BUS side of the NSI83086C is designed with ±10kV ESD protection to ground at system level. This product is designed with a fail-safe circuit that ensures the receiver output is logic high when the receiver input is disconnected or shorted. It features a receiver input impedance of 1/8 unit load, allowing up to 256 transceivers to be connected to the BUS.

The data rate of NSI83085C is 12Mbps, and the data rate of NSI83086C is 16Mbps, and the products reduce EMI and reflection by optimizing the slew rate.

**Product introduction**
NSI8308xC is a family of isolated RS-485 transceivers based on NOVOSENSE digital isolated transceiver technology, where the NSI83085C is a half-duplex RS-485 transceiver and the NSI83086C is a full-duplex RS-485 transceiver. Both devices are safety certified by UL1577 support 5kVrms insulation withstand voltages, and feature low emission, low power consumption and high immunity to electromagnetic interference. The BUS pins on the BUS side of the NSI83086C is designed with ±10kV ESD protection to ground at system level. This product is designed with a fail-safe circuit that ensures the receiver output is logic high when the receiver input is disconnected or shorted. It features a receiver input impedance of 1/8 unit load, allowing up to 256 transceivers to be connected to the BUS.

The data rate of NSI83085C is 12Mbps, and the data rate of NSI83086C is 16Mbps, and the products reduce EMI and reflection by optimizing the slew rate.

**Product feature**
- Dielectric strength 5000Vrms
- Up to 5000Vrms Insulation voltage
- VDD1 supply voltage: 2.5V to 5.5V
- High CMTI: ±150kV/μs
- High system level EMC performance: BUS pins conforming to IEC61000-4-2±10kV ESD
- Fail-safe receiver
- Supporting 256 transceivers
- Isolation Barrier Lifes: >60 years
- Operating temperature: -40°C to 105°C
- RoHS compliant package: SOW-16

**Pinout & Package**

**Application**
- Industrial automation system
- Isolated 485 communication system
- Smart ammeters and water meters
- Security and surveillance systems
NIRS485: Cost-optimized Isolated 485 Transceiver

Product introduction
NIRS485 is an isolated half-duplex RS-485 based on NOVOSENSE digital isolated transceiver technology. It is safety certified by UL1577 support 3KVrms insulation withstand voltages, and features low emission, low power consumption and high immunity to electromagnetic interference. The BUS pins on the BUS side of the NIRS485 is designed with 8KV ESD protection to ground at system level. This device is designed with a fail-safe circuit that ensures the receiver output is logic high when the receiver input is disconnected or shorted. It features a receiver input impedance of 1/8 unit load, allowing up to 256 transceivers to be connected to the BUS. The data rate of NIRS485 is 1Mbps. The NIRS485 reduces EMI and reflections by optimizing the slew rate.

Product feature
- Up to 3000Vrms Insulation voltage
- BUS side supply voltage: 3.0V to 5.5V
- VDD1 supply voltage: 2.5V to 5.5V
- High CMTI: ±100kV/μs
- High system level EMC performance: BUS pins conforming to IEC61000-4-2±8KV ESD
- Fail-safe receiver
- Supporting 256 transceivers
- Operating temperature: -40°C to 105°C
- RoHS compliant package: SSOP-16
- Isolation Barrier Life: >60 years

Pinout & Package

Application
- Battery management system
- Isolated 485 communication system
- Smart ammeters and water meters
Isolated CAN Transceiver

Isolated RS-485 Transceiver

Isolated I²C Interface

RS-485 Transceiver

CAN Transceiver

LIN Transceiver

Digital Isolator

Digital Isolator with Integrated Isolated Power Supply

Isolated 485 with Integrated Isolated Power Supply

Isolated CAN with Integrated Isolated Power Supply

Isolated ADC

Isolated Current Amplifier

Isolated Voltage Amplifier

Isolated Error Amplifier

Isolated Comparator
Isolated CAN Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>ESD (kV)</th>
<th>Max Catadis (Mbps)</th>
<th>Fail Safe</th>
<th>Operating Temperature Range (°C)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1050C</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DDBR</td>
</tr>
<tr>
<td>NSI1050C</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-16</td>
</tr>
<tr>
<td>NSI1042</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-4</td>
</tr>
<tr>
<td>NSI1042</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-16</td>
</tr>
<tr>
<td>NSI1042C</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-4</td>
</tr>
<tr>
<td>NSI1042C</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-16</td>
</tr>
<tr>
<td>NSI1052C</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>Idle, Open, Short</td>
<td>-40~125</td>
<td>DOW-16</td>
</tr>
</tbody>
</table>

81
**NSI1050C: High-Performance Isolated CAN Transceiver**

**Product Introduction**
NSI1050C is an isolated CAN transceiver that is fully compatible with ISO11898-2. NSI1050C integrates a two-channel digital isolator and a high-performance CAN transceiver. The digital isolator uses silicon oxide isolation based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. NSI1050C device is safety certified by UL1577 support 5kVrms insulation withstand voltages, and feature high electromagnetic immunity and low emission. NSI1050C supports data transmission rates of up to 1Mbps and can support at least 110 CAN nodes. NSI1050C is designed with thermal protection and transmission data dominant timeout protection.

**Product Feature**
- Fully compatible with ISO11898-2
- Up to 5000Vrms Insulation voltage
- Power supply voltage: VDD1: 2.5V to 5.5V, VDD2: 4.5V to 5.5V
- BUS protection voltage: -40V to +40V
- Transmission data (TXD) dominant timeout protection
- Overcurrent and thermal protection
- Data transmission rates up to 1Mbps
- High CMTI: 100kV/μs
- Low loop delay: <220ns
- Enhanced system level ESD, EFT, surge immunity
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-16, DUB-8

**Pinout & Package**

**Application**
- Industrial automation system
- Isolated CAN BUS
- Communication
NSI1042/1052: High-Performance Isolated CAN Transceiver

◆ Product introduction
NSI1042 is an isolated CAN transceiver that is fully compatible with ISO11898-2. NSI1042 integrates a two-channel digital isolator and a high-performance CAN transceiver. The digital isolator uses silicon oxide isolation based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. NSI1042 device is safety certified by UL1577 support 5kVrms insulation withstand voltages, and feature high electromagnetic immunity and low emission. NSI1042 supports CAN FD with data rate up to 5Mbps and can support at least 110 CAN nodes. NSI1042 is designed with thermal protection and transmission data dominant timeout protection.

◆ Product feature
- Fully compatible with ISO11898-2
- Up to 5000Vrms insulation voltage
- Power supply voltage
  - VDD1: 2.5V to 5.5V
  - VDD2: 4.5V~5.5V
- BUS protection voltage: -70V to +70V
- Overcurrent and thermal protection
- Communication rate up to 5Mbps
- High CMTI: 150kV/μs
- Low loop delay: <220ns
- Enhanced system level ESD, EFT, surge immunity
- Standby mode: NSI1052
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-8, SOW-16

◆ Pinout & Package

◆ Application
Industrial automation system
Isolated CAN BUS
Communication
**Product introduction**

NSI1042C is an isolated CAN transceiver that is fully compatible with ISO11898-2. NSI1042C integrates a two-channel digital isolator and a high-performance CAN transceiver. The digital isolator uses silicon oxide isolation based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. NSI1042C device is safety certified by UL1577, supporting 5kVrms insulation withstand voltages, and feature high electromagnetic immunity and low emission. NSI1042C supports CAN FD with data rates up to 5Mbps and can support at least 110 CAN nodes. NSI1042C is designed with thermal protection and transmission data dominant timeout protection.

**Product feature**

- Fully compatible with ISO11898-2
- Up to 5000Vrms insulation voltage
- Power supply voltage: VDD1: 2.5V to 5.5V, VDD2: 4.5V~5.5V
- BUS protection voltage: -58V to +58V
- Overcurrent and thermal protection
- Communication rate up to 5Mbps
- High CMTI: 150kV/μs
- Low loop delay: <220ns
- Enhanced system level ESD, EFT, surge immunity
- Standby mode
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-8, SOW-16

**Pinout & Package**

**Application**

- Industrial automation system
- Isolated CAN BUS
- Communication

---

**NSI1042C: Isolated CAN Transceiver**
Isolated I²C

<table>
<thead>
<tr>
<th>Part No.</th>
<th>ISO Rating (kVRMS)</th>
<th>ESD(kV)</th>
<th>Bidirectional Channels</th>
<th>Max DataRate (Mbps)</th>
<th>AEC-Q100</th>
<th>Operating Temperature Range (°C)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI8100N</td>
<td>3.75</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>-40-125</td>
<td>SOP-8</td>
<td></td>
</tr>
<tr>
<td>NSI8100W</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>-40-125</td>
<td>SOIC-16</td>
<td></td>
</tr>
<tr>
<td>NSI8100NC</td>
<td>3.75</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>-40-125</td>
<td>SOP-8</td>
<td></td>
</tr>
</tbody>
</table>
**NSI8100NC/NSI8100: High Reliability Bidirectional I²C Isolators**

**Product introduction**

The NSI810x series are high reliability bidirectional I²C digital isolators. The NSI810x devices are safety certified by UL1577 support several insulation withstand voltages (3.75kVrms, 5kVrms), and features high electromagnetic immunity and low emission characteristics. They support I²C clock at a frequency up to 2MHz, the common mode transient immunity (CMTI) is up to 150kV/μs. The wide power supply range allows them to be directly connected to digital interfaces such as most of the MCUs, and can easily provide bidirectional level conversion. Its excellent system-level electromagnetic compatibility (EMC) performance enhances its reliability and stability. NSI8100 provides dual-channel bidirectional isolation.

NSI8100NC is a bidirectional I²C digital isolator that provides dual-channel bidirectional isolation with high reliability. It is safety certified by UL1577 support 5kVrms insulation withstand voltages, and features high electromagnetic immunity and low emission. They support I²C clock at a frequency up to 2MHz, the common mode transient immunity (CMTI) is up to 100kV/μs. The wide power supply range allows them to be directly connected to digital interfaces such as most of the MCUs, and can easily provide bidirectional level conversion. Its excellent system-level electromagnetic compatibility (EMC) performance enhances its reliability and stability.

**Product feature**

- Up to 3750/5000Vrms Insulation voltage
- I²C clock rate: up to 2MHz
- Wide power supply range: 2.5V to 5.5V
- High common mode transient immunity (CMTI): ±150kV/μs
- High system level EMC performance: system level electrostatic discharge (ESD), burst immunity (EFT), surge protection

**Pinout & Package**

**Application**

- I²C level converter
- Isolated I²C, PMBUS, SMBUS Interface applications
- Power over Ethernet (POE)
- Motor control
- Power Supply System
I²C Interface
### I²C Interface

#### I²C Hot-swappable NCA9511 Series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>VCC1(min)(V)</th>
<th>VCC1(max)(V)</th>
<th>VCC2(min)(V)</th>
<th>VCC2(max)(V)</th>
<th>Frequency (Max) (kHz)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA9511</td>
<td>2.7</td>
<td>5.5</td>
<td>2.7</td>
<td>5.5</td>
<td>400</td>
<td>-40~105</td>
<td>MSOP-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
</tbody>
</table>

#### I²C Level Converter NCA9306 Series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>VCC1(min)(V)</th>
<th>VCC1(max)(V)</th>
<th>Frequency (Max) (kHz)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA9306</td>
<td>1.2</td>
<td>3.3</td>
<td>400</td>
<td>-40~85</td>
<td>VSSOP-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TSSOP-8</td>
</tr>
</tbody>
</table>

#### I²C Buffer NCA9617A Series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>VCC1(min)(V)</th>
<th>VCC1(max)(V)</th>
<th>VCC2(min)(V)</th>
<th>VCC2(max)(V)</th>
<th>Frequency (Max) (kHz)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA9617A</td>
<td>0.8</td>
<td>5.5</td>
<td>2.2</td>
<td>5.5</td>
<td>1000</td>
<td>-40~85</td>
<td>MSOP8</td>
</tr>
</tbody>
</table>

#### I²C switch NCA954x series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Channel</th>
<th>VCC1(min)(V)</th>
<th>VCC1(max)(V)</th>
<th>Frequency (Max) (kHz)</th>
<th>Addresses</th>
<th>Features</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA9545</td>
<td>4</td>
<td>2.3</td>
<td>5.5</td>
<td>400</td>
<td>4</td>
<td>Interrupt Pin</td>
<td>-40~85</td>
<td>TSSOP-20</td>
</tr>
<tr>
<td>NCA9546</td>
<td>4</td>
<td>2.3</td>
<td>5.5</td>
<td>400</td>
<td>3</td>
<td>Reset Pin</td>
<td>-40~85</td>
<td>TSSOP-12</td>
</tr>
<tr>
<td>NCA9548</td>
<td>3</td>
<td>2.3</td>
<td>5.5</td>
<td>400</td>
<td>3</td>
<td>Reset Pin</td>
<td>-40~85</td>
<td>TSSOP-24</td>
</tr>
</tbody>
</table>

### I²C GPIO expansion for NCA95xx series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Channel</th>
<th>VCC1(min)(V)</th>
<th>VCC1(max)(V)</th>
<th>Frequency (Max) (kHz)</th>
<th>Addresses</th>
<th>Features</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA9555</td>
<td>16</td>
<td>2.3</td>
<td>5.5</td>
<td>400</td>
<td>8</td>
<td>Interrupt Pin LED Driver</td>
<td>-40~85</td>
<td>TSSOP-24</td>
</tr>
<tr>
<td>NCA9554B</td>
<td>8</td>
<td>2.3</td>
<td>5.5</td>
<td>400</td>
<td>8</td>
<td>Interrupt Pin LED Driver</td>
<td>-40~85</td>
<td>TSSOP-24</td>
</tr>
<tr>
<td>NCA9553</td>
<td>9-Q1</td>
<td>1.65</td>
<td>5.5</td>
<td>400</td>
<td>4</td>
<td>Interrupt Pin LED Drive</td>
<td>-40~85</td>
<td>TSSOP-24</td>
</tr>
</tbody>
</table>
NCA9511: I2C Hot-swappable BUS and SMBUS Buffer

**Product Introduction**

NCA9511 is a hot-swappable I²C BUS buffer that supports insertion of I/O cards into a powered backplane without damaging the data or the clock BUS. The control circuit prevents the backplane side I²C line (input) from connecting to the card side I²C line (output) until a stop command or BUS idle condition occurs on the backplane and there is no BUS contention on the card. After the connection is established, the device will provide bidirectional buffering, thus keeping the capacitance of the backplane and that of the card separate. During insertion, the SDA and SCL lines are pre-charged to 1V to minimize the current required to charge the parasitic capacitance of the device. When the I²C BUS is idle, the NCA9511 can be put into shutdown mode by setting the EN pin low, thereby reducing power consumption. When EN is pulled high, NCA9511 resumes normal operation. It also includes an open-drain READY output pin that indicates that the backplane is connected to the card side. When READY is high, SDAIN and SCLIN are connected to SDAOUT and SCLOUT. When both sides are disconnected, READY is low.

**Product feature**

- Supporting bidirectional data transmission signal of I²C BUS
- The operating supply voltage range is from 2.7V to 5.5V
- The TA ambient temperature range is from -40°C to 105°C
- 1-V pre-charge on all SDA and SCL lines prevents corruption during live insertion
- Compatible with standard mode and fast mode I²C devices
- Supporting clock stretching, arbitration and synchronization
- I²C BUS high-impedance state when VCC is powered down
- Operating temperature: -40°C to 105°C
- RoHS compliant package: MSOP-8, SOP-8

**Application**

- Telecom switching equipment
- Server
- Enterprise switch
- Base station
- Industrial automation equipment

---

**Pinout & Package**

![Pinout Diagram]

- EN
- SDOU
- SCLOUT
- SDOIN
- SCLIN
- GND
- SDOUT
- SCLIN
- VCC
- READY

---

**Telecom switching equipment**

- Server
- Enterprise switch
- Base station
- Industrial automation equipment
The NCA9306 device is a dual-channel bidirectional I2C and SMBUS voltage level converter with an enable (EN) input that enables bidirectional voltage conversion from 1.2V to 5V without the need of a direction pin. The switch is designed with a low on-state resistance (RON), allowing connections to be made with minimal propagation delay. When EN is high, the translator switch is ON, and the SCL1 and SDA1 I/O are connected to the SCL2 and SDA2 I/O, respectively, allowing bidirectional data flow between ports. When EN is low, the translator switch is off, and a high-impedance state exists between ports. The NCA9306 device can be used to isolate a 400kHz BUS from a 100kHz BUS by controlling the EN pin to disconnect the slower BUS during fast-mode communication.

- **Product feature**
  - 2-bit bidirectional converter for SDA and SCL lines in I2C applications
  - Compatible with I2C and System Management BUS (SMBUS)
  - Allowing level conversion between the following voltages:
    - 1.2V VREF1 and 1.8V, 2.5V, 3.3V or 5V VREF2
    - 1.8V VREF1 and 2.5V, 3.3V or 5V VREF2
    - 2.5V VREF1 and 3.3V or 5V VREF2
    - 3.3V VREF1 and 5V VREF2
  - Allowing bidirectional voltage conversion without direction pin
  - Open drain I2C I/O ports (SCL1, SDA1, SCL2 and SDA2)
  - Latch-up performance exceeds 100 mA per JESD 78, Class II
  - ESD protection exceeds JESD 22
  - 2000V Human Body Model (A114-A)
  - 1000V charging device model (C101)
  - Operating temperature: -40°C to 105°C
  - RoHS compliant package: VSSOP-8, TSSOP-8

- **Application**
  - PC, SMBUS, PMBUS, MDIO, UART, low-speed SDIO, GPIO and other bidirectional signal interfaces
  - Server (telecom switching equipment)
  - Personal computer
  - Industrial automation
**NCA9617A: I²C and SMBUS Dual Bidirectional Buffer**

**Product Introduction**
NCA9617A is a BiCMOS dual bidirectional buffer designed for I²C BUS and SMBUS systems. The device allows bidirectional voltage level conversion (up-conversion and down-conversion modes) between low voltages (as low as 0.8V) and higher voltages (2.2V to 5.5V) in hybrid applications. During level conversion, this device extends I²C and similar BUS systems without impairing system performance.

**Product feature**
- Dual-channel Bidirectional I²C Buffer
- Standard mode, fast mode (400kHz) and fast mode+ (1MHz) optional
- I²C operates voltage level conversion from 0.8V to 5.5V and from 2.5V to 5.5V
- Open-drain I²C I/O
- Clock stretching and multi-master arbitration supported on device
- Latch-up performance exceeds 100 mA per JESD 78, Class II
- ESD protection exceeds JESD 22
- 5500V Human Body Model (A114-A)
- 1500V charging device model (C101)
- Operating temperature: -40°C to 105°C
- RoHS compliant package: MSOP-8

**Pinout & Package**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCCA</td>
</tr>
<tr>
<td>2</td>
<td>SCLA</td>
</tr>
<tr>
<td>3</td>
<td>SDAA</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>EN</td>
</tr>
<tr>
<td>6</td>
<td>SDAB</td>
</tr>
<tr>
<td>7</td>
<td>SCLB</td>
</tr>
<tr>
<td>8</td>
<td>VCCB</td>
</tr>
</tbody>
</table>

**Application**
- Server
- Router (telecom switching equipment)
- Industrial equipment
- Integrated with a number of I²C slave devices or products with long PCB wiring

**Software & Application**
- Linux
- Windows
- Mac
- iOS
- Android
The NCA9545 is a quad bidirectional translating switch controlled via the I²C BUS. The SCL/SDA upstream pair fans out to four downstream pairs, or channels. Any individual SCN/SDN channel or combination of channels can be selected, depending on the contents of the program-mable control registers. Four interrupt inputs (INT3 to INT0) are provided, one for each of the downstream pairs. One interrupt (INT) output can be used as an AND operation of four interrupt inputs. A low-level on reset (RESET) input enables the NCA9545 to recover from a prolonged low state of any down-link I²C BUS. Pulling RESET low resets the I²C state machine and deselects all channels, as does the internal power-on reset function. With a on gate built into the switch, the VCC terminal can be used to limit the maximum voltage delivered by NCA9545. This allows each channel to use a different BUS voltage so that parts with voltage of 1.8V, 2.5V or 3.3V can communicate with parts with voltage of 5V without any additional protection. External pull-up resistors pull the BUS up to the desired voltage level for each channel. All I/O terminals can withstand 5.5 V.

- **Product feature**
  - 1-of-4 bidirectional translating switches
  - Compatible with FC BUS and SMBUS
  - Active-low reset inputs
  - 2 address pins, supporting 4 different addresses
  - The operating supply voltage range is from 1.65V to 5.5V
  - Low standby current
  - Supports hot insertion
  - Latch-up performance exceeds 100 mA per JESD 78
  - ESD protection exceeds JESD 22
  - 2000V Human Body Model (A114-A)
  - 1500V charging device model (C101)

- **Pinout & Package**

- **Application**
  - Server
  - Router (telecom switching equipment)
  - Factory automation
  - Products with I²C slave address conflicts
**Product introduction**

NCA9546 is a quad-channel bidirectional switch controlled by I²C BUS. The SCL/SDA upstream pair fans out to four downstream pairs, or channels. Any single SCN/SDN channel or combination of channels can be selected, depending on the contents of the programmable control registers.

A low-level on reset (RESET) input enables the NCA9546 to recover from a prolonged low state of any down-link I²C BUS. Pulling RESET low resets the I²C state machine and deselects all channels, as does the internal power-on reset function.

The pass gates of the switches are constructed such that the VCC terminal can be used to limit the maximum high voltage, which will be passed by the NCA9546. This allows each channel to use a different BUS voltage so that parts with voltage of 1.8V, 2.5V or 3.3V can communicate with parts with voltage of 5V without any additional protection. External pull-up resistors pull the BUS up to the desired voltage level for each channel. All I/O terminals can withstand 5.5V.

**Product feature**

- 1-of-4 bidirectional translating switches
- Compatible with I²C BUS and SMBUS
- Active-low reset input
- 3 address terminals, allowing up to 8 devices to be connected to the I²C BUS
- Channel selection via I²C BUS, any combination is OK
- Allowing voltage level conversion between 1.8V, 2.5V, 3.3V and 5V buses
- Operating supply voltage range is 1.7 V to 5.5 V
- Withstand voltage input of 5.5 V
- Clock frequency of 0 to 400kHz
- Latch-up performance exceeds 100 mA per JESD 78
- ESD protection exceeds JESD 22
- 2000V Human Body Model (A114-A)
- 1000V charging device model (C101)
- Operating temperature: -40°C to 105°C
- RoHS compliant package: TSSOP-16

**Pinout & Package**

A0 1 18 VCC
A1 2 15 SDA
RESET 3 14 SCL
SDI 4 13 A2
SC0 5 12 SC3
SD1 6 11 SD3
SC1 7 10 SC2
GND 8 7 SD2

**Application**

- Server (telecom switching equipment)
- Router
- Factory automation
- Products with I²C slave address conflicts (e.g. multiple, identical temp sensors)
**Product Introduction**

NCA9548 is an eight-channel bidirectional switch controlled by I2C BUS. The SCL/SDA upstream pair fans out to eight downstream pairs, or channels. Any single SCN/SDN channel or combination of channels can be selected, depending on the contents of the programmable control registers.

A low-level on reset (RESET) input enables the NCA9548 to recover from a prolonged low state of any down-link I2C BUS. Pulling RESET low resets the I2C state machine and deselects all channels, as does the internal power-on reset function.

The pass gates of the switches are constructed such that the VCC terminal can be used to limit the maximum high voltage, which will be passed by the NCA9548. This allows each channel to use a different BUS voltage so that parts with voltage of 1.8V, 2.5V or 3.3V can communicate with parts with voltage of 5V without any additional protection. External pull-up resistors pull the BUS up to the desired voltage level for each channel. All I/O terminals can withstand 5.5V.

**Product feature**

- 1-of-8 bidirectional translating switches
- Compatible with I2C BUS and SMBUS
- Active-low reset input
- 3 address terminals, allowing up to 8 devices to be connected to the I2C BUS
- Channel selection via I2C BUS, any combination is OK
- Allowing voltage level conversion between 1.8V, 2.5V, 3.3V and 5V buses
- Operating supply voltage range is 1.65 V to 5.5 V
- Withstand voltage input of 5.5 V
- Clock frequency of 0 to 400kHz
- Latch-up performance exceeds 100mA per JESD 78
- ESD protection exceeds JESD 22
- 2000V Human Body Model (A114-A)
- 1000V charging device model (C101)
- Operating temperature: -40°C to 105°C
- RoHS compliant package: TSSOP-24

**Pinout & Package**

- A1: VCC
- A2: SDA
- SCL
- SDA
- SCL
- SCN
- SD0
- SD1
- SD2
- GND

**Application**

- Server
- Router (telecom switching equipment)
- Factory automation
- Products with I2C slave address conflicts
NCA9555: I2C 16-bit GPIO Expansion

◆ Product Introduction
NCA9555 is a 24-pin CMOS device that provides 16-bit general purpose parallel I2C BUS number input/output GPIO expansion. It provides a simple solution to the additional I/O requirements of applications such as ACPI power switches, sensors, buttons, LEDs and fans. NCA9555 consists of two 8-bit configurations (input or output selection), input, output and polarity inversion (high-level on or low-level on) registers. By writing to the I/O’s configuration bits, the system host can enable I/O as input or output. The data of each input or output is stored in the corresponding input or output register. The polarity of the read register can be inverted with the Polarity inversion register. All registers can be read by the system host. NCA9555 open-drain interrupt output is activated when any input state differs from its corresponding input port register state and is used to indicate to the main equipment of the system that the output state has changed. A power-on reset sets the registers to their default values and initializes the state machine of the device. Three hardware pins (A0, A1, A2) change the fixed I2C BUS address and allow up to eight devices to share the same I2C BUS.

◆ Product feature
- The operating supply voltage range is from 2.3V to 5.5V
- I2C to parallel port expander
- Polarity inversion register
- Active low interrupt output
- Compatible with most MCUs
- 16 I/O pins, 16 inputs by default
- Low standby current
- ESD protection exceeds JESD 22
  - 2000V Human Body Model (A114-A)
  - 1000V charging device model (C101)
- 3 address pins, supporting 8 different addresses
- Clock frequency of 0 to 400KHz
- Latch-up performance exceeds 100mA
- Operating temperature: -40°C to 85°C
- RoHS compliant package: TSSOP-24

◆ Pinout & Package
The operating supply voltage range is from 2.3V to 5.5V
- I2C to parallel port expander
- Polarity inversion register
- Active low interrupt output
- Compatible with most MCUs
- 16 I/O pins, 16 inputs by default
- Low standby current
- ESD protection exceeds JESD 22
  - 2000V Human Body Model (A114-A)
  - 1000V charging device model (C101)
- 3 address pins, supporting 8 different addresses
- Clock frequency of 0 to 400KHz
- Latch-up performance exceeds 100mA
- Operating temperature: -40°C to 85°C
- RoHS compliant package: TSSOP-24

◆ Application
- Server (telecom switching equipment)
- Router
- Personal computer
- Personal electronics
- Factory automation
- Products with GPIO-constrained processors
NCA9534B: I²C 8-bit GPIO Expansion

**Product introduction**

NCA9534B is a 16-pin CMOS device that provides 8-bit general purpose parallel I²C BUS number input/output GPIO expansion. It provides a simple solution to the additional I/O requirements of applications such as ACPI power switches, sensors, buttons, LEDs and fans. NCA9534B consists of one 8-bit configurations (input or output selection), input, output and polarity inversion (high-level on or low-level on) registers. By writing to the I/O’s configuration bits, the system host can enable I/O as input or output. The data of each input or output is stored in the corresponding input or output register. The polarity of the read register can be inverted with the Polarity Inversion register. All registers can be read by the system host. NCA9534B open-drain interrupt output is activated when any input state differs from its corresponding input port register state and is used to indicate to the main equipment of the system that the output state has changed. A power-on reset sets the registers to their default values and initializes the state machine of the device. Three hardware pins (A0, A1, A2) change the fixed I²C BUS address and allow up to eight devices to share the same I²C BUS.

**Product feature**

- Operating supply voltage range is from 2.3V to 5.5V
- I²C to parallel port expander
- Polarity inversion register
- Active low interrupt output
- Compatible with most MCUs
- 8 I/O pins, 8 inputs by default
- Low standby current
- ESD protection exceeds JEDEC 22
  2000V Human Body Model (A114-A)
  1000V charging device model (C101)
- 3 address pins, supporting 8 different addresses
- Clock frequency of 0 to 400kHz
- Latch-up performance exceeds 100mA
- Operating temperature: -40°C to 85°C
- RoHS compliant package: SOW-16, TSSOP-16

**Pinout & Package**

<table>
<thead>
<tr>
<th>A0</th>
<th>A1</th>
<th>A2</th>
<th>ID0</th>
<th>IO1</th>
<th>IO2</th>
<th>IO3</th>
<th>VSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VDD</td>
</tr>
<tr>
<td>INT</td>
<td>SCL</td>
<td>SDA</td>
<td>VSS</td>
<td>VDD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Application**

- Server
  - (telecom switching equipment)
- Router
- Personal computer
- Personal electronics
- Factory automation
- Products with GPIO-constrained processors
NCA9539-Q1: Automotive I²C 16-bit GPIO Expansion

◆ Product introduction
NCA9539-Q1 is a 16-pin CMOS device that provides 8-bit general purpose parallel I²C BUS number input/output GPIO expansion. It provides a simple solution to the additional I/O requirements of applications such as ACPI power switches, sensors, buttons, LEDs and fans. NCA9539-Q1 consists of two 8-bit configurations (input or output selection). Input, output and polarity inversion (high-level on or low-level on) registers. By writing to the I/O’s configuration bits, the system host can enable I/O as input or output. The data of each input or output is stored in the corresponding input or output register. The polarity of the read register can be inverted with the Polarity Inversion register. All registers can be read by the system host. NCA9539-Q1 open-drain interrupt output is activated when any input state differs from its corresponding input port register state and is used to indicate to the main equipment of the system that the output state has changed. A power-on reset sets the registers to their default values and initializes the state machine of the device. Two hardware pins (A0, A1) change the fixed I²C BUS address and allow up to four devices to share the same I²C BUS.

◆ Product feature
- The operating supply voltage range is from 1.65V to 5.5V
- I²C to parallel port expander
- Polarity inversion register
- Active low interrupt output
- Compatible with most MCUs
- 16 I/O pins, 16 inputs by default
- Low standby current
- ESD protection exceeds JESD 22
  2000V Human Body Model (A114-A)
  1000V charging device model (C101)
- 2 address pins, supporting 4 different addresses
- Clock frequency of 0 to 400kHz
- Latch-up performance exceeds 100mA per JESD 78
- Operating temperature: -40°C to 125°C
- RoHS compliant package: TSSOP-24

◆ Pinout & Package

◆ Application
- In-vehicle infotainment system, advanced driver assistance system (ADAS)
- Automotive body electronics, hybrid electric vehicle (HEV), electric vehicle (EV) and powertrain
- Industrial automation, factory automation, building automation, test & measurement, electronic point of sale (EPOS)
- I²C GPIO expansion
RS-485 Transceiver

Isolated RS-485 Transceiver

Digital Isolator

Isolated Digital Isolator with Integrated Isolated Power Supply

Isolated CAN Transceiver

Isolated CAN with Integrated Isolated Power Supply

Isolated LIN Transceiver

Isolated ADC

Isolated Current Amplifier

Isolated Voltage Amplifier

Isolated Error Amplifier

Isolated Comparator
### RS-485 Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Duplex</th>
<th>Supply Voltage (V)</th>
<th>ESD</th>
<th>Data Rate (Mbps)</th>
<th>No. of Nodes</th>
<th>Bus Common Voltage (V)</th>
<th>Operating Temperature Range (°C)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA3485</td>
<td>Half</td>
<td>3.3–5.5</td>
<td>10</td>
<td>0.5</td>
<td>256</td>
<td>-7–12</td>
<td>-40–105°C</td>
<td>SOP-8</td>
</tr>
<tr>
<td>NCA3481</td>
<td>Full</td>
<td>3.3–5.5</td>
<td>10</td>
<td>1</td>
<td>256</td>
<td>-7–12</td>
<td>-40–105°C</td>
<td>SOP-14</td>
</tr>
<tr>
<td>NCA3176</td>
<td>Half</td>
<td>3.3–5.5</td>
<td>20</td>
<td>2</td>
<td>256</td>
<td>-7–12</td>
<td>-40–125°C</td>
<td>SOP-8</td>
</tr>
<tr>
<td>NCA3085</td>
<td>Half</td>
<td>3.3–5.5</td>
<td>8</td>
<td>0.5</td>
<td>256</td>
<td>-7–12</td>
<td>-40–125°C</td>
<td>SOP-8</td>
</tr>
</tbody>
</table>

**RS-485 Transceiver**

- **Part No.**: NCA3485
- **Duplex**: Half
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 10
- **Data Rate (Mbps)**: 0.5
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–105°C
- **Package Type**: SOP-8

**RS-485 Transceiver**

- **Part No.**: NCA3481
- **Duplex**: Full
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 10
- **Data Rate (Mbps)**: 1
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–105°C
- **Package Type**: SOP-14

**RS-485 Transceiver**

- **Part No.**: NCA3176
- **Duplex**: Half
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 20
- **Data Rate (Mbps)**: 2
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–125°C
- **Package Type**: SOP-8

**RS-485 Transceiver**

- **Part No.**: NCA3085
- **Duplex**: Half
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 8
- **Data Rate (Mbps)**: 0.5
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–125°C
- **Package Type**: SOP-8

**RS-485 Transceiver**

- **Part No.**: NCA3491
- **Duplex**: Full
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 10
- **Data Rate (Mbps)**: 16
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–105°C
- **Package Type**: SOP-14

**RS-485 Transceiver**

- **Part No.**: NCA3176
- **Duplex**: Full
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 20
- **Data Rate (Mbps)**: 20
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–125°C
- **Package Type**: SOP-14

**RS-485 Transceiver**

- **Part No.**: NCA3085
- **Duplex**: Full
- **Supply Voltage (V)**: 3.3–5.5
- **ESD**: 8
- **Data Rate (Mbps)**: 8
- **No. of Nodes**: 256
- **Bus Common Voltage (V)**: -7–12
- **Operating Temperature Range (°C)**: -40–125°C
- **Package Type**: SOP-14
NCA34xx is a high robust RS485 transceiver. NCA3485 is a half-duplex RS-485 transceiver. NCA3491 is a full-duplex RS-485 transceiver. The devices have a 1/8-unit-load receiver input impedance that allows up to 256 transceivers on the bus. The data rate of the device is up to 12Mbps. The bus pins are protected from ±10kV system level ESD to GND. These devices feature fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are open or shorted.

**Product feature**
- Power supply voltage: 3.0V to 5.5V
- High system level EMC performance: Bus Pins meet IEC61000-4-2 ±10kV ESD
- Fail-safe protection receiver: Up to 256 transceivers on the bus
- Operation temperature: -40°C to 105°C
- RoHS-compliant packages: SOP8, SOP14

**Pinout & Package**

**Application**

- Industrial automation system
- RS-485 communication
**NCA3176: High Robust Half-Duplex 485 Transceiver**

**Product introduction**

NCA3176 is a half-duplex RS-485 transceiver with high robust. NCA3491 allows up to 256 transceivers on the bus. The data rate of the device is up to 20Mbps. The Bus pins are protected from ±20kV system level ESD to GND, and integrated IEC EFT (Noise Immunity). These devices feature fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are open or short, and avoid the line faults.

**Product feature**

- Power supply voltage: 3.0V to 5.5V
- High system level EMC performance:
  - Bus Pins meet IEC61000-4-2 ±20kV ESD
  - Fail-safe protection receiver
  - Up to 256 transceivers on the bus
  - Operation temperature: -40°C ~ 125°C
- RoHS-compliant packages: SOP-8, TSSOP-8

**Pinout & Package**

- Power supply: 3.0V to 5.5V
- High system level EMC performance:
  - Bus Pins meet IEC61000-4-2 ±20kV ESD
  - Fail-safe protection receiver
  - Up to 256 transceivers on the bus
  - Operation temperature: -40°C ~ 125°C
- RoHS-compliant packages: SOP-8, TSSOP-8

**Application**

- Industrial automation system
- RS-485 communication
NCA3085 is a low cost half-duplex RS-485 transceiver. NCA3085 allows up to 256 transceivers on the bus. The data rate of the device is 0.5Mbps, and integrated IEC EFT (Noise Immunity). These devices feature fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are open or short, and avoid the line faults.

**Product introduction**

NCA3085 is a low cost half-duplex RS-485 transceiver. NCA3085 allows up to 256 transceivers on the bus. The data rate of the device is 0.5Mbps, and integrated IEC EFT (Noise Immunity). These devices feature fail-safe circuitry, which guarantees a logic-high receiver output when the receiver inputs are open or short, and avoid the line faults.

**Product feature**

- Power supply voltage: 3.0V to 5.5V
- High system level EMC performance:
  - Bus Pins meet IEC61000-4-2 ±20kV ESD
- Fail-safe protection receiver
- Up to 256 transceivers on the bus
- Operation temperature: -40°C ~ 125°C
- RoHS-compliant packages:
  - SOP-8: 4.9mm*3.9mm
  - TSSOP-8: 3mm*3mm

**Pinout & Package**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
</tr>
<tr>
<td>2</td>
<td>/RE</td>
</tr>
<tr>
<td>3</td>
<td>DE</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>7</td>
<td>B</td>
</tr>
<tr>
<td>8</td>
<td>/RE</td>
</tr>
</tbody>
</table>

**Application**

- Industrial automation system
- RS-485 communication
CAN Transceiver
CAN Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>Power Supply Voltage</th>
<th>Max Data Rate (Mbps)</th>
<th>No of Nodes</th>
<th>Low Power Mode</th>
<th>Operating Temperature Range (°C)</th>
<th>AEC-Q100</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA1042B</td>
<td>Q1042B</td>
<td>VCC: 4.5~5.5V</td>
<td>8</td>
<td>5</td>
<td>Standby</td>
<td>-40~125</td>
<td>SOP-8</td>
<td></td>
</tr>
<tr>
<td>NCA1051A</td>
<td>Q1051A</td>
<td>VCC: 4.5~5.5V</td>
<td>8</td>
<td>5</td>
<td>Standby</td>
<td>-40~125</td>
<td>SOP-8</td>
<td></td>
</tr>
<tr>
<td>NCA1145</td>
<td>Q1145</td>
<td>VCC: 4.5~28V</td>
<td>8</td>
<td>5</td>
<td>Standby</td>
<td>-40~125</td>
<td>SOP-14</td>
<td></td>
</tr>
</tbody>
</table>

No. of Node: Max. No. of Nodes - 104.
**Product introduction**

NCA1042B is a high-speed CAN transceiver that provides an interface between a controller area network (CAN) protocol controller and a physical two-wire CAN BUS. It can support at least 110 CAN nodes. NCA1042B implements the CAN physical layer as defined in ISO 11898-2:2016 and SAE J2284-1 to J2284-6. Reliable communication is achieved in CAN FD fast phase networks with data rates up to 5 Mbps. NCA1042B is designed with thermal protection and transmission data explicit timeout protection.

**Product feature**

- Fully compatible with ISO11898-2
- I/O voltage range supports 3.3V and 5V MCU
- Power supply voltage
  - VDD: 4.5V~5.5V
  - CANL: -70V to +70V
- Transmission data (TXD) dominant timeout protection
- BUS dominant timeout function in standby mode
- Ultra-low current standby mode with wake-up function
- Overcurrent and thermal protection
- Data rate: up to 5Mbps
- Low loop delay: <200ns
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOP-8
- Overcurrent and thermal protection
- Data rate: up to 5Mbps
- Low loop delay: <200ns
- Operating temperature: -40°C to 125°C

**Pinout & Package**

- TXD
- GND
- VCC
- RXD
- CANH
- CANL
- VIO

- TXD
- GND
- VCC
- RXD
- CANH
- CANL
- VIO

**Application**

- Industrial automation, controls, sensors and drive systems
- Building, security and climate control automations
- Electric bicycle/electric motorcycle system
- Standards for CAN BUS, such as CANopen, DeviceNet, NMEA2000, ARINC429, ISO11783 and CANaerospace
Product introduction

NCA1042B-Q1 is a high-speed CAN transceiver that provides an interface between a controller area network (CAN) protocol controller and a physical two-wire CAN BUS. It can support at least 110 CAN nodes. NCA1042B-Q1 implements the CAN physical layer as defined in ISO 11898-2:2016 and SAE J2284-1 to SAE J2284-5. Reliable communication is achieved in CAN FD fast phase networks with data rates up to 5 Mbps. NCA1042B-Q1 is designed with thermal protection and transmission data explicit timeout protection.

Product feature

- Fully compatible with ISO11898-2
- I/O voltage range supports 3.3V and 5V MCU
- Power supply voltage: VIO: 3V to 5.5V, VCC: 4.5V to 5.5V
- -58V to 58V BUS fault protection
- Transmission data (TXD) dominant timeout protection
- BUS dominant time out function in standby mode
- Ultra-low current standby mode with wake-up function
- Overcurrent and thermal protection
- Data rate: up to 5Mbps
- Low loop delay: <200ns
- Operating temperature: -40°C to 125°C
- AEC-Q100 certified
- RoHS compliant package: SOP-8, DFN-8

Pinout & Package

Application

- Automotive and Transportation
**Product Introduction**

NCA1051A/N is a high-speed CAN transceiver that provides an interface between a controller area network (CAN) protocol controller and a physical two-wire CAN BUS. It can support at least 110 CAN nodes. NCA1051A/N implements the CAN physical layer as defined in ISO 11898-2:2016 and SAE J2284-1 to SAE J2284-5. Reliable communication is achieved in CAN FD fast phase networks with data rates up to 5 Mbps. The NCA1051A/N provides thermal protection and transmit data dominant time out function.

**Product Feature**

- Fully compatible with ISO11898-2
- Ideal passive behavior to the CAN BUS when the supply voltage is off
- I/O voltage range supports 3.3V and 5V MCU
- Power supply voltage
  - VIO (NCA1051A): 3V to 5.5V
  - VCC: 4.5V to 5.5V
- Power supply voltage
  - CANH, CANL: -45V to 45V BUS fault protection
- Transmission data (TXD) dominant timeout protection
- Overcurrent and thermal protection
- Data rate: up to 5Mbps
- Low loop delay: <200ns
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOP-8

**Pinout & Package**

**Application**

- 5Mbps operation in highly loaded CAN networks down to 10 kbps networks using TXD DTO
- Industrial automation, controls, sensors and drive systems
- Building, security and climate control automations
- Standards for CAN BUS, such as CANopen, DeviceNet, NMEA2000, ARNICA825, ISO11783 and CANaerospace
### Product Introduction

NCA1043B-Q1 is a high-speed CAN transceiver that provides an interface between a controller area network (CAN) protocol controller and a physical two-wire CAN BUS. It can support at least 110 CAN nodes. NCA1043B-Q1 is designed to meet the requirements of high-speed CAN applications in the automotive industry, providing differential transmit and receive capability to (a microcontroller with) a CAN protocol controller. The NCA1043B-Q1 offers excellent Electro Magnetic Compatibility (EMC) and ElectroStatic Discharge (ESD) performance, ultra-low power consumption and passive performance when the power supply voltage is off. Further features include:

- Low-power management controls the power supply throughout the node while supporting local and remote wake-up with wake-up source recognition
- Various protection and diagnostic functions, including BUS short circuit detection and battery connection detection
- Supporting MCU of 3V to 5V

NCA1043B-Q1 implements the CAN physical layer as defined in ISO 11898-2/2016 and SAE J2284-1 to SAE J2284-5. Reliable communication is achieved in CAN FD fast phase networks with data rates up to 5 Mbps. The NCA1043B-Q1 provides thermal protection and transmit data dominant time out function. These features make the NCA1043B-Q1 the ideal choice for high speed CAN networks containing nodes that need to be available all times, even when the internal VIO and VCC supplies are switched off.

### Product feature

- Fully compatible with ISO11898-2/-5
- Standby and sleep modes
- Even if the whole node loses power, the local and remote wake-up functions are still supported
- Suitable for 12 V and 24 V systems
- Data rate up to 5 Mbps
- Power supply voltage
  - VBAT: 4.5V to 40V
  - VCC: 4.5V to 5.5V
  - VIO: 2.8V~5.5V
- -58V to 58V BUS fault protection
- Common mode voltage range: ± 30V
- Low loop delay: <250ns
- BUS pins support 8kV HBM ESD, 4kV IEC
- Low power consumption standby mode: 10μA
- Undervoltage and overtemperature protection
- Operating temperature: -40°C to 125°C
- AEC-Q100 certified
- RoHS compliant package: SOP-14, DFN-14

### Pinout & Package

- TXD
- GND
- VCC
- RXD
- CANL
- CANH
- NC
- VIO
- NC

### Application

- Advanced driver assistance system (ADAS)
- Body Electronics and Lighting
- Instrument panel
- Infotainment system
- Vehicle and transportation
- Applicable to 12V/24V system

### NCA1043B-Q1: Automotive CAN BUS Transceiver

Supporting CAN FD and Battery Back-up

Applicable to 12V/24V system
Product introduction
NCA1145-Q1 is a high-speed CAN transceiver that provides an interface between a controller area network (CAN) protocol controller and a physical two-wire CAN BUS. NCA1145-Q1 is designed to meet the requirements of high-speed CAN applications in the automotive industry, and can provide the function of sending and receiving differential signals for the CAN protocol controller (in the micro-controller). NCA1145-Q1 supports selective wake-up, which allows the system to realize local networking and run with fewer nodes in the active state, while the remaining nodes are in low-power sleep mode. NCA1145-Q1 is designed with VIO pins and supports MCU of 3.3V/5V. The above mentioned features make NCA1145-Q1 a good choice for high-speed CAN networks. The nodes of these networks are always connected to the battery power lines, but in order to reduce power consumption as much as possible, they will only become active when required by the applications.

Product feature
- Fully compatible with ISO11898-2/-5
- Standby and sleep modes
- Remote wake-up can be realized through standard CAN wake-up mode or selective wake-up frame detection.
- Local wake-up can be realized through WAKE pin
- Data rate up to 5 Mbps
- Power supply voltage: VBAT: 4.5V to 28V, VCC: 4.5V to 5.5V, VIO: 2.8V~5.5V
- -58V to 58V BUS fault protection
- Common mode voltage range: ±30V
- Low loop delay: <250ns
- BUS pins support 8kV HBM ESD, 4kV IEC
- Low power consumption standby mode: 10μA
- Operating temperature: -40°C to 125°C
- AEC-Q100 certified
- RoHS compliant package: SOP-14, DFN-14

Pinout & Package

Application
- Body Electronics and Lighting
- Automotive Infotainment System and Instrument Cluster
- Hybrid, electric and powertrain systems
- Industrial transportation
## LIN Transceiver

### LIN Transceiver Table

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>Power Supply Voltage</th>
<th>Max DataRate (Mbps)</th>
<th>BUS Voltage Protection</th>
<th>Wake-up</th>
<th>Operating Temperature Range (°C)</th>
<th>AEC-Q100</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCA1021 S-Q1</td>
<td>NCA1021 S-Q1</td>
<td>VBATT: 5.5~27V</td>
<td>8</td>
<td>20</td>
<td>-40~40</td>
<td>Local/Remote</td>
<td>-40~150</td>
<td>✓</td>
</tr>
<tr>
<td>NCA1021 S-Q1SPR</td>
<td>NCA1021 S-Q1SPR</td>
<td>VBATT: 5.5~27V</td>
<td>8</td>
<td>20</td>
<td>-40~40</td>
<td>Local/Remote</td>
<td>-40~150</td>
<td>✓</td>
</tr>
</tbody>
</table>

### LIN Transceiver Pinout

- **RXD** (1)
- **SLP_N** (2)
- **WAKE_N** (3)
- **TXD** (4)
- **INH** (8)
- **Vbat** (7)
- **INH** (6)
- **GND** (5)
NCA1021S-Q1: Low Power Consumption LIN Transceiver with Multiple Wake-up Functions

**Product introduction**

NCA1021S-Q1 is a LIN transceiver that supports low power consumption and multiple wake-up functions, supporting up to 20kbps for sending and receiving communication. NCA1021S-Q1 is designed with a low power consumption sleep mode and supports remote and local wake-up functions via LIN BUS or other pins. The device can also use the INH output pin as a flag to control the working status of other devices in the local system to achieve low-power operation of the system. NCA1021S-Q1 controls the status of the LIN BUS through the TXD pin and reports the status of the BUS through its open drain RXD output pin. The device converts the signal received by TXD into a LIN BUS signal through waveform shaping and slew rate adjustment to reduce Electro Magnetic Emission (EME).

**Product feature**

- Fully compatible with ISO17987-4
- Ultra-low electromagnetic emission (EME)
- Supporting 12V systems
- Input level compatible with 3.3V and 5 V devices
- -40V to 40V BUS fault protection
- Wake-up source identification (local or remote)
- Integrated with LIN pull-up resistor
- Transmit data (TXD) dominant time out function
- Date rate: up to 20kbps
- AEC-Q100 certified
- Operating temperature: -40°C to 105°C
- RoHS compliant package: SOP-8, DFN-8

**Pinout & Package**

<table>
<thead>
<tr>
<th>Pin Name</th>
<th>Pin Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXD</td>
<td>1</td>
</tr>
<tr>
<td>SLP_N</td>
<td>2</td>
</tr>
<tr>
<td>WAKE_N</td>
<td>3</td>
</tr>
<tr>
<td>TXD</td>
<td>4</td>
</tr>
<tr>
<td>INH</td>
<td>5</td>
</tr>
<tr>
<td>VBAT</td>
<td>6</td>
</tr>
<tr>
<td>NCA1021S-Q1</td>
<td>7</td>
</tr>
</tbody>
</table>

**Application**

- Body Electronics and Lighting
- Automotive Infotainment System and Instrument Cluster
- Hybrid, electric and powertrain systems
**Digital Isolator**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NSI82xx Series High Performance Multi-Channel Digital Isolator Chip

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Forward/Reverse Channels</th>
<th>Max Data Rate (Mbps)</th>
<th>Default Output</th>
<th>AEC-Q100</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI8210</td>
<td>NSI8210Kx</td>
<td>3.75</td>
<td>1/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8210Xx</td>
<td>2</td>
<td>1/1</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td>DFN-8</td>
</tr>
<tr>
<td>NSI8222</td>
<td>NSI8222Kx</td>
<td>3.75</td>
<td>2/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8222Xx</td>
<td>5.7</td>
<td>2/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8221</td>
<td>NSI8221Kx</td>
<td>3.75</td>
<td>2/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8221Xx</td>
<td>5</td>
<td>2/1</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8222</td>
<td>NSI8222Kx</td>
<td>3.75</td>
<td>2/3</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8222Xx</td>
<td>5.7</td>
<td>2/3</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>2/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>2/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>3/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>3/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>3/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>3/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>4/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>4/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>4/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>4/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>4/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>4/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>5/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>5/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>5/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>5/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>6/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>6/0</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>6/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>6/1</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>6/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>6/2</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>6/3</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>6/3</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Kx</td>
<td>3.75</td>
<td>6/6</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
<tr>
<td></td>
<td>NSI8220Xx</td>
<td>5.7</td>
<td>6/6</td>
<td>150</td>
<td></td>
<td></td>
<td>SOP-8</td>
</tr>
</tbody>
</table>

Digital Isolator
### NSI8xxC Series Cost-effective Multi-Channel Digital Isolator Chip

**Speed 150Mbps, Propagation delay 19μs, Output and input voltage range 2.5 to 5.5V, Operating temperature range -40 to 125 °C, and it has passed UL1577 certification**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Forward/Reverse Channels</th>
<th>Max DataRate (Mbps)</th>
<th>Default Output</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI8210</td>
<td>NSI8210Cx-DSWVR</td>
<td>3.75</td>
<td>1/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8220</td>
<td>NSI8220Cx-DSWR</td>
<td>3.75</td>
<td>2/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8230</td>
<td>NSI8230Cx-DSWR</td>
<td>3.75</td>
<td>2/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td><strong>Dual Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI8221</td>
<td>NSI8221Cx-DSWR</td>
<td>3.75</td>
<td>2/1</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8222</td>
<td>NSI8222Cx-DSWR</td>
<td>3.75</td>
<td>2/1</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8223</td>
<td>NSI8223Cx-DSWR</td>
<td>3.75</td>
<td>2/1</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td><strong>Triple Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI8230</td>
<td>NSI8230Cx-DSWR</td>
<td>3.75</td>
<td>3/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8231</td>
<td>NSI8231Cx-DSWR</td>
<td>3.75</td>
<td>3/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td><strong>Quad Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI8240</td>
<td>NSI8240Cx-DSWR</td>
<td>3.75</td>
<td>4/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8241</td>
<td>NSI8241Cx-DSWR</td>
<td>3.75</td>
<td>4/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8242</td>
<td>NSI8242Cx-DSWR</td>
<td>3.75</td>
<td>4/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td><strong>Six Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI8260</td>
<td>NSI8260Cx-DSWR</td>
<td>3.75</td>
<td>6/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8261</td>
<td>NSI8261Cx-DSWR</td>
<td>3.75</td>
<td>6/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8262</td>
<td>NSI8262Cx-DSWR</td>
<td>3.75</td>
<td>6/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8263</td>
<td>NSI8263Cx-DSWR</td>
<td>3.75</td>
<td>6/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
<tr>
<td>NSI8264</td>
<td>NSI8264Cx-DSWR</td>
<td>3.75</td>
<td>6/0</td>
<td>100</td>
<td>✅</td>
<td>SOIC-16N</td>
</tr>
</tbody>
</table>

### NIRSxx Series Low Cost Multi-Channel Digital Isolator Chip with Basic Insulation But High Reliability

Output and input voltage range 2.5 to 5.5V, Operating temperature range -40 to 125 °C, and it has passed UL1577 certification

<table>
<thead>
<tr>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Forward/Reverse Channels</th>
<th>Max DataRate (Mbps)</th>
<th>CNFTd(V/μA)</th>
<th>Default Output</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIRS21HN-DSPR</td>
<td>3</td>
<td>20</td>
<td>1</td>
<td>100</td>
<td>✅</td>
<td>SOP-8</td>
</tr>
<tr>
<td>NIRS21NH-DSPR</td>
<td>3</td>
<td>20</td>
<td>1</td>
<td>100</td>
<td>✅</td>
<td>SOP-8</td>
</tr>
<tr>
<td>NIRS22HN-DSPR</td>
<td>3</td>
<td>21</td>
<td>1</td>
<td>100</td>
<td>✅</td>
<td>SOP-8</td>
</tr>
<tr>
<td><strong>Triple Channel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIRS31-DSX</td>
<td>3</td>
<td>31</td>
<td>1</td>
<td>100</td>
<td>✅</td>
<td>SSOP-16</td>
</tr>
</tbody>
</table>

---

*Note: The diagram and table may not be fully visible due to the limitations of text-based representation.*
Six-Channel Digital Isolators with High Reliability

**Product introduction**

NSI822X/NSI823X/NSI824X/NSI826X are cost-effective dual/triple/quad/six-channel digital isolators with high reliability. This series of products have passed UL1577 safety certification, support several insulation withstand voltage (3kVrms, 3.75kVrms, 5kVrms, 5.7kVrms), while providing high electromagnetic immunity and low emissions at low power consumption. The data rate of the product is up to 150Mbps, and the common mode transient immunity (CMTI) is up to 200kV/μs. It provides digital channel direction configuration and the default output level configuration when the input power is lost. The wide power supply voltage range of this series of devices supports direct connection with most digital interfaces, making it easy for level conversion. Excellent system-level EMC performance improves operation reliability and stability. AEC-Q100 (level 1) options are available for all devices.

**Product feature**

- Isolation withstand voltage 3000Vrms, 3750Vrms, 5000Vrms, 5700Vrms
- VDE Reinforced Isolation Certification
- Date rate: DC to 150Mbps
- High CMTI: ±200kV/μs
- AEC-Q100 (Grade 1) is applicable to all devices
- Chip-level ESD: HBM: ±8kV
- Enhanced ESD, EFT, surge protection at system level
- Lifetime of isolated gate: > 60 years
- Low propagation delay typical <15ns
- Low power consumption: 1.5mA/ch (1 Mbps)
- Operating temperature: -55 to 125°C
- RoHS-compliant packages: SOP-8, SOP-16, SSOP-16, SOIC-8, SOIC-16, and SOIC-16

**Pinout & Package**

![Pinout & Package Diagram]

**Application**

- Industrial automation systems
- Isolation interface, such as SPI, RS232, RS485, CAN
- Multichannel isolation
- General-purpose
- Motor control
- Power transmission
- Communication
**NSI8260/NSI8261/NSI8262/NSI8263: Cost-effective Enhanced Dual/Quad/Six-Channel Digital Isolators with High Reliability**

**Product introduction**
NSI8260/NSI8261/NSI8262/NSI8263 are cost-effective dual/triple/quad/six-channel digital isolators with high reliability. This series of products have passed UL-1577 safety certification, several insulation withstand voltage (3.75kVrms, 5kVrms), while providing high electromagnetic immunity and low emissions at low power consumption. The data rate of the product is up to 100Mbps, and the common mode transient immunity (CMTI) is up to 200kV/μs. It provides digital channel direction configuration and the default output level configuration when the input power is lost. The wide power supply voltage range of this series of devices supports direct connection with most digital interfaces, making it easy for level conversion. Excellent system-level EMC performance improves operation reliability and stability. The MSL rating of the device is MSL 3.

**Product feature**
- Isolation withstand voltage: 3750Vrms, 5000Vrms
- VDE Reinforced Isolation Certification
- Date rate: DC to 100Mbps
- High CMTI: ±150kV/μs
- Chip-level ESD: HBM: ±8kV
- Enhanced ESD, EFT, surge protection at system level
- Lifetime of isolated gate: > 60 years
- Low propagation delay typical <15ns
- Low power consumption: 1.5mA/CH(1 Mbps)
- Operating temperature: -40 to 125°C
- RoHS compliant packages: SOP-8, SOW-8, SOW-16

**Pinout & Package**

**Application**
- Industrial automation system, such as SPI, RS232, RS485 CAN
- General-purpose multichannel isolation
- Motor control
- Power transmission
- Communication

**Chip-level ESD:**
- HBM: ±8kV

**High CMTI:**
- ±150kV/μs

**Date rate:**
- DC to 100Mbps

**VDE Reinforced Isolation Certification**

**Isolation interface, General-purpose multichannel isolation**

**Communication**
**Product introduction**

NIRS2x is a cost-optimized dual-channel digital isolator with high reliability. The NIRS2x device is safety certified by UL1577, support 3kVrms insulation withstand voltages, while providing high electromagnetic immunity and low emissions at low power consumption. The data rate of NIRS2x is up to 500kbps, and the common mode transient immunity (CMTI) is up to 100kV/μs. NIRS2x allows digital channel direction configuration and provide a default output high level when input power is lost. The wide power supply voltage range of NIRS2x supports direct connection with most digital interfaces, making it easy for level conversion. Its high system-level EMC performance enhances its reliability and stability.

**Product feature**

- Up to 3000Vrms insulation voltage
- Data rate: DC to 500kbps
- Power supply voltage: 2.9V to 5.5V
- High CMTI: ±100kV/μs
- Chip-level EMC performance: HBM: ±6kV
- High system level EMC performance: Enhanced system level ESD, EFT, and surge immunity
- Maximum Surge Isolation Voltage VIOSM=6153Vpk
- Low power consumption: 1mA/ch (500kbps)
- Low transmission delay:<500ns
- Lifetime of isolated gate: > 60 years
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOP-8

**Pinout & Package**

<table>
<thead>
<tr>
<th>Pinout &amp; Package</th>
<th>NIRS22</th>
<th>NIRS21</th>
<th>NIRS20</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDD1</td>
<td>VDD1</td>
<td>VDD1</td>
<td>VDD1</td>
</tr>
<tr>
<td>VDD2</td>
<td>VDD2</td>
<td>VDD2</td>
<td>VDD2</td>
</tr>
<tr>
<td>IN1</td>
<td>IN1</td>
<td>IN1</td>
<td>IN1</td>
</tr>
<tr>
<td>IN2</td>
<td>IN2</td>
<td>IN2</td>
<td>IN2</td>
</tr>
<tr>
<td>OUTA</td>
<td>OUTA</td>
<td>OUTA</td>
<td>OUTA</td>
</tr>
<tr>
<td>OUTB</td>
<td>OUTB</td>
<td>OUTB</td>
<td>OUTB</td>
</tr>
<tr>
<td>GND1</td>
<td>GND1</td>
<td>GND1</td>
<td>GND1</td>
</tr>
<tr>
<td>GND2</td>
<td>GND2</td>
<td>GND2</td>
<td>GND2</td>
</tr>
</tbody>
</table>

**Application**

- Industrial automation system
- Communication via isolated SPI, RS-232, RS-485
- General-purpose multichannel isolation
- Motor control

Enhanced system level ESD, EFT, and surge immunity
NIRS31: Cost-optimized Triple-channel Digital Isolator with High Reliability

◆ Product introduction
NIRS31 is a cost-optimized triple-channel digital isolator. The NIRS31 device is safety certified by UL1577 support several insulation withstand voltages (3.00kVrms), while providing high electromagnetic immunity and low emissions at low power consumption. The data rate of NIRS31 is up to 1Mbps, and the common mode transient immunity (CMTI) is up to 100kV/us. NIRS31 allows digital channel direction configuration and provide a default output high level when input power is lost. The wide power supply voltage range of NIRS31 supports direct connection with most digital interfaces, making it easy for level conversion. Its high system-level EMC performance enhances its reliability and stability.

◆ Product feature
- Up to 3000Vrms insulation voltage
- Data rate: DC to 1Mbps
- Power supply voltage: 2.5V to 5.5V
- High CMTI: ±100kV/μs
- Chip-level ESD: HBM: ±6kV
- Isolation surge withstand voltage: >5kV
- Low power consumption: 1.5mA/ch (1Mbps)
- Low transmission delay: <500ns
- Lifetime of isolated gate: > 60 years
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SSOP-16

◆ Pinout & Package

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDD1</td>
<td>Power supply (VDD1)</td>
</tr>
<tr>
<td>GND1</td>
<td>Ground (GND1)</td>
</tr>
<tr>
<td>R1</td>
<td>Digital input (R)</td>
</tr>
<tr>
<td>R/E1</td>
<td>Digital input (R/E)</td>
</tr>
<tr>
<td>DE1</td>
<td>Digital input (DE)</td>
</tr>
<tr>
<td>D1</td>
<td>Digital input (D)</td>
</tr>
<tr>
<td>NC1</td>
<td>Digital input (NC)</td>
</tr>
<tr>
<td>VDD2</td>
<td>Power supply (VDD2)</td>
</tr>
<tr>
<td>GND2</td>
<td>Ground (GND2)</td>
</tr>
<tr>
<td>R2</td>
<td>Digital input (R)</td>
</tr>
<tr>
<td>R/E2</td>
<td>Digital input (R/E)</td>
</tr>
<tr>
<td>DE2</td>
<td>Digital input (DE)</td>
</tr>
<tr>
<td>D2</td>
<td>Digital input (D)</td>
</tr>
<tr>
<td>NC2</td>
<td>Digital input (NC)</td>
</tr>
<tr>
<td>VDD3</td>
<td>Power supply (VDD3)</td>
</tr>
<tr>
<td>GND3</td>
<td>Ground (GND3)</td>
</tr>
</tbody>
</table>

◆ Application
- Battery management system
- Isolated 485/232 communication system
- Smart ammeters and water meters

Isolated RS-485 Transceiver
Isolated CAN Transceiver
Isolated LIN Transceiver
Isolated 2-wire Communication
Isolated A/D Converter
Isolated Delta-Meander
Isolated SPI Interface
Isolated Digital Interface
Digital Isolator with Integrated Isolated Power Supply
# Digital Isolator with Integrated Isolated Power Supply

NSIP88xx/NSIP89xx Series Multi-Channel Digital Isolator Chip with Integrated Isolated Power Supply

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Forward/Reverse Channels</th>
<th>Max DataRate (Mbps)</th>
<th>Default Output</th>
<th>CMTI (kV/us)</th>
<th>Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSIP8820</td>
<td>NSIP8830xx</td>
<td>4.5</td>
<td>2/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8821</td>
<td>NSIP8831xx</td>
<td>4.5</td>
<td>2/1</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8822</td>
<td>NSIP8832xx</td>
<td>4.5</td>
<td>2/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8840</td>
<td>NSIP8840xx</td>
<td>4.5</td>
<td>4/3</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8841</td>
<td>NSIP8841xx</td>
<td>4.5</td>
<td>4/1</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8842</td>
<td>NSIP8842xx</td>
<td>4.5</td>
<td>4/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8843</td>
<td>NSIP8843xx</td>
<td>4.5</td>
<td>4/3</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8844</td>
<td>NSIP8844xx</td>
<td>4.5</td>
<td>4/4</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Split Logic VDD</td>
</tr>
<tr>
<td>NSIP8920</td>
<td>NSIP8930xx</td>
<td>4.5</td>
<td>2/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8921</td>
<td>NSIP8931xx</td>
<td>4.5</td>
<td>2/1</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8922</td>
<td>NSIP8932xx</td>
<td>4.5</td>
<td>2/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8940</td>
<td>NSIP8940xx</td>
<td>4.5</td>
<td>4/3</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8941</td>
<td>NSIP8941xx</td>
<td>4.5</td>
<td>4/1</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8942</td>
<td>NSIP8942xx</td>
<td>4.5</td>
<td>4/2</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8943</td>
<td>NSIP8943xx</td>
<td>4.5</td>
<td>4/3</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
<tr>
<td>NSIP8944</td>
<td>NSIP8944xx</td>
<td>4.5</td>
<td>4/4</td>
<td>150</td>
<td>✓</td>
<td>✓</td>
<td>130</td>
<td>Power Disable</td>
</tr>
</tbody>
</table>

**Features**

- **Split Logic VDD**
- **Power Disable**
- **SOW-16**

## NIRSP31 Low Cost Triple-Channel Digital Isolator Chip with Integrated Isolated Power Supply

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Power Supply Voltage</th>
<th>ISO Rating (kVrms)</th>
<th>Forward/Reverse Channels</th>
<th>Max DataRate (Mbps)</th>
<th>CMTI(kV/us)</th>
<th>Default Output</th>
<th>Operating Temperature</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIRSP31</td>
<td>NIRSP31</td>
<td>4.5 to 5.5V</td>
<td>3</td>
<td>3/1</td>
<td>20</td>
<td>50</td>
<td>High</td>
<td>-40~125°C</td>
<td>LGA-18</td>
</tr>
<tr>
<td>NIRSP31V</td>
<td>NIRSP31V</td>
<td>4.5 to 5.5V</td>
<td>3</td>
<td>3/1</td>
<td>20</td>
<td>50</td>
<td>High</td>
<td>-40~125°C</td>
<td>LGA-18</td>
</tr>
</tbody>
</table>

**Features**

- **Isolated Power Supply Voltage**
- **Iso Rating (kVrms)**
- **Forward/Reverse Channels**
- **Max DataRate (Mbps)**
- **CMTI(kV/us)**
- **Default Output**
- **Operating Temperature**
- **Package Type**
NSIP882x/NSIP892x/NSIP884x/NSIP894x: Dual/Quad-Channel Digital Isolator with Integrated Isolated DC-DC Power Supply

### Product introduction
NSIP882x/NSIP892x/NSIP884x/NSIP894x is a dual/quad-channel digital isolator with integrated isolated DC-DC power supply. The isolation DC-DC power supply can provide up to 500mW of output power on the on-chip transformer. The feedback PWM signal is sent to the primary side by a digital isolator based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. The products are safety certified by UL1577 support 4.5kVrms withstand voltages, while providing high electromagnetic immunity and low emissions. The data rate of this series of products is up to 150Mbps, and the common mode transient immunity (CMTI) is up to 150kV/us. The NSIP882x devices provide 5V to 5V, 5V to 3.3V, 3.3V to 3.3V conversion mode, the output voltage can be set by SEL pin. The logical level of digital isolators on left side can be set by VDDL pin which can support the application when the supply voltage and I/O voltage level are different.

### Product feature
- Up to 4500Vrms insulation voltage
- Supply voltage: 3.3V to 5.5V
- 5V to 5V/5V to 3.3V, 100mA load current
- 3.3V to 3.3V, 60mA load current
- Overcurrent and thermal protection
- Date rate: DC to 150Mbps
- High CMTI:150kV/us
- Propagation delay:<15ns
- High system level EMC performance: Enhanced system level ESD, EFT, and surge immunity
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW16

### Pinout & Package

![Pinout & Package Diagram]

### Application
- Industrial automation system
- Isolated SPI, RS232, RS485
- Universal Multi-Channel Isolator
NIRSP31/V: Low Cost Triple-Channel Digital Isolator with Integrated Isolated DC-DC Power Supply

**Product introduction**

NIRSP31/V is a low cost triple-channel digital isolator with integrated isolated DC-DC power supply. The isolated DC-DC converter provides stable output voltage and up to 400mW output power by closed-loop control and transformer on chip. The feedback PWM signal is transmitted to the primary side by a digital isolator based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. The NIRSP31/V device supports 3kVrms isolation withstand voltages, and features improved electromagnetic immunity and low emission. The data rate of the NIRSP31/V is up to 20Mbps, and the common-mode transient immunity (CMTI) is up to 50kV/μs. For NIRSP31 device, 5V to 5V, 3.3V conversion modes are allowed, for NIRSP31/V device, 5V to 5V, 3.3V conversion modes, 3.3V to 3.3V conversion modes are allowed, both output voltage can be set through SEL pin.

**Product feature**

- Insulation voltage up to 3000Vrms
- Overcurrent and thermal protection
- Data transmission rate: DC to 20Mbps
- High CMTI: 50kV/μs
- Propagation delay: <75ns
- Operating temperature: -40°C to 125°C
- RoHS compliant package: LGA18

**Pinout & Package**

![Pinout Diagram](image)

**Application**

- Industrial BMS System
- Industrial automation system
- Isolated SPI, RS232, RS485
- General-purpose multichannel isolation
Isolated 485 with Integrated Isolated Power Supply

Isolated CAN with Integrated Isolated Power Supply

Isolated I2C Interface

RS-485 Transceiver

CAN Transceiver

LIN Transceiver

Digital Isolator

Digital Isolator with Integrated Isolated Power Supply

Isolated ADC

Isolated Current Amplifier

Isolated Voltage Amplifier

Isolated Error Amplifier

Isolated Comparator
### Isolated 485 with Integrated Isolated Power Supply

#### NSIP83086: RS-485 Transceiver Chip with Integrated Isolated Power Supply

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Power Supply Voltage</th>
<th>ISO Rating (kVrms)</th>
<th>ESD (kV)</th>
<th>Max Data Rate (Mbps)</th>
<th>CMTI (kV/us)</th>
<th>VISO (Output V)</th>
<th>Operating Temperature</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSIP83086</td>
<td>VDD: 4.5<del>5.5V VDDL: 1.8</del>5.5V</td>
<td>S 8 16 150</td>
<td>5</td>
<td>40~105°C</td>
<td>SOW-16</td>
<td>ISO-16</td>
<td>-40~105°C</td>
<td>SOW-20</td>
</tr>
<tr>
<td>NSIP83086W</td>
<td>VDD: 3.3<del>5.5V VDDL: 1.8</del>5.5V</td>
<td>S 8 16 150</td>
<td>3.3</td>
<td>40~105°C</td>
<td>SOW-16</td>
<td>ISO-16</td>
<td>-40~105°C</td>
<td>SOW-20</td>
</tr>
<tr>
<td>NSIP83086G</td>
<td>VDD: 3.3<del>5.5V VDDL: 1.8</del>5.5V</td>
<td>S 8 16 150</td>
<td>3.3</td>
<td>40~105°C</td>
<td>SOW-16</td>
<td>ISO-16</td>
<td>-40~105°C</td>
<td>SOW-20</td>
</tr>
</tbody>
</table>

- **VDD**: Power Supply Voltage
- **VDDL**: Power Supply Voltage
- **ISO**: Isolation Rating
- **ESD**: Electrostatic Discharge
- **Max Data Rate**: Maximum Data Rate
- **CMTI**: Common Mode Transient Immunity
- **VISO**: Output Voltage
- **Operating Temperature**: Operating Temperature Range
Product introduction
NSIP83086/V/C is a full duplex isolated RS-485 transceiver with integrated isolated DC-DC power supply with high reliability. Isolated DC-DC power supply can be based on on-chip transformer, the feedback PWM signal is transmitted to the primary side by a digital isolator based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. NSIP83086/V/C support 5kVrms insulation withstand voltages, while the high integrated solution can help to simplify system design and improve reliability.

The bus pins on the bus side of the NSIP83086/V/C is designed with ±8kV ESD protection to GND2 at system level. This device is designed with a fail-safe circuit that ensures the receiver output is logic high when the receiver input is disconnected or shorted. It features a receiver input impedance of 1/8 unit load, allowing up to 256 transceivers to be connected to the bus.

Product feature
- Insulation voltage up to 5000Vrms
- I/O voltage range supports 1.8V to 5V MCU
- Power supply voltage:
  - VDD: 4.5V to 5.5V (NSIP83086)
  - VDD: 3V to 5.5V (NSIP83086V/C)
  - VDDL: 1.8V to 5.5V
- Overcurrent and thermal protection
- High CMTI: 150kV/us
- Data transmission rate: 16Mbps
- Supporting 256 transceivers
- High system level EMC performance:
  - BUS Pins w.r.t to GND2 meet IEC61000-4-2 ±8kV
  - Other Pins w.r.t to GND2 meet IEC61000-4-2 ±7kV
- Operating temperature: -40°C to 105°C
- RoHS compliant package: SOW16, SOW20

Pinout & Package

Application
- Industrial automation system
- Isolated RS-485 communication system
- Smart ammeters and water meters
- Security and surveillance systems
Isolated CAN with Integrated Isolated Power Supply

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Power Supply Voltage</th>
<th>ISO Rating (kVrms)</th>
<th>ESD (kV)</th>
<th>Max Data Rate (Mbps)</th>
<th>CMTI (kV/us)</th>
<th>Logic Level Voltage</th>
<th>Operating Temperature</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSIP1042</td>
<td>4.5V to 5.5V</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>150</td>
<td>1.8V to 5.5V</td>
<td>-40~105°C</td>
<td>SOW-20</td>
</tr>
</tbody>
</table>

---

![Diagram of circuit board connections](image-url)
NSIP1042 is a CAN transceiver with integrated isolated DC-DC power supply with high reliability. The feedback PWM signal is transmitted to the primary side by a digital isolator based on NOVOSENSE capacitance isolation technology. Highly integrated solutions simplify system design and improve reliability. NSIP1042 is safety certified by UL1577 support 5kVrms insulation withstand voltages, while the high integrated solution can help to simplify system design and improve reliability. The BUS pins on the BUS side of the NSIP1042 is designed with ±5kV ESD protection to GND2 at system level. NSIP1042 can support data transmission rates of up to 5Mbps, while providing thermal protection and explicit timeout protection for transmission data.

- **Product feature**
  - Insulation voltage up to 5000Vrms
  - ISO-Power integrated isolated dc-to-dc converter
  - Supply voltage: 4.5V to 5.5V
  - Overcurrent and thermal protection High
  - CMTI:150kV/us
  - Data transmission rate: 5Mbps
  - High system level EMC performance: BUS pins conforming to IEC61000-4-2±5kV ESD
  - Operating temperature: -40°C to 105°C
  - RoHS compliant package: SOW20

- **Pinout & Package**

- **Application**
  - Industrial automation system
  - Smart ammeters and water meters
  - Security and surveillance systems
Isolated ADC
### NSI1305/6 Isolated ADC Series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Linear Input Range(mV)</th>
<th>Input Type</th>
<th>Output Type</th>
<th>CMTI (kV/μs)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1306</td>
<td>NSI1306M05</td>
<td>5</td>
<td>-250–250</td>
<td>Differential</td>
<td>Digital (clock rising edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1306M15</td>
<td>5</td>
<td>-250–250</td>
<td>Differential</td>
<td>Digital (clock falling edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1306M25</td>
<td>5</td>
<td>-250–250</td>
<td>Differential</td>
<td>Digital (clock falling edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
</tbody>
</table>

### NSI1303 Isolated ADC Series

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Linear Input Range(mV)</th>
<th>Input Type</th>
<th>Output Type</th>
<th>Differential Input Resistance (kΩ)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1303</td>
<td>NSI1303E0x</td>
<td>5</td>
<td>50–50</td>
<td>Differential</td>
<td>Manchester</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1303E2x</td>
<td>5</td>
<td>50–50</td>
<td>Differential</td>
<td>Manchester</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1303E1x</td>
<td>5</td>
<td>50–50</td>
<td>Differential</td>
<td>Uncoded (clock rising edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1303D0x</td>
<td>5</td>
<td>50–50</td>
<td>Differential</td>
<td>Uncoded (clock falling edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
<tr>
<td></td>
<td>NSI1303D2x</td>
<td>5</td>
<td>50–50</td>
<td>Differential</td>
<td>Uncoded (clock falling edge effective)</td>
<td>150</td>
<td>-40–125</td>
<td>SOW-8</td>
</tr>
</tbody>
</table>
NSI1306: Isolated Current Sampling ADC with High Reliability

Product introduction
NSI1306 is a high-performance Σ-Δ modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is ± 50mV (full scale ± 64mV) or ± 250mV (full scale ± 320mV). Differential inputs are ideal for shunt resistance-based current detection in high voltage applications that require isolation. The analog input is amplified and continuously sampled by a second-order Σ-Δ modulator and then converted to a high-speed, single-bit data stream. The output data is synchronized with the external clock, the rising edge of the clock is valid, and the frequency range is 9MHz to 21MHz. By using an appropriate digital filter (such as a sinc3 filter) to extract the bit stream, the device can achieve 16-bit resolution and 86dB/82.5dB signal-to-noise ratio (SNR) with a 20MHz master clock under the condition of 78.125KPS. The fail-safe function includes input common mode overvoltage detection and VDD1 missing detection, simplifying system design and diagnosis.

Product feature
- Insulation voltage up to 5000Vrms
- Clock frequency: 5MHz to 21MHz
- Linear input range of ± 50mV or ± 250mV
- Excellent DC performance:
  - Offset error: ± 50 μV or ± 100 μV(Max)
  - Offset drift: -0.5 to 1.5 μV/°C(Max)
  - Gain error: 0.2%(Max)
  - Gain drift: ± 40ppm/°C(Max)
- SNR: 82.5dB or 86dB(Typ)
- High CMTI: 1500V/μs(Typ)
- System level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
  - Operating temperature: -40°C to 125°C

Pinout & Package

Application
- Shunt current monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger

Product introduction
NSI1306 is a high-performance Σ-Δ modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is ± 50mV (full scale ± 64mV) or ± 250mV (full scale ± 320mV). Differential inputs are ideal for shunt resistance-based current detection in high voltage applications that require isolation. The analog input is amplified and continuously sampled by a second-order Σ-Δ modulator and then converted to a high-speed, single-bit data stream. The output data is synchronized with the external clock, the rising edge of the clock is valid, and the frequency range is 9MHz to 21MHz. By using an appropriate digital filter (such as a sinc3 filter) to extract the bit stream, the device can achieve 16-bit resolution and 86dB/82.5dB signal-to-noise ratio (SNR) with a 20MHz master clock under the condition of 78.125KPS. The fail-safe function includes input common mode overvoltage detection and VDD1 missing detection, simplifying system design and diagnosis.

Product feature
- Insulation voltage up to 5000Vrms
- Clock frequency: 5MHz to 21MHz
- Linear input range of ± 50mV or ± 250mV
- Excellent DC performance:
  - Offset error: ± 50 μV or ± 100 μV(Max)
  - Offset drift: -0.5 to 1.5 μV/°C(Max)
  - Gain error: 0.2%(Max)
  - Gain drift: ± 40ppm/°C(Max)
- SNR: 82.5dB or 86dB(Typ)
- High CMTI: 1500V/μs(Typ)
- System level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
  - Operating temperature: -40°C to 125°C

Pinout & Package

Application
- Shunt current monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
NSI1305: Isolated Current Sampling ADC with High Reliability

Product introduction
NSI1305 is a high-performance Σ-Δ modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is ±50mV (full scale ±64mV) or ±250mV (full scale ±320mV). Differential inputs are ideal for shunt resistance-based current detection in high voltage applications that require isolation.

The analog input is amplified and continuously sampled by a second-order Σ-Δ modulator and then converted to a high-speed, single-bit data stream. The output data is synchronized with the external clock, the falling edge of the clock is valid, and the frequency range is 5MHz to 21MHz. By using an appropriate digital filter (such as a sinc3 filter) to extract the bit stream, the device can achieve 16-bit resolution and 86dB/82.5dB signal-to-noise ratio (SNR) with a 20MHz master clock under the condition of 78.125KPS. The fail-safe function includes input common mode overvoltage detection and VDD1 missing detection, simplifying system design and diagnosis.

Product feature
- Insulation voltage up to 5000Vrms
- Clock frequency: 5MHz to 21MHz
- Linear input range of ±50mV or ±250mV
- Excellent DC performance:
  - Offset error: ±50 μV or ±100 μV (Max)
  - Offset drift: -0.5 to 1.5 μV/°C (Max)
  - Gain error: 0.2% (Max)
  - Gain drift: ±40ppm/°C (Max)
- SNR: 82.5dB or 86dB (Typ)
- High CMTI: 150kV/μs (Typ)
- System-level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
  - Operating temperature: -40°C to 125°C

Pinout & Package

Application
- Shunt current monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
NSI1303 is a high-performance \( \Sigma \Delta \) modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is ±50mV (full scale ±64mV) or ±250mV (full scale ±320mV). The analog input is continuously sampled by a second-order \( \Sigma \Delta \) modulator and then converted to a high-speed, single-bit data stream. The output bit data stream of NSI1303 is synchronized with its internal clock, in this process, Manchester encoding (NSI1303Ex) is used or the data is leaving as unencoded (NSI1303M/Dx). By using an appropriate digital filter (such as a sinc3 filter) to extract the bit stream, the device can achieve 16-bit resolution and 86dB/82.5dB signal-to-noise ratio (SNR) under the condition of 78.125KPS. The output of Manchester coded NSI1303Ex supports single-wire data and clock transmission, regardless of the setting and holding time requirements of the receiving device.

**Product feature**
- Insulation voltage up to 5000Vrms
- Options of 10MHz and 20MHz internal clocks
- Linear input range of ±50mV or ±250mV
- Excellent DC performance:
  - Offset error and drift: ±50μV or ±100μV (Max), ±1μV/°C (Max)
  - Gain error and drift: ±0.2% (Max), ±40ppm/°C (Max)
- High CMTI: 150kV/us (Typ)
- System-level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-8(300mil), SOW-16(300mil)

**Pinout & Package**

**Application**
- Shunt current monitoring
- AC motor control
- UPS
- Onboard charger

---

### Table

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSI1303X</th>
<th>NSI1303M/Dx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation voltage</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RoHS compliant package</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Isolated Current Amplifier

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Linear Input Range (mV)</th>
<th>Gain (X100)</th>
<th>Input Type</th>
<th>CMTI (kV/μs)</th>
<th>AEC-Q100</th>
<th>Operating Temperature Range (℃)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1300</td>
<td>NSI1300D05</td>
<td>50-52</td>
<td>250-500</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1300</td>
<td>NSI1300D25</td>
<td>-50-250</td>
<td>250-500</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1200</td>
<td>NSI1200D05</td>
<td>250-250</td>
<td>8</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1200</td>
<td>NSI1200D25</td>
<td>-250-250</td>
<td>8</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1400</td>
<td>NSI1400D05</td>
<td>50-250</td>
<td>8.2</td>
<td>8</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1400</td>
<td>NSI1400D25</td>
<td>-250-250</td>
<td>8.2</td>
<td>8</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1300C</td>
<td>NSI1300C05</td>
<td>50-52</td>
<td>250-500</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1300C</td>
<td>NSI1300C25</td>
<td>-50-250</td>
<td>250-500</td>
<td>8.2</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1200C</td>
<td>NSI1200C05</td>
<td>250-250</td>
<td>8</td>
<td>8</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
<tr>
<td>NSI1200C</td>
<td>NSI1200C25</td>
<td>-250-250</td>
<td>8</td>
<td>8</td>
<td>Differential</td>
<td>250</td>
<td>✓</td>
<td>-40 to 125</td>
<td>SOW-8</td>
</tr>
</tbody>
</table>

Isolated Current Amplifier Series

Isolation Barrier

VDD1 detection

VCM detection

AGND

DGND

CLKOUT

DOUT

DVDD

AVDD

INP

INN

Reference

RX

RX

TX

TX

∑

Ƕ

modulator

Oscillator

Manchester Coding

Digital Isolator

Digital Isolator with Integrated Isolated Power Supply

Isolated Power Supply

Isolated CAN with Integrated Isolated Power Supply

Isolated ADC

Isolated Voltage Amplifier

Isolated Current Amplifier

Isolated Error Amplifier

Isolated Comparator

134
**Product introduction**

NSI1200/NSI1300 is a high-performance isolated amplifier with output separated from input based on the NOVOSENSE capacitive isolation technology. This series of products are designed with linear differential input signal of ±50mV (NSI1300D05, full scale ±64mV) or ±250mV (NSI1200/NSI1300D25, full scale ±320mV). The fail-safe function includes input common mode overvoltage detection and VDD1 missing detection, simplifying system design and diagnosis. The fixed gain of the NSI1200/NSI1300 is 8/8.2 and provides a differential analog output. Low offset and gain drift ensure accuracy over the entire temperature range. High common-mode transient immunity ensures that the device is able to provide accurate and reliable measurements even in the presence of high-power switching such as in motor control applications.

**Product feature**

- Linear input range of ±50mV or ±250mV
- Fixed gain: 8 for NSI1200, and 8.2 for NSI1300
- Ultralow offset error and drift:
  - NSI1200: ±0.5mV (Max), ±4μV/°C (Max)
  - NSI1300D05: ±0.1mV (Max), -0.8~1μV/°C (Max)
  - NSI1300D25: ±0.2mV (Max), -2~4μV/°C (Max)
- Ultralow gain error and drift:
  - ±0.3% (Max), ±50ppm/°C (Max)
- SNR: 86dB (Typ)
- Wide bandwidth: 100kHz for NSI1200
  310kHz for NSI1300
- High CMTI: 150kV/μs
- Operating temperature: -40°C to 125°C
- Package compliant with RoHS: SOW-8(300mil) (NSI1200 & NSI1300), DUB8 (NSI1200 only)

**Functional Block Diagram**

[Diagram of NSI1200/NSI1300: Isolated Current Sampling Amplifier with High Reliability]

**Application**

- Shunt current monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger

**Diagram**

[Functional Block Diagram of NSI1200/NSI1300]
**Product introduction**

NSI1400/NSI1200C is a cost-effective isolated amplifier with output separated from input based on the NOVOSENSE capacitive isolation technology. This product is designed with linear differential input signal of ±250mV (full scale ±320mV). Differential inputs are ideal for shunt resistance-based current detection in high voltage applications that require isolation.

The fixed gain of the NSI1400 is 8.2, the fixed gain of the NSI1400 is 8, and differential analog input is made available as well. Low offset and gain drift ensure accuracy over the entire temperature range. High common-mode transient immunity ensures that the device is able to provide accurate and reliable measurements even in the presence of high-power switching such as in motor control applications. The fail-safe function includes input common mode overvoltage detection and VDD1 missing detection, simplifying system design and diagnosis.

**Product feature**

- Insulation voltage up to 5000Vrms
- Linear input range of ±250mV
- Low offset error and drift: ±0.5μV/°C (Max), ±5μV/°C (Max) for NSI1200C, ±4μV/°C (Max) for NSI1400
- Low gain error and drift: ±0.3%/Max, ±30ppm/°C (Max)
- Low non-linearity and drift: ±0.05%/Max, ±1ppm/°C (Typ)
- SNR: 72dB (Typ, BW=100kHz)
- Bandwidth: 220kHz (Typ)
- High CMTI: 125kV/us (Typ)
- System-level diagnostic capabilities: VDD1 monitoring
- Input common mode overvoltage detection
- Operating temperature: -40°C to 125°C
- Package compliant with RoHS: SOP-8 (150mil), SOW-8 (300mil), DUB-8 (NSI1200 Only)

**Functional block diagram**

**Application**

- Shunt current monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
# Isolation Voltage Amplifier Series

<table>
<thead>
<tr>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Linear Input Range (mV)</th>
<th>Input Type</th>
<th>Output Type</th>
<th>CMTI (kV/μs)</th>
<th>AEC-Q100</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1311</td>
<td>5</td>
<td>20~2000</td>
<td>Single-ended</td>
<td>Differential</td>
<td>150</td>
<td>-40~125</td>
<td>SOP-8</td>
<td></td>
</tr>
<tr>
<td>NSI1312D</td>
<td>5</td>
<td>1200~1200</td>
<td>Differential</td>
<td>Differential</td>
<td>150</td>
<td>-40~125</td>
<td>SOP-8</td>
<td></td>
</tr>
<tr>
<td>NSI1312S</td>
<td>5</td>
<td>1200~1200</td>
<td>Differential</td>
<td>Single-ended</td>
<td>150</td>
<td>-40~125</td>
<td>SOP-8</td>
<td></td>
</tr>
</tbody>
</table>
NSI1311: Isolated Voltage Sampling Amplifier with High Reliability

◆ Product introduction
NSI1311 is a high-performance isolated amplifier with output separated from input based on the NOVOSENSE capacitive isolation technology. The device is designed with a single-ended input signal range of 0.1V to 2V. The high input impedance of the NSI1311 makes it ideal for connection to high voltage resistive dividers or other voltage signal sources with high output impedance. The fixed gain of the device is 1, and differential analog input is made available as well. Low offset and gain drift ensure accuracy over the entire temperature range. High common-mode transient immunity ensures that the device is able to provide accurate and reliable measurements even in the presence of high-power switching such as in motor control applications. The fail-safe function (high-side supply voltage loss detection) simplifies the design and diagnostics of the system.

◆ Product feature
- Insulation voltage up to 5000Vrms
- Linear input range of 0.02 to 2V
- Fixed gain: 1
- Ultralow offset error and drift: ±1.5mV/(Max), -5 to 30μV/°C/(Max)
- Ultralow gain error and drift: ±0.3%(Max), ±45ppm/°C/(Max)
- Ultralow non-linearity and drift: ±0.05%(Max) for 0.02V~0.1V VIN, ±0.04%(Max) for 0.1V~2V VIN, ±1ppm/°C/(Max)
- SNR: 82dB/(Typ, BW=10kHz) or 70dB/(Typ, BW=100kHz)
- Wide bandwidth: 400kHz/(Typ)
- High CMTI: 150kV/μs/(Typ)
- System-level diagnostic capabilities:
  - VDD1 monitoring
  - Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-8(300mil)

◆ Functional block diagram

◆ Application
- BUS voltage monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
NSI1312: Isolated Voltage Sampling Amplifier with High Reliability

Product Introduction
NSI1312 is a cost-effective isolated amplifier with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is 1.2V (full scale ±1.5V). The high input impedance of the NSI1311 makes it ideal for connection to high voltage resistive dividers or other voltage signal sources with high output impedance. The fixed gain of the device is 1, and two versions are available: one is with differential analog output (NSI1312D), and the other is with single-ended analog output (NSI1312S). Low offset and gain drift ensure accuracy over the entire temperature range. High common-mode transient immunity ensures that the device is able to provide accurate and reliable measurements even in the presence of high-power switching such as in motor control applications. The fail-safe function (high-side supply voltage loss detection) simplifies the design and diagnostics of the system.

Product feature
- Insulation voltage up to 5000Vrms
- Linear input range of ±1.2V
- Fixed gain: 1
- Excellent DC performance:
  - Offset error and drift: ±5mV (Max), ±20μV/°C (Typ)
  - Gain error and drift: ±1% (Max), ±50ppm/°C (Typ)
  - Non-linearity and drift: ±0.3% (Max), ±10ppm/°C (Typ)
- SNR: 72dB (Typ)
- High CMTI: 100kV/μs (Typ)
- System-level diagnostic capabilities:
  - VDD1 monitoring
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW-8 (300mil), SOP-8 (150mil)

Functional block diagram

Application
- BUS voltage monitoring
- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
# Isolated Error Amplifier

<table>
<thead>
<tr>
<th>Part No.</th>
<th>ISO Rating (kVRms)</th>
<th>Bandwidth (kHz)</th>
<th>Initial Accuracy (%)</th>
<th>Reference Voltage (V)</th>
<th>CMTI (kV/μs)</th>
<th>Operating Temperature Range (℃)</th>
<th>Package Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI3190</td>
<td>3</td>
<td>400</td>
<td>0.5</td>
<td>1.225</td>
<td>100</td>
<td>-40~125</td>
<td>SSOP16</td>
</tr>
</tbody>
</table>
**NSI3190: Isolated Error Amplifier with High Reliability**

- **Product introduction**
  The NSI3190 is a high reliability isolated error amplifier based on NOVOSENSE capacitive isolation technology. NSI3190 is ideal for linear feedback power supplies. The primary side controller of the NSI3190 improves transient response, power density and stability compared to schemes using optocouplers and shunt regulators. The output of NSI3190 can support voltage output and current output, which is compatible with optocouplers. The current transmission coefficient can be set by an external resistor between EAOUT2 and VDD1 or VREG1.

- **Product feature**
  - 0.5% initial accuracy
  - Insulation voltage up to 3000Vrms
  - Wide bandwidth: 400kHz
  - Power supply voltage:
    - VDD1: 4V to 20V
    - VDD2: 4V to 20V
  - Reference voltage: 1.225V
  - Compatible with voltage type output and current type output
  - Ultra low power consumption
  - Operating temperature: -40°C to 125°C

- **Functional block diagram**

- **Application**
  - DOSA compliant modules
  - Inverter
  - UPS
  - Voltage monitor
  - Power supply system

---

**Digital Isolator**

**Isolated CAN Transceiver**

**Isolated I²C Interface**

**Isolated CAN Interface**

**Isolated ADC**

**Isolated 485 with Integrated Isolated Power Supply**

**Isolated CAN with Integrated Isolated Power Supply**

---

141
### Isolated Comparator

**Isolated Comparator Series**

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>ISO Rating (kVrms)</th>
<th>Input Power (V)</th>
<th>Reference Threshold (mV)</th>
<th>Output Type</th>
<th>Latching</th>
<th>Operating Temperature Range (℃)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI22C11</td>
<td>5</td>
<td>3-27</td>
<td>500-2000</td>
<td>±20mV – ±320mV</td>
<td>Push-pull Operation</td>
<td>150</td>
<td>-40 to 125</td>
<td>SOP-8</td>
</tr>
<tr>
<td>NSI22C12</td>
<td>5</td>
<td>3-27</td>
<td>500-2000</td>
<td>±20mV – ±320mV</td>
<td>Open-dra</td>
<td>150</td>
<td>-40 to 125</td>
<td>SOP-8</td>
</tr>
</tbody>
</table>
**NSI22C1x: High-speed isolated comparators**

**Product introduction**

NSI22C1x is a high-speed isolated comparator with output separated from input based on the NOVOSENSE capacitive isolation technology. NSI22C11 is an isolated comparator with open-drain and push-pull outputs, and the NSI22C12 is a window comparator with open-drain output and latch function. The fast response characteristics of the NSI22C1x make it ideal for overvoltage and overcurrent protection applications. The protection threshold of the NSI22C1x can be adjusted by external resistors. NSI22C11 is designed with an adjustable threshold from 0.5V to 2V, and NSI22C12 is designed with a window threshold adjustment range from ±20mV to ±320mV. Two packages are available for NSI22C1x, one is SOP-8 narrow-body package with basic isolation and the other is SOW-8 wide-body package with reinforced isolation.

**Product feature**

- Insulation voltage up to 5000Vrms
- Power supply at input side: 3V to 27V
- Adjustable input reference range:
  - NSI22C11: 0.5V to 2V
  - NSI22C12: ±20 to ±320mV
- High-precision input threshold ±1% error (Max)
- Fast Propagation Delay:
  - NSI22C11: 1us(Max)
  - NSI22C12: 250ns(Max)
- CMTI: ±150kV/us(Typ)
- System-level diagnostic capabilities
- VDD1 monitoring
- Operating temperature: -40~125°C
- RoHS compliant package: SOP-8(150mil), SOW-8(300mil)

**Functional block diagram**

![Functional block diagram](image)

**Application**

- AC motor control
- Power and solar inverters
- UPS
- Onboard charger
Isolated Half-bridge Driver
## Isolated Half-bridge Driver

<table>
<thead>
<tr>
<th>Part number</th>
<th>Peak</th>
<th>Threshold (V)</th>
<th>Output side (Max)(V)</th>
<th>Isolation (Max)(V)</th>
<th>Feature</th>
<th>Insulation class</th>
<th>Operating temp (°C)</th>
<th>Classification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS602A-CLAR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-CLAR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-CLAR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-DSPNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-DSPNR</td>
<td>4/6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-DSPNR</td>
<td>4/6</td>
<td>13</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-Q15WR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-Q15WR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-Q15WR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-DSWR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602A-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602B-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NS602C-Q15PNR</td>
<td>4/6</td>
<td>6</td>
<td>6</td>
<td>30</td>
<td>100</td>
<td>Programmable dead time, Disable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>Part number</td>
<td>Input voltage range (V)</td>
<td>Output pulse width (ns)</td>
<td>Isolation voltage (VRMS) (kV)</td>
<td>Insulation grade</td>
<td>Operating temperature (°C)</td>
<td>Qualification</td>
<td>Package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>-------------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>--------------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VB-DLAR</td>
<td>8-18 8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DLAR</td>
<td>8-12 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-CILAR</td>
<td>8-4 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-CLAR</td>
<td>8-6 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-CLAR</td>
<td>8-8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VM-DSWR</td>
<td>8-16 8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DSWR</td>
<td>8-12 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-DSWR</td>
<td>8-4 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-DSWR</td>
<td>8-8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DSWR</td>
<td>8-16 8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VM-DSWR</td>
<td>8-12 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-DSWR</td>
<td>8-4 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Industrial</td>
<td>LGA13</td>
<td>SOW14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VM-DSPVR</td>
<td>8-16 8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DSPVR</td>
<td>8-12 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-DSPVR</td>
<td>8-4 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VM-DSPVR</td>
<td>8-16 8 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DSPVR</td>
<td>8-12 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VD-DSPVR</td>
<td>8-4 24 30 100</td>
<td>Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902VC-DSVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS6902MC-DISVR</td>
<td>8-4 24 30 100</td>
<td>Miller clamp, Prog. dead time, Disable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125 Automotive</td>
<td>SOW14</td>
<td>SOP16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part number</td>
<td>Value (IF full</td>
<td>Value (IF low</td>
<td>Value (IF low</td>
<td>Value (IF low</td>
<td>Feature</td>
<td>Insulation grade</td>
<td>Operating temperature</td>
<td>Certification</td>
<td>Package</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>--------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>NSI6642A-QUSTR</td>
<td>8-5</td>
<td>6</td>
<td>38</td>
<td>100</td>
<td>Miller clamp, Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Automotive</td>
</tr>
<tr>
<td>NSI6642B-QUSTR</td>
<td>8-5</td>
<td>15</td>
<td>3</td>
<td>38</td>
<td>100</td>
<td>Miller clamp, Programmable dead time, Disable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6642A-DLAR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DLAR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DLAR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DLAR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DLATR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DLATR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DLATR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DLATR</td>
<td>8-4</td>
<td>6</td>
<td>24</td>
<td>30</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>5.7</td>
<td>Reinforced insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSSRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>2.5</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSSRN</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>1.6</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642A-DSFRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642B-DSFRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642C-DSFRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
<tr>
<td>NSI6642D-DSFRR</td>
<td>8-2</td>
<td>8</td>
<td>24</td>
<td>36</td>
<td>Programmable dead time, Enable</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
<td>Industrial</td>
</tr>
</tbody>
</table>
NSI66x2: Dual-channel Isolated Gate Driver

Product introduction
NSI66x2 is a series of highly reliable isolated dual-channel gate driver ICs, which can be designed to drive power transistors with switching frequency up to 2MHz. Each output can source and sink up to 4A/6A with fast propagation delay of 25ns and the maximum delay matching of 5ns. NSI66x2 provides 2500Vrms isolation in 5*5mm LGA13 package according to UL1577, 3000Vrms isolation in SOIC16 (150mil) narrow-body package, and 5700Vrms isolation in SOIC16 (300mil) and SOIC14 (300mil) wide-body packages. The minimum common mode transient immunity (CMTI) of 108kV/us improves system robustness. The maximum supply voltage of the driver is 30V, and the input side accepts supply voltages from 3V to 5V. All supply voltage pins support undervoltage lockout (UVLO). With all these outstanding features, NSI66x2 is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

Product feature
- Isolated dual channel driver
- Input side power supply voltage: 3V~5.5V
- Driver side power supply voltage: Absolute max rating 30V, with UVLO
- Peak sources and sink current 4A/6A
- High CMTI: 150kV/us
- Typical propagation delay: 25ns
- Maximum delay matching: 5ns
- Maximum pulse width distortion: 6ns
- Programmable dead time (NSI6602)
- No dead time (NSI6622)
- Minimum receivable input pulse width: 15ns
- Operating temperature: -40°C~125°C
- Package type: LGA13, SOIC14(300mil), SOIC16(150mil), SOIC16(300mil)
- AEC-Q100 qualified

Safety certification
- UL1577 certification:
  LGA13: 2.5kVrms
  SOIC14(300mil): 5.7kVrms for 1 minute
  SOIC16(300mil): 5.7kVrms for 1 minute
  SOIC16(150mil): 3kVrms for 1 minute
- CQC certification: GB4943.1-2011
- CSA certification: 5A
- VDE certification: DIN V VDE V 0884-11:2017-1

Functional block diagram

Application
- Isolated DC-DC and AC-DC power supplies in servers, telecommunications and Industrial
- Motor drive and EV charging
- UPS and battery charger

Isolated DC-DC and AC-DC power supplies in servers, telecommunications and Industrial
- DC-AC solar inverter
- Motor drive and EV charging
- UPS and battery charger
NSI6602V/NSI6602N is the second-generation high-reliability isolated dual-channel gate driver IC, which enhances anti-interference capability and drive capability, reduces power consumption, and improves the withstand voltage of the input side. It can drive power transistors with switching frequencies up to 2MHz. Each channel output can provide a maximum source/sink current capability of 6A/8A with a fast 25ns propagation delay and a maximum delay match of 5ns. Minimum common-mode transient immunity (CMTI) of 150kV/us improves system robustness. The maximum supply voltage of the driver is 28V, and the input side accepts supply voltages from 3V to 18V. All supply voltage pins support undervoltage lockout (UVLO). In addition, multiple undervoltage points are available. The minimum undervoltage point supports 4V and can be used to drive GaN power devices. Multiple packages are available. The minimum package is the 4*4mm LGA package, which can be used in applications with high power density requirements. According to UL1577, the NSI6602V provides 2500Vrms isolation with the 5*5mm LGA13 package, 5000Vrms isolation with SOIC16 (300mil) wide-body packages, and 5000Vrms isolation with SOIC16 (300mil) and SOIC14 (300mil) wide-body packages. With all these outstanding features, NSI6602V is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

Product feature:
- Isolated dual-channel driver
- Input side supply voltage: 3V-18V
- Driver side supply voltage: Absolute max rating 30V, with UVLO
- Peak 6A/8A source/sink current capacity
- High CMTI: 150kV/us
- 25ns typical propagation delay
- 5ns maximum delay matching
- 6ns maximum pulse width distortion

NSI6602V/N

Safety certification:
- UL1577 certification:
  - LGA13: 2.5kVrms for 1 minute
  - SOIC16(300mil): 5kVrms for 1 minute
  - SOIC16(150mil): 3kVrms for 1 minute

- CQC certification: GB4943.1-2011
- CSA certification: components 5A qualified
- VDE certification: DIN V VDE V 0884-11: 2017-1

Functional block diagram:
- Isolated DC-DC and AC-DC power supplies in servers, telecommunications and Industrial
- DC-DC solar inverter
- Motor drive and EV charging
- UPS and battery charger

Application:
- Isolated DC-DC and AC-DC
- Motor drive and EV charging
- UPS and battery charger
NSI6642: Second-generation High-performance Isolated Dual-channel Gate Driver Supporting PWM Input

**Product introduction**
NSI6642 is the second-generation, highly reliable, isolated dual-channel gate driver IC which provides enhanced anti-interference and drive capabilities with lower power consumption and improved withstand voltage of the input side. It uses a single PWM input mode to achieve complementary dual output and is capable of driving power transistors with switching frequencies up to 2MHz. Each channel output can provide a peak source/sink current capability of 6A/8A with a fast 25ns propagation delay and a maximum 5ns channel to channel delay match. It has a minimum common-mode transient immunity (CMTI) of 100kV/us, improving system robustness. The product’s maximum recommended supply voltage of driver side is 28V, and the input side accepts supply voltages from 3V to 18V. All supply voltage pins support undervoltage lockout (UVLO). In addition, multiple UVLO options are available. The minimum UVLO supports 4V and can be used to drive GaN power devices. Multiple packages are also available. The minimum package is the 4×4mm LGA package, which can be used in applications with high power density requirements. According to UL1577, the NSI6642 provides 2500Vrms isolation with the 5×5mm LGA13 package, 3000Vrms isolation in the SOIC16 (300mil) wide-body package, and 5000Vrms isolation in the SOIC16 (150mil) narrow-body package. With all these outstanding features, the NSI6642 is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

**Product feature**
- Isolated dual-channel driver
- Single PWM input with complementary output OUTA and OUTB
- Input side supply voltage: 3V-18V
- Driver side supply voltage: Absolute max rating 30V, with UVLO
- Peak 6A/8A source/sink current capacity
- High CMTI: 150kV/us
- 25ns typical transmission delay
- 5ns maximum channel to channel delay matching
- 6ns maximum pulse width distortion
- Programmable dead zone time
- Enable pins: NSI6642 Disable (high level off), NSI6642N Enable (high level on)
- Acceptable minimum input pulse width 15ns
- Operating temperature: -40°C~125°C
- Package: LGA13 (4×4mm), LGA13 (5×5mm), SOIC14 (300mil), SOIC16 (300mil), SOIC16 (150mil)
- AEC-Q100 qualified
- UL1577 certification:
  - LGA13: 2.5kVrms for 1 minute
  - SOIC14 (300mil): 5kVrms for 1 minute
  - SOIC16 (300mil): 5kVrms for 1 minute
  - SOIC16 (150mil): 5kVrms for 1 minute
- CQC certification: Conforms to GB4943.1-2011
- CSA certification: Components conform to 5A
- VDE certification: DIN V VDE V 0884-11: 2017-1

**Application**
- Isolated DC-DC and AC-DC power supplies for servers, telecommunications and Industrial
- DC-AC solar inverter
- Motor drive and EV charging
- UPS and battery charger

**Functional block diagram**

**Safety certification**
- Safety certification:
  - UL1577 certification:
    - LGA13: 2.5kVrms for 1 minute
    - SOIC14 (300mil): 5kVrms for 1 minute
    - SOIC16 (300mil): 5kVrms for 1 minute
    - SOIC16 (150mil): 5kVrms for 1 minute
- CQC certification: Conforms to GB4943.1-2011
- CSA certification: Components conform to 5A
- VDE certification: DIN V VDE V 0884-11: 2017-1
**NSI6602M: Isolated Dual-channel Gate driver with Integrated Miller Clamp**

**Product introduction**

NSI6602M is an isolated dual-channel gate driver IC integrated with Miller clamp. It is suitable for driving IGBT, power MOSFET and SiC MOSFET in many applications. It can provide peak source/sink current of 5A/5A, and is integrated with Miller clamp with current of up to 5A. The minimum 150kV/μs common mode transient immunity (CMTI) ensures the robustness of the system. The maximum power supply voltage of the driver is 32V, and the input side is supplied with a power supply voltage of 3V to 5.5V. All power pins support undervoltage lockout (UVLO) protection. NSI6602M is designed with high drive current, dual-channel integrated Miller clamp function, excellent reliability, wide power supply voltage range and fast signal propagation, and is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

**Product feature**

- Isolated dual-channel driver
- Input side supply voltage: 3V - 5.5V
- Driver side supply voltage: Absolute max rating 35V, with UVLO
- Peak 5A/5A source/sink current capacity
- Support Miller Clamp, with current of up to 5A
- High CMTI: 150kV/μs
- 80ns typical propagation delay
- 5ns maximum delay matching
- 25ns maximum pulse width distortion
- Programmable dead zone time
- Acceptable minimum input pulse width 30ns
- Working temperature: -40°C~125°C
- Package form: SOIC18 (300mil)
- AEC-Q100 qualified

**Safety certification**

- UL1577 certification: SOIC18 (300mil): 5kVrms for 1 minute
- CQC certification: GB4943.1-2011
- CSA certification: components 5A qualified
- VDE certification: DIN V VDE V 0884-11: 2017-1

**Functional block diagram**

![Functional block diagram](image)

**Application**

- Isolated DC-DC and AC-DC power supplies in servers, telecommunications and Industrial
- DC-AC solar inverter
- Motor drive and EV charging
- UPS and battery charger
Isolated Single-Channel Gate Driver
## Isolated Single-Channel Gate Driver

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Pinout</th>
<th>Peak drive current (A)</th>
<th>VCC side (Max)(V)</th>
<th>CMTI (Min)(kV/us)</th>
<th>Feature</th>
<th>Insulation grade</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI6801B-DSWAR</td>
<td>S1-S</td>
<td>9</td>
<td>N/A</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801C-DSWAR</td>
<td>S1-S</td>
<td>13</td>
<td>N/A</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MB-DSWVR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Split output</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MC-DSWVR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Split output</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MB-Q1SWAR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Miller clamp</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MC-Q1SWAR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Miller clamp</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801B-Q1SWAR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801C-Q1SWAR</td>
<td>S1-S</td>
<td>13</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input</td>
<td>3</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MB-Q1SWVR</td>
<td>S1-S</td>
<td>9</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input, Miller clamp</td>
<td>5</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
<tr>
<td>NSI6801MC-Q1SWVR</td>
<td>S1-S</td>
<td>13</td>
<td>17</td>
<td>35</td>
<td>150</td>
<td>Opto-compatible input, Miller clamp</td>
<td>5</td>
<td>Basic insulation</td>
<td>-40~125</td>
</tr>
</tbody>
</table>
NSI6801 is a single-channel isolated gate driver, which is pin-compatible with popular optically coupled gate drivers. It can provide a peak source/sink current of 5A. It supports the minimum common mode transient immunity (CMTI) of 150kV/μs, which ensures the robustness of the system. The maximum power supply voltage of the driver is 32V. When the input circuit is used in optocoupler compatible systems, it has performance advantages over optocoupler gate drivers, including better reliability and aging performance, higher operating temperature, shorter propagation delay and less pulse width distortion. Therefore, NSI6801 is more suitable than photoelectric isolation driver in switching power supply systems which requires high reliability, high power density and high efficiency.

**Product introduction**
NSI6801 is a single-channel isolated gate driver, which is pin-compatible with popular optically coupled gate drivers. It can provide a peak source/sink current of 5A. It supports the minimum common mode transient immunity (CMTI) of 150kV/μs, which ensures the robustness of the system. The maximum power supply voltage of the driver is 32V. When the input circuit is used in optocoupler compatible systems, it has performance advantages over optocoupler gate drivers, including better reliability and aging performance, higher operating temperature, shorter propagation delay and less pulse width distortion. Therefore, NSI6801 is more suitable than photoelectric isolation driver in switching power supply systems which requires high reliability, high power density and high efficiency.

**Product feature**
- P2P compatible with optocoupler drivers, but upgraded performance
- Driver side power supply voltage: Absolute max rating 35V, with UVLO
- Peak source/sink current of 5A/5A
- High CMTI: 150kV/μs
- Typical propagation delay: 75ns
- Maximum pulse width distortion: 30ns

**Safety certification**
- Operation ambient temperature: -40°C~125°C
- UL certification: SOW6: 5700Vrms for 1 minute
- DUB8: 5000Vrms for 1 minute
- VDE certification: DIN VDE V 0884-11:2017-01
- CSA certification: CSA components has passed 5A approval
- TUV certification: GB4943.1-2011

**Application**
- Photovoltaic inverter
- Motor driver
- UPS power supply and battery charger
- Isolation DC/DC and AC/DC power supplies

**Functional block diagram**

- **Product feature:**
  - P2P compatible with optocoupler drivers, but upgraded performance
  - Driver side power supply voltage: Absolute max rating 35V, with UVLO
  - Peak source/sink current of 5A/5A
  - High CMTI: 150kV/μs
  - Typical propagation delay: 75ns
  - Maximum pulse width distortion: 30ns

- **Safety certification:**
  - Operation ambient temperature: -40°C~125°C
  - UL certification: SOW6: 5700Vrms for 1 minute
  - DUB8: 5000Vrms for 1 minute
  - VDE certification: DIN VDE V 0884-11:2017-01
  - CSA certification: CSA components has passed 5A approval
  - TUV certification: GB4943.1-2011

- **Application:**
  - Photovoltaic inverter
  - Motor driver
  - UPS power supply and battery charger
  - Isolation DC/DC and AC/DC power supplies
NSI6801x series is the second generation product based on NSI6801, including NSI68010B and NSI68011C. NSI6801x is more cost-effective compared with the first generation in order to assist customers to reduce system costs and increase efficiency. NSI6801x single-channel isolated gate driver can be pin compatible with optically coupled gate drivers. It can provide up to 2A drive current. The minimum common mode transient immunity (CMTI) of 150kV/μs ensures system robustness. The maximum supply voltage of the driver is 32 V. When the input circuit is applied in an optocoupler-compatible system, it offers better performance compared with optocoupler gate drivers, including better reliability, longer working life, higher operating temperature, shorter propagation delay and less pulse width distortion. Therefore, NSI6801x is suitable for replacing opto-isolated drivers in switching power supply systems which require high reliability, power density and efficiency.

**Product introduction**

NSI6801x series is the second generation product based on NSI6801, including NSI68010B and NSI68011C. NSI6801x is more cost-effective compared with the first generation in order to assist customers to reduce system costs and increase efficiency. NSI6801x single-channel isolated gate driver can be pin compatible with optically coupled gate drivers. It can provide up to 2A drive current. The minimum common mode transient immunity (CMTI) of 150kV/μs ensures system robustness. The maximum supply voltage of the driver is 32 V. When the input circuit is applied in an optocoupler-compatible system, it offers better performance compared with optocoupler gate drivers, including better reliability, longer working life, higher operating temperature, shorter propagation delay and less pulse width distortion. Therefore, NSI6801x is suitable for replacing opto-isolated drivers in switching power supply systems which require high reliability, power density and efficiency.

**Product feature**

- P2P compatible with optocoupler drivers, but upgraded performance
- Driver side power supply voltage: Absolute max rating 35V, with UVLO
- High CMTI: 150kV/μs
- NSI68010 drive current: +0.7A/-0.8A
- NSI68011 drive current: +1.5A/-2A
- Typical propagation delay: 63ns
- Maximum pulse width distortion: 30ns
- Operation ambient temperature: -40°C to 125°C
- AEC-Q100 qualified

**Safety certification**

- UL certification: 5700Vrms for 1 minute (SOW6)
- VDE certification: DIN VDE V 0884-11:2017-01
- CSA certification: CSA components has passed 5A approval
- CQC certification: GB4943.1-2011

**Package**

- SOIC-6 wide body (SOW6)

**Functional block diagram**

**Application**

- Photovoltaic inverter
- Motor driver
- UPS power supply and battery changer
- Isolation DC/DC and AC/DC power supplies
NSI6601/NSI6601M is a single-channel isolated gate driver suitable for driving IGBT, power MOSFET and SiC MOSFET in many applications. Separate outputs are provided to control the rising and falling duration respectively. It can provide peak source/sink current of 5A/5A. The minimum 150kV/μs common mode transient immunity (CMTI) ensures the robustness of the system. The maximum power supply voltage of the driver is 32V, and the input side is supplied with a power supply voltage of 3.1V to 17V. All power pins support undervoltage lockout (UVLO) protection. NSI6601 is designed with high drive current, excellent durability, wide power supply voltage range and fast signal propagation, and is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

**Product feature**
- Single-channel isolated driver
- Input side supply voltage: 3.1V to 17V
- Driver side supply voltage: Absolute max rating 35V, with UVLO
- Version M supports Miller Clamp function (NSI6601M) with current up to 5A
- Peak source/sink current of 5A/5A
- High CMTI: 150kV/μs
- Typical propagation delay: 78ns
- Operation ambient temperature: -40°C to 125°C
- AEC-Q100

**Safety certification**
- UL certification: SOP8: 3000Vrms for 1 minute
  SO8W: 5700Vrms for 1 minute
- VDE certification: DIN VDE V 0884-11:2017-01
- CSA certification: CSA components has passed 5A approval
- CQC certification: GB4943.1-2011

**Package**
- SOP8
- SOIC-8 wide body (SOW8)

**Functional block diagram**

**Application**
- Photovoltaic inverter
- Motor driver
- UPS power supply and battery charger
- Isolation DC/DC and AC/DC power supplies
NSI6801M: Optocoupler-compatible Single-channel Isolated Gate Driver with Miller Clamp

**Product introduction**
NSI6801M is a single-channel isolation gate driver suitable for driving IGBT, power MOSFET and SiC MOSFET in many applications. It can provide peak source/sink current of 5A/5A, and is integrated with Miller clamp with current of up to 5A. The minimum 150kV/μs common mode transient immunity (CMTI) ensures the robustness of the system. The maximum power supply voltage of the driver is 32V, and the input side is supplied with a power supply voltage of 3.1V to 17V. All power pins support undervoltage lockout (UVLO) protection. NSI6801M is designed with high drive current, excellent reliability, wide power supply voltage range and fast signal propagation, and is suitable for switching power supply systems which require high reliability, high power density and high efficiency.

**Product feature**
- Isolated single-channel driver
- Input side supply voltage: 3.1V - 17V
- Driver side supply voltage: Absolute max rating 35V, with UVLO
- Support Miller Clamp function, with current of up to 5A
- Peak 5A/5A source/sink current
- High CMTI: ±150kV/μs
- 75ns typical propagation delay
- Operating ambient temperature: -40°C~125°C
- AEC-Q100

**Safety certification**
- UL certification:
  - SOP8: 3000Vrms for 1 minute
  - SOW8: 5700Vrms for 1 minute
- VDE certification: DIN VDE V 0884-11:2017-01
- CSA certification: components 5A qualified
- CQC certification: GB4943.1-2011

**Functional block diagram**

**Package**
- SOIC-8 wide-body (SOW8)

**Application**
- Solar inverter
- Motor driver
- UPS and battery charger
- Isolated DC-DC power supplies
Smart Isolated Gate Driver
# Smart Isolated Gate Driver

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Peak drive current (A)</th>
<th>VCC voltage (Max) (V)</th>
<th>CMTI (Min) (kV/us)</th>
<th>Insulation grade</th>
<th>Feature</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI6611ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Industrial</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6601ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Industrial</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6601AC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm</td>
<td>40-125</td>
<td>Industrial</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6651ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 OCP short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6651AC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6631ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 OCP short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6611ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6651AC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI6631ASC</td>
<td>10/-10</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 OCP short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI68515LC</td>
<td>5/-5</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI68515UC</td>
<td>5/-5</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm, UVLO alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI68515AC</td>
<td>5/-5</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm, UVLO alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI68515RC</td>
<td>5/-5</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 Non-Rail-to-Rail output, DESAT short circuit protection, Auto Reset, soft shutdown, Miller clamp, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
<tr>
<td>NSI68515RC</td>
<td>5/-5</td>
<td>13</td>
<td>6</td>
<td>35</td>
<td>150 Non-Rail-to-Rail output, DESAT short circuit protection, Auto Reset, soft shutdown, Miller clamp, and Fault alarm</td>
<td>40-125</td>
<td>Automotive</td>
<td>SOW16</td>
</tr>
</tbody>
</table>
**NSI6611/NSI6651: Smart Isolated Gate Driver**

- **Product introduction**
  NSI6611/NSI6651 is a single-channel smart isolated gate driver designed to drive IGBT, power MOSFET and SiC MOSFET and other power transistors in many applications and provide protection for their safe operation. It can provide separate output to control the rising and falling duration respectively, it supports rail-to-rail output, and can provide a maximum 10A/10A source and sink current capability. NSI6611/NSI6651 can provide protection functions, such as UVLO, Miller clamp, DESAT protection, soft shutdown, and when short circuit fault or undervoltage occurs, the fault can be indicated through a separate pin. NSI6611 supports ASC function and can be used to force the output to be high in emergency situations. It supports minimum common mode transient immunity (CMTI) of 150kV/μs to improve system robustness. The maximum supply voltage of driver side is 32V, and the input side accepts supply voltages from 3V to 5.5V. NSI6611/NSI6651 features large drive current, wide power supply voltage range, and high CMTI, and is designed with excellent protection. It is suitable for switching power supply systems and inverters which require high reliability, high power density and high efficiency.

- **Product feature**
  - Smart Single-channel isolated Driver
  - Input side power supply voltage: 3V~5.5V
  - Driver side power supply voltage: Absolute max rating 35V, with UVLO
  - Peak source and sink current 10A/10A
  - High CMTI: 150kV/μs
  - Typical propagation delay: 80ns
  - Maximum pulse width distortion: 30ns
  - Minimum receivable input pulse width: 40ns
  - Rail-to-rail output, with separate output as an option
  - Protection mode: Miller Clamp 4.5A
  - DESAT protection with a threshold of 9V
  - Supporting soft shutdown at a current of 400mA
  - Supporting alarm feedback, reset or enable
  - Operating temperature: -40°C~125°C

- **Functional block diagram**

- **Safety certification**
  - UL1577 certification: 5.7kVrms (certification in progress)
  - CQC certification: GB4943.1-2011 (certification in progress)
  - CSA certification: components conform to 5A (certification in progress)
  - VDE certification: DIN V VDE V 0884-11:2017-1 (certification in progress)

- **Application**
  - EV electric drive system
  - Air conditioning compressor
  - DC-AC solar inverter
  - Motor driver
  - UPS and battery charger
NSI68515 is an optocoupler-compatible single-channel smart isolated gate driver designed to drive and provide protection for safe operation of IGBTs, power MOSFETs and SiC MOSFETs in many applications. NSI68515 can provide up to ±5A source/sink current capability, with a maximum power supply voltage of 32V on the driver side and a power supply voltage of 3V to 5.5V on the input side. It can provide excellent protection function, such as UVLO, Miller clamp, DESAT protection, and soft shutdown, etc., and send alarm by a separate pin when detecting a short circuit fault or undervoltage. It is available in automatic alarm reset version, rail to rail output version and non-rail to rail output version. It supports a minimum common-mode transient immunity (CMTI) of 150kV/μs to improve system robustness. NSI68515 features high driver current, wide range of power supply voltage, high CMTI, and has excellent protection function, which is suitable for motor drive, inverter, switching power system and other systems with high reliability, high power density and high efficiency.

**Product introduction**

NSI68515 is an optocoupler-compatible single-channel smart isolated gate driver designed to drive and provide protection for safe operation of IGBTs, power MOSFETs and SiC MOSFETs in many applications. NSI68515 can provide up to ±5A source/sink current capability, with a maximum power supply voltage of 32V on the driver side and a power supply voltage of 3V to 5.5V on the input side. It can provide excellent protection function, such as UVLO, Miller clamp, DESAT protection, and soft shutdown, etc., and send alarm by a separate pin when detecting a short circuit fault or undervoltage. It is available in automatic alarm reset version, rail to rail output version and non-rail to rail output version. It supports a minimum common-mode transient immunity (CMTI) of 150kV/μs to improve system robustness. NSI68515 features high driver current, wide range of power supply voltage, high CMTI, and has excellent protection function, which is suitable for motor drive, inverter, switching power system and other systems with high reliability, high power density and high efficiency.

**Product feature**

- Smart isolated single-channel driver
- Input side supply voltage: 3V - 5.5V
- Driver side supply voltage: Absolute max rating 35V, with UVLO
- Peak 5A/5A source/sink current capacity
- High CMTI: 150kV/μs
- 100ns typical propagation delay
- 100ns maximum pulse width distortion
- Acceptable minimum input pulse width 40ns
- NSI68515LC/UC/AC rail to rail output, NSI68515AC non-rail to rail output
- NSI68515AC/RC supports automatic resetting
- Protection mode
- Miller clamp 4.0A
- DESAT protection, with threshold of 6.5V
- Support soft shutdown function, with soft shutdown current of 140mA
- Support alarm feedback
- Working temperature: -40°C~125°C

**Safety certification**

- UL1577 certification: 5.7KVrms (under qualification)
- CQC certification: GB4943.1 -2011 (under qualification)
- CSA certification: Components 5A qualified (under qualification)
- VDE certification: DIN V VDE V 0884-11:2017-1 (under qualification)

**Functional block diagram**

**Application**

- EV motor driving system
- A/C compressor
- DC-AC solar inverter
- Motor driver
- UPS and battery charger
Non-isolated Gate Driver_Low-side Driver
# Non-isolated Gate Driver _Low-side Driver_

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Drive Object</th>
<th>Peak Drive Current (A)</th>
<th>Output Channel</th>
<th>VCC (V)</th>
<th>Propagation Delay (Max) (ns)</th>
<th>Delay Matching (ns)</th>
<th>Feature</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD1025V-DHMSR</td>
<td>GaNFET/MOSFET/IGBT</td>
<td>5/5</td>
<td>2</td>
<td>30</td>
<td>27/27</td>
<td>4</td>
<td>Enable Negative Voltage Handling on Input(-10V)</td>
<td>Industrial</td>
<td>EP-MSOP8</td>
</tr>
<tr>
<td>NSD1025V-DDAER</td>
<td>GaNFET/MOSFET/IGBT</td>
<td>5/5</td>
<td>2</td>
<td>30</td>
<td>27/27</td>
<td>4</td>
<td>Enable Negative Voltage Handling on Input(-10V)</td>
<td>Industrial</td>
<td>DFN8</td>
</tr>
<tr>
<td>NSD1025V-QIHSPR</td>
<td>GaNFET/MOSFET/IGBT</td>
<td>5/5</td>
<td>2</td>
<td>30</td>
<td>27/27</td>
<td>4</td>
<td>Enable Negative Voltage Handling on Input(-10V)</td>
<td>Automotive</td>
<td>EP-SOP8</td>
</tr>
<tr>
<td>NSD1015T-Q1HMSR</td>
<td>GaNFET/MOSFET/IGBT</td>
<td>5/5</td>
<td>2</td>
<td>30</td>
<td>27/27</td>
<td>4</td>
<td>Enable Negative Voltage Handling on Input(-10V)</td>
<td>Automotive</td>
<td>EP-SOP8</td>
</tr>
<tr>
<td>NSD1015T-Q1HSPR</td>
<td>GaNFET/MOSFET/IGBT</td>
<td>5/5</td>
<td>2</td>
<td>30</td>
<td>27/27</td>
<td>4</td>
<td>Enable Negative Voltage Handling on Input(-10V)</td>
<td>Automotive</td>
<td>EP-SOP8</td>
</tr>
<tr>
<td>NSD1015T-DSPR</td>
<td>MOSFET/IGBT/SIC</td>
<td>5/5</td>
<td>1</td>
<td>36</td>
<td>15/15</td>
<td>NA</td>
<td>DESAT protection, FAULT output, 5V supply voltage</td>
<td>Industrial</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD1015MT-DSPR</td>
<td>MOSFET/IGBT/SIC</td>
<td>5/5</td>
<td>1</td>
<td>36</td>
<td>15/15</td>
<td>NA</td>
<td>DESAT protection, FAULT output, Miller Clamp</td>
<td>Industrial</td>
<td>SOP8</td>
</tr>
</tbody>
</table>
NSD1025V: High Speed Dual Low-side Gate Driver

◆ Product introduction
NSD1025V is an in-phase dual-channel high-speed gate driver suitable for driving MOSFET, IGBT, GaN and SiC power devices. It can provide 5A source current and sink current to drive capacitive loads, as well as rail-to-rail voltage swing in Miller platform area, which helps to reduce the Miller effect during MOSFET switching. In addition, the short rising and falling duration and the matching propagation delay of the two output channels make the NSD1025V series suitable for high frequency and dual-gate drive power applications, such as synchronous rectifiers.

Both the input pin and the enable pin support -10V input, thus increasing robustness, while the enable pin can help users realize control functions in different applications. Moreover, the internal circuit allows under-voltage lockout (UVLO), which keeps the output low until the power supply voltage returns to the operating range. The hysteresis function between high and low thresholds provides excellent immunity.

◆ Product feature
- Supply voltage range: 4.5V to 26V (Absolute max rating 30V)
- Source/sink drive current: 5A (peak)
- Each channel output is designed with two independent enable pins
- Supporting inputs as low as -10V
- CMOS / TTL compatible logic input
- The 5A reverse current function eliminates the need for output protection
- Operating temperature range: -40°C~125°C
- Propagation delay: 21 ns (typical)
- AEC-Q100 certification passed for automotive applications

◆ Application
- PFC, LLC, SR power supply topology
- Power system (OBC/DCDC, industrial power, photovoltaic, communication, server)
- Motor controller
- Linear driver

◆ Functional block diagram

◆ Package
- SOP8, HSOP8, HMSOP8, DFN8

◆ Supply voltage range: 4.5V to 26V (Absolute max rating 30V)
- Source/sink drive current: 5A (peak)
- Each channel output is designed with two independent enable pins
- Supporting inputs as low as -10V
- CMOS / TTL compatible logic input
- The 5A reverse current function eliminates the need for output protection
- Operating temperature range: -40°C~125°C
- Propagation delay: 21 ns (typical)
- AEC-Q100 certification passed for automotive applications

◆ Application
- PFC, LLC, SR power supply topology
- Power system (OBC/DCDC, industrial power, photovoltaic, communication, server)
- Motor controller
- Linear driver

◆ Functional block diagram

◆ Package
- SOP8, HSOP8, HMSOP8, DFN8
NSD1015T is a smart single-channel non-isolated gate driver suitable for driving MOSFET, IGBT, and SiC power devices. It provides 5A source/sink current to drive capacitive loads. In addition, fast rise and fall times and short propagation delays make the NSD1015T series suitable for high-frequency switching applications. NSD1015T’s protection features include undervoltage protection (UVLO), desaturation protection (DESAT), and open-drain output fault reporting (FAULT). NSD1015T can also provide accurate 5V power output for external chips such as digital isolators. NSD1015T supports bipolar power supply, and NSD1015MT supports Miller clamp to ensure reliable shutdown.

**Product introduction**

NSD1015T is a smart single-channel non-isolated gate driver suitable for driving MOSFET, IGBT, and SiC power devices. It provides 5A source/sink current to drive capacitive loads. In addition, fast rise and fall times and short propagation delays make the NSD1015T series suitable for high-frequency switching applications. NSD1015T’s protection features include undervoltage protection (UVLO), desaturation protection (DESAT), and open-drain output fault reporting (FAULT). NSD1015T can also provide accurate 5V power output for external chips such as digital isolators. NSD1015T supports bipolar power supply, and NSD1015MT supports Miller clamp to ensure reliable shutdown.

**Product feature**

- Supply voltage range: VCC-GND: 13V to 22V
- Source/sink drive current: 5A (peak)
- Rise time 9.2ns (typical), drop time 7.9ns (typical)
- Input to output propagation delay 75ns (maximum)
- UVLO undervoltage protection
- Desaturation (DESAT) protection
- NSD1015T supports bipolar power supply and NSD1015MT supports Miller clamp
- Operating temperature range: -40°C to 125°C
- SOP8 package

**Functional block diagram**

- NSD1015T
- NSD1015MT

**Application**

- Industrial servo driver, inverter
- HEV/EV compressor controller
- HEV/EV PTC
Non-isolated Half-bridge Gate Driver
## Non-isolated Half-bridge Gate Driver

<table>
<thead>
<tr>
<th>PartNumber</th>
<th>Drive object</th>
<th>Peak drive current (A)</th>
<th>Voltage rating (V) BUS</th>
<th>Propagation delay (Max)</th>
<th>Delay matching (ns)</th>
<th>Feature</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD1624-CLAJR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>LGA10</td>
</tr>
<tr>
<td>NSD1624-DSPR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD1624-DSPKR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>1200</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP14</td>
</tr>
<tr>
<td>NSD1624-Q1SPR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD1624-Q1SPKR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>1200</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP14</td>
</tr>
<tr>
<td>NSD16241-DS PR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD16241-DS PRK</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>1200</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP14</td>
</tr>
<tr>
<td>NSD16241-Q1SPR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD16242-DS PR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD16242-Q1SPR</td>
<td>MOSFET/GTR</td>
<td>4-6</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>35/35</td>
<td>7 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD2621A-DQAGR</td>
<td>GaNFET</td>
<td>2-4</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>60/60</td>
<td>10 UVLO, Programmable dead line, Enable, Integrated LDO</td>
<td>-40~125</td>
<td>QFN15</td>
</tr>
<tr>
<td>NSD2621B-DQAGR</td>
<td>GaNFET</td>
<td>2-4</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>60/60</td>
<td>10 UVLO, Programmable dead line, Enable, Integrated LDO</td>
<td>-40~125</td>
<td>QFN15</td>
</tr>
<tr>
<td>NSD2621C-DQAGR</td>
<td>GaNFET</td>
<td>2-4</td>
<td>2</td>
<td>700</td>
<td>24</td>
<td>60/60</td>
<td>10 UVLO, Programmable dead line, Enable, Integrated LDO</td>
<td>-40~125</td>
<td>QFN15</td>
</tr>
<tr>
<td>NSD1224A-DQPR</td>
<td>MOSFET/GaNFET</td>
<td>3-4</td>
<td>2</td>
<td>115</td>
<td>20</td>
<td>35/35</td>
<td>5 UVLO, Interlock</td>
<td>-40~125</td>
<td>DFN10</td>
</tr>
<tr>
<td>NSD1224A-DSPR</td>
<td>MOSFET/GaNFET</td>
<td>3-4</td>
<td>2</td>
<td>115</td>
<td>20</td>
<td>35/35</td>
<td>5 UVLO, Interlock</td>
<td>-40~125</td>
<td>SOP8</td>
</tr>
</tbody>
</table>
NSD1624 is a high-voltage half-bridge driver IC launched by NOVOSENSE lately. It is designed with 4/-6A drive current and can be used to drive various power devices such as MOSFET/IGBT.

The isolation technology scheme is applied to high-voltage half-bridge driver by NOVOSENSE innovatively, so that the high-voltage output side can withstand up to 1200V DC voltage, while SW can meet the requirements of high dV/dt and can withstand negative spike. It can be applied to high-voltage half-bridges, full-bridges and LLC power supply topologies. NSD1624 input is compatible with TTL/CMOS. Both the high-voltage side and the low-voltage side are designed with independent power supply undervoltage protections (UVLO), which operate in the voltage range of 10~20V.

NSD1624 can be delivered in SOP14, SOP8 or LGA 4*4mm packages.

**Product feature**
- Voltage range on high voltage side: +/-1200V (SOP14 package); +/-700V (SOP8 & LGA package)
- Less than 35ns propagation delay, less than 7ns delay matching
- 4/-6A drive current capability
- High/low side independent UVLO protection
- Independent Logic Ground Pin (SOP14 package)
- Anti-interference of dV/dt on high voltage side up to 150kV/us
- Operating temperature range: -40°C~125°C
- AEC-Q100 qualified

**Application**
- Half-bridge, full-bridge, and LLC power supply topology
- Power supply for industrial, communication and server applications which requires high efficiency and high density
- Solar energy, motor driver and new energy fields
**NSD2621 High Voltage Half-bridge GaN Driver IC**

**Product introduction**

NSD2621 is a high-voltage half-bridge driver IC launched by NOVOSENSE lately, which is specially designed for GaN. The IC adopts the mature capacitance isolation technology of NOVOSENSE. The high-side driver can support common-mode voltage of -700V to 700V, SW voltage change slope of 150V/ns, and is designed with the feature of low transmission delay and low delay between channels. Both channels can provide 2A/-4A driving capability. Both high-side drive stage and low-side drive stage are equipped with special voltage regulators to ensure that the driving voltage is in a stable range acceptable to GaN gate, so that GaN can work properly under any conditions. At the same time, it is designed with U/LVO protection to protect the operation safety of the power supply system.

**Product feature**

- Voltage range on high voltage side: +/-700V
- Independent U/LVO protection for high and low sides
- 2A/-4A drive current capability
- Built-in LDO makes the driving voltage more stable and reliable
- Integrated Miller Clamp with a current capability of 2A
- Less than 60ns propagation delay, less than 10ns delay matching between high and low side
- +5/-5V logic ground bias
- Anti-interference of dV/dt on high voltage side: 150V/ns
- Operation ambient temperature: -40°C ~ 125°C
- Package: LGA (4*4mm)
- Driver voltage NSD2621A: 6V/NSD2621B: 5.5V/NSD2621C: 5V

**Functional block diagram**

**Application**

- Half-bridge, full-bridge, and LLC power supply topology
- Adapter high density power supply
- Solar energy, motor driver and new energy fields
NSD1224 120V Half-bridge Grid Driver

◆ Product introduction
NSD1224 is a powerful 120V half-bridge gate driver. With peak source/sink current of 3A/-4A and low Ron of inside ON/OFF MOSFETs, it can drive high-power MOSFETs with very low switching losses. The NSD1224 input pin and SW pin can withstand large negative voltage to improve system reliability. The input interlock function prevents the short-through from high-side and low-side MOSFETs in bridge topologies. The undervoltage locking (UVLO) is available in both the high-side and low-side drivers. The small communication delay and channel to channel delay matching provide more dead time design margin, further improve efficiency. NSD1224 integrates a built-in bootstrap diode, requiring no external separate diode to save layout space and reduce system costs.

◆ Product feature
- Withstand voltage of VDD power of 20V
- Withstand voltage at SW bridge arm midpoint of -10V to 115V
- Negative withstand voltage of input pin of -10V
- The HS voltage ramp up rate of 50V/ns
- Peak source/sink current 3A/-4A
- Compatible with CMOS/TTL level input
- Input interlock
- Independent UVLO protection for high-side and low-side output
- Integrated high-voltage bootstrap diode
- Typical input/output delay of 16ns
- Typical transmission delay matching between high and low sides of 1ns
- DFN10 package has enable pin, and the static power consumption is 7uA in standby mode
- Package available in SOP8, HSOP8, DFN10 and DFN8
- Junction temperature range of -40°C to 150°C

◆ Functional block diagram

◆ Application
- Micro inverter and power optimizer
- Power module
- New energy vehicles
- LED driver
- DC/DC converter
- Smart High-side Switch
- Gate Power stage IC
- Smart High-side and Low-side Switch
- LDO Linear Regulator
- Voltage Monitoring
- Reset IC Series
- Brushed DC Motor Driver
- SiC Diode
- GaN Power Stage IC
- Isolated Half-bridge Driver
- Isolated Single-Channel Gate Driver
- Smart Isolated Gate Driver
- Non-Isolated Gate Driver_Low-side Driver
- Non-isolated Half-bridge Gate Driver

170
## GaN Power Stage IC

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Product type</th>
<th>Bus voltage (V)</th>
<th>Rds(on)(mΩ)</th>
<th>Ids(A)</th>
<th>Features</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSG65N15K-DQAFR</td>
<td>Half-bridge</td>
<td>750</td>
<td>50</td>
<td>20</td>
<td>UVLO、Dead-time programmable, Integrated bootstrap diode</td>
<td>-40 to 125</td>
<td>Industrial</td>
<td>QFN32</td>
</tr>
</tbody>
</table>

### Key Features
- **Isolated Half-bridge Driver**
- **Isolated Single-Channel Gate Driver**
- **Smart Isolated Gate Driver**
- **Non-Isolated Gate Driver**
- **Low-side Driver**
- **Non-isolated Half-bridge Gate Driver**
- **Brushed DC Motor Driver**
- **SiC Diode**
- **LDO Linear Regulator**
- **Voltage Monitoring**
- **Reset IC Series**
- **Smart High and Low Side Switch**
- **LED Driver**
- **Multi-channel Low-side Driver**
NSG65N15K High-voltage Half-bridge GaN Power Stage

◆ Product introduction
NSG65N15K is the latest GaN power stage device launched by NOVOSENSE. It is integrated with half-bridge driver NSD2621 and two 650V GaN HEMT with 150mΩ conduction resistance, and the working current can reach 20A. Besides, NSG65N15K is integrated with the bootstrap diode, and built-in adjustable dead time, undervoltage protection, overtemperature protection, which make GaN applications more safe and reliable, and give full play to its advantages of high frequency and high speed.

◆ Product feature
- Integrated 650V GaN HEMT and half-bridge driver
- GaN conduction resistance 150mΩ
- Non-reverse recovery loss
- Built-in LDO makes the driver voltage more stable and reliable
- High/low side independent UVLO protection
- Internal adjustable dead time
- Built-in bootstrap diode
- Operation ambient temperature: -40°C ~ 125°C
- Package form: QFN (9*9mm)

◆ Functional block diagram

◆ Application
- Half-bridge or full-bridge topologies such as totem poles PFC, ACF and LLC
- Adapter high density power supply
- PV, motor driver and ESS

172
Brushed DC Motor Driver
Isolated Half-bridge Driver
Isolated Single-Channel Gate Driver
Smart Isolated Gate Driver
Non-Isolated Gate Driver_Low-side Driver
Non-isolated Half-bridge Gate Driver
GaN Power Stage IC
SiC Diode
LDO Linear Regulator
Voltage Monitoring
Reset IC Series
Smart High and Low Side Switch
LED Driver
Multi-channel Low-side Driver
### Brushed DC Motor Driver

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Load type</th>
<th>Side (H/L) / Diode</th>
<th>Peak current (A)</th>
<th>Number of load stage channel</th>
<th>Voltage (max) (V)</th>
<th>Load protection</th>
<th>Integrated current detector</th>
<th>Interface</th>
<th>Load diagnosis</th>
<th>Protection, fault report</th>
<th>Protection, under-voltage protection</th>
<th>Protection, over-temperature protection</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD7310</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Industrial</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD7310A</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>Yes</td>
<td>No</td>
<td>SPI</td>
<td>No</td>
<td>Over-current protection, over-temperature protection</td>
<td>40~125 Industrial</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD7310B</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Industrial</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD7312</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection, fault report</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD7312A</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD7312B</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection, fault report</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8306</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8307</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8307</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8310</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8312</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD8312</td>
<td>Brushed DC motor</td>
<td>3.6</td>
<td>2</td>
<td>5-40</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>SPI</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection</td>
<td>40~125 Automotive</td>
<td>HSOP6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NSD7310/NSD7312/NSD7310A/NSD7312A/NSD7312-Q1 is a brushed DC motor driver IC. The IC has built-in N-MOSFET and provides full protection for the power level, including power supply undervoltage protection, overcurrent protection and overtemperature protection. This product can provide 3.6A peak current and supports PWM current regulation. In version A product, the internal power path current mirror function is added, and the external ADC/MCU can directly obtain the current value from the pin of the product, saving power sampling resistor and optimizing the layout. The Automotive version has passed the AEC-Q100 qualification to meet the requirements in terms of quality and reliability of vehicles.

**Product introduction**

NSD7310/NSD7312/NSD7310A/NSD7312A/NSD7312-Q1 is a brushed DC motor driver IC. The IC has built-in N-MOSFET and provides full protection for the power level, including power supply undervoltage protection, overcurrent protection and overtemperature protection. This product can provide 3.6A peak current and supports PWM current regulation. In version A product, the internal power path current mirror function is added, and the external ADC/MCU can directly obtain the current value from the pin of the product, saving power sampling resistor and optimizing the layout. The Automotive version has passed the AEC-Q100 qualification to meet the requirements in terms of quality and reliability of vehicles.

**Product feature**

- Wide operating voltage range: 5V-36V (Absolute max rating 40V)
- On-resistance (HS + LS) 520mΩ
- Peak current 3.6A
- AEC-Q100 qualified
- Supporting current modulation
- Undervoltage protection
- Overcurrent protection
- Operating temperature: -40°C to 125°C

**Functional block diagram**

![Functional block diagram](image)

- **Application**
  - Home appliances
  - New energy vehicles
  - Brushed DC motor module
NSD8312/NSD8310/NSD8308/NSD8306 - Q1 is a multi-channel half-bridge driver chip with built-in 12/10/8/6-channel half bridge. With flexible configuration, the chip can support a variety of different types of load including DC brushed motors, stepper motors, relays and LEDs. The chip has built-in PWM generator, which can control the load by configuring PWM frequency and duty cycle through SPI. It can be applied to soft start of DC brushed motor and LED dimming, etc. In addition, the product provides intelligent diagnosis function to help check the load connection status. If there is disconnection or short circuit, the external MCU can obtain the error information of each channel through the internal register of the chip.

- **Product introduction**
  NSD8312/NSD8310/NSD8308/NSD8306 - Q1 is a multi-channel half-bridge driver chip with built-in 12/10/8/6-channel half bridge. With flexible configuration, the chip can support a variety of different types of load including DC brushed motors, stepper motors, relays and LEDs. The chip has built-in PWM generator, which can control the load by configuring PWM frequency and duty cycle through SPI. It can be applied to soft start of DC brushed motor and LED dimming, etc. In addition, the product provides intelligent diagnosis function to help check the load connection status. If there is disconnection or short circuit, the external MCU can obtain the error information of each channel through the internal register of the chip.

- **Product feature**
  - Wide operating voltage range: 4.5V – 36V (Absolute max rating: 40V)
  - On-resistance (HS + LS): 1.7Ω
  - Peak current: 1.3A
  - The PWM generator supports configurable frequency and duty cycle
  - Open load diagnostics
  - Undervoltage protection and overvoltage protection
  - Working temperature: -40°C – 125°C
  - AEC-Q100 qualified

- **Package**
  - HTSSOP24

- **Functional Block Diagram**

- **Application**
  - Vehicle body controller
  - Vehicle area controller
  - Vehicle A/C controller
## Multi-channel Low-side Driver

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Load type</th>
<th>Rds (on) (LS) mΩ</th>
<th>Peak current (A)</th>
<th>Number of low side channels</th>
<th>V Power (Max) (V)</th>
<th>Interface</th>
<th>LDO</th>
<th>Feature</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSD5604E-DHTSTR</td>
<td>Relay</td>
<td>260</td>
<td>3</td>
<td>4</td>
<td>8-55</td>
<td>Parallel</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Industrial</td>
<td>HTSSOP20</td>
</tr>
<tr>
<td>NSD5604-DHTSTR</td>
<td>Relay</td>
<td>260</td>
<td>3</td>
<td>4</td>
<td>8-55</td>
<td>Parallel</td>
<td>Yes</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Industrial</td>
<td>HTSSOP16</td>
</tr>
<tr>
<td>NSD5604NE-DHTSTR</td>
<td>Relay</td>
<td>260</td>
<td>3</td>
<td>4</td>
<td>8-55</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Industrial</td>
<td>HTSSOP20</td>
</tr>
<tr>
<td>NSD5604N-DHTSPR</td>
<td>Relay</td>
<td>260</td>
<td>3</td>
<td>4</td>
<td>8-55</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Industrial</td>
<td>HTSSOP16</td>
</tr>
<tr>
<td>NSD5604N-DHTSTR</td>
<td>Relay</td>
<td>260</td>
<td>3</td>
<td>4</td>
<td>8-55</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Industrial</td>
<td>HTSSOP16</td>
</tr>
<tr>
<td>NSD12416-Q1STBR</td>
<td>Relay</td>
<td>160</td>
<td>2.5</td>
<td>2</td>
<td>40</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Automotive</td>
<td>SO8</td>
</tr>
<tr>
<td>NSD12416-Q1SPR</td>
<td>Relay</td>
<td>160</td>
<td>2.5</td>
<td>2</td>
<td>40</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Automotive</td>
<td>SOP8</td>
</tr>
<tr>
<td>NSD11416-Q1STBR</td>
<td>Relay</td>
<td>90</td>
<td>8</td>
<td>2</td>
<td>40</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Automotive</td>
<td>SO8</td>
</tr>
<tr>
<td>NSD11416-Q1SPR</td>
<td>Relay</td>
<td>160</td>
<td>2.5</td>
<td>1</td>
<td>40</td>
<td>Parallel</td>
<td>No</td>
<td>Over-current protection, over-temperature protection, under-voltage protection and clamp and configurable current limiting point</td>
<td>-40~125</td>
<td>Automotive</td>
<td>SOP8</td>
</tr>
</tbody>
</table>
NSD5604E/NSD5604/NSD5604NE/NSD5604N
55V Four-channel Low-side Relay and Solenoid Driver IC

◆ Product introduction

NSD5604E/NSD5604 is a 4-channel low-side driver IC. The product integrates 4-channel low-side NMOSFET to drive resistive, capacitive or inductive loads. The 4 channels can be turned on at the same time and each channel can support a load current of greater than 500mA. Each channel of the product supports independent overcurrent protection and the overcurrent points can be configured through external resistors. The IC also integrates active clamp and freewheeling diodes, by working with external TVS, different current attenuation modes including slow attenuation and fast shutdown can be realized for inductive load.

◆ Product feature

- Wide operating voltage range: 8V – 50V (Absolute max rating 55V)
- On-resistance of 260mΩ
- Peak current 3.0A
- Supporting EFT frequency
- LDO supports transmission voltage of 5V-20mA
- Integrated active clamp and freewheeling diode
- Configurable current limit point and overcurrent protection
- Undervoltage protection
- Operating temperature: -40°C to 125°C

◆ Functional Block Diagram

◆ Package:

- HTSSOP16
- HTSSOP20

◆ Application

- Industrial automation
- Industrial machinery
- Digital machine tools
- General resistive/capacitive/inductive loads
**NSD12409 – Q1 Automotive 40V Dual-channel 90mΩ Intelligent Low-Side Switch**

**Product introduction**

NSD12409 is a single-channel intelligent low-side switch developed for automobile and industrial applications, featuring a withstand voltage of > 40V, and an internal resistance of about 90mΩ. It allows various diagnostic functions and different protections, and has passed AEC Q100 qualification. The IC is designed with an integrated overvoltage clamp of > 45V, which is especially suitable for driving inductive loads such as relays and valves to help them realize rapid demagnetization. The chip has internal output current limiting function to realize overload and short circuit protection. Built-in absolute overtemperature protection and relative overtemperature protection prevent chip overheating in multiple ways, so that to improve chip reliability. In addition, the chip supports open circuit detection, overtemperature detection and other diagnostic output. The chip can be operated at ambient temperature from -40°C to 125°C, with SOP8 package to meet different design requirements.

**Product feature**

- Operating voltage range of up to 40V
- On-resistance: 90mΩ
- Overvoltage clamp to support inductive load
- Overcurrent protection: Current limit >8A
- Overcurrent protection: Absolute overtemperature protection, relative overtemperature protection
- Working temperature: -40°C to 125°C
- AEC-Q100 qualified

**Package:**

- SOP8

**Functional Block Diagram**

**Application**

- Vehicle BMS system
- Vehicle body controller
- Vehicle controller
- A/C control panel
- PLC

**Product introduction**

NSD12409 is a single-channel intelligent low-side switch developed for automobile and industrial applications, featuring a withstand voltage of > 40V, and an internal resistance of about 90mΩ. It allows various diagnostic functions and different protections, and has passed AEC Q100 qualification. The IC is designed with an integrated overvoltage clamp of > 45V, which is especially suitable for driving inductive loads such as relays and valves to help them realize rapid demagnetization. The chip has internal output current limiting function to realize overload and short circuit protection. Built-in absolute overtemperature protection and relative overtemperature protection prevent chip overheating in multiple ways, so that to improve chip reliability. In addition, the chip supports open circuit detection, overtemperature detection and other diagnostic output. The chip can be operated at ambient temperature from -40°C to 125°C, with SOP8 package to meet different design requirements.

**Product feature**

- Operating voltage range of up to 40V
- On-resistance: 90mΩ
- Overvoltage clamp to support inductive load
- Overcurrent protection: Current limit >8A
- Overcurrent protection: Absolute overtemperature protection, relative overtemperature protection
- Working temperature: -40°C to 125°C
- AEC-Q100 qualified

**Package:**

- SOP8

**Functional Block Diagram**

**Application**

- Vehicle BMS system
- Vehicle body controller
- Vehicle controller
- A/C control panel
- PLC
NSD11/12416 - Q1 Automotive 40V Single/Dual-channel 160mΩ Intelligent Low-side Switch

◆ Product introduction
NSD11/12419 is a single-channel intelligent low-side switch developed for automobile and industrial applications, featuring a withstand voltage of > 45V, and an internal resistance of about 160mΩ. It allows various diagnostic functions and different protections, and has passed AEC Q100 qualification. The IC is designed with an integrated overvoltage clamp of > 45V, which is especially suitable for driving inductive loads such as relays and valves to help them realize rapid demagnetization. The chip has internal output current limiting function to realize overload and short circuit protection. Built-in absolute overtemperature protection and relative overtemperature protection prevent chip overheating in multiple ways, so that to improve chip reliability. In addition, the chip supports open circuit detection, overtemperature detection and other diagnostic output. The chip can be operated at ambient temperature from -40°C to 125°C, and support SOT223, with SOP8 package to meet different design requirements.

◆ Product feature
- Operating voltage range of up to 40V
- On-resistance: 160mΩ
- Overvoltage clamp to support inductive load
- Overcurrent protection: Current limit >2.5A
- Overcurrent protection; Absolute overtemperature protection, relative overtemperature protection
- Working temperature: -40°C~125°C
- AEC-Q100 qualified

◆ Functional Block Diagram

◆ Package:
- SOP8
- SOT223

◆ Application
- Vehicle BMS system
- Vehicle body controller
- Vehicle controller
- A/C control panel
- PLC

---

---
SiC Diode

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Power Supply VRRM</th>
<th>Current (I(1D-150°C))</th>
<th>Operating temperature (°C)</th>
<th>Qualification</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPS010N120A-DTOGT</td>
<td>1200V</td>
<td>10A</td>
<td>-55~175</td>
<td>Industrial</td>
<td>TO247-2</td>
</tr>
<tr>
<td>NPS020N120A-DTOGT</td>
<td>1200V</td>
<td>20A</td>
<td>-55~175</td>
<td>Industrial</td>
<td>TO247-2</td>
</tr>
<tr>
<td>NPS030N120A-DTOGT</td>
<td>1200V</td>
<td>30A</td>
<td>-55~175</td>
<td>Industrial</td>
<td>TO247-2</td>
</tr>
<tr>
<td>NPS040N120A-DTOGT</td>
<td>1200V</td>
<td>40A</td>
<td>-55~175</td>
<td>Industrial</td>
<td>TO247-2</td>
</tr>
</tbody>
</table>
NPD0x0N120A 1200V SiC Diode Series

◆ Product introduction
NPD0x0N120A is a 1200V series SiC Schottky diode product, with four current specifications, namely, 10A, 20A, 30A and 40A, which is designed for PV, energy storage, charging and other industrial applications. It offers excellent efficiency characteristics in single- or three-phase PFC, and isolation or non-isolation DC-DC circuits to meet the needs of medium- and high-voltage systems. Compared with traditional silicon-based diodes, the forward conduction voltage of high-voltage SiC diodes is lower, and the reverse recovery current is almost zero, which is not affected by the forward conduction current, turn-off speed (di/dt) and junction temperature. It has excellent reverse recovery characteristics, and can be used with high-frequency switching devices to improve switching frequency, thus reducing the overall volume and cost of the system. Its excellent reverse recovery features also lead to better EMI performance. In addition, the thermal conductivity of SiC material is stronger, so its heat dissipation performance under the same package is better.

◆ Product feature
- Operating voltage range of up to 1200V
- Current specifications: 10A, 20A, 30A and 40A
- Operating temperature: -55°C~175°C
- Zero reverse recovery current
- Excellent inrush current capability
- Positive temperature coefficient of on-state voltage for easy parallel connection
- Suitable for applications with high switching frequency

◆ Functional Block Diagram

◆ Package
- TO247-2

◆ Application
- PV storage
- Charging piles
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ambient temperature</th>
<th>Minimum input voltage</th>
<th>Maximum input voltage</th>
<th>Output Current</th>
<th>Output voltage</th>
<th>Iq-Quiescent Current</th>
<th>Other Feature</th>
<th>Package</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSR31xxx</td>
<td>-40°C~125°C</td>
<td>3V</td>
<td>45V</td>
<td>120mA</td>
<td>Fixed output 2.5V, 3.3V and 5V</td>
<td>SmA</td>
<td>Current limit protection, Over temperature protection</td>
<td>SOT223, DFN8</td>
<td>In-vehicle entertainment and autopilot, Body electronics and lighting, Inverter and motor control, OBC/DCDC, and BMS</td>
</tr>
<tr>
<td>NSR33xxx</td>
<td>-40°C~125°C</td>
<td>3V</td>
<td>45V</td>
<td>300mA</td>
<td>Fixed output 2.5V, 3.3V and 5V, Adjustable output 0.65V~18V</td>
<td>SmA</td>
<td>Enable, Power good indication, Current limit protection, Over temperature protection</td>
<td>MOOP-8 DIP-8</td>
<td>In-vehicle entertainment and autopilot, Body electronics and lighting, Inverter and motor control, OBC/DCDC, and BMS</td>
</tr>
<tr>
<td>NSR35xxx</td>
<td>-40°C~125°C</td>
<td>3V</td>
<td>45V</td>
<td>500mA</td>
<td>Fixed output 2.5V, 3.3V and 5V, Adjustable output 0.65V~18V</td>
<td>SmA</td>
<td>Enable, Current limit protection, Over temperature protection</td>
<td>TSS223-3, TSS223-5, TQ263-5</td>
<td>In-vehicle entertainment and autopilot, Antenna, GPS, load supply, ADAS camera load supply</td>
</tr>
<tr>
<td>NGE6702</td>
<td>-40°C~125°C</td>
<td>4.5V</td>
<td>45V</td>
<td>350mA/2CH</td>
<td>Adjustable output 1.0V~20V</td>
<td>2CH</td>
<td>Current limiting protection, Reverse current protection, Reverse polarity protection</td>
<td>TSSOP-16</td>
<td>In-vehicle entertainment and autopilot, Antenna, GPS, load supply, ADAS camera load supply</td>
</tr>
<tr>
<td>NGE6702</td>
<td>-40°C~125°C</td>
<td>4.5V</td>
<td>45V</td>
<td>350mA/2CH</td>
<td>Adjustable output 1.0V~20V</td>
<td>2CH</td>
<td>Current limiting protection, Reverse current protection, Reverse polarity protection</td>
<td>TSSOP-16</td>
<td>In-vehicle entertainment and autopilot, Antenna, GPS, load supply, ADAS camera load supply</td>
</tr>
</tbody>
</table>
Functional Block Diagram

AEC-Q100 automotive qualified
Operation ambient temperature: -40°C to 125°C
Operating voltage range: 3V-40V, supporting transient voltage up to 45V
Output current range:
NSR31 series: 150mA; NSR33 series: 300mA; NSR35 series: 500mA
Output voltage range:
Fixed output: 2.5V, 3.3V, and 5V, Adjustable output: 0.65V to 18V
Ultra low quiescent current Iq
Iq: 270nA in shutdown mode
Typical value under light load is: 5uA

Product feature
- AEC-Q100 automotive qualified
- Operation ambient temperature: -40°C to 125°C
- Operating voltage range: 3V-40V, supporting transient voltage up to 45V
- Output current range:
  - NSR31 series: 150mA
  - NSR33 series: 300mA
  - NSR35 series: 500mA
- Output voltage range:
  - Fixed output: 2.5V, 3.3V, and 5V
  - Adjustable output: 0.65V to 18V
- Ultra low quiescent current Iq
  - Iq: 270nA in shutdown mode
  - Typical value under light load is: 5uA
- Maximum voltage drop:
  - NSR31 Series: 650mV at 150mA load current
  - NSR33 Series: 263mV at 300mA load current
  - NSR35 Series: 426mV at 500mA load current
- Excellent output transient response, supporting 1uF-200uF low ESR ceramic capacitor
- Enable signal, PG signal, delay programmable function:
  - NSR331 series
- Integrated output short circuit protection, over-temperature protection
- Package:
  - NSR31 series: SOT223, SOT23, DFN-8
  - NSR33 series: MSOP-8 EP, SOP-8 EP
  - NSR35 series: TO252-3, TO252-5, TO263-5

Product introduction
The latest NSR31/33/35 series LDO chips launched by NOVOSENSE are designed for the applications where the automobile battery supplies power to the system. With a wide input voltage of 3V to 40V, it supports transient voltage up to 45V, which can meet the normal operating requirements of automobile under cold crank and start-stop conditions. Its ultra-low quiescent current of 5uA and low dropout voltage is very suitable for automotive applications with low standby power consumption required. It supplies power to MCU and CAN/LIN transceivers in standby systems to save power and extend battery life.

The NSR31/33/35 series provides sufficient solutions for hardware designers, with various fixed voltage versions: 2.5V, 3.3V and 5.0V, and also provides adjustable output options (0.65V to 18V). In addition, different series are designed with output currents of 150mA, 300mA and 500mA respectively. This low-power linear regulator also integrates short-circuit protection and over-temperature protection. These devices can operate at ambient temperatures from -40°C to 125°C. SOT223, SOT23, DFN-8, MSOP-8 EP, SOP-8 EP, TO252, TO263 and other packages are made available to meet different design requirements.

Application
- In-vehicle entertainment and autopilot
- Body electronics and lighting
- Inverter and motor control
- OBC/DCDC and BMS
- Maximum voltage drop:
  - NSR31 Series: 650mV at 150mA load current
  - NSR33 Series: 263mV at 300mA load current
  - NSR35 Series: 426mV at 500mA load current
- Excellent output transient response, supporting 1uF-200uF low ESR ceramic capacitor
- Enable signal, PG signal, delay programmable function:
  - NSR331 series
- Integrated output short circuit protection, over-temperature protection
- Package:
  - NSR31 series: SOT223, SOT23, DFN-8
  - NSR33 series: MSOP-8 EP, SOP-8 EP
  - NSR35 series: TO252-3, TO252-5, TO263-5

Product feature

Application
### Voltage Monitoring Reset IC Series

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Threshold Voltage</th>
<th>Supply Voltage (V)</th>
<th>Quiescent Current</th>
<th>Other Features</th>
<th>Reset Delay Time</th>
<th>Output Type</th>
<th>Qualification</th>
<th>Package</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSR7808Gxx-Q1</td>
<td>Adjustable, 0.84, 1.12, 1.16, 1.4, 1.67, 1.77, 2.33, 2.79, 3.07, 4.65</td>
<td>1.8-6.5</td>
<td>3.6uA</td>
<td>With Manual Reset Function</td>
<td>Programmable</td>
<td>Low active, Open Drain</td>
<td>Automotive</td>
<td>SOT33 TDFN</td>
<td>ADAS, DSP, and MCU processor applications, In-vehicle entertainment</td>
</tr>
<tr>
<td>NSR7808Gxx</td>
<td>Adjustable, 0.84, 1.12, 1.16, 1.4, 1.67, 1.77, 2.33, 2.79, 3.07, 4.65</td>
<td>1.8-6.5</td>
<td>3.6uA</td>
<td>With Manual Reset Function</td>
<td>Programmable</td>
<td>Low active, Open Drain</td>
<td>Industrial</td>
<td>SOT33 TDFN</td>
<td>DSP/SUA/ADAS processor applications, Portable devices, Laptop</td>
</tr>
</tbody>
</table>
Automotive and Industrial grade low-Iq Programmable-delay Voltage Monitoring Reset IC Series

Product introduction
OVOSENSE launches the industry-leading NSR7808 series voltage monitoring reset chip, which is designed for automotive and industrial applications of microprocessor core voltage monitoring circuits. It can be used to monitor system voltages as low as 0.4V and provides reset function with programmable reset delay. The RESET signal is activated when the SENSE voltage is down to the threshold VIT or when the manual reset MR voltage is triggered to low. The RESET output remains low until the user sets the delay time and releases it, then it will be pulled up to the logic high level. The monitored voltage can be set to a fixed typical voltage rail from 0.9V to 5V, and the reset voltage for the adjustable version NSR7808G01 can be configured with an external resistance divider.

The NSR7808 series features a typical ultra-low static current of 3.6uA, which is ideal for automotive and industrial battery-powered applications. It provides an accurate reference voltage, achieving a threshold accuracy of ±1%. The time to select the reset delay can be configured through the capacitor connected between CD and GND pin, which can be set to any value from 1.25ms to 1s. When the CD pin is suspended, the default delay time is 20ms. When the CD pin is connected to the VDD, the delay time is 300ms.

NSR7808 series provides hardware engineers with ample solutions, available in a variety of fixed-voltage versions as well as adjustable voltage options. Packages SOT23-6 (2.9mm*1.6mm) and DFN-6 (2mm*2mm) are available to meet different design requirements.

Product feature
- Wide temperature range: -40°C to 125°C
- AEC-Q100 qualified
- Supply voltage range: 1.8V-6.5V
- Monitoring threshold voltage:
  - Fixed version: 0.84, 1.12, 1.16, 1.4, 1.67, 1.77, 2.33, 2.79, 3.07, 4.65
  - Adjustable version: Adjustable

Function Block Diagram

Application
- IVI In-Vehicle infotainment
- Camera
- BCM
- ADAS
### Smart High and Low Side Switch

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ambient Temperature</th>
<th>Type</th>
<th>Number of Channels</th>
<th>MOS Impedance</th>
<th>Overcurrent value</th>
<th>Protection</th>
<th>Feature</th>
<th>Package</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSE11490</td>
<td>-40°C~125°C</td>
<td>Low side switch</td>
<td>1CH</td>
<td>90mohm</td>
<td>BA</td>
<td>Open circuit diagnosis</td>
<td>Overcurrent protection</td>
<td>Ultra low power consumption</td>
<td>SO-8 + SOT-223</td>
</tr>
</tbody>
</table>

- **Features**:
  - Diagnostic output
  - VDD clamp
  - Overcurrent protection
  - Over-temperature protection

- **Applications**:
  - Body electronic controller
  - Vehicle controller
  - Air conditioning controller
  - BMS
Automotive 40V Single Channel 90mΩ
Intelligent Low Side Switch NSE11409 Series

◆ Product introduction
NSE11409 is a single-channel smart low-side switch developed for automotive and industrial applications, featuring a withstand voltage of > 40V, and an internal resistance of about 90mΩ, it allows various diagnostic functions and different protections, and has passed AEC Q100 certification. The IC is designed with a built-in VDD clamp of > 45V, which is especially suitable for driving inductive loads such as relays and valves to help them realize rapid demagnetization/deenergization. The IC is designed with an internal output current limiting function for overload protection and short circuit protection. Built-in absolute over-temperature protection and relative over-temperature protection to prevent the IC from overheating in multiple ways, slow down power accumulation, and improve IC reliability. At the same time, the IC supports open circuit detection, over-temperature detection and other diagnostic outputs. The IC can operate at ambient temperatures from -40°C to 125°C. SOT223 and SO-8 packages are made available to meet different design requirements.

◆ Product feature
- AEC-Q100 automotive qualified
- Operation ambient temperature: -40°C to 125°C
- The operating voltage is up to 40V
- VDD clamp to support the connection to inductive load
- Overcurrent protection: current limit value > 8A
- Over-temperature protection: absolute over-temperature protection, relative over-temperature protection
- Error status diagnostic output (SO-8 Package): open circuit detection, over-temperature detection
- Ultra-low static power consumption Iq < 5μA
- Packages:
  - NSE11409 series: SOT223, SO-8

◆ Functional Block Diagram

◆ Application
- Body electronic controller
- Vehicle controller
- Air conditioning panel controller

| BMS | Vehicle controller | Air conditioning panel controller | | | | | | |
## LED Driver

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ambient temperature</th>
<th>Number of channels</th>
<th>Input voltage</th>
<th>Output current</th>
<th>Diagnostic and protection</th>
<th>Heat dissipation enhancement</th>
<th>Feature</th>
<th>Package</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSL21610</td>
<td>-40°C~125°C</td>
<td>1CH</td>
<td>5-40V</td>
<td>300mA</td>
<td>Open circuit diagnosis, Short circuit diagnosis, Over-temperature protection</td>
<td>External resistor, Automatic current steering</td>
<td>PWM dimming, Multiple diagnostic cascades, Independent enable</td>
<td>MSOP-8 EP</td>
<td>Tail light, Interior lights, Other body lighting</td>
</tr>
<tr>
<td>NSL21611</td>
<td>-40°C~125°C</td>
<td>1CH</td>
<td>5-40V</td>
<td>450mA</td>
<td>Open circuit diagnosis, Short circuit diagnosis, Over-temperature protection</td>
<td>None</td>
<td>PWM dimming, Multiple diagnostic cascades, Independent enable</td>
<td>MSOP-8 EP</td>
<td></td>
</tr>
<tr>
<td>NSL21630</td>
<td>-40°C~125°C</td>
<td>3CH</td>
<td>5-40V</td>
<td>200mA</td>
<td>Open circuit diagnosis, Short circuit diagnosis, Over-temperature protection</td>
<td>External resistor, Automatic current steering</td>
<td>PWM dimming, Multiple diagnostic cascades</td>
<td>HTSSOP-16</td>
<td>Interior lights, Tail light</td>
</tr>
<tr>
<td>NSL21631</td>
<td>-40°C~125°C</td>
<td>3CH</td>
<td>5-40V</td>
<td>200mA</td>
<td>Open circuit diagnosis, Short circuit diagnosis, Over-temperature protection</td>
<td>External resistor, Automatic current steering</td>
<td>PWM dimming, Multiple diagnostic cascades, Independent enable</td>
<td>HTSSOP-16</td>
<td>Interior lights, Tail light</td>
</tr>
</tbody>
</table>
Automotive-qualified Three-channel High-side LED Driver with Heat Sharing Function NSL2163X Series

◆ Product introduction

The NSL2163X series is an automotive-qualified three-channel linear LED high-side driver with a wide input voltage range of 5V~40V. Each channel can be configured with an output current capacity of up to 200mA. External shunt resistors can be used to share the output current, reducing device temperature rise. The device has a full range of diagnostic functions, including LED open circuit protection, LED GND short circuit protection, and device overheat protection for joint failure or failure channel closing protection with the flexible configuration of the Fault bus. The chip offers an EN pin version for low power consumption.

◆ Product feature

- AEC-Q100 qualified
- Operating ambient temperature of -40°C ~ 125°C
- Wide input voltage range of 5V~40V
- Three-channel high-precision current regulation
- Output current capacity of 200mA per channel
- Each channel with independent PWM control and current setting
- Equipped with external resistors to realize automatic heat sharing and reduce device temperature rise
- Low voltage drop of 600mV (Iout=100mA)
- Output current accuracy of ±5% in full temperature range
- LED open circuit protection, with automatic recovery function
- LED short circuit protection, with automatic recovery function
- Flexible configuration of the Fault bus to enable joint failure or failure channel closure
- Thermal shutdown
- EN pin version available for low power consumption
- HTSSOP-16 package

◆ Functional Block Diagram

◆ Application

Vehicle light
IMPORTANT NOTICE

The information given in this document (the "Document") shall in no event be regarded as any warranty or authorization of, express or implied, including but not limited to accuracy, completeness, merchantability, fitness for a particular purpose or infringement of any third party’s intellectual property rights.

Users of this Document shall be solely responsible for the use of NOVOSENSE’s products and applications, and for the safety thereof. Users shall comply with all laws, regulations and requirements related to NOVOSENSE’s products and applications, although information or support related to any application may still be provided by NOVOSENSE.

This Document is provided on an "AS IS" basis, and is intended only for skilled developers designing with NOVOSENSE’ products. NOVOSENSE reserves the rights to make corrections, modifications, enhancements, improvements or other changes to the products and services provided without notice. NOVOSENSE authorizes users to use this Document exclusively for the development of relevant applications or systems designed to integrate NOVOSENSE’s products. No license to any intellectual property rights of NOVOSENSE is granted by implication or otherwise. Using this Document for any other purpose, or any unauthorized reproduction or display of this Document is strictly prohibited. In no event shall NOVOSENSE be liable for any claims, damages, costs, losses or liabilities arising out of or in connection with this Document or the use of this Document.

For further information on applications, products and technologies, please contact NOVOSENSE (www.novosns.com).

Suzhou NOVOSENSE Microelectronics Co., Ltd.
NOVOSENSE
Product Selection Guide

- Signal Sensing
- System Interconnection
- Power and Driver

www.novosns.com