



# NOVOSENSE Product Selection Guide

- ▶ Signal Sensing
- ▶ System Interconnection
- ▶ Power and Driver

# About NOVOSENSE

NOVOSENSE Microelectronics (NOVOSENSE, SSE Code 688052) is a highly robust & reliable analog and mixed signal IC design company. Since its establishment in 2013, the company has been focusing on signal sensing, system interconnection and power drive, 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](http://www.novosns.com)

---



“Sense and Drive the Future,  
Build a Green, Smart and  
Connected World with  
Semiconductors”



# Contents

## Signal Sensing

▲ Temperature Sensor	01	▲ MEMS Pressure Sensor	17
NST1001: D-NTC® Digital Pulse Output Temperature Sensor	03	NSPGM1 series: Automotive-qualified Integrated Differential Pressure Sensor Module	19
NST1002: D-NTC Single Bus-type Digital Temperature Sensor	04	NSPGM2 series: Automotive-qualified Integrated Differential Pressure Sensor Module	20
NS18B20: High-precision Single-BUS Digital Temperature Sensor	05	NSPAS3M series: Automotive-qualified Integrated Absolute Pressure Sensor	21
NS18B20L: High-precision Single-BUS Digital Temperature Sensor	06	NSPAS3 series: Automotive-qualified Integrated Absolute Pressure Sensor	22
NST175: Digital Temperature Sensor with I <sup>2</sup> C Port in Industrial-qualified Package	07	NSPAS1 series: Automotive-qualified Integrated Absolute Pressure Sensor	23
NST1075: Small-size High-precision Digital Temperature Sensor	08	NSPGS2 series: Integrated Gauge Pressure Sensor with Air Nozzle in SOP Package	24
NST118: Small Ultra-high-precision Digital Temperature Sensor with I <sup>2</sup> C Port	09	NSPGD1 series: Integrated Gauge Pressure Sensor with Air Nozzle in DIP8 Package	25
NST117: Small-size High-precision Digital Temperature Sensor with I <sup>2</sup> C Port	10	NSPDSx series: Dual-nozzle Integrated Differential Pressure Sensor	26
NST112: High-precision Low-power I <sup>2</sup> C Port Digital Temperature Sensor with Ultra-small SOT563 and DSBGA Package	11	NSPGS5 series: Single-nozzle Integrated Gauge Pressure Sensor	27
NST103: Digital Temperature Sensor with I <sup>2</sup> C Port in Wafer-level Package	12	NSP183x: High-performance and High-reliability MEMS Differential Pressure Sensor Wafer	28
NST461: Small-size High-precision I <sup>2</sup> C Interface Remote and Local Digital Temperature Sensor	13	NSP163x: High-performance and High-reliability MEMS Absolute Pressure Sensor Wafer	29
NST1412/NST1413: High-precision Remote and Local Temperature Sensors with Digital Interface in Industrial-qualified Package	14	▲ Current Sensor	30
NST7719: High-precision Remote and Local Temperature Sensors with Digital Interface in Industry-standard Package	15	NSM2011/2012/2013/2015/2016/2017: Chip-level Current Sensor with Integrated Current Path	32
NST20/NST60/NST235/NST86: High-precision and Low-power Analog Output Temperature Sensor	16	▲ Linear Hall Current Sensor	33
		NSM2031: Linear Hall Current Sensor	34





## System Interconnection

▲ Isolated RS-485 Transceiver	70	NCA9555: I <sup>2</sup> C 16-bit GPIO Expansion	86
NSi8308xE: Isolated Half-Duplex/Full-Duplex 485 Transceiver with High Reliability	71	NCA9534B: I <sup>2</sup> C 8-bit GPIO Expansion	87
NIRS485: Cost-optimized Isolated 485 Transceiver	72	NCA9539-Q1: Automotive I <sup>2</sup> C 16-bit GPIO Expansion	88
▲ Isolated CAN Transceiver	73	▲ RS-485 Transceiver	89
NSi1050: High-Performance Isolated CAN Transceiver	74	NCA34xx: high robust RS485 half/full duplex transceiver	90
NSi1042/1052: High-Performance Isolated CAN Transceiver	75	▲ CAN Transceiver	91
▲ Isolated I <sup>2</sup> C	76	NCA1042: Fail-Safe CAN Transceiver Supporting CAN FD and BUS Wakeup	93
NSi8100NC/NSi8100: High Reliability Bidirectional I <sup>2</sup> C Isolators	77	NCA1042-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and BUS Wakeup	94
▲ I <sup>2</sup> C Interface	78	NCA1051/N: Fail-Safe CAN Transceiver Supporting CAN FD and BUS Wakeup	95
NCA9511: I <sup>2</sup> C Hot-swappable BUS and SMBUS Buffer	80	NCA1043-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Battery Back-up	96
NCA9306: I <sup>2</sup> C and SMBUS Voltage Level Converter	81	NCA1145-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Local Interconnect	97
NCA9617A: I <sup>2</sup> C and SMBUS Dual Bidirectional Buffer	82	▲ LIN Transceiver	98
NCA9545: 4-channel I <sup>2</sup> C-BUS Switch with Interrupt Logic and Reset	83	NCA1021-Q1: Automotive LIN BUS Transceiver	99
NCA9546: 4-channel I <sup>2</sup> C Switch with Reset	84		
NCA9548: 8-channel I <sup>2</sup> C Switch with Reset	85		

---

▲ **Digital Isolator** **100**

---

NSi822X/ NSi823X/NSi824X/NSi826X: 103  
Enhanced Dual/Triple/Quad/Six-Channel  
Digital Isolators with High Reliability

---

NSi822XC/ NSi823XC/NSi824XC/NSi826XC: 104  
Cost-effective Enhanced  
Dual/Triple/Quad/Six-Channel Digital Isolators  
with High Reliability

---

NIRS2x: Cost-optimized Dual-channel 105  
Digital Isolator with High Reliability

---

NIRS31: Cost-optimized Triple-channel 106  
Digital Isolator with High Reliability

---

▲ **Digital Isolator with Integrated Isolated Power Supply** **107**

---

NSiP882x/NSiP892x/NSiP884x/NSiP894x: 109  
Dual/Quad-Channel Digital Isolator with  
Integrated Isolated DC-DC Power Supply

---

NIRSP31: Low Cost Triple-Channel Digital 110  
Isolator with Integrated Isolated DC-DC  
Power Supply

---

▲ **Isolated 485 with Integrated Isolated Power Supply** **111**

---

NSiP83086: Isolated RS-485 Transceiver 112  
With Integrated Isolated DC-DC Power  
Supply

---

▲ **Isolated CAN with Integrated Isolated Power Supply** **113**

---

NSiP1042: Isolated CAN Transceiver With 114  
Integrated Isolated DC-DC Power Supply

---

▲ **Isolated ADC** **115**

---

NSi1306: Isolated Current Sampling ADC 117  
with High Reliability

---

NSi1305: Isolated Current Sampling ADC 118  
with High Reliability

---

NSi1303: Isolated ADC with Integrated 119  
Internal Clock with High Reliability

---

▲ **Isolated Current Amplifier** **120**

---

NSi1200/NSi1300: Isolated Current 122  
Sampling Amplifier with High Reliability

---

NSi1400: Cost-effective Isolation Current 123  
Sampling Amplifier with High Reliability

---

▲ **Isolated Voltage Amplifier** **124**

---

NSi1311: Isolated Voltage Sampling 125  
Amplifier With High Reliability

---

NSi1312: Isolated Voltage Sampling 126  
Amplifier With High Reliability

---

▲ **Isolated Error Amplifier** **127**

---

NSi3190: Isolated Error Amplifier with 128  
High Reliability

---

▲ **Isolated Comparator** **129**

---

NSi22C1x: High-speed isolated 130  
comparators

---



## Power & Driver

▲ Isolated Half-bridge Driver	131	▲ Non-Isolated Gate Driver_> 600V Half-bridge Driver	151
NSi66x2: Dual-channel Isolated Gate Driver	134	NSD1624 High Voltage Half-bridge Gate Driver	153
NSi6602V/NSi6602N: Second - generation High-performance Isolated Dual-channel Gate Driver	135	NSD2621 High Voltage Half-bridge GaN Driver IC	154
NSi6602M: Isolated Dual-channel Gate driver with Integrated Miller Clamp	136		
▲ Isolated Single Driver	137	▲ GaN Power Stage IC	155
NSi6801: Optocoupler Compatible Single-Channel Isolated Gate Driver	139	NSG65N15K High-voltage Half-bridge GaN Power Stage IC	156
NSi6801x: Cost-effective Optocoupler Compatible Single-Channel Isolated Gate Driver	140		
NSi6601/NSi6601M: Single-Channel Isolated Gate Driver	141	▲ Brushed DC Motor	157
NSi6801M: Optocoupler-compatible single-channel isolated gate driver with Miller clamp	142	NSD731x/NSD731x-Q1 40V Peak Current 3.6A Brushed DC Motor Driver IC	159
		NSD8312/NSD8310/NSD8308/NSD8306/ – Q1 40V 12/10/8/6-Channel Half-bridge Driver	160
▲ Smart Isolated Driver	143		
NSi6611/NSi6651: Smart Isolated Gate Driver	145	▲ Multi-channel Low-side Driver	161
NSi68515: Optocoupler-compatible Smart Isolated Gate Driver	146	NSD5604E/NSD5604/NSD5604NE /NSD5604N 55V Four-channel Low-side Relay and Solenoid Driver IC	162
		NSD12409 – Q1 Automotive 40V Dual-channel 90mΩ Intelligent Low-Side Switch	163
▲ Non-Isolated Gate Driver_Low-side Driver	147	NSD11/12416– Q1 Automotive 40V Single/Dual-channel 160mΩ Intelligent Low-side Switch	164
NSD1025: High Speed Dual Low-side Gate Driver	149		
NSD1015T: Smart Non-isolated Low-side Gate Driver	150		

▲ LDO Linear Regulator	165
Automotive 40V 150/300/500mA LDO NSR31/33/35 Series with Ultra Low-Quiescent Current	166

---

▲ LED Driver	171
Automotive-qualified Three-channel High-side LED Driver with Heat Sharing Function NSL2163X Series	172

---

▲ Voltage Monitoring Reset IC Series	167
Automotive and Industrial grade low-Iq Programmable-delay Voltage Monitoring Reset IC Series	168

---

▲ Smart High and Low Side Switch	169
Automotive 40V Single Channel 90mΩ Intelligent Low Side Switch NSE11409 series	170

---



# Temperature Sensor

Part number	Product description	Package	Temperature range	Supply voltage	Working current	Port type	Max. resolution	Max. precision	Typical application
NST1001	High-precision dual-pin digital pulse output temperature sensor	TO-92S/DFN-2	-50°C~150°C	1.65V~5.5V	30μA	Pulse count output	0.0625°C	±0.5°C	NTC replacement, quick response probe, 2-wire temperature probe, gas meter temperature compensation, wearable and IoT temperature measurement
NST1001HA	High-precision dual-pin digital pulse output temperature sensor with maximum accuracy of ±0.2°C	DFN-2	-50°C~150°C	1.65V~5.5V	30μA	Pulse count output	0.0625°C	±0.1°C	NTC replacement, quick response probe, 2-wire temperature probe, gas meter temperature compensation, wearable and IoT temperature measurement
NST1002	High-precision single-BUS digital temperature sensor	TO-92S/DFN-2	-40°C~125°C	1.7V~5.5V	30μA	One wire protocol	0.0078125°C	±0.1°C	NTC replacement, quick response probe, 2-wire temperature probe, glucometer, wearable and IoT temperature measurement
NS18B20	High-precision single-BUS digital temperature sensor	TO-92S	-55°C~125°C	2.7V~5.5V	26μA	One wire protocol	0.0625°C	±0.5°C	NTC replacement, quick response probe, 2-wire temperature probe, gas meter temperature compensation, wearable and IoT temperature measurement
NS18B20L	High-precision single-BUS digital temperature sensor	TO-92L	-55°C~150°C	2.7V~5.5V	26μA	One wire protocol	0.0625°C	±0.5°C	DS18B20 replacement, digital temperature probe, granary/flue-cured tobacco network temperature measurement, power terminal temperature measurement

# Temperature Sensor





Part number	Product description	Package	Temperature range	Supply voltage	Working current	Port type	Max. resolution	Max. precision	Typical application
NST175	Digital temperature sensor with I <sup>2</sup> C/SMBUS interface in industrial-qualified package	MSOP-8/ SOIC-8	-55°C ~ 125°C	1.62V~5.5V	30μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.5°C	LM75/TMP75 replacement, server temperature measurement, battery temperature measurement, SSD temperature measurement, board-level temperature measurement
NST1075	Small-size high-precision digital temperature sensor	WSON8	-55°C~125°C	1.62V~5.5V	30μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.5°C	TMP75 replacement, server temperature measurement, routers, communication base stations, board-level temperature measurement
NST118	Small-size high-precision digital temperature sensor with I <sup>2</sup> C/SMBUS port	DFN-6	-40°C~125°C	1.71V~3.6V	6.5μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.1°C	x117 substitution, wearable temperature monitoring, medical thermometer, battery temperature measurement, industrial IoT, environmental monitoring, etc.
NST117	Small-size high-precision digital temperature sensor with I <sup>2</sup> C port	DFN-6	-55°C~125°C	1.62V~5.5V	30μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.2°C	x117 series substitution, wearable temperature monitoring, medical thermometer, battery temperature measurement, industrial Internet of Things, environmental monitoring, etc.
NST112 -DSTR	SOT563 is a high-accuracy and low-power digital temperature sensor with a I <sup>2</sup> C/SMBUS port	SOT563	-40°C~125°C	1.71V~3.6V	6.5μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.5°C	1X2 series substitution, board level temperature measurement, server temperature measurement, battery temperature measurement, SSD temperature measurement, IoT temperature monitoring, etc.
NST112x	WLCSP is a high-accuracy and low-power digital temperature sensor with a I <sup>2</sup> C/SMBUS port	DSBGA-4	-40°C~125°C	1.5V~3.6V	6.5μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.1°C	1X2 series substitution, wearable temperature monitoring, board level temperature measurement, server temperature measurement, battery temperature measurement, SSD temperature measurement, IoT temperature monitoring, etc.
NST103	WLCSP is a low-power digital temperature sensor with a I <sup>2</sup> C/SMBUS port	DSBGA-4	-40°C~125°C	1.5V~3.6V	6.5μA	I <sup>2</sup> C/SMBUS	1°C	±1°C	X103 series substitution, mobile phone, laptop, SOLID-state disk, server, telecommunication, set-top box, sensor, low power environment
NST461	High-precision and high-resolution I <sup>2</sup> C/SMBUS remote and local temperature sensors (1L+1R)	WQFN-10	-40°C~125°C	2.1V~3.6V	37μA	I <sup>2</sup> C/SMBUS	0.0625°C	±0.5°C	X461/451 substitution, X4x1 compatibility, laptop, desktop, solid-state drive, server, telecommunication, Industrial Internet of Things, etc.
NST1412	High-precision I <sup>2</sup> C/SMBUS remote and local temperature sensors (1L+1R)	MSOP-10	-40°C~125°C	3V~3.6V	37μA	I <sup>2</sup> C/SMBUS	0.125°C	±0.5°C	EMC1412 substitution, laptop, desktop, solid-state drive, server, telecommunication, Industrial Internet of Things, etc.
NST1413	High-precision I <sup>2</sup> C/SMBUS remote and local temperature sensors (1L+2R)	MSOP-10	-40°C~125°C	3V~3.6V	37μA	I <sup>2</sup> C/SMBUS	0.125°C	±0.5°C	EMC1413 substitution, laptop, desktop, solid-state drive, server, telecommunication, Industrial Internet of Things, etc.
NST7719	High-precision I <sup>2</sup> C/SMBUS remote and local temperature sensors (1L+2R)	MSOP-10	-40°C~125°C	3V~3.6V	37μA	I <sup>2</sup> C/SMBUS	0.125°C	±0.5°C	NCT7719 substitution, laptop, desktop, server, telecommunication, Industrial Internet of Things, etc.
NST20	High-precision, low-power analog output temperature sensor (negative temperature coefficient)	SC70-5	-55°C~130°C	2.4V~5.5V	20μA	Analog output	-11.77mV/°C	±0.5°C	X20 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 &HVAC, etc.
NST86	High-precision, low-power analog output temperature sensor (negative temperature coefficient)	SC70-5	-50°C~150°C	2.4V~5.5V	20μA	Analog output	-10.9mV/°C	±0.5°C	X86 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 &HVAC, etc.
NST235	High-precision, low-power analog output temperature sensor (positive temperature coefficient)	SC70-5 SOT23-3	-40°C~150°C	2.3V~5.5V	20μA	Analog output	10mV/°C	±0.5°C	X235 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 &HVAC, etc.
NST60	High-precision, low-power analog output temperature sensor (positive temperature coefficient)	SOT23-3	-40°C~125°C	2.4V~5.5V	20μA	Analog output	6.25mV/°C	±0.5°C	X60 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 &HVAC, etc.

# NST1001: D-NTC® Digital Pulse Output Temperature Sensor

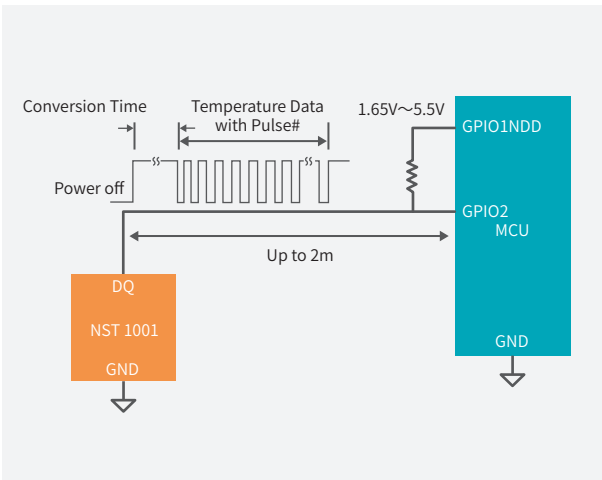
## ◆ Product introduction

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  $\pm 0.75\text{ }^{\circ}\text{C}$  over temperatures ranging from  $-50\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ , while providing extremely high resolution ( $0.0625\text{ }^{\circ}\text{C}$ ) 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

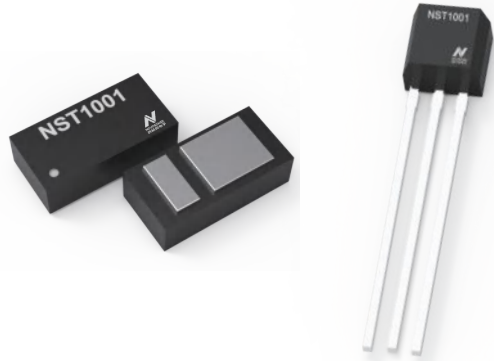
- Operating temperature range:  $-50\text{ }^{\circ}\text{C}\sim 150\text{ }^{\circ}\text{C}$
- High accuracy in full temperature range  
 $25\text{ }^{\circ}\text{C}\sim 45\text{ }^{\circ}\text{C}$ :  $\pm 0.2\text{ }^{\circ}\text{C}$  (typical) @ NST1001  
 $25\text{ }^{\circ}\text{C}\sim 45\text{ }^{\circ}\text{C}$ :  $\pm 0.2\text{ }^{\circ}\text{C}$  (max.) @ NST1001HA  
Accuracy within range  $-20\text{ }^{\circ}\text{C}\sim 85\text{ }^{\circ}\text{C}$ :  $\pm 0.5\text{ }^{\circ}\text{C}$  (max.)  
Accuracy within range  $-50\text{ }^{\circ}\text{C}\sim -20\text{ }^{\circ}\text{C}$ :  $\pm 0.75\text{ }^{\circ}\text{C}$  (max.)  
Accuracy within range  $85\text{ }^{\circ}\text{C}\sim 150\text{ }^{\circ}\text{C}$ :  $\pm 0.75\text{ }^{\circ}\text{C}$  (max.)
- High resolution:  $0.0625\text{ }^{\circ}\text{C}$  (1 LSB)
- Quick temperature response: silicone oil  $\tau 63\% 0.21\text{S}$  (DFN2L)
- Single temperature conversion time: 50mS
- Ultra-low power consumption:  $30\mu\text{A}$  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

## ◆ Functional block diagram




## ◆ Package

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




## ◆ Application




Power metering




Gas meter temperature measurement




Smart closetool



Digital temperature probes



Smart wearable devices,



Industrial Internet of things



Battery temperature detection

## NST1002: D-NTC single bus-type digital temperature sensor

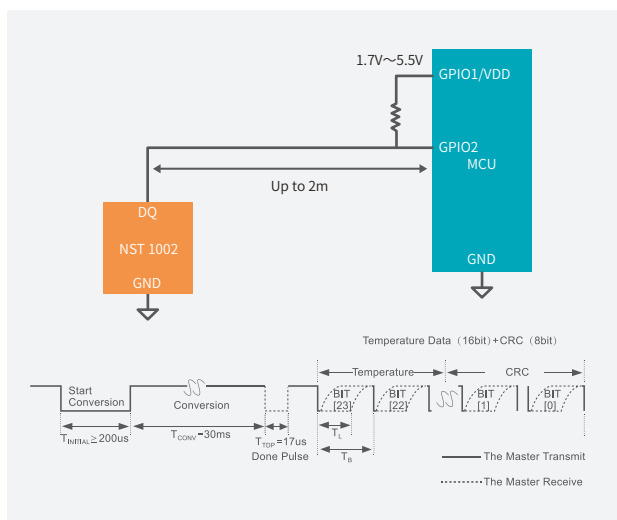
### ◆ Product introduction

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  $\pm 0.5^{\circ}\text{C}$  over temperatures ranging from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ , while providing extremely high resolution ( $0.0078125^{\circ}\text{C}$ ) without system calibration or hardware/software compensation. The digital interface of the single bus protocol is designed to connect directly to GPIO, simplifying hardware implementation. The simple dual-pin architecture enables the NST1002 device to be easily converted into a two-wire temperature probe.

### ◆ Product feature

- Operating temperature range:  $-50^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- Maintain high accuracy in full temperature range
  - Accuracy in  $25^{\circ}\text{C}$  ~  $85^{\circ}\text{C}$ :  $\pm 0.1^{\circ}\text{C}$  (typical)
  - Accuracy in  $20^{\circ}\text{C}$  ~  $85^{\circ}\text{C}$ :  $\pm 0.2^{\circ}\text{C}$  (max.)
  - Accuracy in  $-40^{\circ}\text{C}$  ~  $125^{\circ}\text{C}$ :  $\pm 0.5^{\circ}\text{C}$  (max.)
- High resolution:  $0.0078125^{\circ}\text{C}$  (1 LSB)
- Quick temperature response: 0.27S (DFN2L)
- Single temperature conversion time: 32ms
- Ultra-low power consumption:  $30\mu\text{A}$  operating current, zero standby power consumption
- 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



### ◆ Package

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



### ◆ Application



Ammeter



Gas meter temperature measurement



Intelligent closetool



Home appliances



Glucometer



Digital temperature probe



Intelligent wearables



Industrial Internet of Things



Battery temperature detection



# NS18B20: High-precision Single-BUS Digital Temperature Sensor

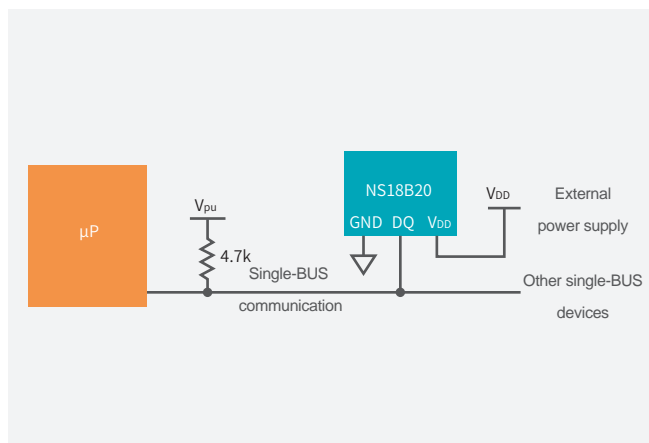
## ◆ Product introduction

NS18B20 is a high-precision one wire temperature measurement chip with temperature sensor ranging from -55°C to +125°C. According to user needs, digital conversion accuracy and temperature measurement speed can be set by configuring registers. The chip has built-in 5-byte non-volatile storage unit for users, 3 bytes for high and low temperature alarm and accuracy configuration, and another 2 bytes for storing user-defined information. The maximum error is ±0.5°C in the range from 10°C to +85°C, and ±1°C in the whole temperature range. NS18B20 has two working modes, namely, parasitic power supply and external power supply. The parasitic power supply can be powered by data line without external power supply. Each NS18B20 has a unique 64-bit serial number that allows multiple devices to be connected to the same BUS using an one wire port. Therefore, with this feature, a single processor can be used to control multiple NS18B20 sensors. NS18B20 is widely used in distributed temperature environment monitoring and temperature control system.

## ◆ Product feature

- Single-BUS communication, saving wiring resources
- Each device has a unique serial number ID
- Wide temperature range 55°C to 125°C
- Maintain high accuracy in full temperature range
  - 10°C~85°C: +0.5°C
  - 55°C~-125°C: ±1°C
- Conversion time is short, only 40ms
- No additional strong pull up is required for temperature conversion
- Temperature measurement range exceeding 100°C and can be powered via digital interface
- Simple application, no additional components required
- Operating voltage range 2.7V~5.5V
- >±8KV(HBM) strong ESD protection
- Programmable 9-12 digit output
- Users can configure alarm threshold by themselves TO-92S package, with small size

## ◆ Functional block diagram







## ◆ Package

- TO-92S (4.5mm x 4.5mm x 3.5mm)



## ◆ Application

				
Distributed temperature measurement	Process monitoring and control system	Industrial Internet of Things	White household appliances	Temperature monitoring

# NS18B20L: High-precision single-bus digital temperature sensor

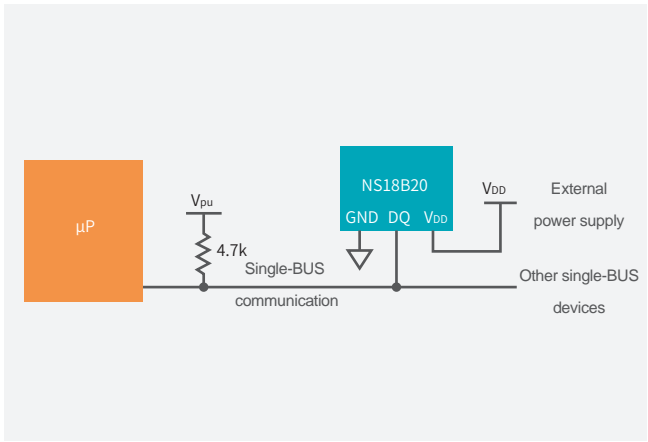
## ◆ Product introduction

NS18B20L is a high-precision single-bus temperature measurement chip with temperature sensor ranging from -55°C to +150°C. According to user needs, digital conversion accuracy and temperature measurement speed can be set by configuring registers. The chip has built-in 5-byte non-volatile storage unit for users, 3 bytes for high and low temperature alarm and accuracy configuration, and another 2 bytes for storing user-defined information. The typical error is  $\pm 0.5^{\circ}\text{C}$  in the range from  $-10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , and  $\pm 1^{\circ}\text{C}$  in the whole temperature range. NS18B20L has two working modes, namely, parasitic power supply and external power supply. The parasitic power supply can be powered by data line without external power supply. Each NS18B20L has a unique 64-bit serial number that allows multiple devices to be connected to the same bus using a single-bus port. Therefore, with this feature, a single processor can be used to control multiple NS18B20 sensors. NS18B20 is widely used in distributed temperature environment monitoring: temperature control system. TO-92L package is extended to 8mm, meeting power terminal temperature measurement requirements.

## ◆ Product feature

- Single-BUS communication, saving wiring resources
- Each device has a unique serial number ID
- Wide temperature range:  $-50^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- High accuracy in full temperature range
  - $10^{\circ}\text{C}$  ~  $85^{\circ}\text{C}$ :  $\pm 0.5^{\circ}\text{C}$  (max.)
  - $55^{\circ}\text{C}$  ~  $150^{\circ}\text{C}$ :  $\pm 1^{\circ}\text{C}$  (typical)
- Conversion time is short, only 50ms
- No additional equipment is required for temperature conversion
- Support parasitic mode
- Simple application, no additional devices required
- Operating voltage range 2.7V~5.5V
- $> \pm 8\text{kV}$  (HBM) super strong ESD protection
- Programmable 9~12-digit output
- Users can configure alarm value by themselves
- TO-92L package for customized requirements

## ◆ Functional block diagram



## ◆ Package

- TO-92L (8mmx4.9mmx3.9mm)



## ◆ Application

Distributed temperature measurement	Process monitoring and control system	Industrial Internet of Things	White household appliances	Electricity terminal	Temperature monitoring

# NST175: Digital Temperature Sensor with I<sup>2</sup>C Port in Industrial-qualified Package

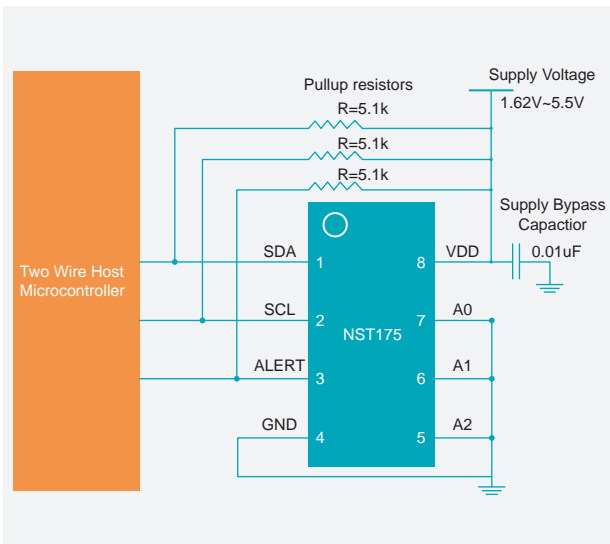
## ◆ Product introduction

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  $\pm 0.5\text{ }^{\circ}\text{C}$  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  $0.0625\text{ }^{\circ}\text{C}$ . The NST175 is compatible with SMBUS and I<sup>2</sup>C, 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  $-55\text{ }^{\circ}\text{C}$  to  $125\text{ }^{\circ}\text{C}$  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 feature

- Maintain high accuracy in full temperature range:
  - 20°C~ 85°C:  $\pm 0.5^{\circ}\text{C}$  (typical)
  - 55°C~-20°C:  $\pm 2^{\circ}\text{C}$  (max.)
  - 85°C~125°C:  $\pm 2^{\circ}\text{C}$  (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, I<sup>2</sup>C

## ◆ Functional block diagram



## ◆ Package

- MSOP8 (3.0mm x 3mm)
- SOP8 (4.9mm x 3.91mm)



## ◆ Application



System temperature monitoring



Computer peripherals overheating protection



Laptop



IoT application



Communication device



Power supply temperature monitoring



Thermostat control



Environmental monitoring, heating ventilation air conditioning (HVAC)

## NST1075: Small-size high-precision digital temperature sensor

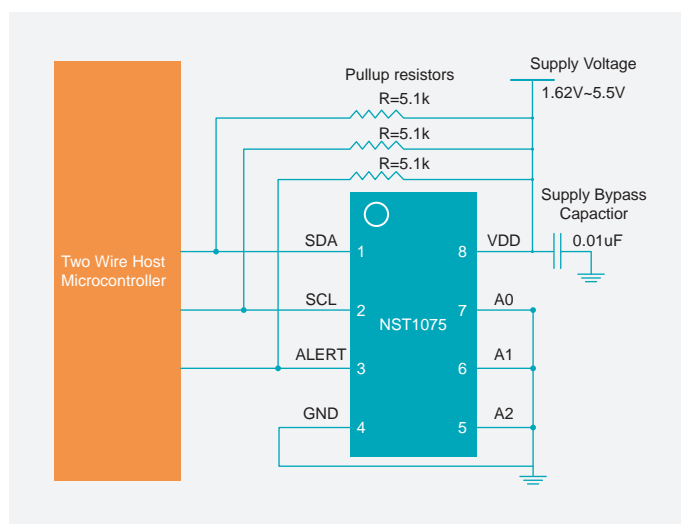
### ◆ Product introduction

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  $\pm 0.5^{\circ}\text{C}$  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  $0.0625^{\circ}\text{C}$ . The NST1075 is compatible with SMBUS and I<sup>2</sup>C 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  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  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 2.0mmx2.0mm, 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:  $\pm 0.5^{\circ}\text{C}$  (typical)
  - 55°C ~ -20°C:  $\pm 2^{\circ}\text{C}$  (max.)
  - 85°C ~ 125°C:  $\pm 2^{\circ}\text{C}$  (max.)
- Maximum resolution:  $0.0625^{\circ}\text{C}$ , optional
- Up to 27 device addresses supported
- Wide supply voltage range: 1.62V to 5.5V
- Working current: 30 $\mu\text{A}$  (typical)
- Turn-off current: 0.2 $\mu\text{A}$  (typical)
- Digital port: Compatible with SMBUS, I<sup>2</sup>C

### ◆ Functional block diagram



### ◆ Package

- WSON8 (2.0mmx2.0mm)



### ◆ Application



System temperature monitoring



Computer peripherals overheating protection



Server



IoT application



Communication device



Power supply temperature monitoring



Thermostat control



Environmental monitoring, heating ventilation air conditioning (HVAC)

# NST118: Small Ultra-high-precision Digital Temperature Sensor with I<sup>2</sup>C Port

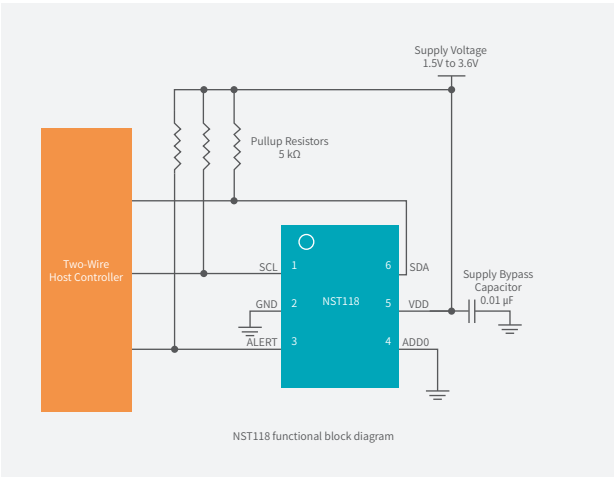
## ◆ Product introduction

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 I<sup>2</sup>C 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 DNF(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)
- I<sup>2</sup>C/ SMBUS compatible port
- Resolution rate: 12 bits, resolution: 0.0625°C
- User programmable over-temperature alarm threshold
- Low static current:  
 Working current 2.9µA@1Hz in operating mode (typical)  
 Turn-off current 0.5µA in shutdown mode (typical)
- Input voltage range: 1.71 V to 3.6 V  
 Digital port: compatible with SMBUS, I<sup>2</sup>C

## ◆ Functional block diagram



## ◆ Package

- DFN6(2mmx2mm)



## ◆ 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 I<sup>2</sup>C Port

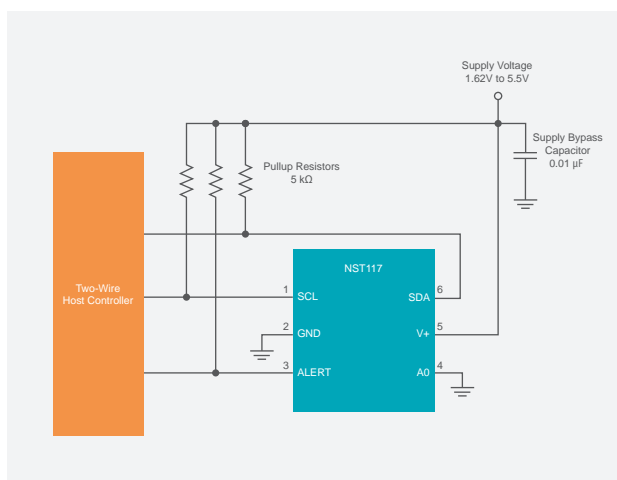
### ◆ Product introduction

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  $\pm 0.2$  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 I<sup>2</sup>C, 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:  $\pm 0.2^{\circ}\text{C}$  (typical)
  - 20°C~ 85°C:  $\pm 0.5^{\circ}\text{C}$  (typical)
  - 55°C~125°C: $\pm 2^{\circ}\text{C}$  (max.)
- Maximum resolution 0.0625°C, optional
- Up to 3 device addresses supported
- Wide supply voltage range: 1.62V to 5.5V
- Working current: 30 $\mu\text{A}$  (typical)
- Turn-off current: 0.1 $\mu\text{A}$  (typical)
- Digital port: compatible with SMBUS, I<sup>2</sup>C

### ◆ Functional block diagram

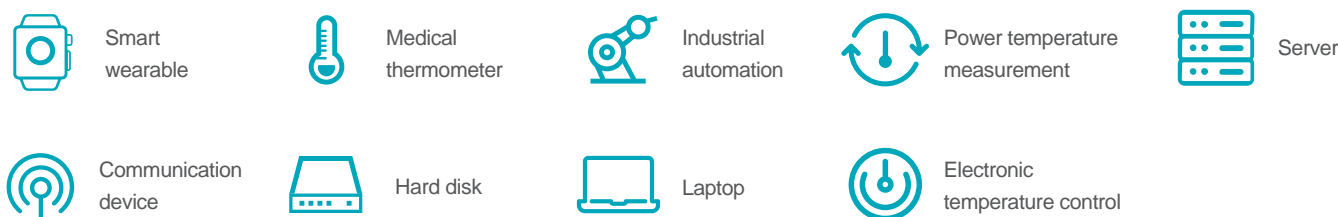


### ◆ Package

- DFN6 (2mm\*2mm)



### ◆ Application



# NST112: High-precision Low-power I<sup>2</sup>C Port Digital Temperature Sensor with Ultra-small SOT563 and DSBGA Package

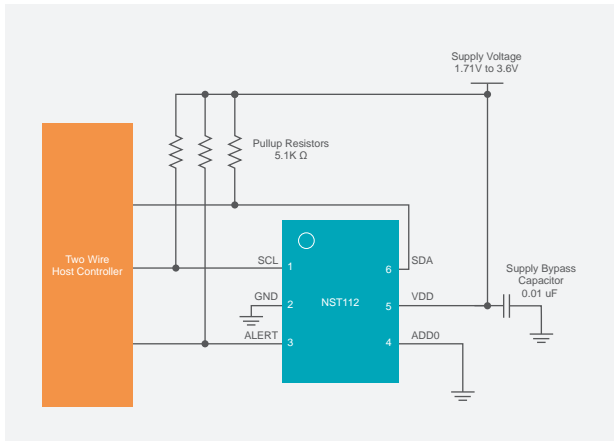
## ◆ Product introduction

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 port compatible with I<sup>2</sup>C and SMBUS, 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 is highly linear and does not require recombination calculations or lookup to derive the temperature. The NST112 features 12bit analog-to-digital conversion and provides up to 0.0625°C resolution. 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 DSBGA(4) packages, with the DSBGA(4) 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
  - 20 °C ~ 60°C: 0.5°C (max.)@DSBGA
  - 20°C~85°C: ±0.5°C (typ.)
  - 40°C~-20°C: ±1°C (max.)
  - 85°C~125°C: ±1°C (max.)
- I<sup>2</sup>C/ SMBUS compatible port
- Resolution rate: 12 bits, resolution: 0.0625°C@SOT563
- Resolution rate:14 bits, resolution: 0.015625 @DSBGA
- Over-temperature alarm value presetting
- Ultra-low static power consumption
  - 2.9µA@1Hz
  - 6.5µA@4Hz
- Supply voltage range: 1.71 V to 3.6 V with SOT563 package, 1.5V to 3.6V with DSBGA package
- Digital output

## ◆ Functional block diagram












## ◆ Package

- SOT563(6) (1.6mm x 1.2mm)
- DSBGA(4) (0.75mm x 0.75mm)



## ◆ Application

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

# NST103: Digital Temperature Sensor with I<sup>2</sup>C Port in Wafer-level Package

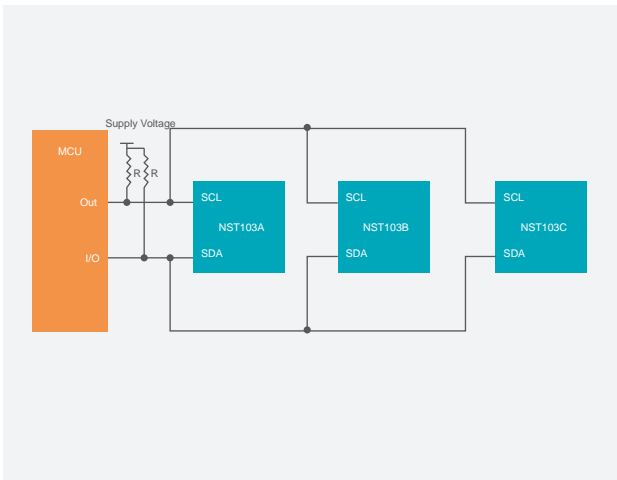
## ◆ Product introduction

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 I<sup>2</sup>C 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

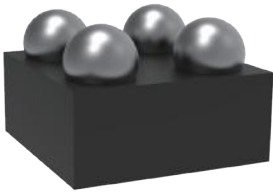
- Multiple device access (MDA)
- Global read/write operations
- I<sup>2</sup>C/ SMBUS compatible
- Resolution: 8 bits
- Precision: The typical value is ±1°C(-10°C to 100°C)  
Maximum error in the whole temperature range: ±3°C
- Low static current: In operating mode, the current is 3 μA@0.25Hz  
The turn-off current in shutdown mode is 1.0μA
- Input voltage range: 1.5V to 3.6V
- Digital output

## ◆ Functional block diagram



## ◆ Package

- WLCSP (DSBGA) (0.75mm x 0.75mm)



## ◆ Application



# NST461: Small-size High-precision I<sup>2</sup>C Interface Remote and Local Digital Temperature Sensor

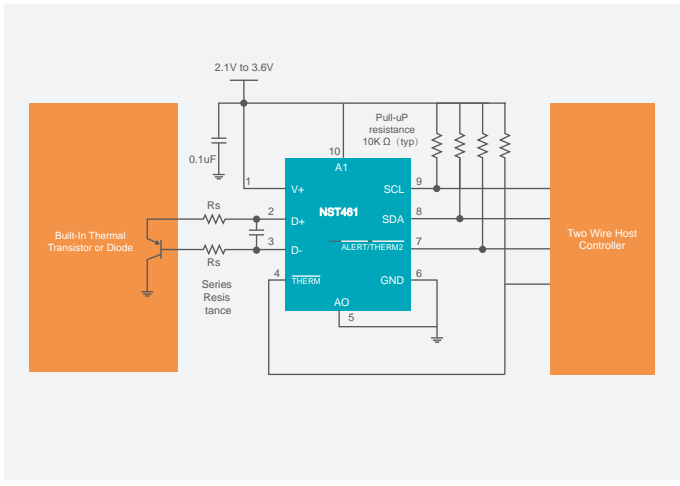
## ◆ Product introduction

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 I<sup>2</sup>C and SMBu 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 ( $\eta$  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

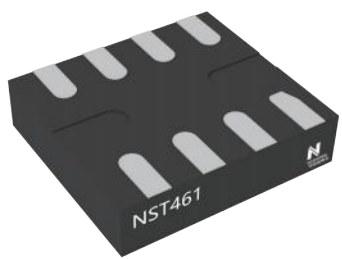
- Remote temperature detector:  $\pm 1.5^{\circ}\text{C}$  max. accuracy error
- Local temperature monitor:  $\pm 1.5^{\circ}\text{C}$  max. accuracy error
- Resolution rate: 12 bits, resolution: 0.0625°C
- Power supply and logic voltage range: 2.1 V to 3.6 V
- 37- $\mu\text{A}$  working current (1 SPS)
- 4- $\mu\text{A}$  shutoff current
- Series resistance error elimination
- $\eta$ - factor and offset correction
- Programmable digital filter
- Diode fault detection
- SMBUS and I<sup>2</sup>C serial interface
- Compatible with programmable pin addresses

## ◆ Functional block diagram



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

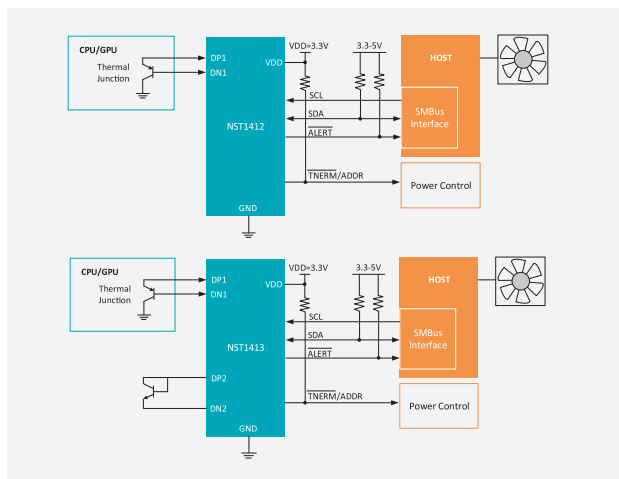
## ◆ Product introduction

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 I<sup>2</sup>C 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 ( $\eta$  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 (-10°C < T<sub>Diode</sub> < 105°C)
  - Resolution rate: 11 bits, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
- Local temperature monitor:
  - ±1°C precision (-10°C < T<sub>Diode</sub> < 105°C)
  - Resolution rate: 11 bits, resolution: 0.125°C
- Automatic remote diode type identification and optimization setting
- Series resistance cancellation
- Programmable temperature threshold alarm
- I<sup>2</sup>C/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



# NST7719: High-precision remote and local temperature sensors with digital interface in industry-standard package

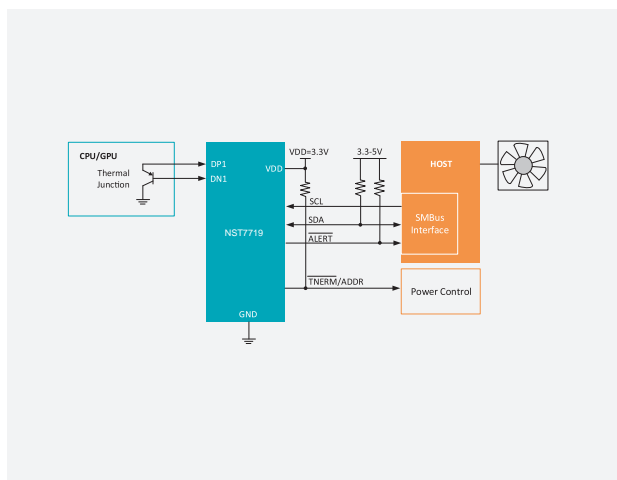
## ◆ Product introduction

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 ( $\eta$  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)
  - Resolution rate: 11 bits, resolution: 0.125°C
  - Support diode filter capacitors up to 1nF
- Local temperature monitor:
  - ±1°C max precision (-10°C < T<sub>Diode</sub> < 105°C)
- Resolution rate: 11 bits, resolution: 0.125°C
- Automatic remote diode type identification and optimization setting
- Series resistance elimination
- Programmable temperature threshold alarm
- I<sup>2</sup>C/SMBUS digital output

## ◆ Functional block diagram



## ◆ Package

- MSOP-10 (3.0mmx3.0mm)



## ◆ 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

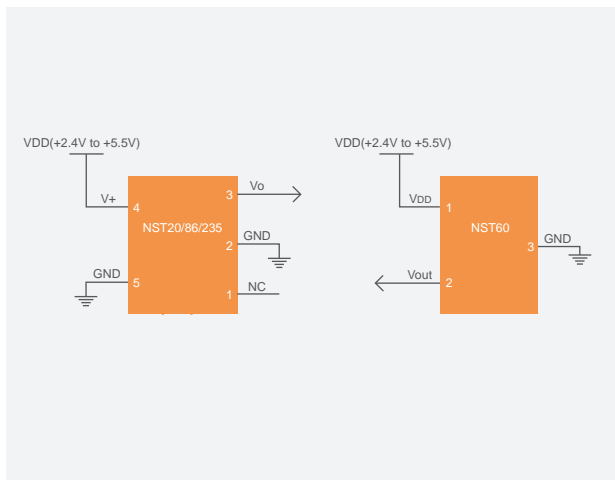
## ◆ Product introduction

NST20/60/235/86 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  $\pm 2.5^{\circ}\text{C}$ (excluded NST60). 20 $\mu\text{A}$  typical static current and 0.1 $\mu\text{A}$  typical shutdown static current can greatly reduce the power loss of battery-powered equipment. Class-AB output drivers provide a powerful maximum output of 500 $\mu\text{A}$ , 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 NST20/60/235/86 analog output temperature sensor is an extremely cost-effective alternative to passive thermistors.

## ◆ Product feature

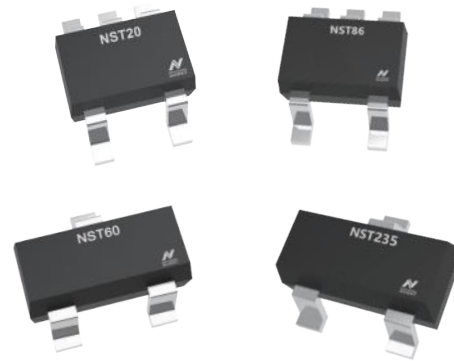
- Operating temperature range:
  - NST20:  $-55^{\circ}\text{C} \sim 130^{\circ}\text{C}$
  - NST60:  $-40^{\circ}\text{C} \sim 125^{\circ}\text{C}$
  - NST235:  $-40^{\circ}\text{C} \sim 150^{\circ}\text{C}$
  - NST86:  $-55^{\circ}\text{C} \sim 150^{\circ}\text{C}$
- High accuracy:  $\pm 1.5^{\circ}\text{C}$  (typical)
- Wide input voltage range: 2.4V~5.5V
- Output drive capacity: 500 $\mu\text{A}$
- Output short circuit protection
- Analog output parameter:
  - NST20:  $-11.77\text{mV}/^{\circ}\text{C}$  negative slope output
  - NST60:  $6.25\text{mV}/^{\circ}\text{C}$  positive slope output
  - NST235:  $10\text{mV}/^{\circ}\text{C}$  positive slope output
  - NST86:  $-10.9\text{mV}/^{\circ}\text{C}$  negative slope output
- Low static current:
  - Operating mode current 20 $\mu\text{A}$  (typical)
  - Turn-off current 0.1 $\mu\text{A}$  (typical)

## ◆ Functional block diagram



## ◆ Package

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



## ◆ Application

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

# MEMS Pressure Sensor





# MEMS Pressure Sensor

Part number	Product description	Package	Temperature range	Supply voltage	Operation current	Pressure range	Output type	Accuracy	Typical application
NSPGM1	Automotive integrated gauge pressure sensor module (range can be customized)	Ceramic substrate PCBA	-40°C~90°C	3.0V~5.5V	2.9mA	0~±6kPa	Absolute / Ratio-metric	±2.5% F.S.	FTPS fuel steam pressure, KPS crankcase ventilation pressure detection, vacuum boosting system, industrial control
NSPGM2	Automotive integrated gauge pressure sensor module (range can be customized)	Ceramic substrate PCBA	-40°C~130°C	3.0V~5.5V	2.9mA	0~±5kPa /±100kPa	Absolute / Ratio-metric	±2.5% F.S.	Automotive GPF differential pressure detection, FTPS fuel vapor pressure, KPS crankcase ventilation pressure detection, vacuum boosting system, industrial control
NSPAS3M	Automotive-qualified integrated absolute pressure sensor (range can be customized)	SOP-8 (7.0mmx7.0mm)	-40°C~125°C	4.5V~5.5V	2.9mA	10kPa~400kPa	Absolute / Ratio-metric	±0.5% F.S.	Motorcycle intake manifold pressure sensor, ECU atmospheric monitoring, seat pressure detection, EV/HEV vacuum boosting system, canister desorption pressure detection, gas/refrigerant leak detection, industrial vacuum degree detection
NSPAS3	Automotive integrated gauge pressure sensor module (range can be customized)	SOP-8 (7.0mmx7.0mm)	-40°C~130°C	4.5V~5.5V	2.9mA	10kPa~400kPa	Absolute / Ratio-metric	±0.5% F.S.	Motorcycle/automobile TMAP sensor, EV/HEV vacuum boosting system, canister desorption pressure detection, ECU atmospheric monitoring, battery pack pressure detection, seat pressure detection, industrial vacuum degree detection
NSPAS1	Automotive integrated gauge pressure sensor module (range can be customized)	SOP-8 (7.3mmx7.3mm)	-40°C~125°C	4.5V~5.5V	3.1mA	10kPa~400kPa	Absolute / Ratio-metric	±0.5% F.S.	Motorcycle/automobile TMAP sensor, EV/HEV vacuum system, canister desorption pressure detection, ECU atmospheric monitoring, battery pack pressure, seat pressure detection, industrial vacuum degree detection
NSPGS2	Gauge pressure sensor integrated with air nozzle in SOP-6 package (range can be customized)	Single air nozzle SOP-6 (7.0mmx7.0mm)	-40°C~70°C	3V~5.5V	2.5mA	-100kPa~250kPa	Analog/I <sup>2</sup> C	±1% F.S.	Coffee machine, health pot, vacuum cleaner, vacuum juicer and other small household appliances, air cushion bed, massage chair, smart sphygmomanometer and other health care applications, industrial control, and IoT pressure detection
NSPGD1	Gauge pressure sensor integrated with air nozzle in DIP-8 package (range can be customized)	Single air nozzle DIP-8 (10.4mmx10.4mm)	0°C~70°C	3V~5.5V	3mA	-10kPa~10kPa	Analog/I <sup>2</sup> C/Frequency	±1% F.S.	Washing machine, dishwasher, water purifier and other household appliances, pressure switch, negative pressure vacuum detection, gas pressure detection ventilator, oxygen generator, anesthesia instrument, biological safety cabinet
NSPDS5/7	Differential pressure sensor with dual air nozzle in SOIC-16 package (range can be customized)	Dual air nozzle SOIC-16 (10.3mmx7.5mm)	-20°C~70°C	3V~5.5V	2.4mA	±125Pa~±250kPa	Analog/I <sup>2</sup> C	±1% F.S.	Fire fighting residual pressure monitoring, ventilator, oxygen generator, anesthesia instrument, HVAC/AV, biological safety cabinet, environmental monitoring, industrial micro differential pressure detection, etc.
NSPDS9	Ultra-low range differential pressure sensor with dual air nozzle in SOIC-16 package (range can be customized)	Dual air nozzle SOIC-16 (10.3mmx7.5mm)	-20°C~70°C	3V~5.5V	2.4mA	±125Pa~±1kPa	Analog/I <sup>2</sup> C	±1% F.S.	Fire fighting residual pressure monitoring, ventilator, oxygen generator, anesthesia instrument, HVAC/AV, biological safety cabinet and other micro differential pressure detection
NSPGS5	Differential gauge pressure sensor with single air nozzle in SOIC-16 package (range can be customized)	Single air nozzle SOIC-16 (10.3mmx7.5mm)	-20°C~70°C	3V~5.5V	2.4mA	-10kPa~10kPa	Analog/I <sup>2</sup> C	±1% F.S.	Ventilator, oxygen generator, anesthesia instrument, biosafety cabinet, etc.

Part number	Product description	Package	Temperature range	Supply voltage	Bridge arm resistance	Pressure range	Output type	Accuracy	Typical application
NSP1830	High-performance and high-reliability MEMS differential pressure sensor (range can be customized)	MEMS wafer (1.8x1.8x0.4mm)	-40°C~125°C	5V	6.3kΩ	0kPa~±100kPa/500kPa	analog voltage output (mV)	±0.05% F.S.	White household appliances, medical electronics, automotive electronics, industrial control
NSP1831B	High-performance and high-reliability MEMS micro differential pressure sensor (range can be customized)	MEMS wafer (2x2x0.4mm)	-40°C~125°C	5V	5.3kΩ	0kPa~±6kPa	analog voltage output (mV)	±0.2% F.S.	White household appliances, medical electronics, automotive electronics, industrial control
NSP1831A	High-performance and high-reliability MEMS micro differential pressure sensor (range can be customized)	MEMS wafer (2x2x0.4mm)	-40°C~125°C	5V	5.3kΩ	0kPa~±10kPa	analog voltage output (mV)	±0.2% F.S.	White household appliances, medical electronics, automotive electronics, industrial control
NSP1832	High-performance and high-reliability automotive-qualified MEMS differential pressure sensor with PT pad (range can be customized)	MEMS wafer (1.65x1.65x0.4mm)	-40°C~150°C	5V	5.3kΩ	0kPa~±5kPa /±100kPa	analog voltage output (mV)	±0.2% F.S.	EVAP/FTPS fuel steam, GPF/DPF vehicle exhaust detection
NSP1833	High-performance and high-reliability MEMS micro differential pressure sensor (range can be customized)	MEMS wafer (2.5x2.5x0.4mm)	-40°C~85°C	5V	5.3kΩ	0kPa~±1kPa	analog voltage output (mV)	±0.2% F.S.	White household appliances, medical electronics, industrial control
NSP1630	High-performance and high-reliability absolute pressure sensor (range can be customized)	MEMS wafer (1x1x0.4mm)	-40°C~125°C	5V	5.3kΩ	0kPa~200kPa	analog voltage output (mV)	±0.1% F.S.	TMAP intake manifold pressure detection, BPS battery pack pressure detection
NSP1631	High-performance and high-reliability large-range absolute pressure sensor (range can be customized)	MEMS wafer (1x1x0.4mm)	-40°C~125°C	5V	5.3kΩ	0kPa~500kPa	analog voltage output (mV)	±0.1% F.S.	Turbo-TMAP pressurized intake pressure detection
NSP1632	High-performance and high-reliability automotive-qualified MEMS absolute pressure sensor with Pt pad (range can be customized)	MEMS wafer (1x1x0.4mm)	-40°C~150°C	5V	5.3kΩ	0kPa~100kPa/200kPa	analog voltage output (mV)	±0.1% F.S.	TMAP intake manifold pressure detection, BPS battery pack pressure detection, and EGR-TMAP exhaust gas recirculation pressure detection

## NSPGM1 series: Automotive-qualified Integrated Differential Pressure Sensor Module

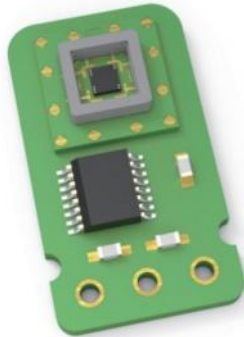
### ◆ Product introduction

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.

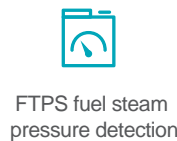
### ◆ Product feature

- 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  $\pm 2.5\%$ F.S.
- 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





## NSPGM2 series: Automotive-qualified Integrated Differential Pressure Sensor Module

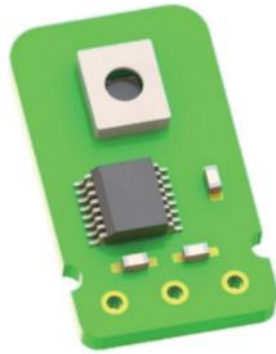
### ◆ Product introduction

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  $\pm 5\text{kPa}$ ~ $\pm 100\text{kPa}$ , which can be customized
- The comprehensive accuracy in the full temperature range is better than  $\pm 2.5\%$ F.S. ( $\pm 0.18\text{kPa}$ )
- 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

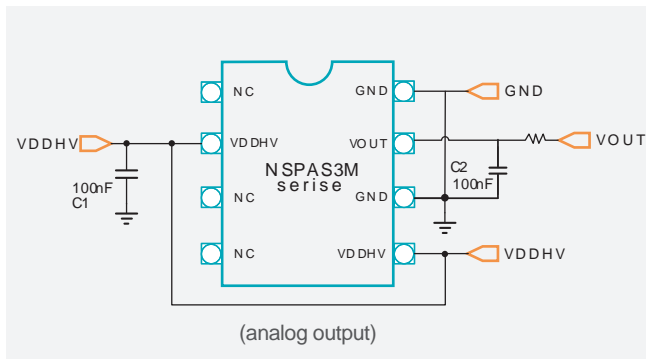
## ◆ Product introduction

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 products 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

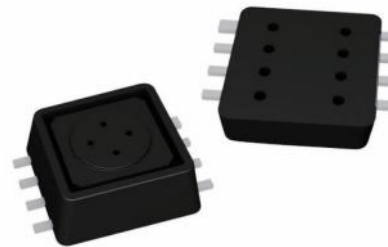
- Width operating temperature range: -40°C~125°C
- High accuracy in full temperature range:
  - Better than ±1.5%F.S. in the range of 0°C~85°C
  - Better than ±1.5%F.S. in the range of -40°C~125°C
- Support -24V to 28V over voltage and reverse voltage protection
- Support 5V power supply and direct power 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	
 Industrial	 Gas/refrigerant leak detection	 Pressure transmitter	 Industrial vacuum degree testing

# NSPAS3 series: Automotive-qualified Integrated Absolute Pressure Sensor

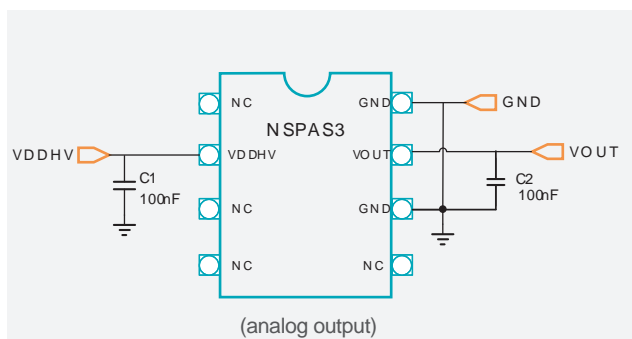
## ◆ Product introduction

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 products 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

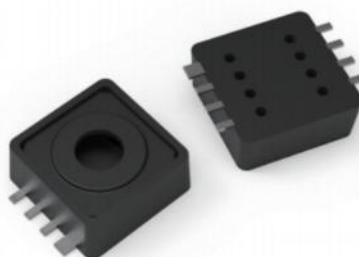
- Width operating temperature range: -40°C~130°C
- High accuracy in full temperature range:
  - Better than ±1%F.S. in the range of 0°C~85°C
  - Better than ±1.5%F.S. in the range of -40°C~130°C
- Support -24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible 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

## ◆ Functional block diagram



## ◆ Package

SOP-8 (7.0mm x 7.0mm)



## ◆ Application



Motorcycle three-in-one sensor



Vehicle TMAP intake pressure detection



BPS battery pack thermal runaway pressure detection



EGR-TMAP exhaust gas recirculation pressure detection



Canister desorption pressure detection



VBS vacuum boosting system sensor



ECU/VCU atmospheric pressure detection



Seat air bag pressure detection



Gas/refrigerant leak detection



Pressure transmitter



Industrial vacuum degree testing

# NSPAS1 series: Automotive-qualified Integrated Absolute Pressure Sensor

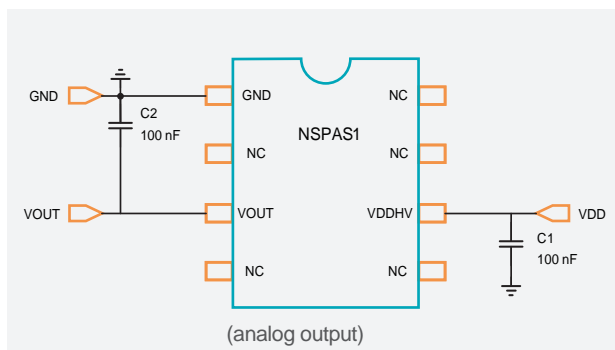
## ◆ Product introduction

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

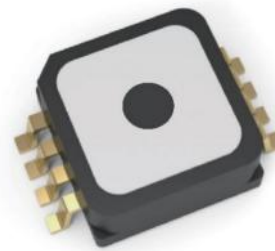
- Operating temperature range: -40°C~125°C
- High accuracy in full temperature range:
  - Better than ±1%F.S. in the range of - 0°C~85°C
  - Better than ±1.5%F.S. in the range of - 40°C~125°C
- Support -24V to 28V over voltage and reverse voltage protection
- Fluorinated gel protection, compatible with 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



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



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

# NSPGS2 series: Integrated Gauge Pressure Sensor with Air Nozzle in SOP Package

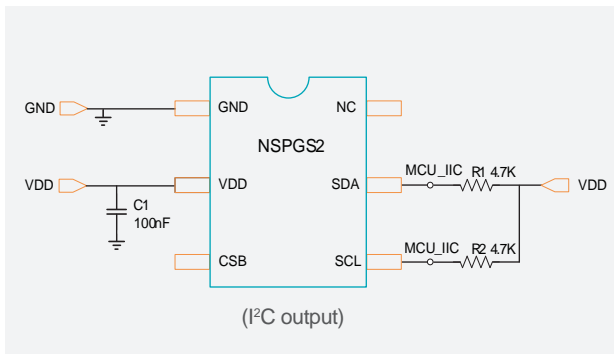
## ◆ Product introduction

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/ I<sup>2</sup>C digital output
- 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

<p><b>Industrial</b></p>	<p>Pressure transmitter</p>	<p>Pressure switch</p>	<p>Negative pressure vacuum detection</p>		
<p><b>Medical</b></p>	<p>Sphygmomanometer</p>	<p>Oxygen generator</p>	<p>Biosafety cabinet</p>		
<p><b>Home appliances</b></p>	<p>Coffee machine</p>	<p>Health pot</p>	<p>Vacuum cleaner</p>	<p>Sweeper</p>	<p>Vacuum juicer</p>
<p><b>Consumption</b></p>	<p>Air mattress</p>	<p>Massage chair</p>	<p>Inflator</p>		



# NSPGD1 series: Integrated Gauge Pressure Sensor with Air Nozzle in DIP8 Package

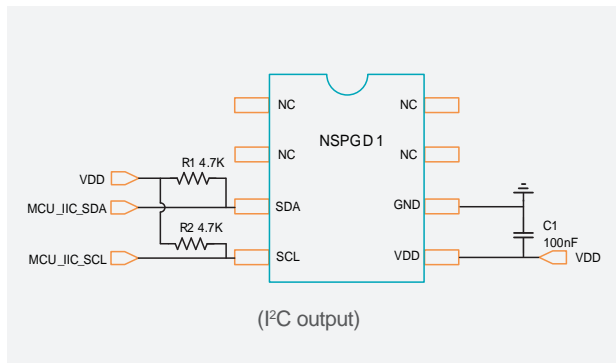
## ◆ Product introduction

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 /I<sup>2</sup>C 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 /I<sup>2</sup>C 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

<p><b>Home appliances</b></p>	<p><b>Industrial</b></p>	<p><b>Medical</b></p>	<p>Washing machine</p>	<p>Dishwasher</p>	<p>Coffee machine</p>	<p>Water purifier</p>
			<p>Pressure switch</p>	<p>Negative pressure vacuum detection</p>	<p>Gas pressure detection</p>	
			<p>Ventilator</p>	<p>Oxygen generator</p>	<p>Anesthesia apparatus</p>	<p>Biosafety cabinet</p>

# NSPDSx series: Dual-nozzle Integrated Differential Pressure Sensor

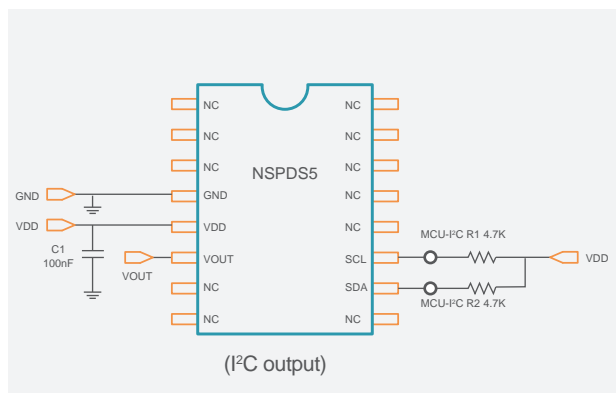
## ◆ Product introduction

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  $\pm 125\text{Pa}$  to  $\pm 250\text{kPa}$ , 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 /I<sup>2</sup>C digital output and can be installed directly on standard printed circuit boards for multi-applications.

## ◆ Product feature

- Supply voltage: 3V~5.5V
- Operating temperature range: -20°C~70°C
- High accuracy in full temperature range, and customizable pressure range
  - NSPDS9:  $\pm 125\text{Pa} \sim \pm 1\text{kPa}$ ,  $\pm 1\%$ F.S.
  - NSPDS5/7:  $\pm 125\text{Pa} \sim \pm 250\text{kPa}$ ,  $\pm 1.5\%$ F.S.
- Optional output mode (analog /I<sup>2</sup>C digital output)
- High stability, 100% calibration, temperature compensation
- Dual vertical barb air nozzle package, easy to install and seal

## ◆ Functional block diagram
















## ◆ Package

SOIC-16 (7.5mm x 10.3mm)



## ◆ Application

 <b>Industrial</b>	 Fire residual pressure monitoring	 HVAC/VAV	 Pressure transmitter	 Pressure switch	 Negative pressure vacuum detection	 Gas pressure monitoring
 <b>Medical</b>	 Ventilator	 Oxygen generator	 Anesthesia apparatus	 Biosafety cabinet	 Sphygmomanometer	

# NSPGS5 series: Single-nozzle Integrated Gauge Pressure Sensor

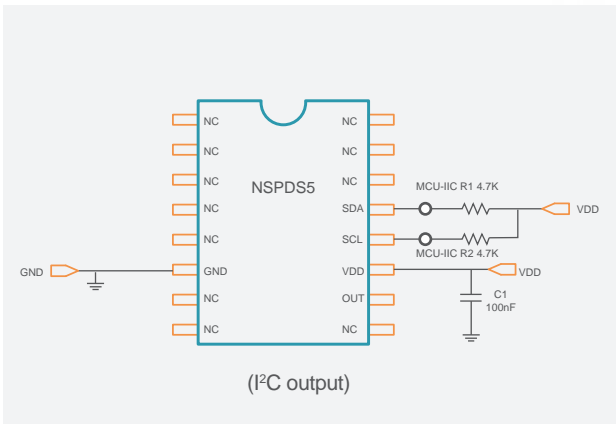
## ◆ Product introduction

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. JEDEC-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 feature

- 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.
- Output mode optional (analog /I<sup>2</sup>C digital output)
- High stability, 100% calibration, temperature compensation
- Single vertical nozzle package, easy to install and seal

## ◆ Functional block diagram



## ◆ Package

SOIC-16 (7.5mm x 10.3mm)



## ◆ Application

<div style="text-align: center;">   <b>Industrial</b> </div>	 Gas pressure detection	 Pressure switch	 Negative pressure vacuum detection		
	<div style="text-align: center;">   <b>Medical</b> </div>	 Ventilator	 Sphygmomanometer	 Oxygen generator	 Anesthesia apparatus

# NSP183x: High-performance and High-reliability MEMS Differential Pressure Sensor Wafer

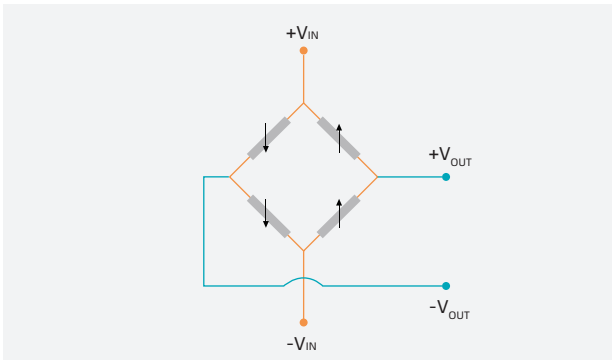
## ◆ Product introduction

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.

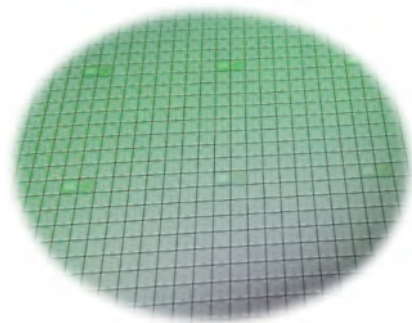
## ◆ Product feature

- 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
- Compiles with AEC-Q103 standard

## ◆ Functional block diagram



## ◆ Package



## ◆ Application

<p><b>Automotive</b></p>	<p>FTPS fuel steampressure detection</p>	<p>GPF/DPF exhaust differential pressure detection</p>	<p>VBS vacuum boosting system sensor</p>	<p>EGR system differential pressure detection</p>	<p>Crankcase ventilation pressure sensor</p>	
<p><b>Industrial</b></p>	<p>Fire residual pressure monitoring</p>	<p>HVAC/VAV</p>	<p>Pressure transmitter</p>	<p>Pressure switch</p>	<p>Negative pressure vacuum detection</p>	<p>Gas flow monitoring</p>
<p><b>Medical</b></p>	<p>Ventilator</p>	<p>Sphygmomanometer</p>	<p>Oxygen generator</p>	<p>Anesthesia apparatus</p>	<p>Biosafety cabinet</p>	
<p><b>Home appliances</b></p>	<p>Washing machine</p>	<p>Dishwasher</p>	<p>Coffee machine</p>	<p>Vacuum cleaner</p>	<p>Water purifier</p>	<p>Vacuum juicer</p>
<p><b>Consumption</b></p>	<p>Air mattress</p>	<p>Massage chair</p>	<p>Air pump</p>			

# NSP163x: High-performance and High-reliability MEMS Absolute Pressure Sensor Wafer

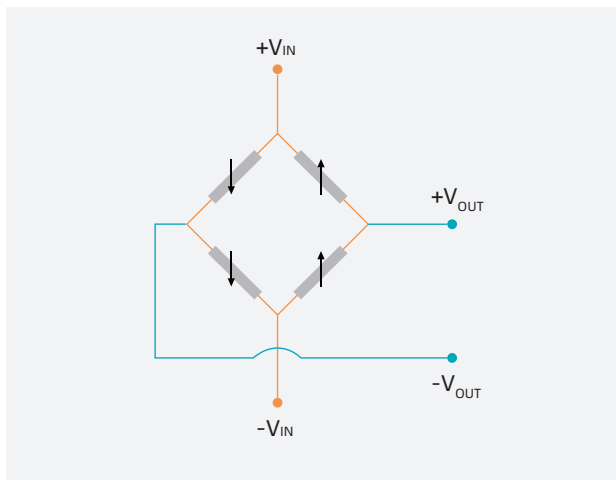
## ◆ Product introduction

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.

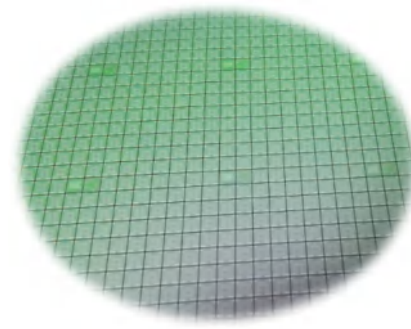
## ◆ Product feature

- 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

## ◆ Functional block diagram



## ◆ Package

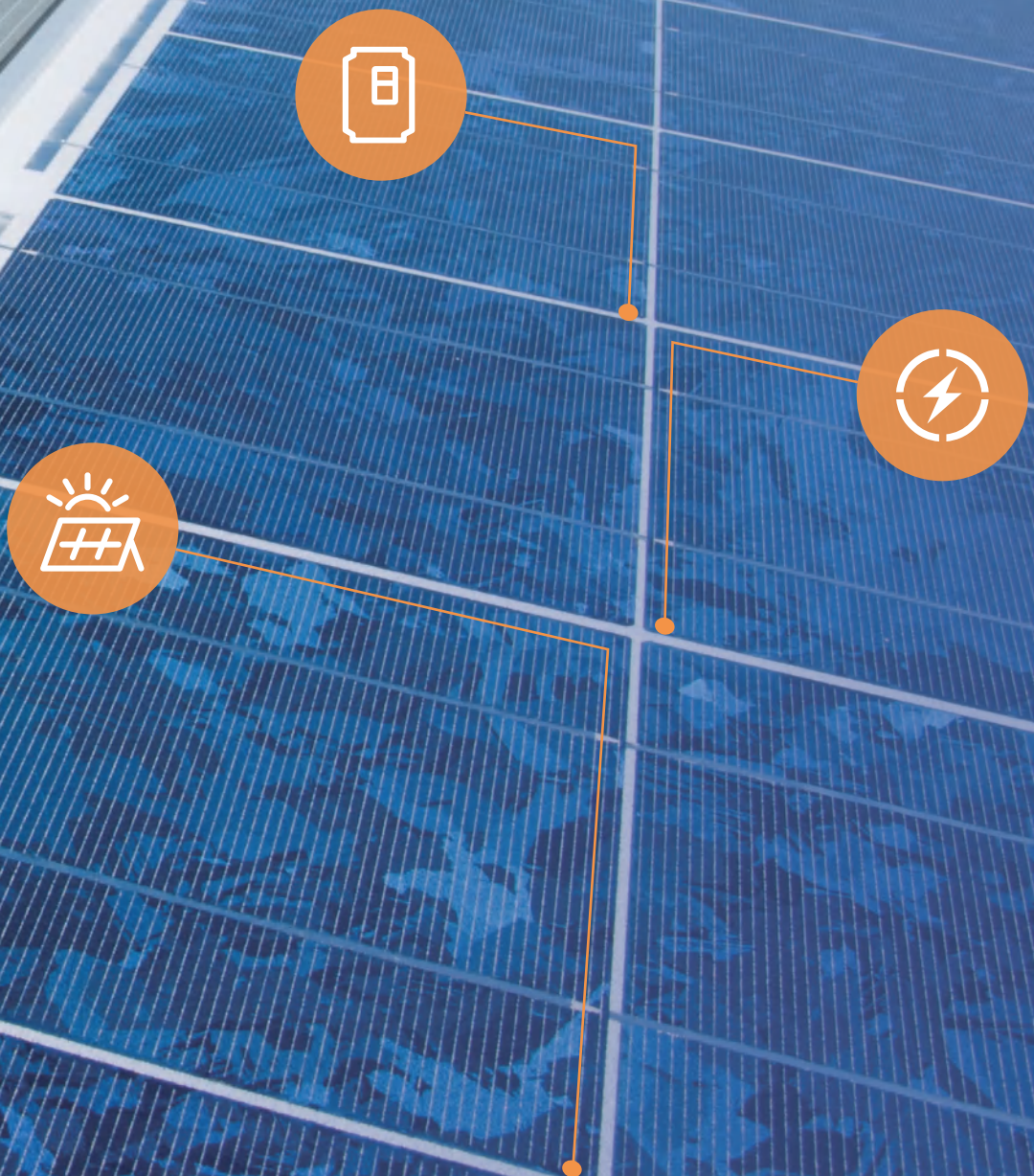


## ◆ Application

Automotive	Motorcycle three-in-one sensor	Vehicle TMAP intake pressure detection	BPS battery pack thermal runaway pressure detection	EGR-TMAP exhaust gas recirculation pressure detection	Seat air bag pressure detection	EV/HEV vacuum boosting system sensor
	Canister desorption pressure detection	VBS vacuum assist sensor	ECU/VCU atmospheric pressure detection	Pressure transmitter	Industrial vacuum degree testing	Barometer
Industrial	Altimeter					
Consumption						



# Current Sensor





# Current Sensor

Part number	Product feature	Package	Range ability	Supply voltage	Isolation voltage / operating voltage	Creepage distance / electric clearance	Temperature range	Signal bandwidth / response time	Typical application
NSM2011	Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Proportional output +/-2% current measurement accuracy	SOICW-16	20~100A	3.3V/5V	5000Vrms@1min 1550VDC (1097VAC)	8mm/8mm	-40°C ~125°C	240kHz /2.2µs	Photovoltaic inverter Automotive OBC, DC/DC, charging gun, PTC heater Industrial inverter Power supply Service robot Unmanned aerial vehicle Two-wheeled vehicle
NSM2012	Wide current range available AC/DC measurement Support proportional output or fixed output Reference voltage output +/-2% current measurement accuracy	SOIC-8	5~65A	3.3V/5V	3000Vrms@1min 600VDC (424VAC)	4mm/4mm	-40°C ~125°C	400kHz /1.5µs	
NSM2013	Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Fixed output Reference voltage output +/-2% current measurement accuracy	SOICW-16	20~100A	3.3V/5V	5000Vrms@1min 1550VDC (1097VAC)	8mm/8mm	-40°C ~125°C	240kHz /2.2µs	
NSM2015	Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Fixed output Reference voltage output Integrated over-current protection +/-2% current measurement accuracy	SOICW-16	20~100A	3.3V/5V	5000Vrms@1min 1550VDC (1097VAC)	8mm/8mm	-40°C ~125°C	320kHz /1.5µs	
NSM2016	Wide current range available AC/DC measurement Fixed output Integrated over-current protection +/-2% current measurement accuracy	SOIC-8	5~65A	3.3V/5V	3000Vrms@1min 600VDC (424VAC)	4mm/4mm	-40°C ~125°C	380kHz /1.5µs	
NSM2017	Wide current range available AC/DC measurement Conduction resistance as low as 0.85mOhm Support proportional output or fixed output Integrated over-current protection	SOICW-16	40~65A	3.3V/5V	5000Vrms@1min 1550VDC (1097VAC)	8mm/8mm	-40°C ~125°C	320kHz /1.5µs	



# NSM2011/2012/2013/2015/2016/2017: Chip-level Current Sensor with Integrated Current Path

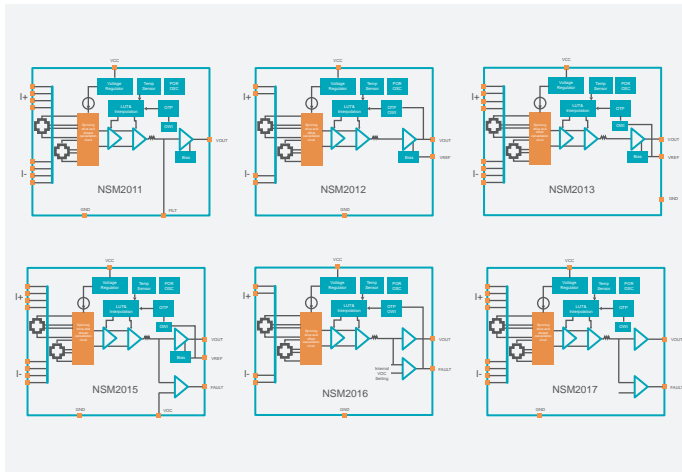
## ◆ Product introduction

NSM201x series is a chip-level current sensor under 100A launched by NOVOSENSE which is mainly used for isolation measurement of current under 100A.

## ◆ Product feature

- Wide current range available 5A~100A
- AC/DC input
- 3.3V/5V single power supply
- Input conduction impedance as low as to 0.85mOhm
- ±2% current measurement accuracy
- Withstand up to 13kA surge current (8μs /20μs surge current waveform)
- Multiple output type
  - Single-end proportional output
  - Pseudo difference fixed output
- Two types of package
  - Narrow-body SOIC 8-pin package: 600VDC working isolation voltage / 3000 Vrms @ 1min Withstand isolation voltage (NSM2012/NSM2016)
  - Wide-body SOIC16-pin package: 1550VDC working insulation voltage / 5000 Vrms @ 1 min Withstand isolation voltage (NSM2011/NSM2013/NSM2015/NSM2017)
- Overcurrent protection OCD output (NSM2015/NSM2016/NSM2017)
  - Overcurrent protection response in micro seconds
  - Overcurrent protection threshold is configurable

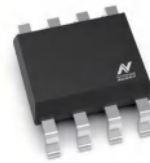
## ◆ Functional block diagram



## ◆ Safety certificate

- UL62368/EN62368 safety certification

## ◆ Package



NSM2012/2016: SOP8



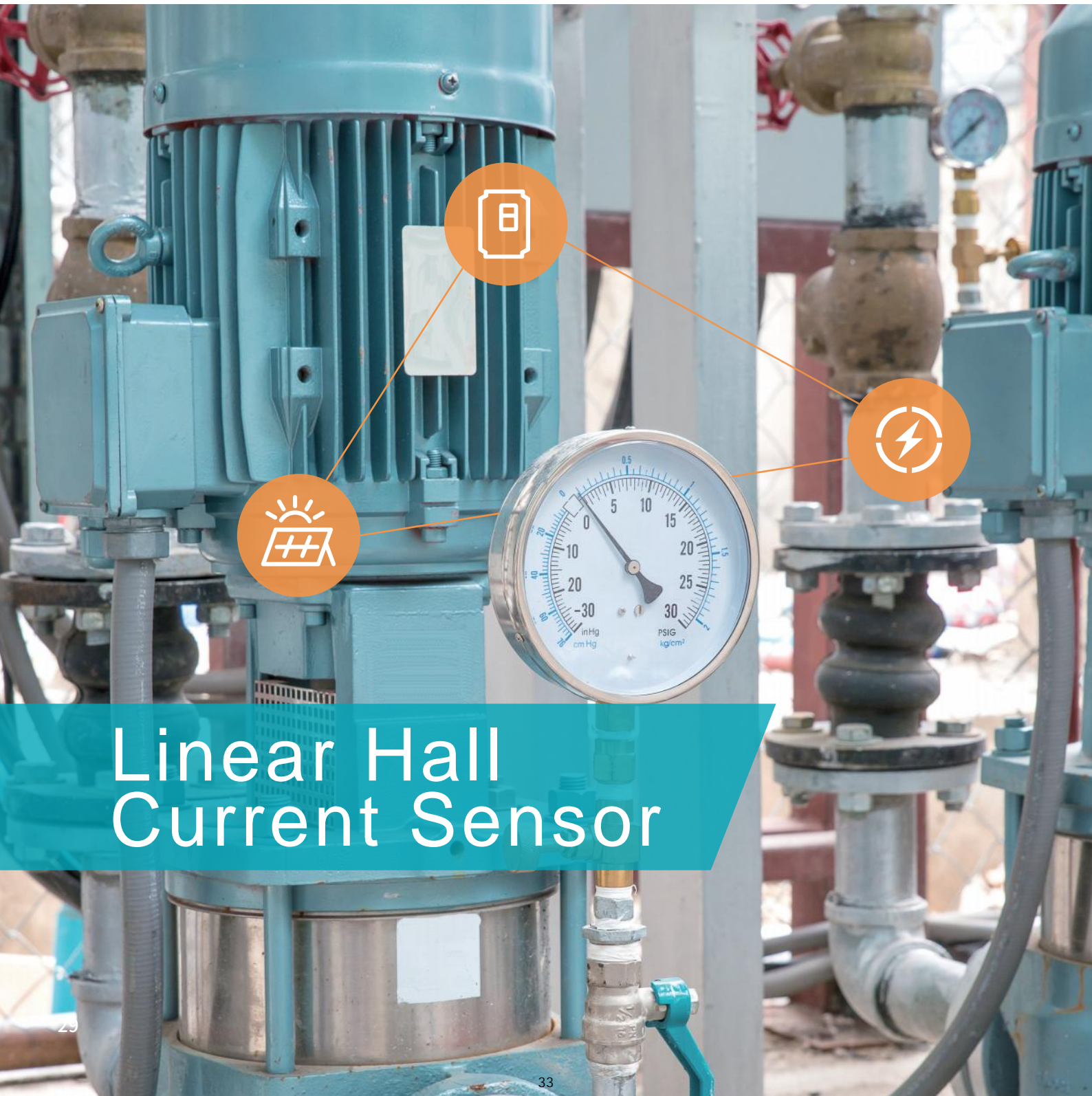
NSM2011/2013/2015 /2017: SOW16

## ◆ Application

<p><b>Automotive</b></p>		OBC	DC/DC	PTC heater	Charging gun	PDU
<p><b>Industrial</b></p>		PV inverter	Industrial frequency converter	Power supply (UPS, SMPS)	PDU	
<p><b>Consumer</b></p>		Service robots	Drones	Two-wheeled vehicles	Vacuum cleaners	

# Linear Hall Current Sensor

Part number	Product feature	Package	Package thickness	Pin forms	Sensitivity range	Supply voltage	Temperature range	Signal bandwidth / response time	Typical application
NSM2031	AC/DC measurement Support proportional output or fixed output Reference voltage output or overcurrent protection output Sensitivity drift $\leq \pm 2\%$ Zero drift $\leq \pm 10\text{mV}$ Multiple pin bending forms	TO94	1.0mm	L-shaped bend (BL, BS) V-shaped bend (BV)	0.5-15mV/G	3.3V/5V	-40°C -150°C	240kHz /2.2 $\mu\text{s}$	Electric drive system for electric vehicle Open-loop current sensor module Electric two-wheeled vehicle



# Linear Hall Current Sensor

# NSM2031: Linear Hall Current Sensor

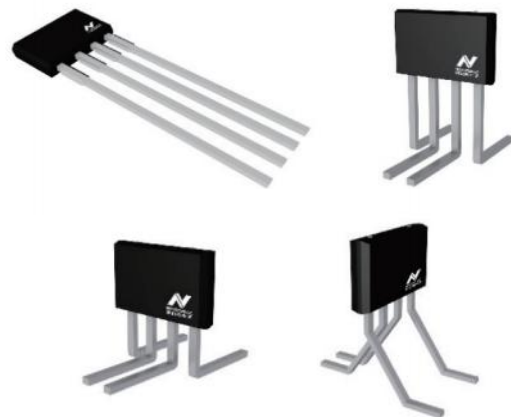
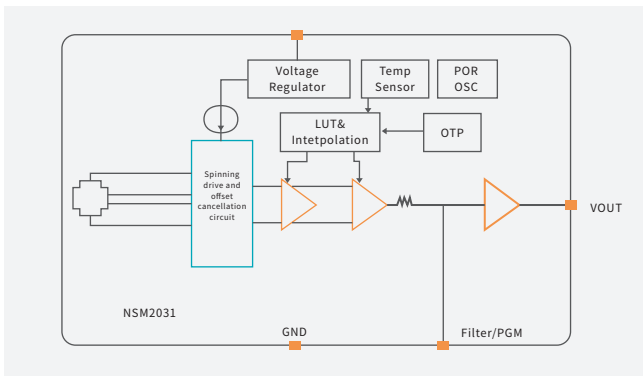
## Product introduction

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 Grade0 requirements
- Working environment temperature: - 40 °C ~ 150 °C
- Wide programmable sensitivity range: 0.4 ~ 30 mV/G
- High precision, low temperature drift  
Sensitivity error <math>< \pm 1\%</math> over the whole temperature range  
Zero drift <math>< \pm 5\text{ mV}</math> in the whole temperature range
- Industry-leading noise performance
- High bandwidth and fast response  
-3dB 240kHz bandwidth model, response time 2.2μs  
-3dB Model with 400kHz bandwidth and response time of 1.5μs
- Various diagnostic modes, overvoltage, undervoltage, open circuit and so on
- Industry leading ESD performance  
HBM:  $\pm 8\text{ kV}$   
CDM:  $\pm 2\text{ kV}$
- 1 mm / 1.55 mm, TO94 package and a variety of pin bent form
- Support proportional output or fixed output
- Optional reference voltage output, the output over-current protection, 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

 <b>Automotive</b>	 Traction motor inverter	 DC/DC converters	 PDU
 <b>Industrial</b>	 Industrial motor control	 Photovoltaic inverter	



# Magnetic Position Sensor

Part number	Product feature	Package	Range ability	Supply voltage	Interface form	Accuracy of angle measurement	Response time	Temperature range	Typical application
NSM3011	The axial angle is measured based on planar Hall Differential Hall detection can resist external stray magnetic field Provide OWI user-programmable communication port Automotive-qualified model and industrial-qualified model available	SOIC-8	0~360° Support user defined small range measurement as well	3.3V/5V	14-bit linear DAC analog output 12-bit resolution PWM output	±1° The accuracy can reach ±0.2° after four-section calibration	120μs (10μs after dynamic Angle compensation is enabled)	-40°C ~125°C	<b>Automotive:</b> Valve angle sensor (throttle, EGR, ball valve, expansion valve, etc.) Accelerator pedal angle sensor Electronic gear shifter Wiper position sensor Body height sensor
NSM3012	The axial angle is measured based on planar Hall Differential Hall detection can resist external stray magnetic field Provide SPI and OWI user-programmable communication interfaces Automotive-qualified model and industrial-qualified model available	SOIC-8	0~360° Support user defined small range measurement as well	3.3V/5V	14-bit linear DAC analog output 12-bit resolution PWM output Three-line SPI communication	±1° The accuracy can reach ±0.2° after four-section calibration	120μs (10μs after dynamic Angle compensation is enabled)	-40°C ~125°C	<b>Industrial:</b> Industrial steering gear angle sensor Non-contact rotary button switch
NSM3013	The axial angle is measured based on planar Hall Differential Hall detection can resist external stray magnetic field Provide OWI user-programmable communication port Automotive-qualified model and industrial-qualified model available	SOIC-8	0~360° Support user defined small range measurement as well	3.3V/5V	14-bit linear DAC analog output 12-bit resolution PWM output UVW output Z-direction programmable threshold judgment switch output (SON)	±1° The accuracy can reach ±0.2° after four-section calibration	120μs (10μs after dynamic Angle compensation is enabled)	-40°C ~125°C	<b>Consumer:</b> Home printer Hand-held marking gun Moving curtain angle detection

# Magnetic Position Sensor



# NSM3011/3012/3013: Hall-based Angle Sensor

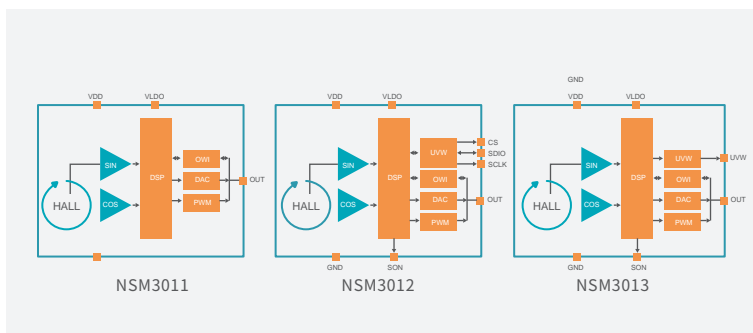
## ◆ Product introduction

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 125°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 feature

- Operating temperature: -40°C to 125°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
- 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

SOP8



## ◆ 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 gear angle sensor                                 | Non-contact rotary button switch | Hand-held marking gun   | Moving curtain angle detection |                    |
| Consumer   | Home printer  |                                  |                         |                                |                    |



# Industrial Pressure Transmitter Signal Conditioning Chip



# Industrial Pressure Transmitter Signal Conditioning Chip

Part number	Product description	Sensor input type supported	Package	Temperature range	Supply voltage	Output type	Power Shunt Down function supported	Non-volatile memory	Typical application
NSA2860 _SSOP16	General industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	SSOP16	-40~150°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20mA output PWM OWI	No	EEPROM	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter
NSA2860 _TSSOP	General industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	TSSOP20	-40~150°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20mA output PWM I <sup>2</sup> C SPI OWI	No	EEPROM	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter
NSA2860 X-QQNR	General EMC-enhanced industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	QFN20	-40~125°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20mA output PWM I <sup>2</sup> C SPI OWI	No	EEPROM	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter
NSA2862 X-DQNR	General EMC-enhanced industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	QFN20	-40~105°C	3~5.5V	I <sup>2</sup> C SPI OWI	Yes	EEPROM	BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter IOT industrial transmitter
NSC2860 X-DQNR	General industrial capacitive pressure transmitter signal conditioning chip	apacitive pressure sensor	QFN20	-40~125°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20mA output PWM I <sup>2</sup> C SPI OWI	No	EEPROM	Capacitive industrial pressure transmitter



# NSA2860/NSA2860X: Industrial Transmitter Signal Processing Chip Supporting 4~20mA Output

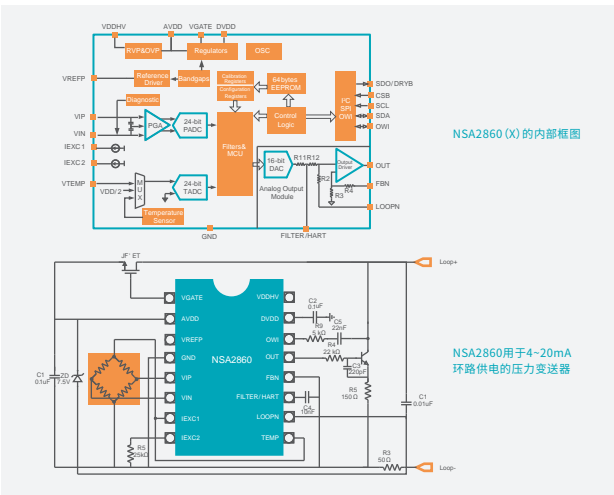
## ◆ Product introduction

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

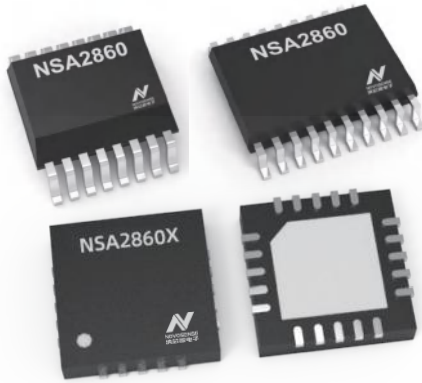
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Integrated external JFET 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 I<sup>2</sup>C 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



## ◆ Package

- NSA2860\_SSOP16: SSOP16
- NSA2860\_TSSOP: TSSOP20
- NSA2860X-QQNR: QFN20



## ◆ Application



# NSA2862X: Analog Front-end Chip for Low-power Digital Industrial Sensor

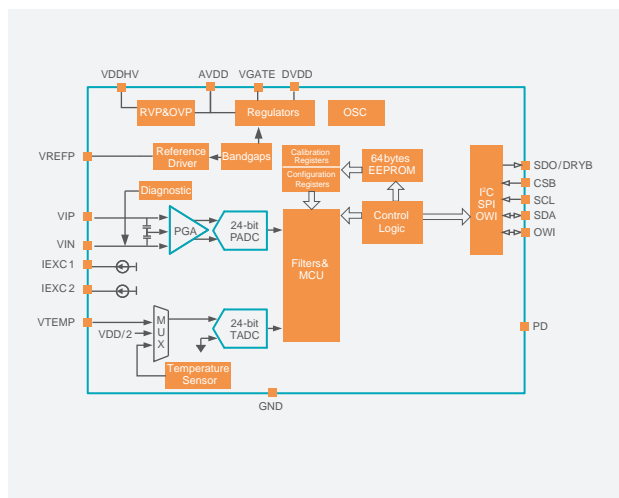
## ◆ Product introduction

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

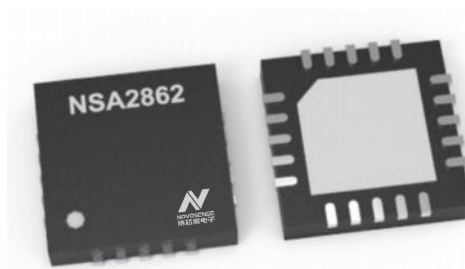
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support SPI BUS or I<sup>2</sup>C 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

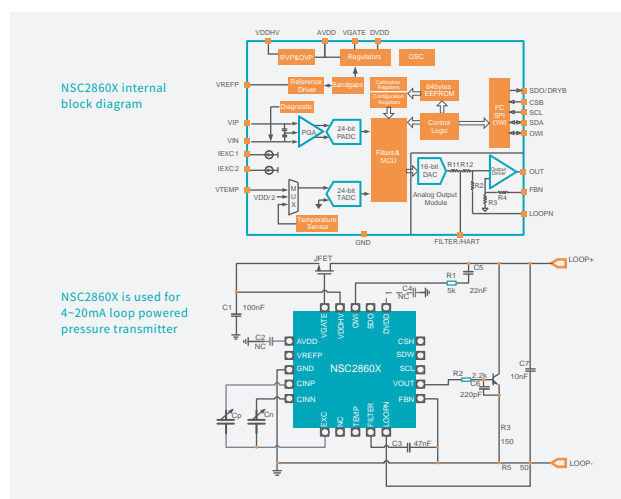
### ◆ Product introduction

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

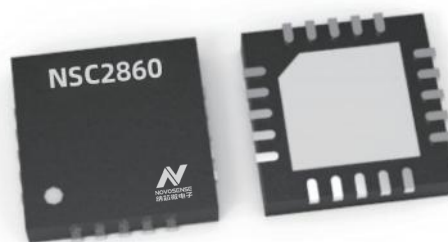
- Integrated capacitive voltage conversion circuit, supporting capacitive pressure sensor interface
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support 4 to 20mA output or 0 to 5V/0 to 10V analog output
- Support SPI BUS or I<sup>2</sup>C 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



### ◆ Package

- NSC2860X-DQNR: QFN20



### ◆ Application



Industrial capacitive pressure transmitter

# Pressure Sensor Signal Conditioning Chip



# Pressure Sensor Signal Conditioning Chip

Part number	Product description	Sensor input type supported	Package	Temperature range	Supply voltage	Output type	Non-volatile memory	Key words of selection	Typical application
NSA2200	General low-cost voltage/resistance bridge signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor	KDG	-40~125°C	1.8~5.5V	I <sup>2</sup> C SPI OWI	OTP	Low-cost digital output	Altimeter Consumer pressure gauge
NSA2300	General low-cost voltage/resistance bridge signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor	SOP8 MSOP10 KDG	-40~125°C	1.8~5.5V	Analog voltage I <sup>2</sup> C SPI OWI	OTP	Low-cost analog + digital output	Altimeter Consumer pressure gauge Additional automotive pressure sensor ear/forehead thermometer (thermopile sensor)
NSA2302	General low-cost voltage/resistance bridge signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor (with bias voltage)	MSOP10 KDG	-40~125°C	3~5.5V High-voltage direct power supply is supported with an external JFET	Analog voltage I <sup>2</sup> C SPI OWI	EEPROM	Low cost analog + digital output, rewritable EEPROM	Additional automotive pressure sensor ear/forehead thermometer (thermopile sensor)
NSA2860 _SSOP16	General industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	SSOP16	-40~150°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20-mA output PWM I <sup>2</sup> C SPI OWI	EEPROM	Industrial transmitter, cost optimized version	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter
NSA2860 _TSSOP	General industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	SSOP16 TSSOP20	-40~150°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20-mA output PWM I <sup>2</sup> C SPI OWI	EEPROM	Industrial transmitter, full function	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter
NSA2860 X-QQNR	General EMC-enhanced industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	QFN20	-40~125°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage Industrial transmitter standard 0~5V/0~10V/4~20-mA output PWM I <sup>2</sup> C SPI OWI	EEPROM	Industrial transmitter, small package	Analog output industrial pressure transmitter Analog output industrial RTD temperature transmitter BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter
NSA2862 X-DQNR	General EMC-enhanced industrial resistance pressure transmitter signal conditioning chip	Wheatstone bridge pressure sensor Strain gage General voltage output sensor PT100/PT1000 RTD temperature sensor	QFN20	-40~125°C	3~5.5V	I <sup>2</sup> C SPI OWI	EEPROM	IoT pressure sensor	BUS-type industrial pressure transmitter BUS-type industrial RTD temperature transmitter IOT industrial transmitter
NSC2860 X-DQNR	General industrial capacitive pressure transmitter signal conditioning chip	Capacitive pressure sensor	QFN20	-40~125°C	3~5.5V with external JFET can support 4~20mA loop power supply (compatible with 24V industrial power supply)	Analog voltage output Industrial transmitter standard 0~5V/0~10V/4~20-mA output PWM I <sup>2</sup> C SPI OWI	EEPROM	Capacitive input industrial pressure level transmitter	Capacitive industrial pressure transmitter
NSA9260	High-reliability automotive-qualified resistance pressure sensor conditioning chip	Wheatstone bridge resistance pressure sensor	SSOP16	-40~150°C	Wheatstone bridge resistance pressure sensor	Analog voltage PWM OWI	EEPROM	Automotive pressure ordinary analog output type	Automotive pressure sensor
NSA9260X	EMC-enhanced high-reliability automotive-qualified resistance pressure sensor conditioning chip	Wheatstone bridge resistance pressure sensor	SSOP16	-40~150°C	Wheatstone bridge resistance pressure sensor	Analog voltage PWM OWI	EEPROM	Automotive pressure EMC-enhanced analog output type	Automotive pressure sensor
NSC9260	High-reliability automotive-qualified capacitive pressure sensor conditioning chip	Capacitive pressure sensor	SSOP16	-40~150°C	Capacitive pressure sensor	Analog voltage PWM OWI	EEPROM	Automotive capacitance pressure ordinary analog output type	Automotive pressure sensor
NSC9260X	EMC-enhanced high-reliability automotive-qualified capacitive pressure sensor conditioning chip	Capacitive pressure sensor	SSOP16	-40~150°C	Capacitive pressure sensor	Analog voltage PWM OWI	EEPROM	Automotive capacitance pressure EMC-enhanced analog output type	Automotive pressure sensor
NSC9262	LIN-interface High-reliability automotive-qualified resistance pressure sensor conditioning chip	Capacitive pressure sensor	SSOP16	-40~150°C	Capacitive pressure sensor	OWI LIN	EEPROM	Automotive capacitance pressure LIN output type	Automotive pressure sensor
NSC9264	SENT-interface High-reliability automotive-qualified resistance pressure sensor conditioning chip	Capacitive pressure sensor	SSOP16	-40~150°C	Capacitive pressure sensor	OWI SENT	EEPROM	Automotive capacitance pressure SENT output type	Automotive pressure sensor



# NSA2200: Digital Output Pressure Sensor Interface Chip

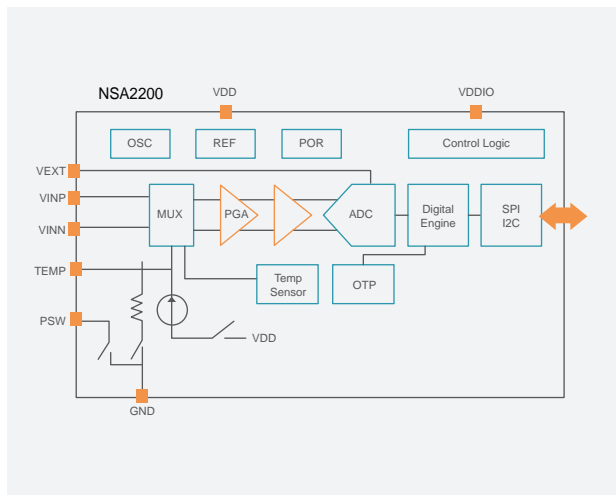
## ◆ Product introduction

NSA2200 is an interface chip for low-cost pressure sensors. It integrates pressure sensor bridge driver, with high precision PGA, 24-bit ADC, customer programmable digital calibration logic and customer-writable 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

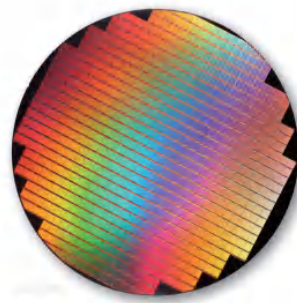
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- Excellent noise performance:  $600\text{nV}@\text{OSR} = 1024\text{X}$ , Gain = 32X (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  $< 0.5^\circ\text{C}$ , resolution  $< 0.01^\circ\text{C}$ ); 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 I<sup>2</sup>C 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

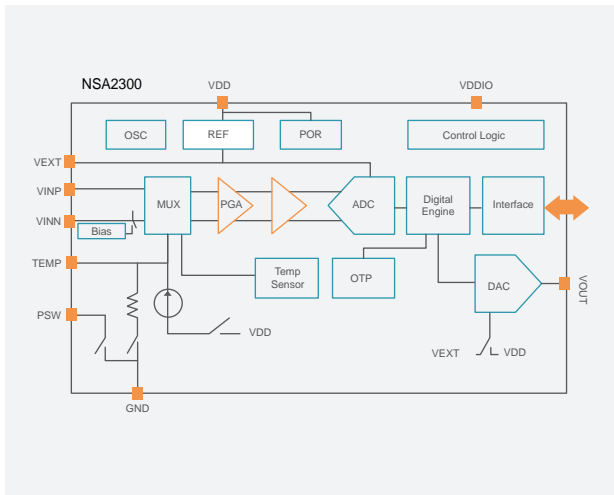
## ◆ Product introduction

NSA2300 is a low-cost pressure sensor interface chip, with both analog output and digital output supported. It integrates pressure sensor bridge driver, with 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 Know Good Die can also be provided.

## ◆ Product feature

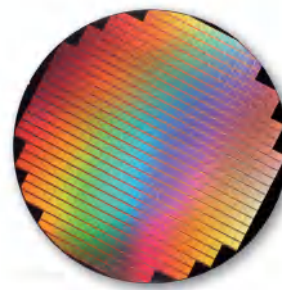
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- Excellent noise performance:  $600\text{nV}@\text{OSR} = 1024\text{X}$ , Gain = 32X (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  $< 0.5^\circ\text{C}$ , resolution  $< 0.01^\circ\text{C}$ ); 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 I<sup>2</sup>C digital interface output, with analog proportional/fixed output mode.

## ◆ Functional block diagram



## ◆ Package

- SO8, MSOP10, 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



Automobile additional pressure sensor module

# NSA2302: Pressure Sensor Interface Signal Conditioning Chip Compatible with Analog and Digital Output

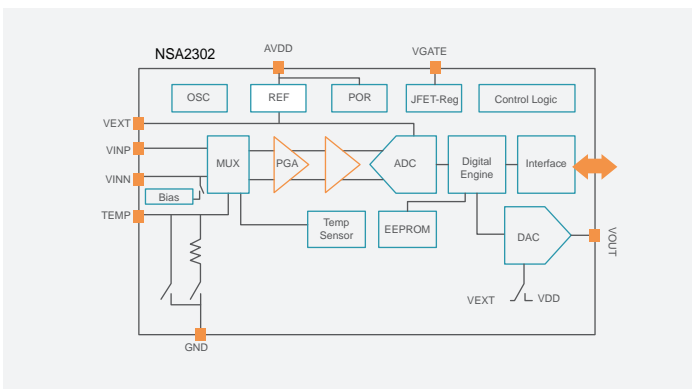
## ◆ Product introduction

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  $\Sigma$ - $\Delta$  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 I<sup>2</sup>C/SPI digital output and analog output, and supports one-wire interface (OWI) multiplexing analog pins for post-sensor calibration.

## ◆ Product feature

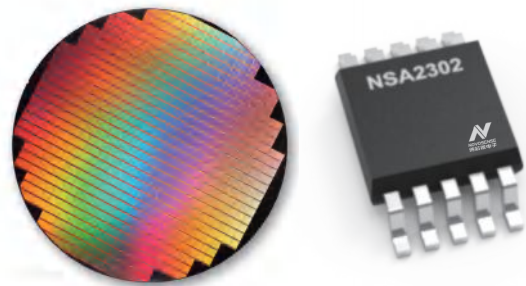
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Support sensor diagnosis and output clamp function
- Excellent noise performance: 600nV@OSR = 1024X, Gain = 32X (equivalent to input noise) 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 I<sup>2</sup>C 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

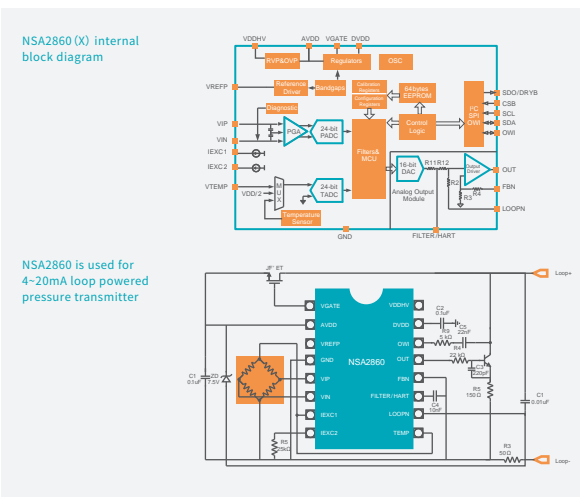
## ◆ Product introduction

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 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 4 to 20mA output or 0 to 5V/0 to 10V analog output
- Support SPI BUS or I<sup>2</sup>C 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 VDDHV can withstand high voltage shocks up to 28V to achieve high reliability in industrial field applications

## ◆ Functional block diagram



## ◆ Package

- NSA2860\_SSOP16: SSOP16
- NSA2860\_TSSOP: TSSOP20
- NSA2860X-QQNR: 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

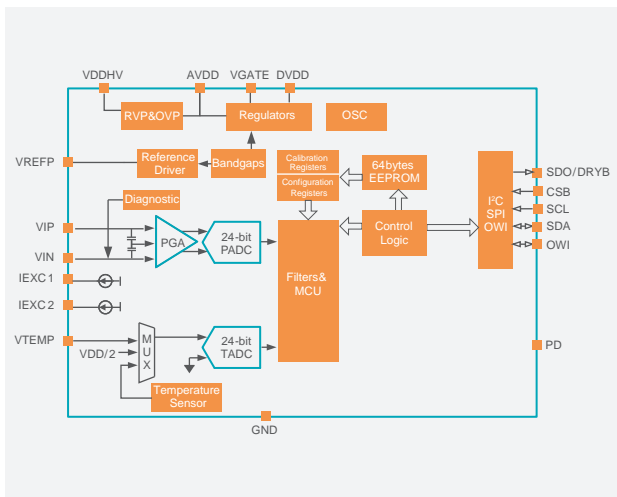
## ◆ Product introduction

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/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

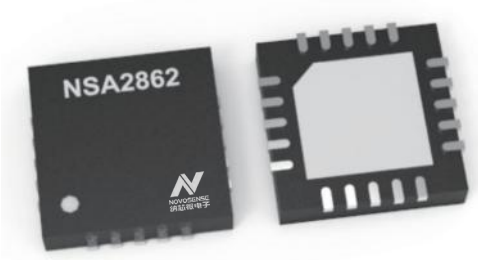
- Integrated bridge drive, high precision PGA, 24-bit high precision ADC, supporting proportional measurement, strain gauge type or resistance bridge sensor input
- Integrated dual constant current source output, supporting three-wire or four-wire RTD temperature sensor input
- Support SPI BUS or I<sup>2</sup>C 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 quantity input and output

# NSC2860X: Capacitive Industrial Transmitter Signal Processing Chip Supporting 4~20mA Output

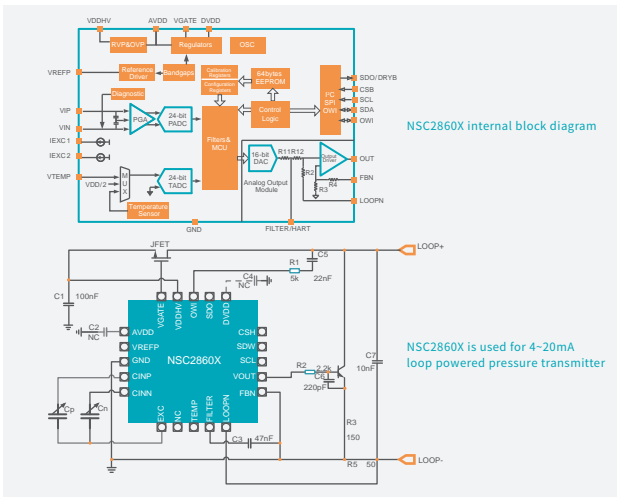
## ◆ Product introduction

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 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

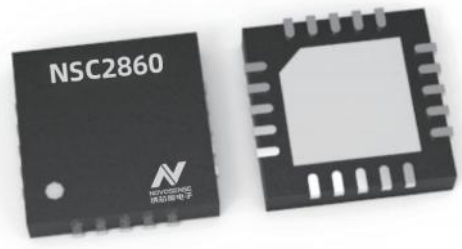
- Integrated capacitive voltage conversion circuit, supporting capacitive pressure sensor interface
- Integrated external JFET controller, supporting 24V industrial loop power supply mode for direct power supply
- Support 4 to 20mA output or 0 to 5V/0 to 10V analog output
- Support SPI BUS or I<sup>2</sup>C 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 VDDHV can withstand high voltage shocks up to 28V to achieve high reliability in industrial field applications

## ◆ Functional block diagram



## ◆ Package

- NSC2860X-DQNR: QFN20



## ◆ Application



Industrial capacitive pressure transmitter





# NSC9260(X): Signal Conditioning Chip for Capacitive Automobile Pressure Sensor

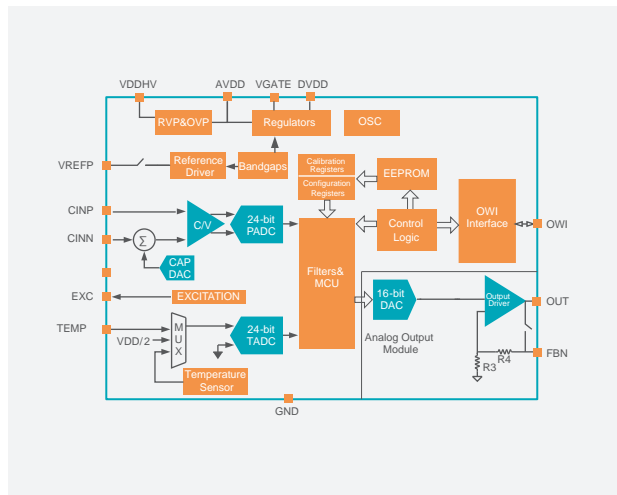
## ◆ Product introduction

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) supports over-voltage and reverse-voltage protection, analog voltage output and PWM output, which is mainly used in automotive 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 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 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: Capacitive Automobile Pressure Sensor Signal Conditioning Chip Supporting LIN BUS

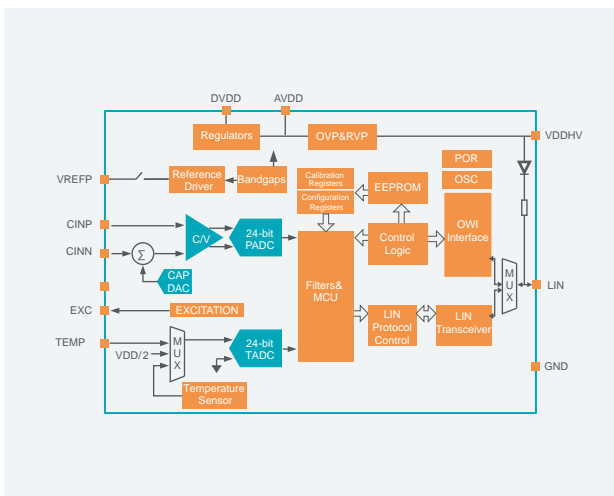
## ◆ Product introduction

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

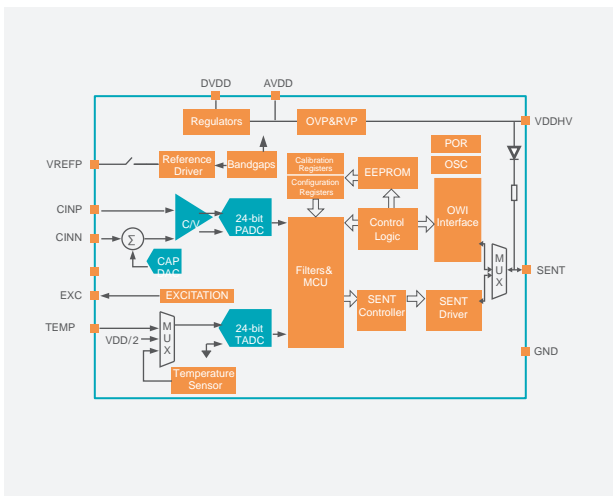
## ◆ Product introduction

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



## ◆ Package

- SSOP16



## ◆ Application



Automotive capacitive pressure sensor module

# MEMS Microphone Signal Conditioning Chip



# MEMS Microphone Signal Conditioning Chip

Part number	Product description	Product feature	Supply voltage/current	AOP	Bias range / step size	Gain range/ step size	Noise	Output mode	Typical application
NSC6272	Analog output MEMS microphone signal conditioning chip	Low cost analog output MEMS microphone signal conditioning Bias adjustment step length 0.3V Gain adjustment step 0.5dB	1.6V~3.6V /125μA	128dBV	7.5V~16V/0.3V	-4dB~11dB/ 0.5dB	4μVrms	Analog	TWS headset Smart television Smart household appliances Smart speaker
NSC6273	Analog output MEMS microphone signal conditioning chip	Low cost analog output MEMS microphone signal conditioning Bias adjustment step length 0.3V Gain adjustment step 0.5dB	2.3V~3.6V /125μA	130dBV	7.5V~16V/0.3V	-4dB~11dB/ 0.5dB	4μVrms	Analog	TWS headset Smart television Smart household appliances Smart speaker
NSC6280	Analog output MEMS microphone signal conditioning chip	Enhanced analog output MEMS microphone signal conditioning Bias adjustment step length 0.3V Gain adjustment step 0.5dB Increase EMI anti-interference of high frequency signal, make it more suitable for use in mobile phone and other applications	1.6V~3.6V /120μA	132dBV	6V~15.5V/0.3V	-1.5dB~11dB /0.5dB	4μVrms	Analog	Mobile/PAD
NSC6360	Digital output MEMS microphone signal conditioning chip	Enhanced digital output MEMS microphone signal conditioning Enhanced power supply PSRR	1.62V~3.6V /330μA@ 768kHz,750μA @2.4MHz	117dBFS.	7.6V~15.9V /1.18V	9dB~17dB/ 0.6dB	4.5μVrms	Digital	Laptop Smart speaker
NSC6362	Digital output MEMS microphone signal conditioning chip	Enhanced digital output MEMS microphone signal conditioning Enhanced power supply PSRR	1.62V~3.6V /330μA@ 768kHz,780μA @2.4MHz	120dBFS.	7.5V~14.4V/0.3V; 15V~19.2V/0.6V	0dB~23dB/ 0.5dB	3μVrms	Digital	Laptop Smart speaker
NSC6364	Digital output MEMS microphone signal conditioning chip with I2S interface	I2S interface Multiple modes including performance, low power and standby mode Low power consumption Suitable for mini size package	1.65V~3.6V /540μA@ 3.072MHz, 285μA@768kHz	120dB SPL	4.7V~12.7V/0.5	AGain: 4.9dB~15.7dB/1.8dB-DGain: -1.9dB~3.8dB/0.5dB	4μVrms	Digital	Wearable devices Remote control Internet of Things Smart home appliances Game consoles



# NSC6272/NSC6273: Analog Output MEMS Microphone Signal Conditioning Chip

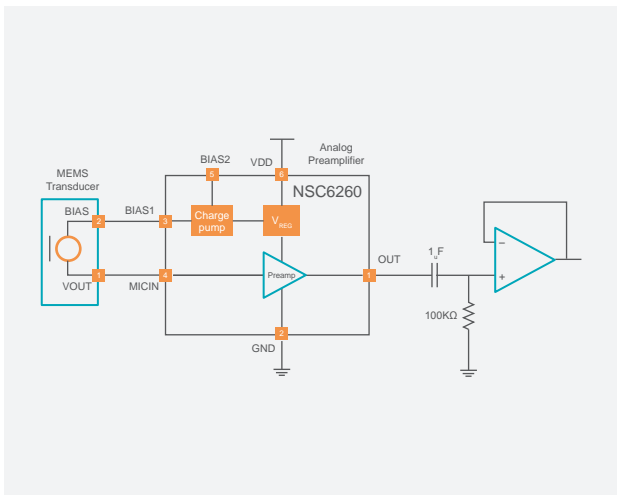
## ◆ Product introduction

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

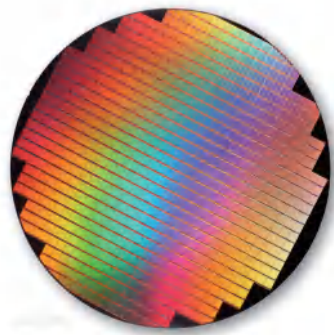
- Working voltage: 1.6V ~ 3.6V for NSC6272, 2.3V ~ 3.6V for NSC6273
- Current drain: 125 $\mu$ A typ.
- Equivalent input noise: 4 $\mu$ Vrms (-108dBV)
- Gain adjustment (OTP): -4dB ~ 11dB with 0.5dB/Step
- Frequency response: 20Hz ~ 20kHz
- Bias voltage: 7.5V ~ 16V with 0.3V/Step
- Working temperature: -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

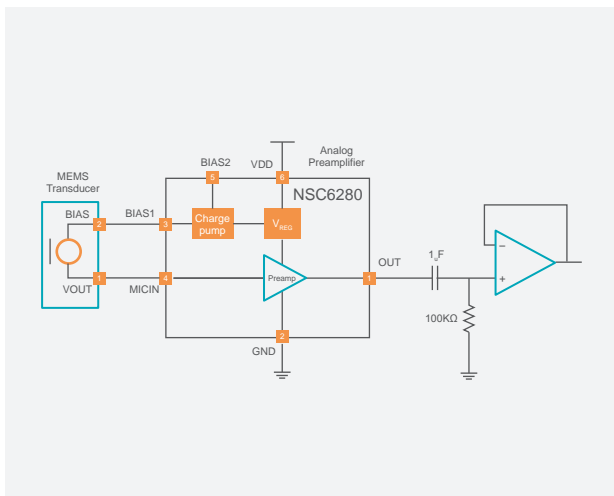
### ◆ Product introduction

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 increase 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 optimization in respect of high-frequency EMI interference and yield in mass production.

### ◆ Product feature

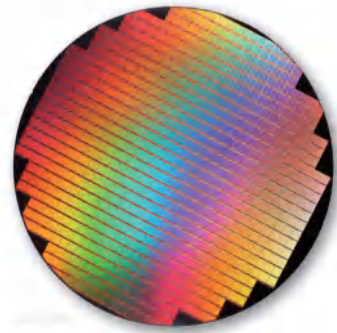
- Working voltage: 1.6V ~ 3.6V
- Current drain: 120 $\mu$ A typ.
- Equivalent input noise: 4 $\mu$ Vrms (-108dBV)
- Gain adjustment (OTP): -4dB ~ 11dB with 0.5dB/Step
- Frequency response: 20Hz ~ 20kHz
- Bias voltage: 6V ~ 15.5V with 0.3V/Step
- Working temperature: -40°C ~ 85°C

### ◆ Functional block diagram



### ◆ Package

- KGD



### ◆ Application



Cellphone



PAD products

# NSC6360: Digital PDM Output MEMS Microphone Signal Conditioning Chip

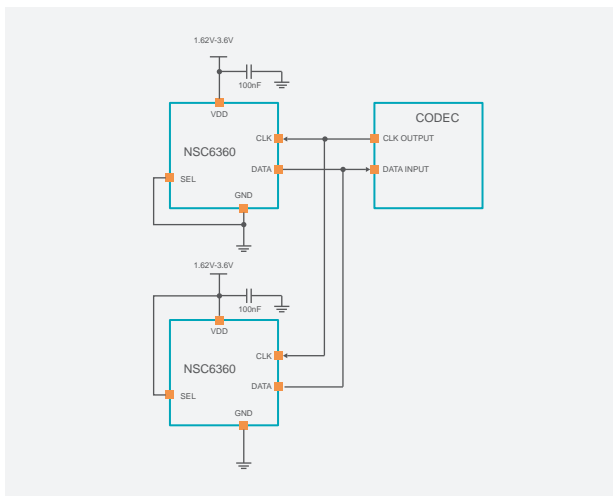
## ◆ Product introduction

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

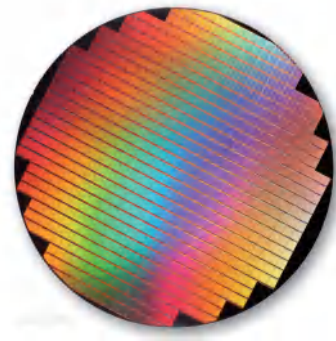
- Working voltage: 1.62V~3.6V
- Working mode: sleep mode, low voltage mode, and normal mode
- Current drain: 300μA @768kHz, 750uA@2.4MHz
- Equivalent input noise: 4.5μVrms (-107dBV)
- Gain adjustment (OTP): 9dB~17dBFS with 0.6dB/Step
- Bias voltage: 7.6V~15.9V with 1.18V/Step
- Working temperature: -40°C~85°C

## ◆ Functional block diagram



## ◆ Package

- KGD



## ◆ Application



Laptop



Cellphone



Smart speaker

# NSC6362: Digital PDM Output MEMS Microphone Signal Conditioning Chip

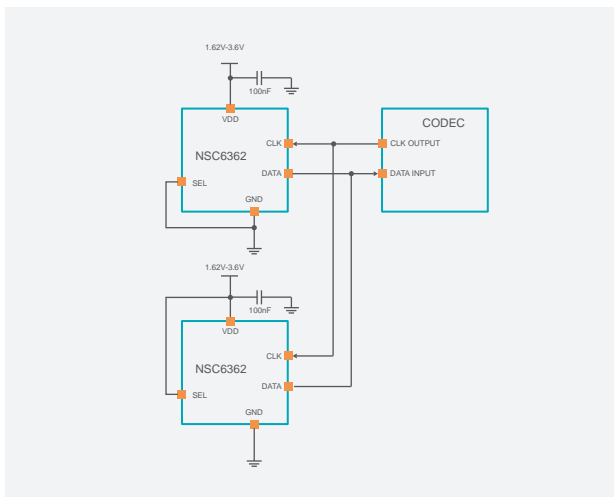
## ◆ Product introduction

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

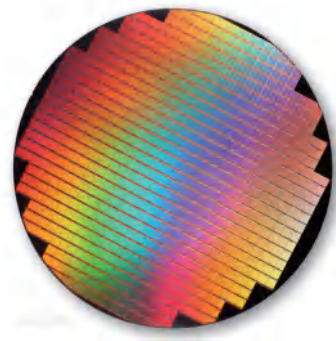
- Working voltage: 1.62V ~ 3.6V
- Working mode: sleep mode, low voltage mode, and normal mode
- Current drain: 330μA @768kHz, 780uA@2.4MHz
- Equivalent input noise: 3μVrms (-110dBV)
- Gain adjustment (OTP): 0dB ~ 23dBFS with 0.5dB/Step
- Bias voltage: 7.5V ~ 19.2V with 1.3V/Step
- Working temperature: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

## ◆ Functional block diagram



## ◆ Package

- KGD



## ◆ Application



Laptop



Cellphone



Smart speaker

# NSC6364: I2S Interface Digital MEMS Microphone Signal Conditioning Chip

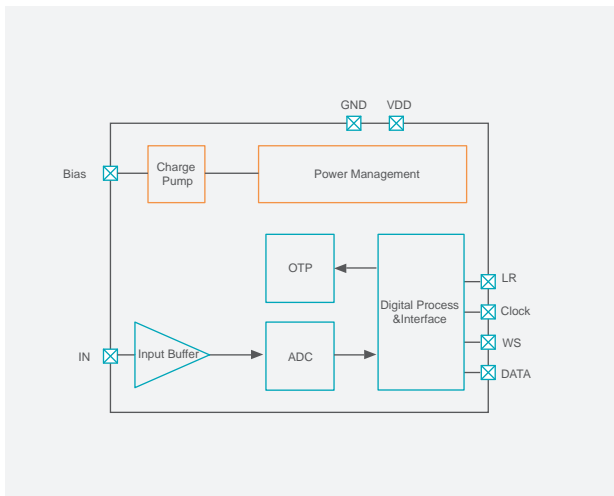
## ◆ Product introduction

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

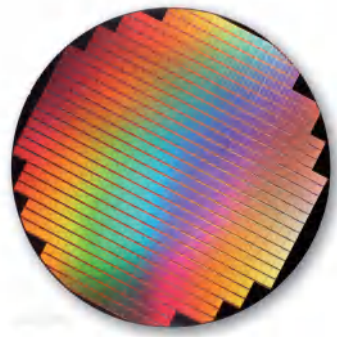
- I2S output, SNR up to 67dB
- Operating voltage range: 1.65V~3.6V
- Ultra-low power consumption
- BIAS adjustable, 4.7V~12.7V
- Analog gain adjustable, 4.9dB~+15.7dB
- Digital gain adjustable, -1.9dB~+3.8dB
- Grain size, 600um x 900um
- HBM ESD, ±4kV
- Operating temperature, -40°C~85°C
- Three working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

Part number	Probe fitting mode	Output mode	Product feature	Package	Temperature range	Supply voltage/ current	Start (minimum) trigger threshold	Product sub-material No. / Order No.	Output mode	Typical application
NSC6272	External type	Switching value output	Resistance adjustment for judging the threshold and opening time	SOP8	-25~85°C	1.8V~4.5V/ 13μA	52μV	NSA3162T	Binary	Smart lighting/Smart doorbell Smart security (camera)
NSA3180	Internal type	Switching value output	Resistance adjustment for judging the threshold and opening time	DFN8	-40~85°C	1.5V~4.5V/ 10μA	50μV	NSA3180FT 520	Binary	Smart lighting/Smart doorbell Smart security (camera)
NSA3180T	Internal type	Switching value output	Resistance adjustment for judging the threshold and opening time	DFN8	-25~85°C	1.8V~4.5V /13μA	52μV	NSA3180TF T00	Binary	Smart lighting/Smart doorbell Smart security (camera)
NSA3182	External type	Switching value output	Resistance adjustment for judging the threshold and opening time, with built-in LDO	SOP8	-40~85°C	3.1V~12V /13μA	50μV	NSA3182FT 100	Binary	Smart lighting
NSA3166	External type	Digital output/switching output	Register configuration for judging the threshold and opening time	DFN8	-40~85°C	1.6V~4.5V /6μA	50μV	NSA3166_C DNR	Digital and Binary	Smart lighting/Smart doorbell Smart security (camera)



# Infrared PIR Sensor Signal Conditioning Chip

# NSA3162T: Common External PIR Sensor Signal Conditioning Chip

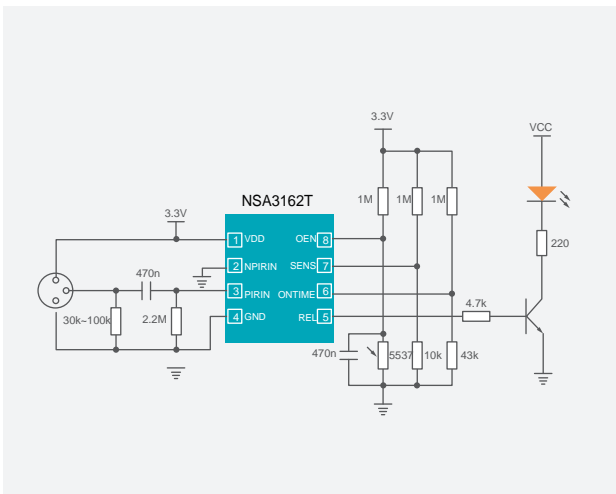
## ◆ Product introduction

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

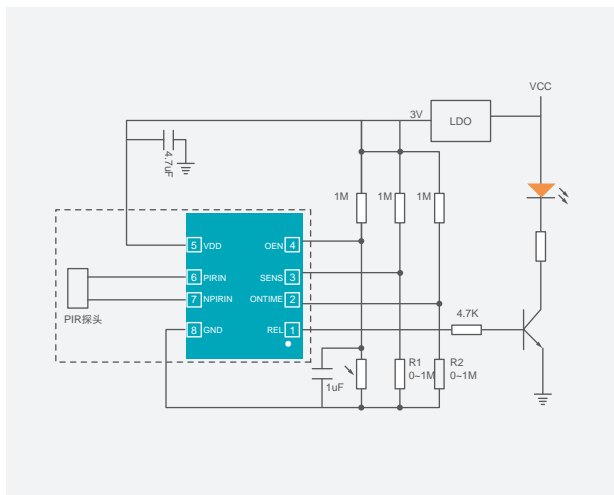
### ◆ Product introduction

NSA3180/3180T 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

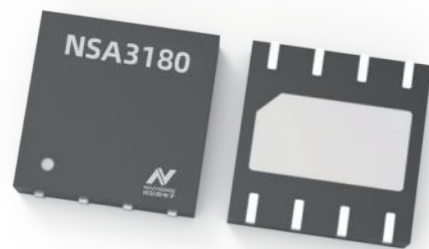
- Suitable for PIR internal signal conditioning applications, with DFN8 package
- Sensitivity and response time adjustable through an external resistor
- Binary output
- Low power consumption, static current 15 $\mu$ A (NSA3180T: 15 $\mu$ A)
- Power supply voltage range is 1.8V~4.5V (NSA3180T: 1.8V~4.5V)

### ◆ Functional block diagram



### ◆ Package

- DFN8



### ◆ Application



Smart lighting



Smart security



Building automation

# NSA3182: External PIR Sensor Signal Conditioning Chip Integrated with LDO

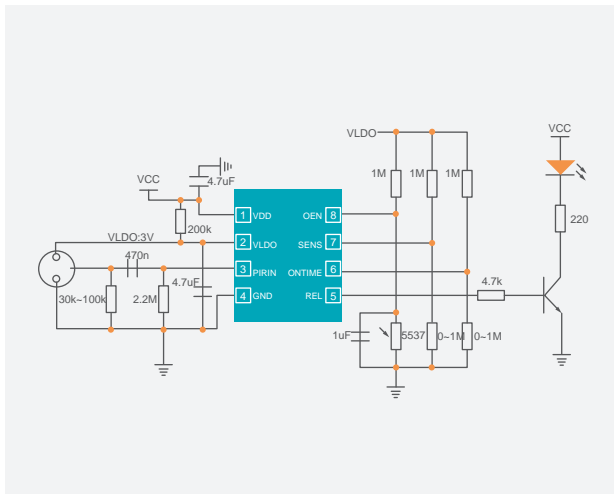
## ◆ Product introduction

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

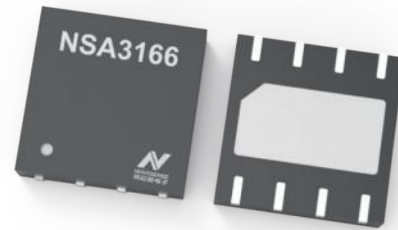
The NSA3166 is a highly integrated signal processing chip for pyroelectric infrared sensors (PIR) for smart security applications. A single NSA3166 integrates all the necessary components for pyroelectric passive infrared mobile detection, and the analog front end can be directly connected to the analog 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

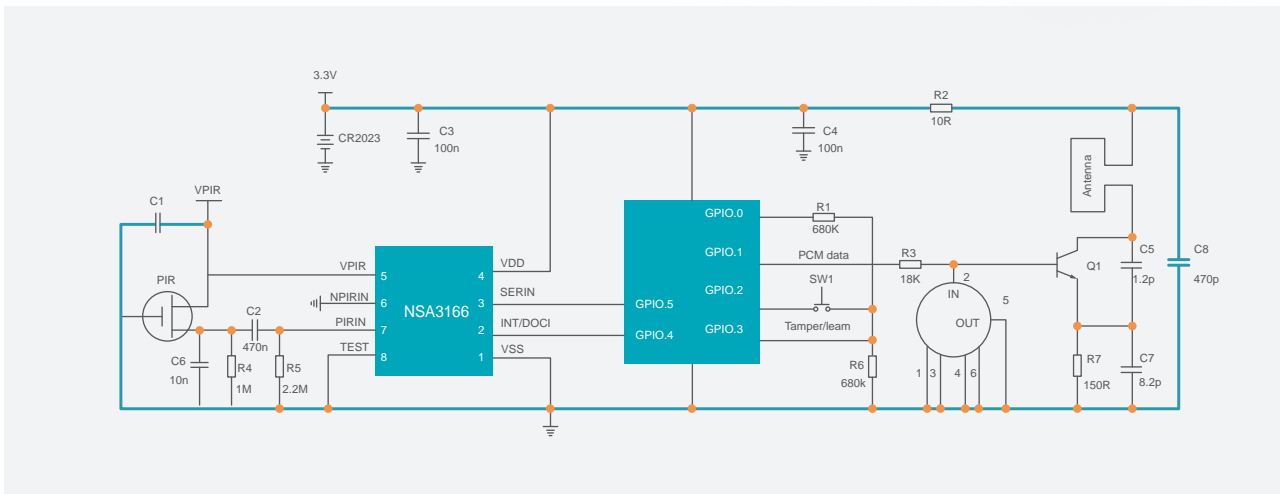
- Suitable for PIR external signal conditioning applications, with DFN8 package
- Sensitivity and response time are adjustable through digital interface
- Power supply ranges from 1.6V to 4.5V
- Support digital output and binary output
- Low-power consumption, low static current of 6 $\mu$ A
- Built-in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

## ◆ Package

- DFN8



## ◆ Functional block diagram



## ◆ Application



Smart lighting



Smart security



Smart camera



Building automation  
and smart doorbell



# Thermopile Sensor Signal Conditioning Chip



# NSA3300: Thermopile Sensor Signal Conditioning Chip

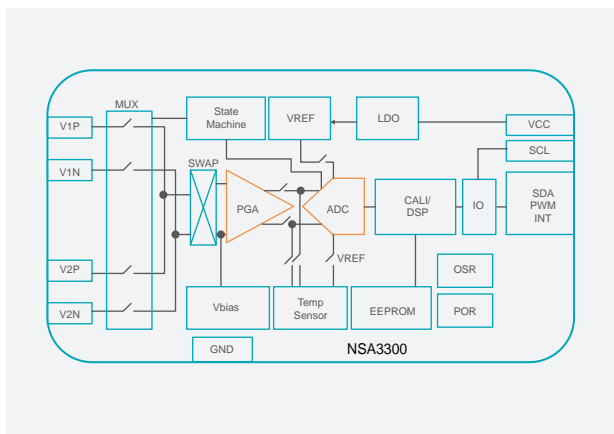
## ◆ Product introduction

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 programmed by the user, the end customer can directly read the temperature value through the I<sup>2</sup>C interface from the IC. The chip has low-noise instrument amplifier PGA, 24bit  $\Sigma$ - $\Delta$ ADC 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  $\pm 0.2^{\circ}\text{C}$  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  $\pm 0.2^{\circ}\text{C}$  error in the range between 0~40°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

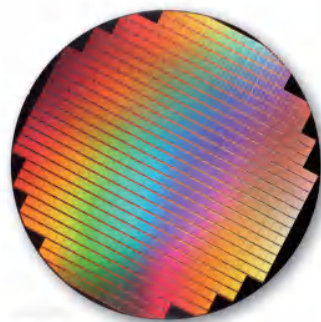
- High-precision signal amplification PGA, adjustable gain from 8x to 128x, and equivalent input noise less than 3 $\mu\text{Vrms}$
- Integrated high-precision temperature sensor, with accuracy up to  $\pm 0.2^{\circ}\text{C}$  in room temperature range from 0°C to 40°C
- Built-in EEPROM for 32-point LUT input, with digital linear interpolation between two points
- Support client sensor post-calibration, with sensitivity, offset and non-linearity compensation
- Support direct I<sup>2</sup>C reading of the target temperature, which can be configured as the temperature binary output mode
- Low power consumption, with sleep current of 5 $\mu\text{A}$
- 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





# NSA5312: Magnetic Sensor Signal Conditioning Chip/Programmable Instrumentation Amplifier

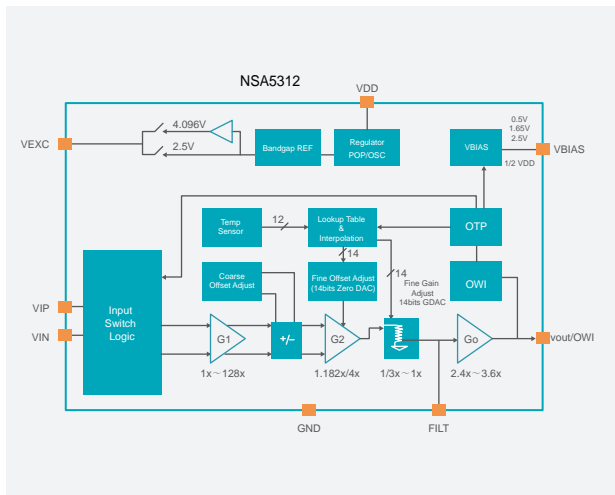
## ◆ Product introduction

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

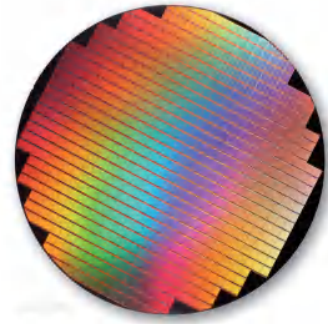
- Provide 2.5V / 4.096V voltage excitation
- Provide 0.9456~1843x programmable gain setting
- Provide 14-bit sensor sensitivity and offset calibration
- Provide sensor temperature calibration based on lookup table
- Programmable output signal bandwidth, with maximum signal bandwidth is about 600kHz
- Fast response time <math><1\mu\text{s}</math>
- 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

## ◆ Functional block diagram



## ◆ Package

- KGD



## ◆ Application



Current sensor module



Pressure sensor module



Industrial transmitter

# Isolated RS-485 Transceiver

NSi8038x Series Isolated RS-485 Transceiver									
	Part No.	Duplex	ISO Rating (kVrms)	ESD	Max DataRate (Mbps)	No. of Nodes	Isolation Grade	Operating Temperature Range (°C)	Package Type
RS-485	NSi83085E	Half	5	16	0.5	256	Reinforced	-40~105	SOW-16
	NSi83086E	Full	5	16	16	256	Reinforced	-40~105	SOW-16
	NIRS485	Half	3	8	1	256	Basic	-40~105	SSOP-16



Isolated RS-485 Transceiver





# NIRS485: Cost-optimized Isolated 485 Transceiver

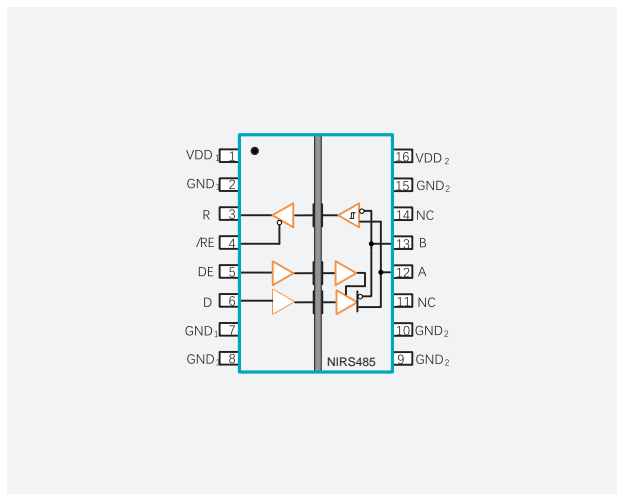
## ◆ Product introduction

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  $\pm 8\text{kV}$  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:  $\pm 100\text{kV}/\mu\text{s}$
- High system level EMC performance: BUS pins conforming to IEC61000-4-2 $\pm 8\text{kV}$  ESD
- Fail-safe receiver
- Supporting 256 transceivers
- Isolation Barrier Life: >60 years
- Operating temperature:  $-40^\circ\text{C}$  to  $105^\circ\text{C}$
- RoHS compliant package: SSOP-16

## ◆ Pinout & Package



## ◆ Application



Battery management system



Isolated 485 communication system



Smart ammeters and water meters

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	CAN Transceiver	Isolated LIN Transceiver	Digital Isolator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Isolated Power Supply	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator

# Isolated CAN Transceiver

NSi1050 isolated CAN transceiver									
	Part No.	Part No.	ISO Rating (kVrms)	ESD(kV)	Max DataRate (Mbps)	No.of Nodes	Fail Safe	Operating Temperature Range (°C)	Package Type
CAN	NSi1050	NSi1050-DDBR	3	8	1	110	Idle, Open, Short	-40~125	DUB-8
	NSi1050	NSi1050-DSWR	5	8	1	110	Idle, Open, Short	-40~125	SOW-16
	NSi1042	NSi1042-DSWVR	5	8	5	110	Idle, Open, Short	-40~125	SOW-8
	NSi1042	NSi1042-DSWR	5	8	5	110	Idle, Open, Short	-40~125	SOW-16
	NSi1052	NSi1052-DSWR	5	8	5	110	Idle, Open, Short	-40~125	SOW-16

# Isolated CAN Transceiver



# NSi1050: High-Performance Isolated CAN Transceiver

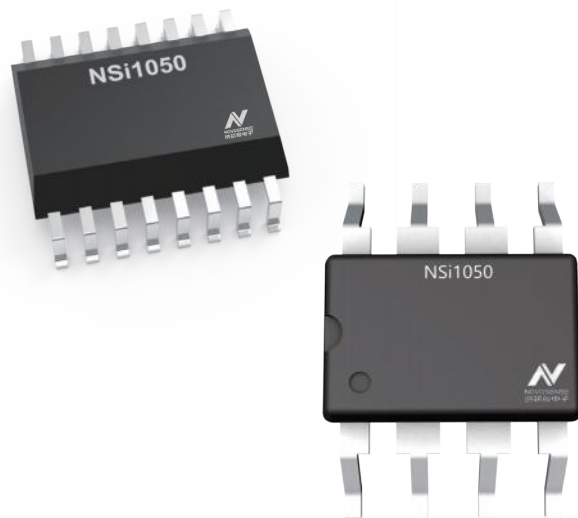
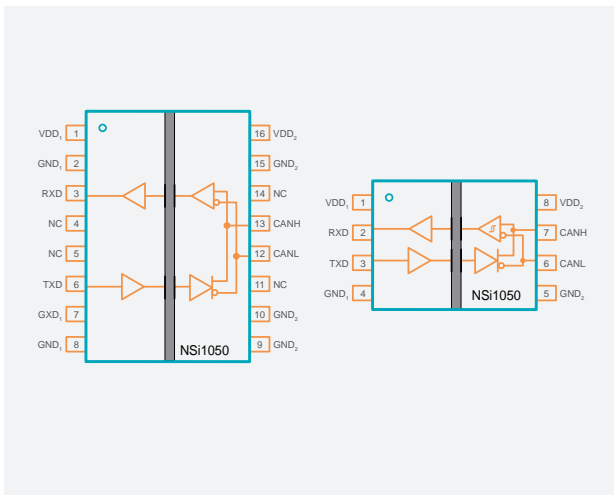
## ◆ Product introduction

NSi1050 is an isolated CAN transceiver that is fully compatible with ISO11898-2. NSi1050 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. NSi1050 device is safety certified by UL1577 support 5kVrms insulation withstand voltages, and feature high electromagnetic immunity and low emission. NSi1050 supports data transmission rates of up to 1Mbps and can support at least 110 CAN nodes. NSi1050 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

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NSi1042/1052: High-Performance Isolated CAN Transceiver

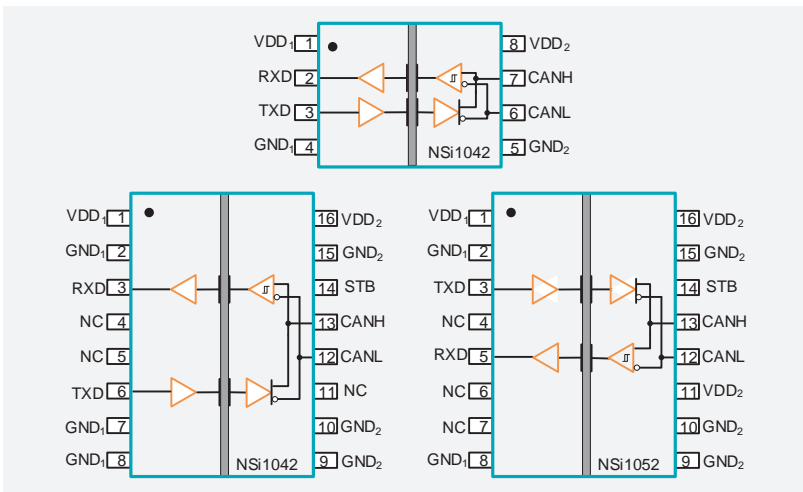
## ◆ Product introduction

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 /  $\mu$ s
- 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



Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator



# Isolated I<sup>2</sup>C

NSI810x Isolated I <sup>2</sup> C								
	Part No.	ISO Rating (kVrms)	ESD(kV)	Bidirectional Channels	Max DataRate (Mbps)	AEC-Q100	Operating Temperature Range (°C)	Package Type
I <sup>2</sup> C	NSI8100N	3.75	6	2	2		-40~125	SOP-8
	NSI8100W	5	6	2	2		-40~125	SOW-16
	NSI8100NC	3.75	6	2	2		-40~125	SOP-8

## Isolated I<sup>2</sup>C



# NSi8100NC/NSi8100: High Reliability Bidirectional I<sup>2</sup>C Isolators

## ◆ Product introduction

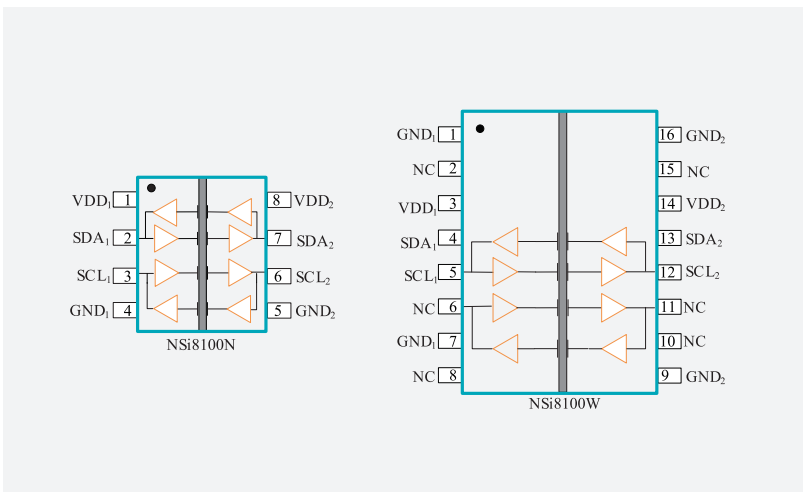
The NSi810x series are high reliability bidirectional I<sup>2</sup>C digital isolators. The NSi810x devices are safety certified by UL1577 support several insulation withstand voltages (3.75kVrms, 5kVrms), and features high electromagnetic immunity and low emission characteristics. They Support I<sup>2</sup>C 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 I<sup>2</sup>C 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 I<sup>2</sup>C 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
- I<sup>2</sup>C 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
- Chip-level ESD performance: HBM: ±6kV
- Isolation Barrier Life: >60 years
- Wide operating temperature range: -40°C to 125°C
- RoHS compliant package: SOP-8, SOW-16

## ◆ Pinout & Package



## ◆ Application



I<sup>2</sup>C level converter



Isolated I<sup>2</sup>C, PMBUS, SMBUS interface applications



Power over Ethernet (POE)



Motor control



Power Supply System

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
	Digital Isolator



# I<sup>2</sup>C Interface



## I<sup>2</sup>C Interface

I <sup>2</sup> C Hot-swappable NCA9511 Series								
	Part No.	VCC1(min)(V)	VCC1(max)(V)	VCC2(min)(V)	VCC2(max)(V)	Frequency (Max) (kHz)	Operating Temperature Range (°C)	Package Type
Hot Swappable Buffer	NCA9511	2.7	5.5	2.7	5.5	400	-40~105	MSOP-8
								SOP-8

I <sup>2</sup> C Level Converter NCA9306 Series								
	Part No.	VCC1(min)(V)	VCC1(max)(V)	VCC2(min)(V)	VCC2(max)(V)	Frequency (Max) (kHz)	Operating Temperature Range (°C)	Package Type
voltage-level shifter	NCA9306	1.2	3.3	1.8	5.5	400	-40~85	VSSOP-8
								TSSOP-8

I <sup>2</sup> C Buffer NCA9617A Series								
	Part No.	VCC1(min)(V)	VCC1(max)(V)	VCC2(min)(V)	VCC2(max)(V)	Frequency (Max) (kHz)	Operating Temperature Range (°C)	Package Type
Level-Translating Repeater	NCA9617A	0.8	5.5	2.2	5.5	1000	-40~85	MSOP8

I <sup>2</sup> C switch NCA954x series									
	Part No.	Channel	VCC(min)(V)	VCC(max)(V)	Frequency (Max) (kHz)	Addresses	Features	Operating Temperature Range (°C)	Package Type
I <sup>2</sup> C-BUS switch	NCA9545	4	2.3	5.5	400	4	Interrupt Pin Reset Pin	-40~85	TSSOP-20
	NCA9546	4	2.3	5.5	400	8	Reset Pin	-40~85	TSSOP-16
	NCA9548	8	2.3	5.5	400	8	Reset Pin	-40~85	TSSOP-24

I <sup>2</sup> C GPIO expansion for NCA95xx series										
	Part No.	Channel	VCC(min)(V)	VCC(max)(V)	Frequency (Max) (kHz)	Addresses	Features	Operating Temperature Range (°C)	AEC-Q100	Package Type
I <sup>2</sup> C GPIO Expander	NCA9555	16	2.3	5.5	400	8	Interrupt Pin LED Driver	-40~85		TSSOP-24
	NCA9534B	8	2.3	5.5	400	8	Interrupt Pin LED Driver	-40~85		TSSOP-16
										SOW-16
	NCA9539-Q1	16	1.65	5.5	400	4	Interrupt Pin LED Drive	-40~85	✓	TSSOP-24

# NCA9511: I<sup>2</sup>C Hot-swappable BUS and SMBUS Buffer

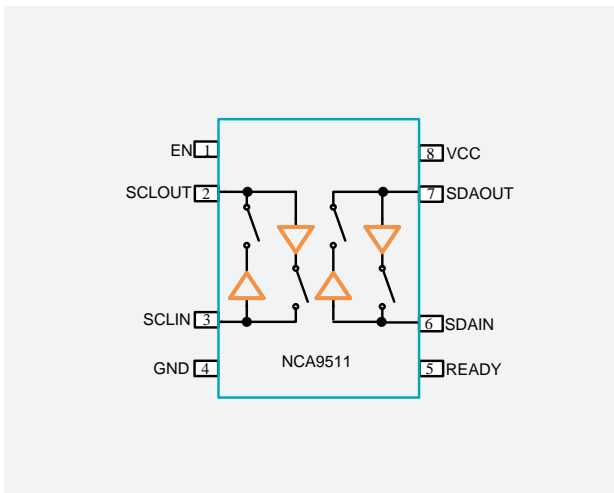
## ◆ Product introduction

NCA9511 is a hot-swappable I<sup>2</sup>C 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 I<sup>2</sup>C line (input) from connecting to the card side I<sup>2</sup>C 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 I<sup>2</sup>C 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 I<sup>2</sup>C 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 I<sup>2</sup>C devices
- Supporting clock stretching, arbitration and synchronization
- I<sup>2</sup>C BUS high-impedance state when VCC is powered down
- Operating temperature: -40°C to 105°C
- RoHS compliant package: MSOP-8, SOP-8

## ◆ Pinout & Package



## ◆ Application



Telecom switching equipment



Server



Enterprise switch



Base station



Industrial automation equipment

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	CAN Transceiver	Isolated Error Amplifier	Isolated Comparator
Digital Isolator with Integrated Isolated Power Supply	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	I <sup>2</sup> C Interface	RS-485 Transceiver	Isolated Voltage Amplifier	LIN Transceiver	Digital Isolator



## NCA9306: I<sup>2</sup>C and SMBUS Voltage Level Converter

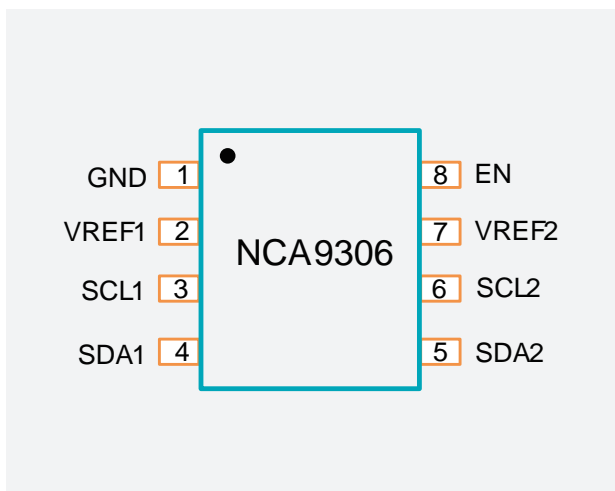
### ◆ Product introduction

The NCA9306 device is a dual-channel bidirectional I<sup>2</sup>C 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 I<sup>2</sup>C applications
- Compatible with I<sup>2</sup>C 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 I<sup>2</sup>C 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

### ◆ Pinout & Package



### ◆ Application



I<sup>2</sup>C, SMBUS, PMBUS, MDIO, UART, low-speed SDIO, GPIO and other bidirectional signal interfaces



Server



Router  
(telecom switching equipment)



Personal computer



Industrial automation

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

## NCA9617A: I<sup>2</sup>C and SMBUS Dual Bidirectional Buffer

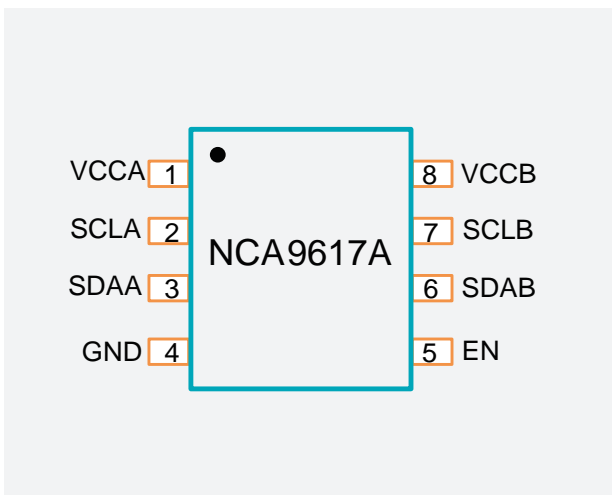
### ◆ Product introduction

NCA9617A is a BiCMOS dual bidirectional buffer designed for I<sup>2</sup>C 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 I<sup>2</sup>C and similar BUS systems without impairing system performance.

### ◆ Product feature

- Dual-channel Bidirectional I<sup>2</sup>C Buffer
- Standard mode, fast mode (400kHz) and fast mode+ (1MHz) optional
- I<sup>2</sup>C operates voltage level conversion from 0.8V to 5.5V and from 2.5V to 5.5V
- Open-drain I<sup>2</sup>C 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



### ◆ Application



Server



Router  
(telecom switching equipment)



Industrial equipment



Integrated with a number of I<sup>2</sup>C slave devices or products with long PCB wiring

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NCA9545: 4-channel I<sup>2</sup>C-BUS Switch with Interrupt Logic and Reset

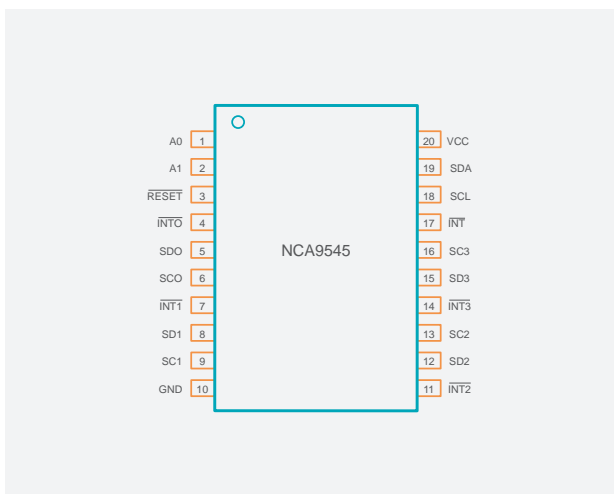
## ◆ Product introduction

The NCA9545 is a quad bidirectional translating switch controlled via the I<sup>2</sup>C 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 programmable 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 I<sup>2</sup>C BUS. Pulling RESET low resets the I<sup>2</sup>C 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 I<sup>2</sup>C 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) 1000V charging device model (C101)
- Operating temperature: -40°C to 105°C
- RoHS compliant package: TSSOP-20

## ◆ Pinout & Package



## ◆ Application



Server



Router  
(telecom switching equipment)



Factory  
automation



Products with I<sup>2</sup>C  
slave address conflicts  
(e.g. multiple, identical temp sensors)

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated I <sup>2</sup> C	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	Isolated I <sup>2</sup> C Interface	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator

## NCA9546: 4-channel I<sup>2</sup>C Switch with Reset

### ◆ Product introduction

NCA9546 is a quad-channel bidirectional switch controlled by I<sup>2</sup>C 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.

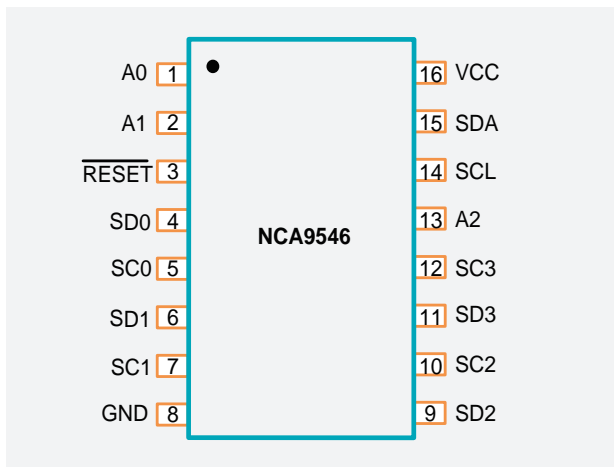
A low-level on reset (RESET) input enables the NCA9546 to recover from a prolonged low state of any down-link I<sup>2</sup>C BUS. Pulling RESET low resets the I<sup>2</sup>C state machine and deselects all channels, as does the internal power-on reset function.

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 5.5 V.

### ◆ Product feature

- 1-of-4 bidirectional translating switches
- Compatible with I<sup>2</sup>C BUS and SMBUS
- Active-low reset input
- 3 address terminals, allowing up to 8 devices to be connected to the I<sup>2</sup>C BUS
- Channel selection via I<sup>2</sup>C 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



### ◆ Application



Server



Router  
(telecom switching equipment)



Factory  
automation



Products with I<sup>2</sup>C  
slave address conflicts  
(e.g. multiple, identical temp sensors)

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated CAN with Integrated Power Supply	I <sup>2</sup> C Interface	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator

## NCA9548: 8-channel I<sup>2</sup>C Switch with Reset

### ◆ Product introduction

NCA9548 is an eight-channel bidirectional switch controlled by I<sup>2</sup>C 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.

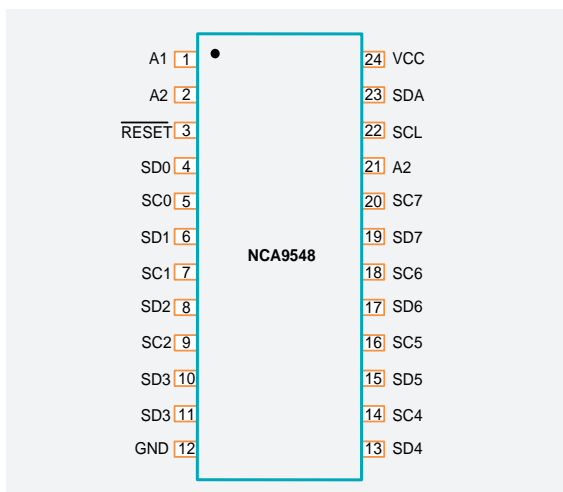
A low-level on reset (RESET) input enables the NCA9548 to recover from a prolonged low state of any down-link I<sup>2</sup>C BUS. Pulling RESET low resets the I<sup>2</sup>C state machine and deselects all channels, as does the internal power-on reset function.

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 5.5 V.

### ◆ Product feature

- 1-of-8 bidirectional translating switches
- Compatible with I<sup>2</sup>C BUS and SMBUS
- Active-low reset input
- 3 address terminals, allowing up to 8 devices to be connected to the I<sup>2</sup>C BUS
- Channel selection via I<sup>2</sup>C 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



### ◆ Application



Server



Router  
(telecom switching equipment)



Factory  
automation



Products with I<sup>2</sup>C  
slave address conflicts

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated I <sup>2</sup> C	I <sup>2</sup> C 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



## NCA9555: I<sup>2</sup>C 16-bit GPIO Expansion

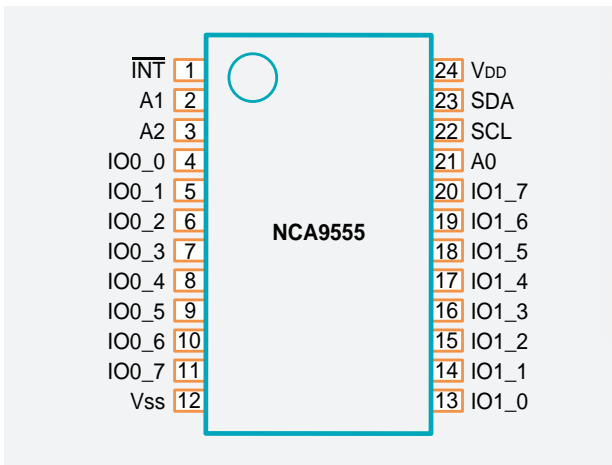
### ◆ Product introduction

NCA9555 is a 24-pin CMOS device that provides 16-bit general purpose parallel I<sup>2</sup>C 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 I<sup>2</sup>C BUS address and allow up to eight devices to share the same I<sup>2</sup>C BUS.

### ◆ Product feature

- The operating supply voltage range is from 2.3V to 5.5V
- I<sup>2</sup>C 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



### ◆ Application



Server



Router  
(telecom switching equipment)



Personal  
computer



Personal  
electronics



Factory  
automation



Products with  
GPIO-constrained  
processors

Isolated RS-485 Transceiver	Isolated RS-485 Transceiver with Integrated Isolated Power Supply	Isolated CAN Transceiver	Isolated CAN Transceiver with Integrated Isolated Power Supply	Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply	I <sup>2</sup> C Interface	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
-----------------------------	---	--------------------------	--	---------------------------	--	----------------------------	--------------	----------------------------	----------------------------	--------------------------	---------------------

## NCA9534B: I<sup>2</sup>C 8-bit GPIO Expansion

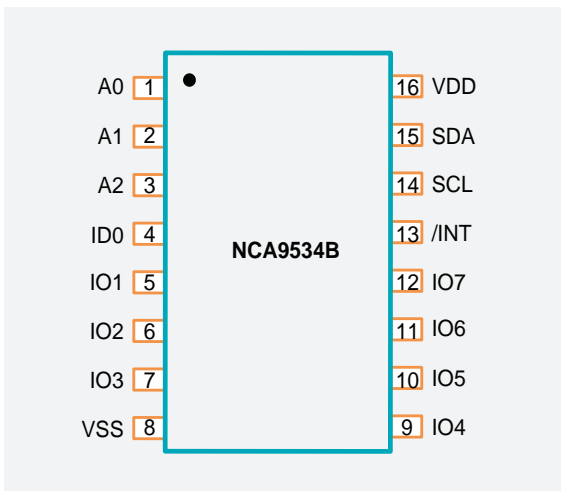
### ◆ Product introduction

NCA9534B is a 16-pin CMOS device that provides 8-bit general purpose parallel I<sup>2</sup>C 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 I<sup>2</sup>C BUS address and allow up to eight devices to share the same I<sup>2</sup>C BUS.

### ◆ Product feature

- The operating supply voltage range is from 2.3V to 5.5V
- I<sup>2</sup>C 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 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: SOW-16, TSSOP-16

### ◆ Pinout & Package



### ◆ Application



Server



Router  
(telecom switching equipment)



Personal  
computer



Personal  
electronics



Factory  
automation



Products with  
GPIO-constrained  
processors

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NCA9539-Q1: Automotive I<sup>2</sup>C 16-bit GPIO Expansion

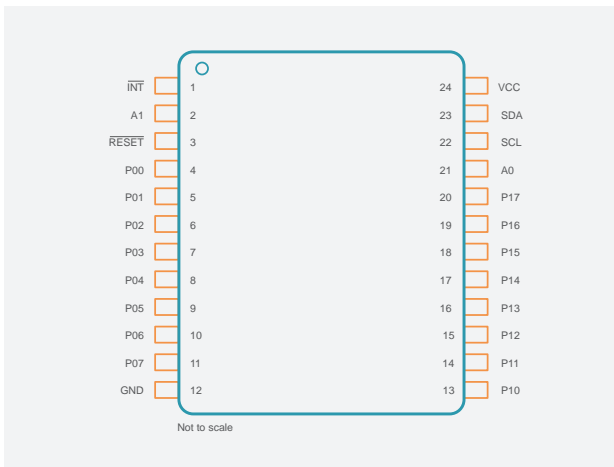
## Product introduction

NCA9539-Q1 is a 16-pin CMOS device that provides 8-bit general purpose parallel I<sup>2</sup>C 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 I<sup>2</sup>C BUS address and allow up to four devices to share the same I<sup>2</sup>C BUS.

## Product feature

- The operating supply voltage range is from 1.65V to 5.5V
- I<sup>2</sup>C 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)



I<sup>2</sup>C GPIO expansion

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# RS-485 Transceiver

NCA34xx Series RS-485 Transceiver									
	Part No.	Duplex	Supply Voltage (V)	ESD	Max DataRate (Mbps)	No. of Nodes	Bus Common Voltage(V)	Operating Temperature Range (°C)	Package Type
RS-485	NCA3485	Half	3~5.5	10	0.5	256	-7~12	-40~105°C	SOP-8
	NCA3491	Full	3~5.5	10	16	256	-7~12	-40~105°C	SOP-14



RS-485 Transceiver

## NCA34xx: high robust RS485 half/full duplex transceiver

### ◆ Product introduction

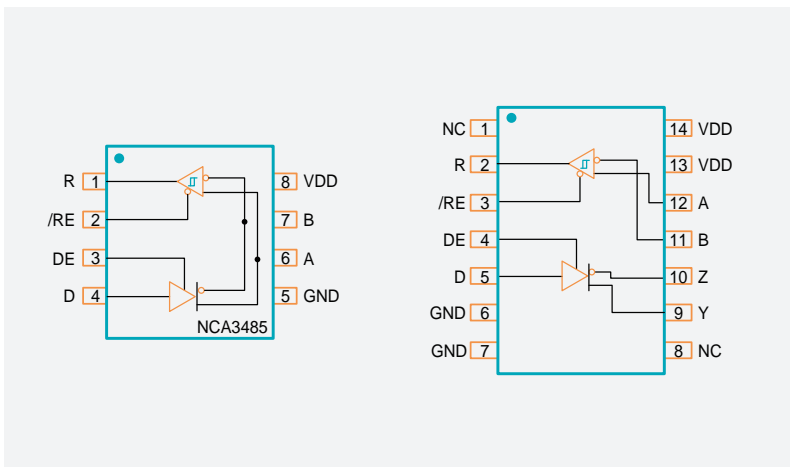
NCA34xx is high robust RS485 transceiver. NCA3485 is a half-duplex RS-485 transceiver. NCA3491 is a full-duplex RS-485 transceiver. The devices have a 1/8-unit-load receiver input impedance that allows up to 256 transceivers on the bus. The data rate of the device is up to 12Mbps.

The Bus pins are protected from  $\pm 10\text{kV}$  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  $\pm 10\text{kV}$  ESD
- Fail-safe protection receiver
- Up to 256 transceivers on the bus
- Operation temperature:  $-40\text{ }^{\circ}\text{C} \sim 105\text{ }^{\circ}\text{C}$
- RoHS-compliant packages:  
SOP8  
SOP14

### ◆ Pinout & Package



### ◆ Application



Industrial automation system



RS-485 communication

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
-----------------------------	--------------------------	---	--------------	----------------------------	----------------------------	--------------------------	---------------------





# CAN Transceiver

# CAN Transceiver

CAN transceiver										
	Part No.	Part No.	Power Supply Voltage	ESD(kV)	Max DataRate (Mbps)	No. of Nodes	Low Power Mode	Operating Temperature Range (°C)	AEC-Q100	Package Type
CAN	NCA1042	NCA1042-DSPR	VIO: 3-5.5V VCC: 4.5-5.5V	8	5	110	Standby	-40-125		SOP-8
	NCA1042-Q1	NCA1042-Q1SPR	VIO: 3-5.5V VCC: 4.5-5.5V	8	5	110	Standby	-40-125	✓	SOP-8
		NCA1042-Q1DNR					Standby		✓	DFN-8
	NCA1051	NCA1051-DSPR	VIO: 3-5.5V VCC: 4.5-5.5V	5	5	110	Silent	-40-125		SOIC-8W
	NCA1051N	NCA1051N-DSPR	VCC: 4.5-5.5V	5	5	110	Silent	-40-125		SOIC-16W
	NCA1043-Q1	NCA1043-Q1SPKR	VBAT: 4.5-40V VIO: 2.8-5.5V VCC: 4.5-5.5V	8	5	110	Standby Sleep	-40-125	✓	SOP-14
		NCA1043-Q1DNKR							✓	DFN-14
	NCA1145-Q1	NCA1145-Q1SPKR	VBAT: 4.5-28V VIO: 2.8-5.5V VCC: 4.5-5.5V	8	5	110	Standby Sleep	-40-125	✓	SOP-14
		NCA1145-Q1DNKR							✓	DFN-14

# NCA1042: Fail-Safe CAN Transceiver Supporting CAN FD and BUS Wakeup

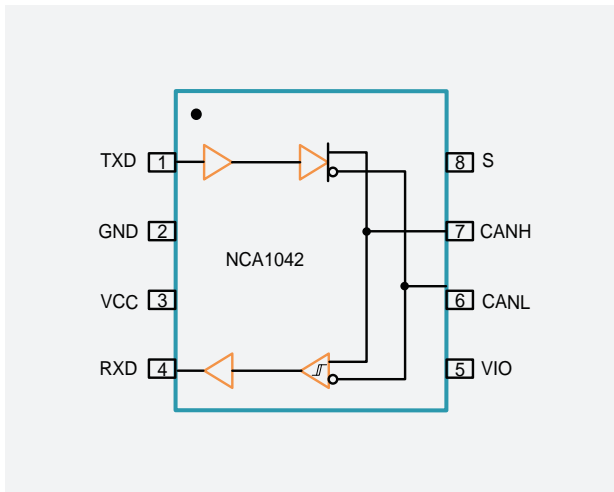
## ◆ Product introduction

NCA1042 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. NCA1042 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. NCA1042 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
  - VDD: 4.5V~5.5V
- -70V to +70V 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
- RoHS compliant package: SOP-8

## ◆ Pinout & Package



## ◆ 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, ARNIC825, ISO11783 and CANaerospace

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply	i2C Interface	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	Isolated ADC	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator

# NCA1042-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and BUS Wakeup

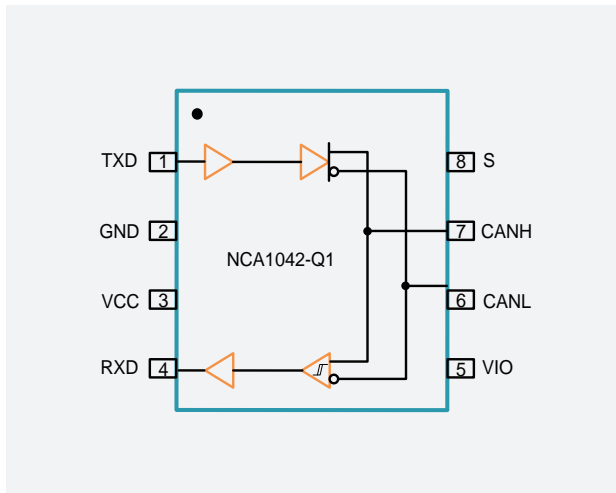
## ◆ Product introduction

NCA1042-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. NCA1042-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. NCA1042-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

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply	Isolated ADC	Isolated Current Amplifier	CAN Transceiver	Isolated Error Amplifier	Isolated Comparator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	iC Interface	RS-485 Transceiver	Isolated Voltage Amplifier	Isolated LIN Transceiver	Digital Isolator

# NCA1051/N: Fail-Safe CAN Transceiver Supporting CAN FD and BUS Wakeup

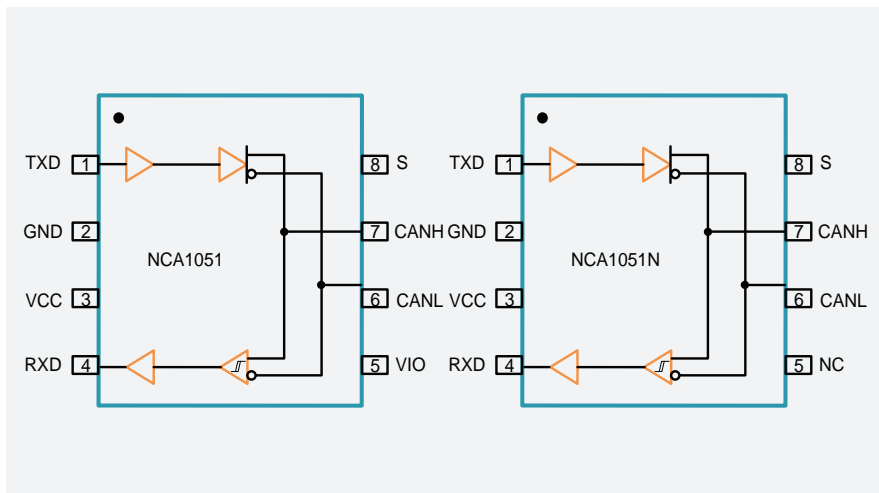
## ◆ Product introduction

NCA1051/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. NCA1051 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 NCA1051 provides thermal protection and transmit data dominant time out function. These features make the NCA1051 an excellent choice for all types of HS-CAN networks, in nodes that do not require a silent mode with wake-up capability via the BUS.

## ◆ 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 (NCA1051): 3V to 5.5V  
VCC: 4.5V to 5.5V
- -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, ARNIC825, ISO11783 and CANaerospace

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator



# NCA1043-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Battery Back-up

## ◆ Product introduction

NCA1043-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. NCA1043-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 NCA1043-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:

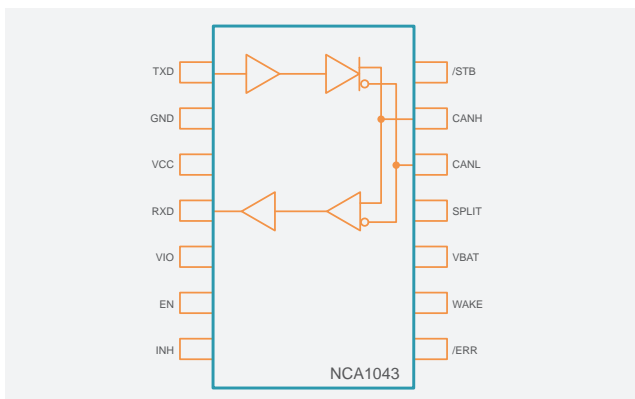
- Low-power management controls the power supply throughout the node while supporting local and remote wake-up with wake-up source recognition
- Various protection and diagnostic functions, including BUS short circuit detection and battery connection detection
- Supporting MCU of 3V to 5V

NCA1043-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 NCA1043-Q1 provides thermal protection and transmit data dominant time out function. These features make the NCA1043-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:  $\pm 30V$
- Low loop delay: <250ns
- BUS pins support 8kV HBM ESD, 4kV IEC
- Low power consumption standby mode: 10 $\mu$ A
- Undervoltage and overtemperature protection
- Operating temperature: -40°C to 125°C
- AEC-Q100 certified
- RoHS compliant package: SOP-14, DFN-14


## ◆ Pinout & Package





## ◆ Application


  
Applicable to 12V/24V system

  
Vehicle and transportation

  
Advanced driver assistance system(ADAS)

  
Infotainment system

  
Instrument cluster

  
Body Electronics and Lighting

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	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

# NCA1145-Q1: Automotive CAN BUS Transceiver Supporting CAN FD and Local Interconnect

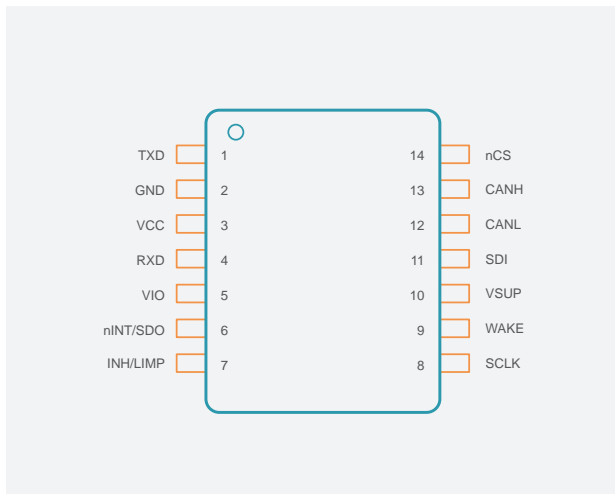
## ◆ Product introduction

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 support 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:  $\pm 30V$
- Low loop delay: <250ns
- BUS pins support 8kV HBM ESD, 4kV IEC
- Low power consumption standby mode: 10 $\mu$ A
- 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

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	iC 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

# LIN Transceiver

LIN transceiver										
	Part No.	Part No.	Power Supply Voltage	ESD(kV)	Max DataRate (kbps)	BUS Voltage Protection	Wake-up	Operating Temperature Range (°C)	AEC-Q100	Package Type
LIN	NCA1021-Q1	NCA1021-Q1SPR	VBAT: 5.5-27V	8	20	-40-+40	Local/Remote	-40-150	✓	SOP-8

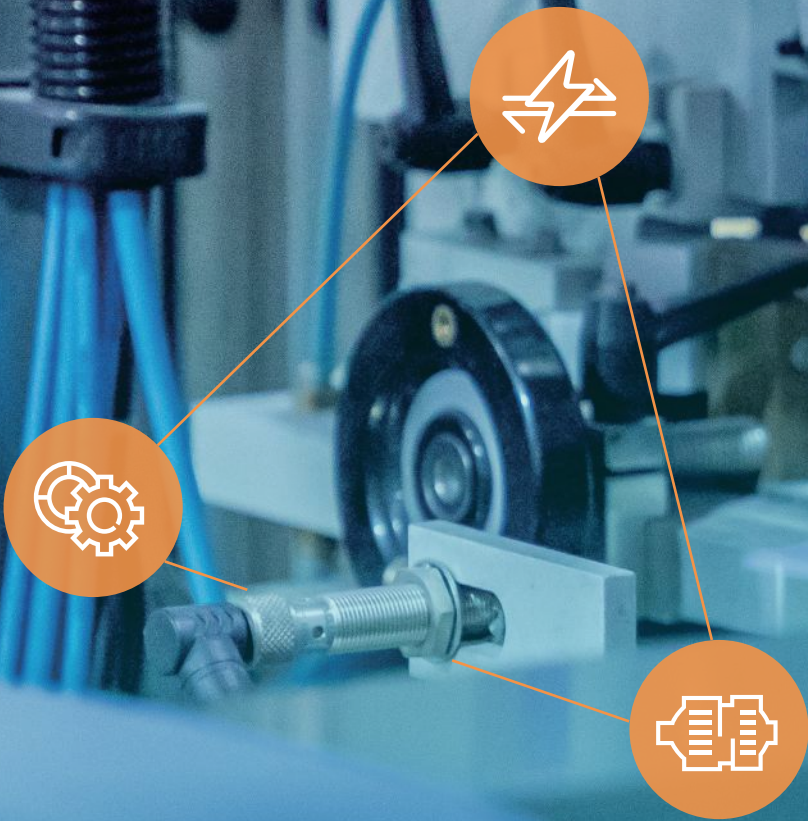
# LIN Transceiver







# Digital Isolator





# Digital Isolator

NSi82xx Series High Performance Multi-Channel Digital Isolator Chip										
Speed 150Mbps; Propagation delay 10ns; Output and input voltage range 2.5 to 5.5V; Operating temperature range -40 to 125 °C, and it has passed UL1577 certification										
	Part No.	Part No.	ISO Rating (kVrms)	Forward/Reverse Channels	Max DataRate (Mbps)	Default Output		AEC-Q100	Package Type	
						LOW	HIGH			
Single Channel	NSi8210	NSi8210Nx	3.75	1/0	150	✓	✓	✓	SOP-8	
		NSi8210Dx	2	1/0	150	✓	✓		DFN-8	
Dual Channel	NSi8220	NSi8220Nx	3.75	2/0	150	✓	✓	✓	SOP-8	
		NSi8220Wx	5	2/0	150	✓	✓	✓	SOP-8	
			5.7						SOW-16	
									SOWW-16	
	NSi8221	NSi8221Nx	3.75	2/1	150	✓	✓	✓	SOP-8	
		NSi8221Wx	5	2/1	150	✓	✓	✓	SOW-8	
			5.7						SOW-16	
									SOWW-16	
	NSi8222	NSi8222Nx	3.75	2/2	150	✓	✓	✓	SOP-8	
		NSi8222Wx	5	2/2	150	✓	✓	✓	SOW-8	
			5.7						SOW-16	
									SOWW-16	
Triple Channel	NSi8230	NSi8230Wx	5	3/0	150	✓	✓	✓	SOW-16	
			5.7						SOWW-16	
	NSi8231	NSi8240Wx	5	3/1	150	✓	✓	✓	SOW-16	
									5.7	SOWW-16
Quad Channel	NSi8240	NSi8240Wx	5	4/0	150	✓	✓	✓	SOW-16	
			5.7						SOWW-16	
			NSi8240Sx	3	4/0	150	✓	✓		SSOP-16
			NSi8240Nx	3.75	4/0	150	✓	✓	✓	SOP-16
	NSi8241	NSi8241Wx	5	4/1	150	✓	✓	✓	SOW-16	
			5.7						SOWW-16	
			NSi8241Sx	3	4/1	150	✓	✓	✓	SSOP-16
			NSi8241Nx	3.75	4/1	150	✓	✓	✓	SOP-16
	NSi8242	NSi8242Wx	5	4/2	150	✓	✓	✓	SOW-16	
			5.7						SOWW-16	
			NSi8242Sx	3	4/2	150	✓	✓	✓	SSOP-16
			NSi8242Nx	3.75	4/2	150	✓	✓	✓	SOP-16
Six Channel	NSi8260	NSi8260Wx	5	6/0	150	✓	✓	✓	SOW-16	
			NSi8260Sx	3	6/0	150	✓	✓	✓	SSOP-16
	NSi8261	NSi8261Wx	5	6/1	150	✓	✓	✓	SOW-16	
			NSi8261Sx	3	6/1	150	✓	✓	✓	SSOP-16
	NSi8262	NSi8262Wx	5	6/2	150	✓	✓	✓	SOW-16	
			NSi8262Sx	3	6/2	150	✓	✓	✓	SSOP-16
NSi8263	NSi8263Wx	5	6/3	150	✓	✓	✓	SOW-16		
								3	SSOP-16	
	NSi8266	NSi8266Wx	5	6/6	150	✓	✓	✓	SOW-16	
			NSi8266Sx	3	6/6	150	✓	✓	✓	SSOP-16

### NSi82xxC Series Cost-effective Multi-Channel Digital Isolator Chip

Speed 150Mbps; Propagation delay 10ns; Output and input voltage range 2.5 to 5.5V; Operating temperature range -40 to 125 °C, and it has passed UL1577 certification

	Part No.	Part No.	ISO Rating (kVrms)	Forward /Reverse Channels	Max DataRate (Mbps)	Default Output		Package Type
						LOW	HIGH	
Single Channel	NSi8210	NSi8210Cx-DSPR	3.75	1/0	100	✓	✓	SOP-8
		NSi8210Cx-DSWVR	5	1/0	100	✓	✓	SOW-8
Dual Channel	NSi8220	NSi8220Cx-DSPR	3.75	2/0	100	✓	✓	SOP-8
		NSi8220Cx-DSWVR	5	2/0	100	✓	✓	SOW-8
		NSi8220Cx-DSWR	5	2/0	100	✓	✓	SOW-16
	NSi8221	NSi8221Cx-DSPR	3.75	2/1	100	✓	✓	SOP-8
		NSi8221Cx-DSWVR	5	2/1	100	✓	✓	SOW-8
		NSi8221Cx-DSWR	5	2/1	100	✓	✓	SOW-16
	NSi8222	NSi8222Cx-DSPR	3.75	2/1	100	✓	✓	SOP-8
		NSi8222Cx-DSWVR	5	2/1	100	✓	✓	SOW-8
		NSi8222Cx-DSWR	5	2/1	100	✓	✓	SOW-16
Triple Channel	NSi8230	NSi8230Cx-DSWR	5	3/0	100	✓	✓	SOW-16
	NSi8231	NSi8231Cx-DSWR	5	3/1	100	✓	✓	SOW-16
Quad Channel	NSi8240	NSi8240Cx-DSPR	3.75	4/0	100	✓	✓	SOIC-16N
		NSi8240Cx-DSWR	5	4/0	100	✓	✓	SOW-16
	NSi8241	NSi8241Cx-DSWR	5	4/1	100	✓	✓	SOW-16
	NSi8242	NSi8242Cx-DSWR	5	4/1	100	✓	✓	SOW-16
Six Channel	NSi8260	NSi8260Cx-DSWR	5	6/0	100	✓	✓	SOW-16
	NSi8261	NSi8261Cx-DSWR	5	6/1	100	✓	✓	SOW-16
	NSi8262	NSi8262Cx-DSWR	5	6/2	100	✓	✓	SOW-16
	NSi8263	NSi8263Cx-DSWR	5	6/3	100	✓	✓	SOW-16
	NSi8266	NSi8266Cx-DSWR	5	6/0	100	✓	✓	SOW-16

### 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

	Part No.	ISO Rating (kVrms)	Forward/Reverse Channels	Max DataRate (Mbps)	CMTI(kV/us)	Default Output		Package Type
						LOW	HIGH	
Dual Channel	NIERS20N1-DSPR	3	2/0	1	100		✓	SOP-8
	NIERS21N1-DSPR	3	2/0	1	100		✓	SOP-8
	NIERS22N1-DSPR	3	2/1	1	100		✓	SOP-8
Triple Channel	NIERS31-DSSR	3	3/1	1	100		✓	SSOP-16

# NSi822X/ NSi823X/NSi824X/NSi826X: Enhanced Dual/Triple/Quad/Six-Channel Digital Isolators with High Reliability

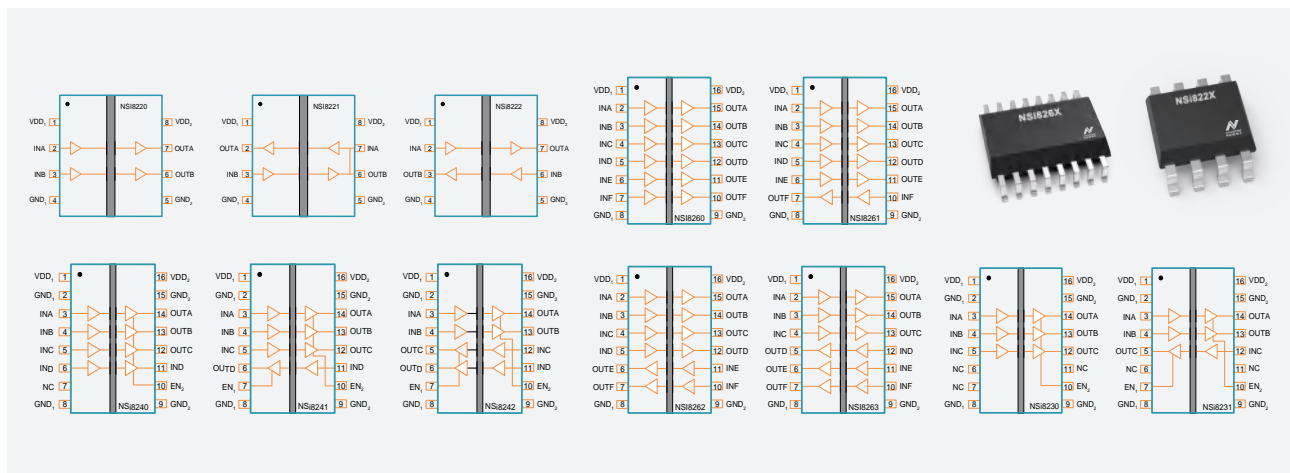
## ◆ Product introduction

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/us. 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
- Data rate: DC to 150Mbps
- High CMTI:  $\pm 200\text{kV}/\mu\text{s}$
- AEC Q100 (Grade 1) is applicable to all devices
- Chip-level ESD: HBM:  $\pm 8\text{kV}$
- 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, SOW-8, SOW-16, and SOWW-16

## ◆ Pinout & Package



## ◆ Application

Industrial automation system	Isolation interface, such as SPI, RS232, RS485	CAN multichannel isolation	Motor control	Power transmission	Communication

Isolated RS-485 Transceiver	Isolated 495 with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	iC Interface	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Digital Isolator
-----------------------------	--	--	--	--------------	--------------	----------------------------	----------------------------	--------------------------	------------------

# NSi822XC/ NSi823XC/NSi824XC/NSi826XC: Cost-effective Enhanced Dual/Triple/Quad/Six-Channel Digital Isolators with High Reliability

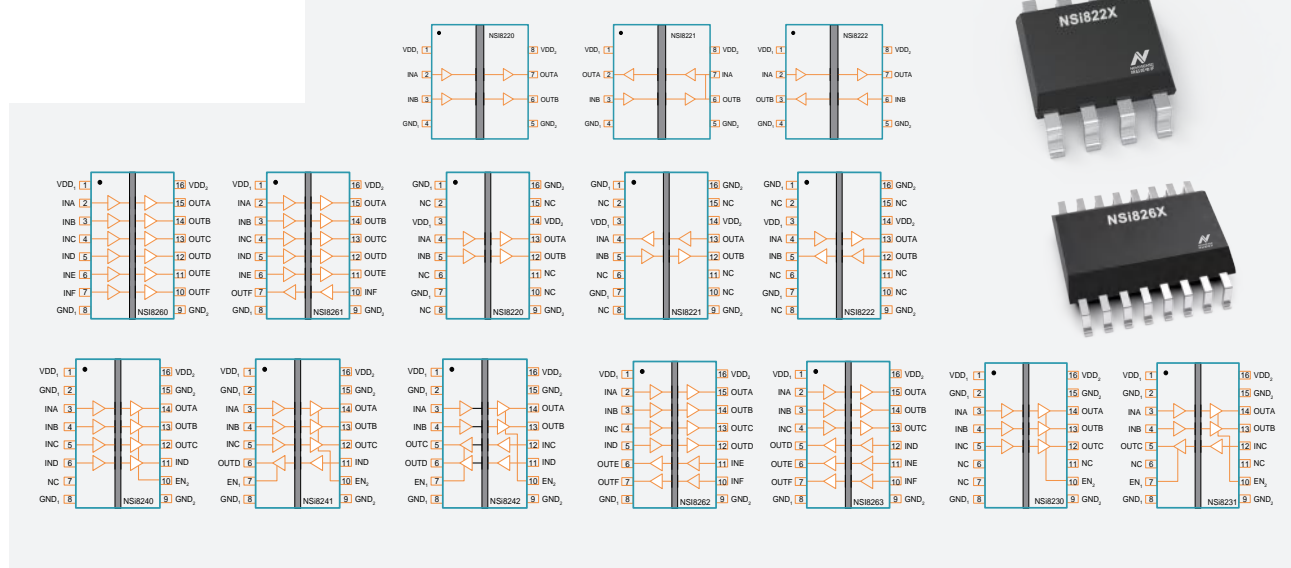
## ◆ Product introduction

NSi822XC/NSi823XC/NSi824XC/NSi826XC are cost-effective dual/triple/quad/six-channel digital isolators with high reliability. This series of products have passed UL1577 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/us. 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.

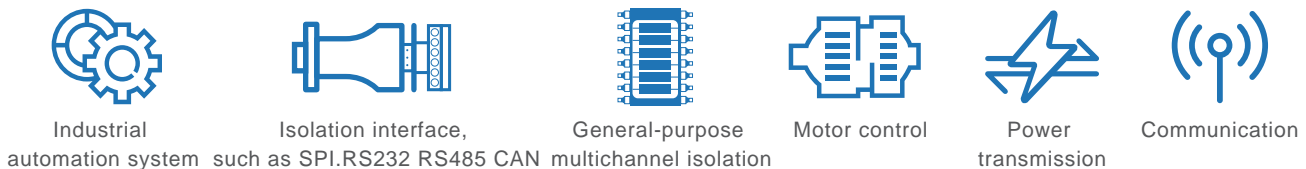
## ◆ Product feature

- Isolation withstand voltage 3750VRms, 5000VRms
- VDE Reinforced Isolation Certification
- Data 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 package: SOP-8, SOW-8, SOW-16

## ◆ Pinout & Package



## ◆ Application



Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
-----------------------------	--------------------------	---	---	--------------	----------------------------	----------------------------	--------------------------	---------------------

# NIRS2x: Cost-optimized Dual-channel Digital Isolator with High Reliability

## ◆ Product introduction

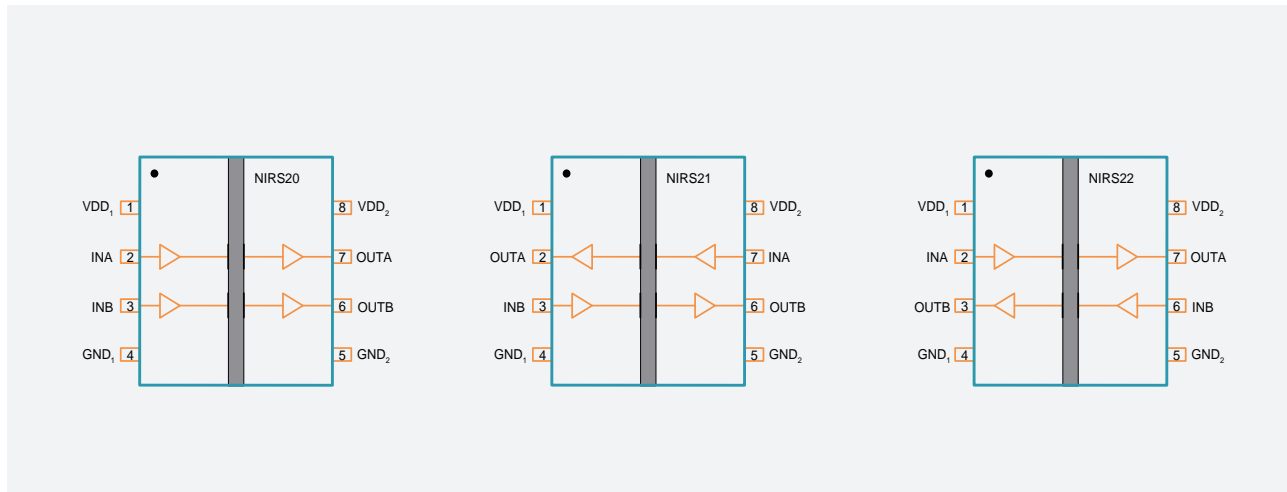
NIRS2x is a cost-optimized dual-channel digital isolator with high reliability. The NIRS2x device is safety certified by UL1577 support 3kVrms insulation withstand voltages, while providing high electromagnetic immunity and low emissions at low power consumption. The data rate of NIRS2x is up to 500kbps, and the common mode transient immunity (CMTI) is up to 100kV/us. 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: 2.5V to 5.5V
- High CMTI:  $\pm 100\text{kV}/\mu\text{s}$
- Chip-level EMC performance: HBM:  $\pm 6\text{kV}$
- High system level EMC performance: Enhanced system level ESD, EFT, and surge immunity
- Maximum Surge Isolation Voltage  $V_{IOSM}=6153\text{Vpk}$
- Low power consumption: 1mA/ch (500kbps)
- Low transmission delay:  $< 500\text{ns}$
- Lifetime of isolated gate:  $> 60$  years
- Operating temperature:  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- RoHS compliant package: SOP-8



## ◆ Pinout & Package



## ◆ Application



Industrial automation system



Communication via isolated SPI, RS-232, RS-485



General-purpose multichannel isolation



Motor control

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	iC Interface	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator



# NIRS31: Cost-optimized Triple-channel Digital Isolator with High Reliability

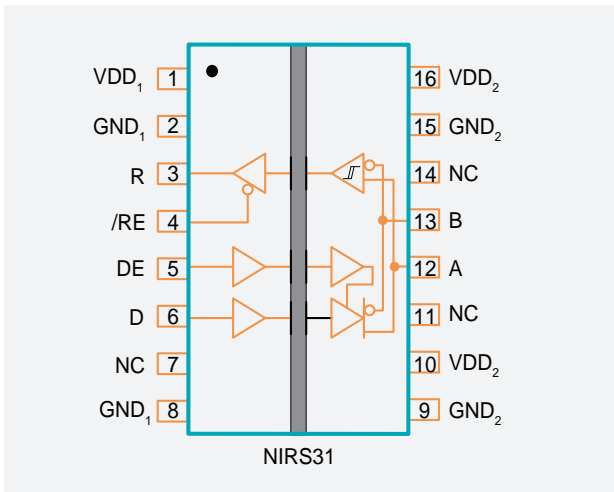
## ◆ Product introduction

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:  $\pm 100\text{kV}/\mu\text{s}$
- Chip-level ESD: HBM:  $\pm 6\text{kV}$
- Isolation surge withstand voltage:  $> 5\text{kV}$
- Low power consumption: 1.5mA/ch (1Mbps)
- Low transmission delay:  $< 500\text{ns}$
- Lifetime of isolated gate:  $> 60$  years
- Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$
- RoHS compliant package: SSOP-16

## ◆ Pinout & Package



## ◆ Application



Battery management system

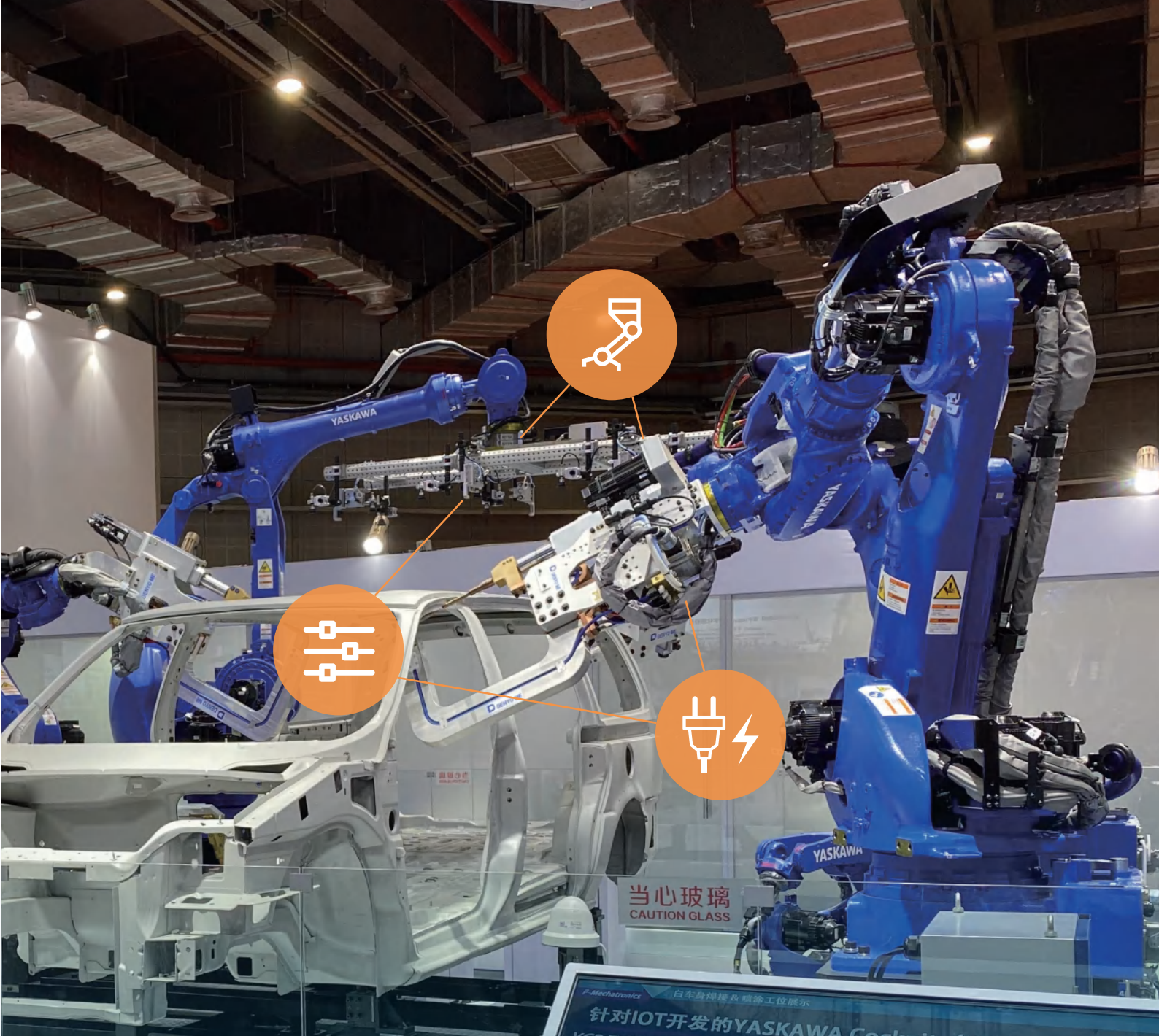


Isolated 485/232 communication system



Smart ammeters and water meters

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply	Isolated CAN with Integrated Isolated Power Supply	Isolated ADC	Isolated Current Amplifier	CAN Transceiver	Isolated Error Amplifier	Isolated Comparator
-----------------------------	--------------------------	--	--	--------------	----------------------------	-----------------	--------------------------	---------------------



# 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

Speed 150Mbps; Propagation delay 10ns; Output and input voltage range 3.3 to 5.5V; Operating temperature range -40 to 125°C, and it has passed UL1577 certification

	Part No.	Part No.	ISO Rating (kVrms)	Forward/Reverse Channels	Max DataRate (Mbps)	Default Output		CMTI (kV/us)	Features	Package
						LOW	HIGH			
Dual Channel	NSiP8820	NSiP8820Wx	4.5	2/0	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8821	NSiP8821Wx	4.5	2/1	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8822	NSiP8822Wx	4.5	2/2	150	✓	✓	150	Split Logic VDD	SOW-16
Quad Channel	NSiP8840	NSiP8840Wx	4.5	4/0	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8841	NSiP8841Wx	4.5	4/1	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8842	NSiP8842Wx	4.5	4/2	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8843	NSiP8843Wx	4.5	4/3	150	✓	✓	150	Split Logic VDD	SOW-16
	NSiP8844	NSiP8844Wx	4.5	4/4	150	✓	✓	150	Split Logic VDD	SOW-16
Dual Channel	NSiP8920	NSiP8920Wx	4.5	2/0	150	✓	✓	150	Power Disable	SOW-16
	NSiP8921	NSiP8921Wx	4.5	2/1	150	✓	✓	150	Power Disable	SOW-16
	NSiP8922	NSiP8922Wx	4.5	2/2	150	✓	✓	150	Power Disable	SOW-16
Quad Channel	NSiP8940	NSiP8940Wx	4.5	4/0	150	✓	✓	150	Power Disable	SOW-16
	NSiP8941	NSiP8941Wx	4.5	4/1	150	✓	✓	150	Power Disable	SOW-16
	NSiP8942	NSiP8942Wx	4.5	4/2	150	✓	✓	150	Power Disable	SOW-16
	NSiP8943	NSiP8943Wx	4.5	4/3	150	✓	✓	150	Power Disable	SOW-16
	NSiP8944	NSiP8944Wx	4.5	4/4	150	✓	✓	150	Power Disable	SOW-16

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

	Product	Part No.	Power Supply Voltage	Iso Rating (kVrms)	Forward/Reverse Channels	Max DataRate (Mbps)	CMTI(kV/us)	Default Output	Operating Temperature	Package Type
Isolated Power	NIRSP31	NIRSP31	4.5V to 5.5V	3	3/1	20	50	High	-40~125°C	LGA-18
		NIRSP31V	3.0V to 3.6V 4.5V to 5.5V	3	3/1	20	50	High	-40~125°C	LGA-18



# NSiP882x/NSiP892x/NSiP884x/NSiP894x: Dual/Quad-Channel Digital Isolator with Integrated Isolated DC-DC Power Supply

## ◆ Product introduction

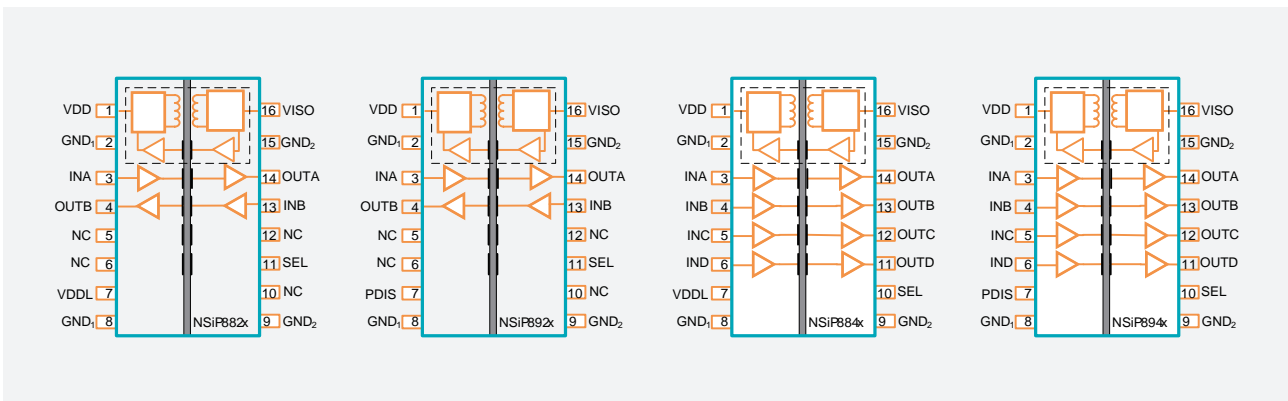
NSiP882x/NSiP892x/NSiP884x/NSiP894x is a dual/quad-channel digital isolator with integrated isolated DC-DC power supply. The isolation DC-DC power supply can provide up to 500mW of output power on the on-chip transformer. The feedback PWM signal is sent to the primary side by a digital isolator based 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 supported
- Overcurrent and thermal protection
- Data 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



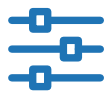
## ◆ Pinout & Package



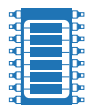
## ◆ Application



Industrial automation system



Isolated SPI, RS232, RS485



Universal Multi-Channel Isolator

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NIRSP31/V: Low Cost Triple-Channel Digital Isolator with Integrated Isolated DC-DC Power Supply

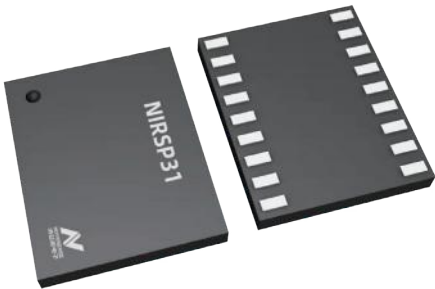
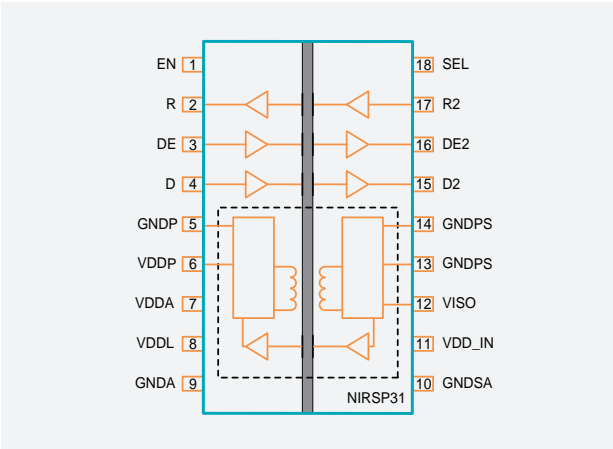
## ◆ Product introduction

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 device supports 3kVrms insulations 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/us. For NIRSP31 device, 5V to 5V/ 3.3V conversion modes are allowed, for NIRSP31V 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
- Supply voltage: 4.75V to 5.25V
- Support 80mA load current
- Overcurrent and thermal protection
- Data transmission rate: DC to 20Mbps
- High CMTI: 50kV/us
- Propagation delay: <75ns
- High system level EMC performance: Enhanced system level ESD, EFT, and surge immunity
- Operating temperature: -40°C to 125°C
- RoHS compliant package: LGA18


## ◆ Pinout & Package



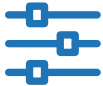
## ◆ Application



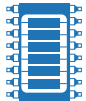
Industrial BMS System



Industrial automation system



Isolated SPI, RS232, RS485



General-purpose multichannel isolation



# Isolated 485 with Integrated Isolated Power Supply

NSiP83086: RS-485 Transceiver Chip with Integrated Isolated Power Supply									
	Part No.	Power Supply Voltage	ISO Rating (kVrms)	ESD(kV)	Max DataRate (Mbps)	CMTI (kV/us)	VISO Output(V)	Operating Temperature	Package Type
Isolated Power	NSiP83086	VDD: 4.5~5.5V VDDL: 1.8~5.5V	5	10	16	150	5	-40~105 C	SOW-16 SOW-20
	NSiP83086V	VDD: 3~5.5V VDDL: 1.8~5.5V	5	10	16	150	3.3	-40~105 C	SOW-20
	NSiP83086C	VDD: 3~5.5V VDDL: 1.8~5.5V	5	10	16	150	3.3 SEL=5V/Floating, VISO=5V SEL=GND2, VISO=3.3V	-40~105 C	SOW-20

# Isolated 485 with Integrated Isolated Power Supply



# NSiP83086/V/C: Isolated RS-485 Transceiver With Integrated Isolated DC-DC Power Supply

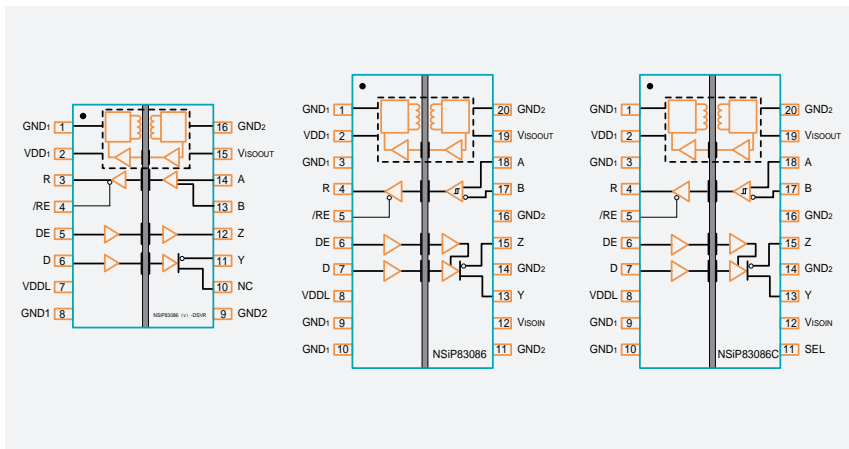
## ◆ Product introduction

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  $\pm 10\text{kV}$  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
- It is with integrated isolated DC-DC power supply
- 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 conforming to IEC61000-4-2 $\pm 10\text{kV}$  ESD
- Lifetime of isolated gate: > 60 years
- Operating temperature: -40°C to 105°C
- RoHS compliant package: SOW-16, SOW-20

## ◆ Pinout & Package



## ◆ Application



Industrial automation system



Isolated RS-485 communication system



Smart ammeters and water meters



Security and surveillance systems

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	i2C Interface	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator
Digital Isolator with Integrated Isolated Power Supply	Isolated 485 with Integrated Power Supply	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator



# Isolated CAN with Integrated Isolated Power Supply

NSiP1042: CAN Transceiver Chip with Integrated Isolated Power Supply									
	Part No.	Power Supply Voltage	ISO Rating (kVrms)	ESD(kV)	Max DataRate (Mbps)	CMTI (kV/us)	Logic Level Voltage	Operating Temperature	Package Type
Isolated Power	NSiP1042	4.5V to 5.5V	5	5	5	150	1.8V to 5.5V	-40~105°C	SOW-20



# Isolated CAN with Integrated Isolated Power Supply

# NSiP1042: Isolated CAN Transceiver With Integrated Isolated DC-DC Power Supply

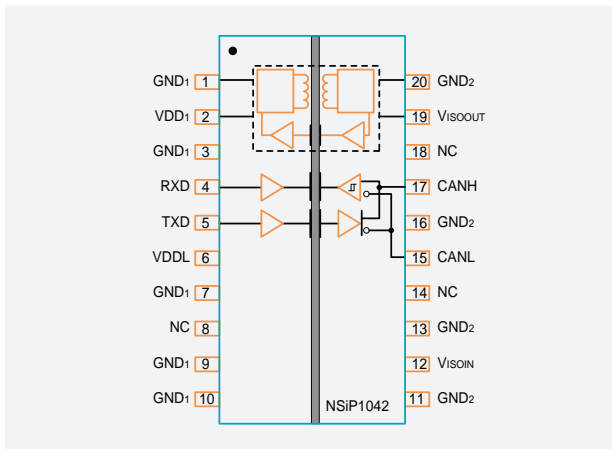
## ◆ Product introduction

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  $\pm 5\text{kV}$  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
- Isopower 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 $\pm 5\text{kV}$  ESD
- Lifetime of isolated gate: > 60 years
- Operating temperature: -40°C to 125°C
- RoHS compliant package: SOW20

## ◆ Pinout & Package

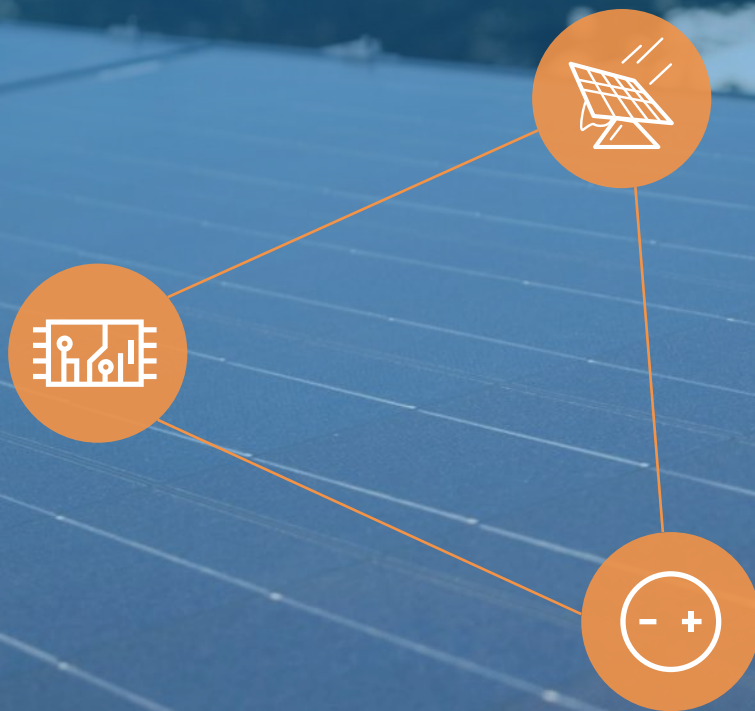


## ◆ Application

-  Industrial automation system
-  Smart ammeters and water meters
-  Security and surveillance systems

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated ADC	Isolated Current Amplifier	Isolated Voltage Amplifier	Isolated Error Amplifier	Isolated Comparator
Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	iC Interface	RS-485 Transceiver	CAN Transceiver	LIN Transceiver	Digital Isolator

# Isolated ADC





# Isolated ADC

NSi1305/6 Isolated ADC Series									
	Part No.	Part No.	ISO Rating (kVrms)	Linear Input Range(mV)	Input Type	Output Type	CMTI (kV/μs)	Operating Temperature Range (°C)	Package Type
Isolated Modulator	NSi1306	NSi1306M25	5	-250~250	Differential	Digital (clock rising edge effective)	150	-40~125	SOW-8
							SOW-16		
		NSi1306M05	5	-250~250	Differential	150	-40~125	SOW-8	
						SOW-16			
	NSi1305	NSi1305M25	5	-250~250	Differential	Digital (clock rising edge effective)	150	-40~125	SOW-8
									SOW-16

NSi1303x Isolated ADC Series										
	Product	Part No.	ISO Rating (kVrms)	Linear Input Range(mV)	Input Type	Output Type	CMTI (kV/μs)	Differential Input Resistance (kohm)	Operating Temperature Range (°C)	Package
Isolated Modulator	NSi1303	NSi1303E0x	5	-50~50	Differential	Manchester	150	4.9	-40~125	SOW-8
		NSi1303E2x	5	-250~250	Differential	Manchester	150	22	-40~125	
		NSi1303M0x	5	-50~50	Differential	Uncoded (clock rising edge effective)	150	4.9	-40~125	SOW-8 SOW-16
		NSi1303M2x	5	-250~250	Differential		150	22	-40~125	
		NSi1303D0x	5	-50~50	Differential	Uncoded (clock falling edge effective)	150	4.9	-40~125	
		NSi1303D2x	5	-250~250	Differential		150	22	-40~125	

# NSi1306: Isolated Current Sampling ADC with High Reliability

## ◆ Product introduction

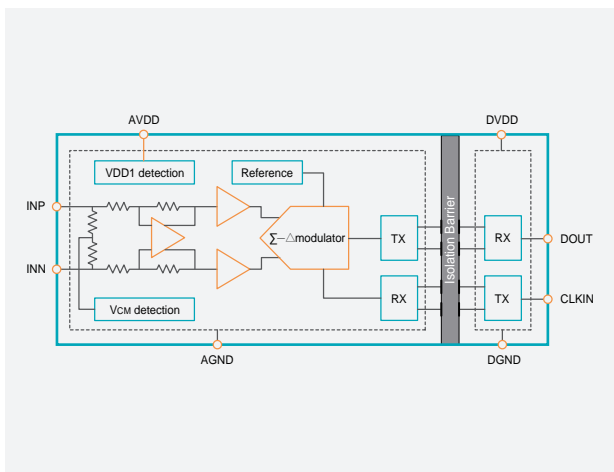
NSi1306 is a high-performance  $\Sigma$ - $\Delta$  modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is  $\pm 50\text{mV}$  (full scale  $\pm 64\text{mV}$ ) or  $\pm 250\text{mV}$  (full scale  $\pm 320\text{mV}$ ). 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  $\Sigma$ - $\Delta$  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 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  $\pm 50\text{mV}$  or  $\pm 250\text{mV}$
- Excellent DC performance:
  - Offset error:  $\pm 50\ \mu\text{V}$  or  $\pm 100\ \mu\text{V}$ (Max)
  - Offset drift:  $-0.5$  to  $1.5\ \mu\text{V}/^\circ\text{C}$ (Max)
  - Gain error: 0.2%(Max)
  - Gain drift:  $\pm 40\text{ppm}/^\circ\text{C}$ (Max)
- SNR: 82.5dB or 86dB(Typ)
- High CMTI: 150kV/us(Typ)
- System-level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
  - Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$

## ◆ Pinout & Package



## ◆ Application



Shunt current monitoring



AC motor control



Power and solar inverters



UPS



Onboard charger

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
	Digital Isolator

# NSI1305: Isolated Current Sampling ADC with High Reliability

## Product introduction

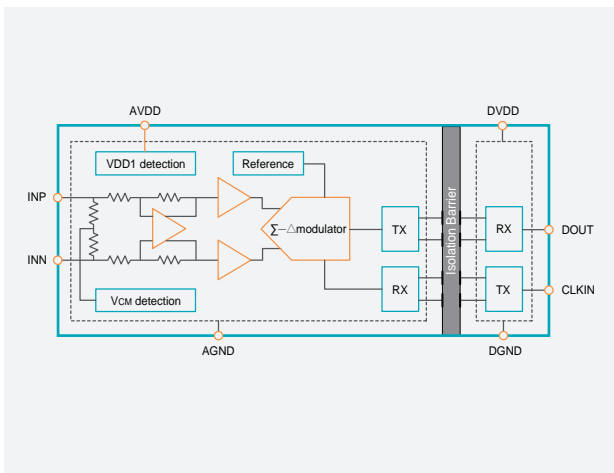
NSI1305 is a high-performance  $\Sigma$ - $\Delta$  modulator with output separated from input based on the NOVOSENSE capacitive isolation technology. The linear differential input signal range of the device is  $\pm 50\text{mV}$  (full scale  $\pm 64\text{mV}$ ) or  $\pm 250\text{mV}$  (full scale  $\pm 320\text{mV}$ ). 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  $\Sigma$ - $\Delta$  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  $\pm 50\text{mV}$  or  $\pm 250\text{mV}$
- Excellent DC performance:
  - Offset error:  $\pm 50\ \mu\text{V}$  or  $\pm 100\ \mu\text{V}$ (Max)
  - Offset drift:  $-0.5$  to  $1.5\ \mu\text{V}/^\circ\text{C}$ (Max)
  - Gain error: 0.2%(Max)
  - Gain drift:  $\pm 40\text{ppm}/^\circ\text{C}$ (Max)
- SNR: 82.5dB or 86dB(Typ)
- High CMTI: 150kV/us(Typ)
- System-level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
- Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$

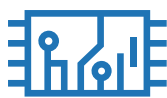
## Pinout & Package



## Application



Shunt current monitoring



AC motor control



Power and solar inverters



UPS



Onboard charger

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated +45 with Integrated Isolated Power Supply
Isolated I2C	Isolated CAN with Integrated Isolated Power Supply
I2C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NSi1303: Isolated ADC with Integrated Internal Clock with High Reliability

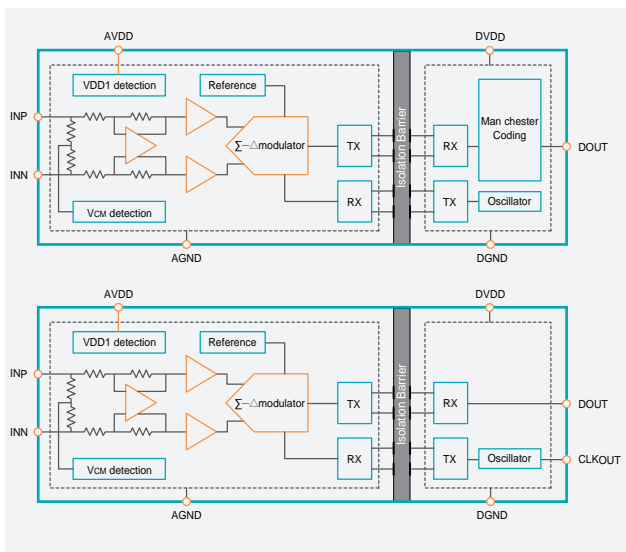
## ◆ Product introduction

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  $\pm 50\text{mV}$  (full scale  $\pm 64\text{mV}$ ) or  $\pm 250\text{mV}$  (full scale  $\pm 320\text{mV}$ ). 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  $\pm 50\text{mV}$  or  $\pm 250\text{mV}$
- Excellent DC performance:
  - Offset error and drift:  $\pm 50\mu\text{V}$  or  $\pm 100\mu\text{V}$  (Max) ,  $\pm 1\mu\text{V}/\text{C}$  (Max)
  - Gain error and drift:  $\pm 0.2\%$ (Max),  $\pm 40\text{ppm}/\text{C}$ (Max)
- High CMTI: 150kV/us(Typ)
- System-level diagnostic capabilities:
  - AVDD monitoring
  - Input common mode overvoltage detection
- Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$
- RoHS compliant package: SOW-8(300mil), SOW-16(300mil)

## ◆ Pinout & Package



## ◆ Application



Shunt current monitoring



AC motor control



UPS



Onboard charger

Isolated RS-485 Transceiver	Isolated CAN Transceiver	Isolated CAN with Integrated Power Supply	Isolated ADC	iC Interface	Isolated Current Amplifier	CAN Transceiver	Isolated Error Amplifier	LIN Transceiver	Isolated Comparator
Isolated RS-485 Transceiver with Integrated Power Supply	Isolated CAN Transceiver with Integrated Power Supply	Isolated CAN with Integrated Power Supply							

机器人输入

12针插座4

12针插座3

# Isolated Current Amplifier





# Isolated Current Amplifier

Isolated Current Amplifier Series											
	Product	Part No.	ISO Rating (kVrms)	Linear Input Range(mV)	Gain	Input Type	Output Type	CMTI (kV/μs)	AEC-Q100	Operating Temperature Range (°C)	Package
Isolated Current Amplifier	NSi1300	NSi1300D05	5	-50~50	8.2	Differential	Differential	150	✓	-40~125	SOW-8
		NSi1300D25		-250~250							
	NSi1200	NSi1200	5	-250~250	8	Differential	Differential	150	✓	-40~125	SOW-8 DUB-8
	NSi1400	NSi1400	5	-250~250	8.2	Differential	Differential/ Single-ended	150		-40~125	SOW-8
			3		8.2						SOP-8
		NSi1200C	5		8						DUB-8

# NSi1200/NSi1300: Isolated Current Sampling Amplifier with High Reliability

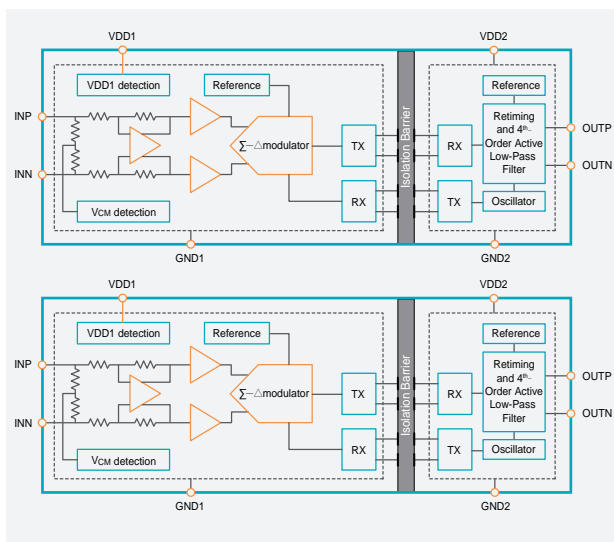
## ◆ Product introduction

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  $\pm 50\text{mV}$  (full scale  $\pm 64\text{mV}$ ) or  $\pm 250\text{mV}$  (full scale  $\pm 320\text{mV}$ ). 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  $\pm 50\text{mV}$  or  $\pm 250\text{mV}$
- Fixed gain: 8 for NSi1200, and 8.2 for NSi1300
- Ultralow offset error and drift:  $\pm 0.2\text{mV}(\text{Max})$ ,  $\pm 3\mu\text{V}/^\circ\text{C}(\text{Max})$
- Ultralow gain error and drift:  $\pm 0.3\%(\text{Max})$ ,  $\pm 50\text{ppm}/^\circ\text{C}(\text{Max})$
- SNR: 86dB(Typ)
- Wide bandwidth: 310kHz
- High CMTI: 150kV/us
- Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$
- Package compliant with RoHS: SOW-8(300mil), DUB8

## ◆ Functional Block Diagram



## ◆ Application



Shunt current monitoring



AC motor control



Power and solar inverters



UPS



Onboard charger

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# NSi1400/NSi1200C: Cost-effective Isolated Current Sampling Amplifier with High

## ◆ Product introduction

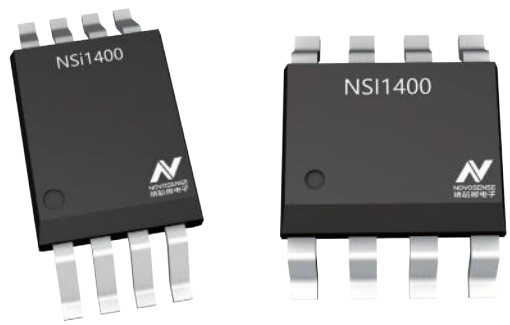
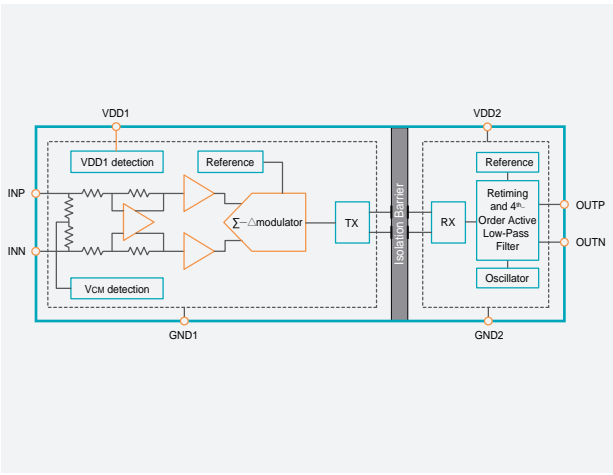
NSi1400/NSi1200C is an cost-effective isolated amplifier with output separated from input based on the NOVOSENSE capacitive isolation technology. This product is designed with linear differential input signal of  $\pm 250\text{mV}$  (full scale  $\pm 320\text{mV}$ ). Differential inputs are ideal for 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 NSi1200C 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  $\pm 250\text{mV}$
- Low offset error and drift:  $\pm 1\text{mV}(\text{Max})$ ,  $\pm 4\mu\text{V}/^\circ\text{C}(\text{Max})$   
Low gain error and drift:  $\pm 0.3\%(\text{Max})$ ,  $\pm 50\text{ppm}/^\circ\text{C}(\text{Max})$
- Low non-linearity and drift:  $\pm 0.03\%(\text{Max})$ ,  $\pm 1\text{ppm}/^\circ\text{C}(\text{Typ})$
- SNR: 70dB(Typ, BW=100kHz)
- Bandwidth: 220kHz(Typ)
- High CMTI: 150kV/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

## ◆ Functional block diagram



## ◆ Application

Shunt current monitoring

AC motor control

Power and solar inverters

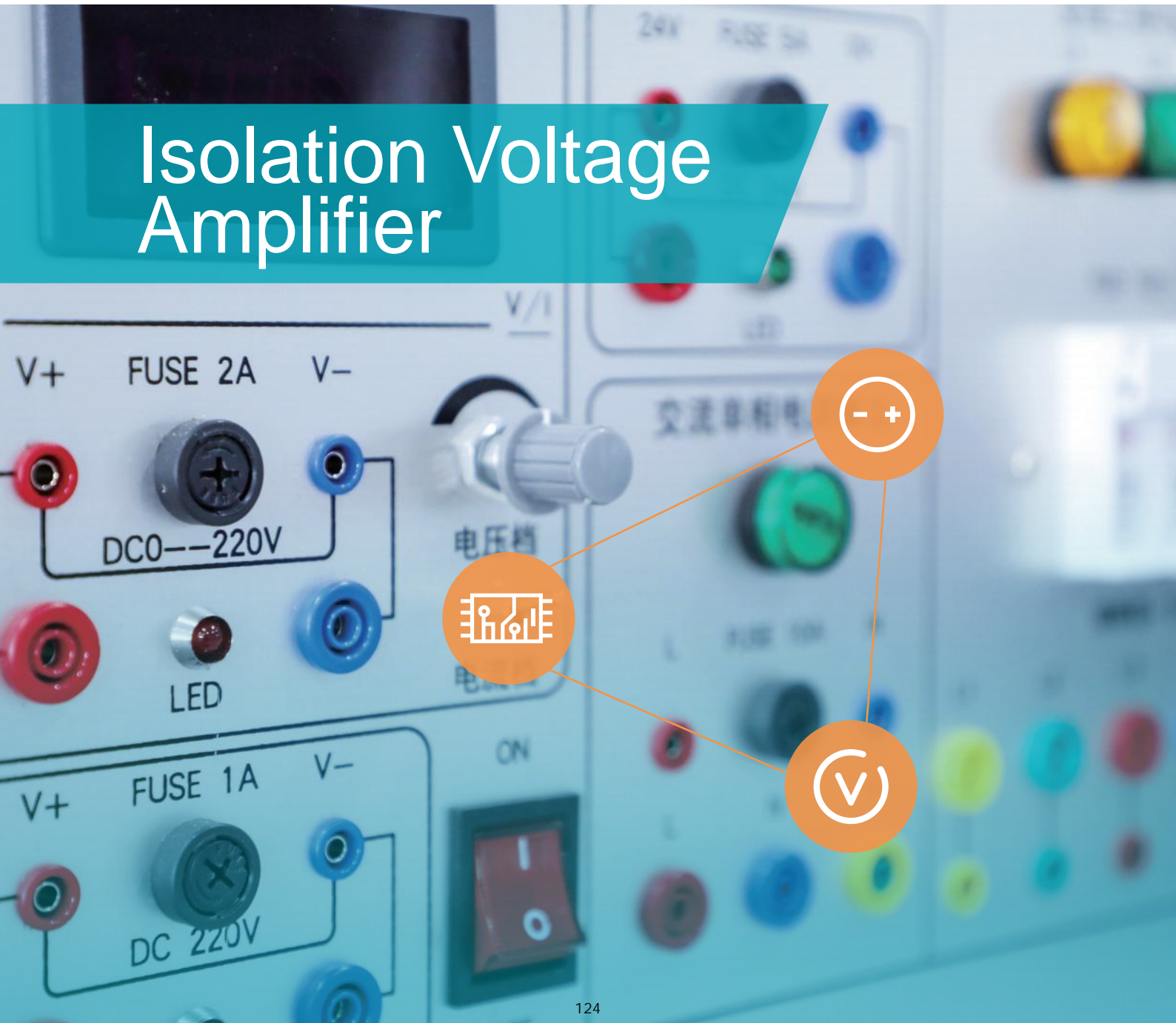
UPS

Onboard charger

# Isolation Voltage Amplifier

Isolation Voltage Amplifier Series											
	Part No.	Part No.	ISO Rating (kVrms)	Linear Input Range(mV)	Input Type	Output Type	CMTI (kV/μs)	AEC-Q100	Operating Temperature Range (°C)	Package Type	
Isolated Amplifier	NSi1311	NSi1311	5	100~2000	Single-ended	Differential	150	✓	-40~125	SOW-8	
	NSi1312	NSi1312D	5	-1200~1200	Single-ended	Differential	150		-40~125	SOW-8	
		NSi1312S		5	-1200~1200	Single-ended	Single-ended	150		-40~125	SOP-8
											-40~125

# Isolation Voltage Amplifier



# NSi1311: Isolated Voltage Sampling Amplifier with High Reliability

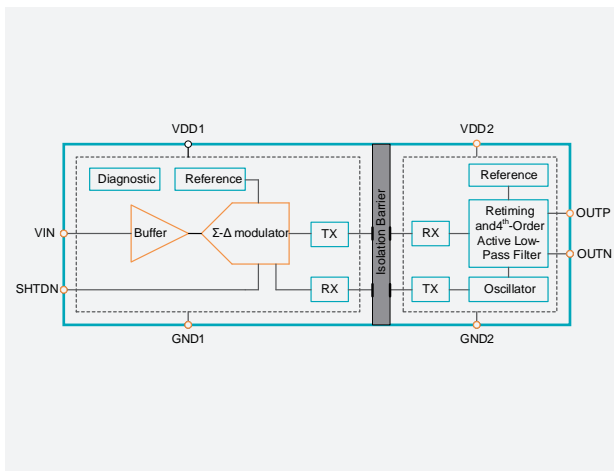
## ◆ Product introduction

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 0.1 to 2V
- Fixed gain: 1
- Ultralow offset error and drift:  $\pm 1.5\text{mV}(\text{Max})$ ,  $-5$  to  $30\mu\text{V}/^\circ\text{C}(\text{Max})$
- Ultralow gain error and drift:  $\pm 0.3\%(\text{Max})$ ,  $\pm 45\text{ppm}/^\circ\text{C}(\text{Max})$
- Ultralow non-linearity and drift:  $\pm 0.04\%(\text{Max})$ ,  $\pm 1\text{ppm}/^\circ\text{C}(\text{Max})$
- SNR: 82dB(Typ, BW=10kHz) or 70dB(Typ, BW=100kHz)
- Wide bandwidth: 400kHz(Typ)
- High CMTI: 150kV/us(Typ)
- System-level diagnostic capabilities: VDD1 monitoring
- Operating temperature:  $-40^\circ\text{C}$  to  $125^\circ\text{C}$
- RoHS compliant package: SOW-8(300mil)

## ◆ Functional block diagram



## ◆ Application



BUS voltage monitoring



AC motor control



Power and solar inverters



UPS



Onboard charger

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator



# NSi1312: Isolated Voltage Sampling Amplifier with High Reliability

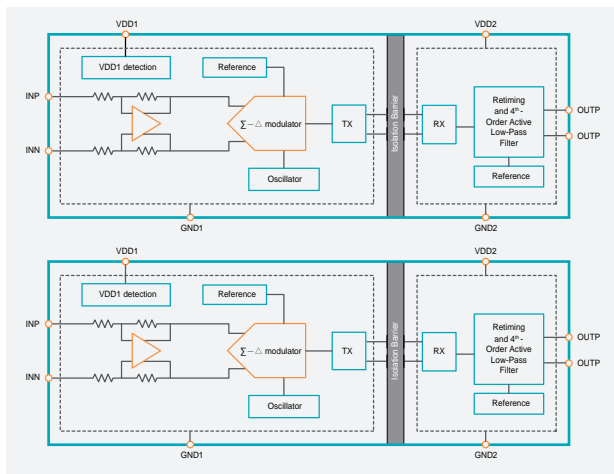
## ◆ Product introduction

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  $\pm 1.5V$ ). 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  $\pm 1.2V$
- Fixed gain: 1
- Excellent DC performance:
  - Offset error and drift:  $\pm 5mV(\text{Max})$ ,  $\pm 20\mu V/^\circ C(\text{Typ})$
  - Gain error and drift:  $\pm 1\%(\text{Max})$ ,  $\pm 30\text{ppm}/^\circ C(\text{Typ})$
  - Non-linearity and drift:  $\pm 0.3\%(\text{Max})$ ,  $\pm 10\text{ppm}/^\circ C(\text{Typ})$
- SNR: 72dB(Typ)
- High CMTI: 100kV/us(Typ)
- System-level diagnostic capabilities:
  - VDD1 monitoring
- Operating temperature:  $-40^\circ C$  to  $125^\circ C$
- 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 RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# Isolated Error Amplifier

NSi319x Isolated Error Amplifier								
	Part No.	ISO Rating (kVrms)	Bandwidth (kHz)	Initial Accuracy (%)	Reference Voltage (V)	CMTI (kV/ $\mu$ s)	Operating Temperature Range ( $^{\circ}$ C)	Package Type
Isolated Error Amplifier	NSi3190	3	400	0.5	1.225	150	-40-125	SSOP16

# Isolated Error Amplifier



# NSi3190: Isolated Error Amplifier with High Reliability

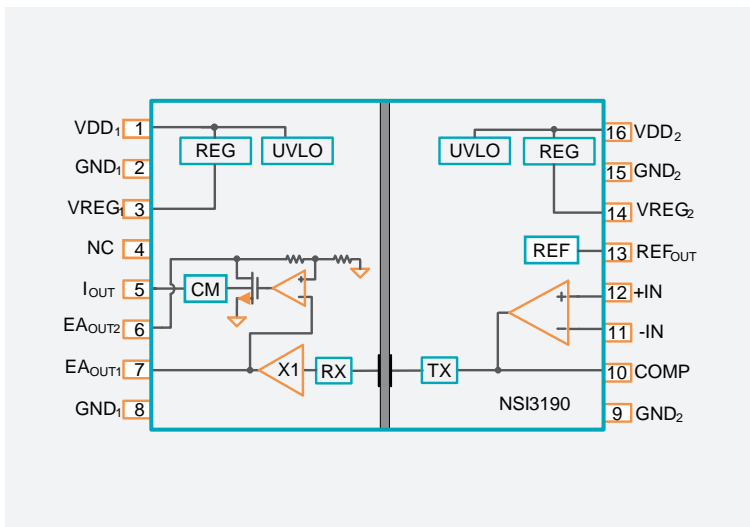
## ◆ Product introduction

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

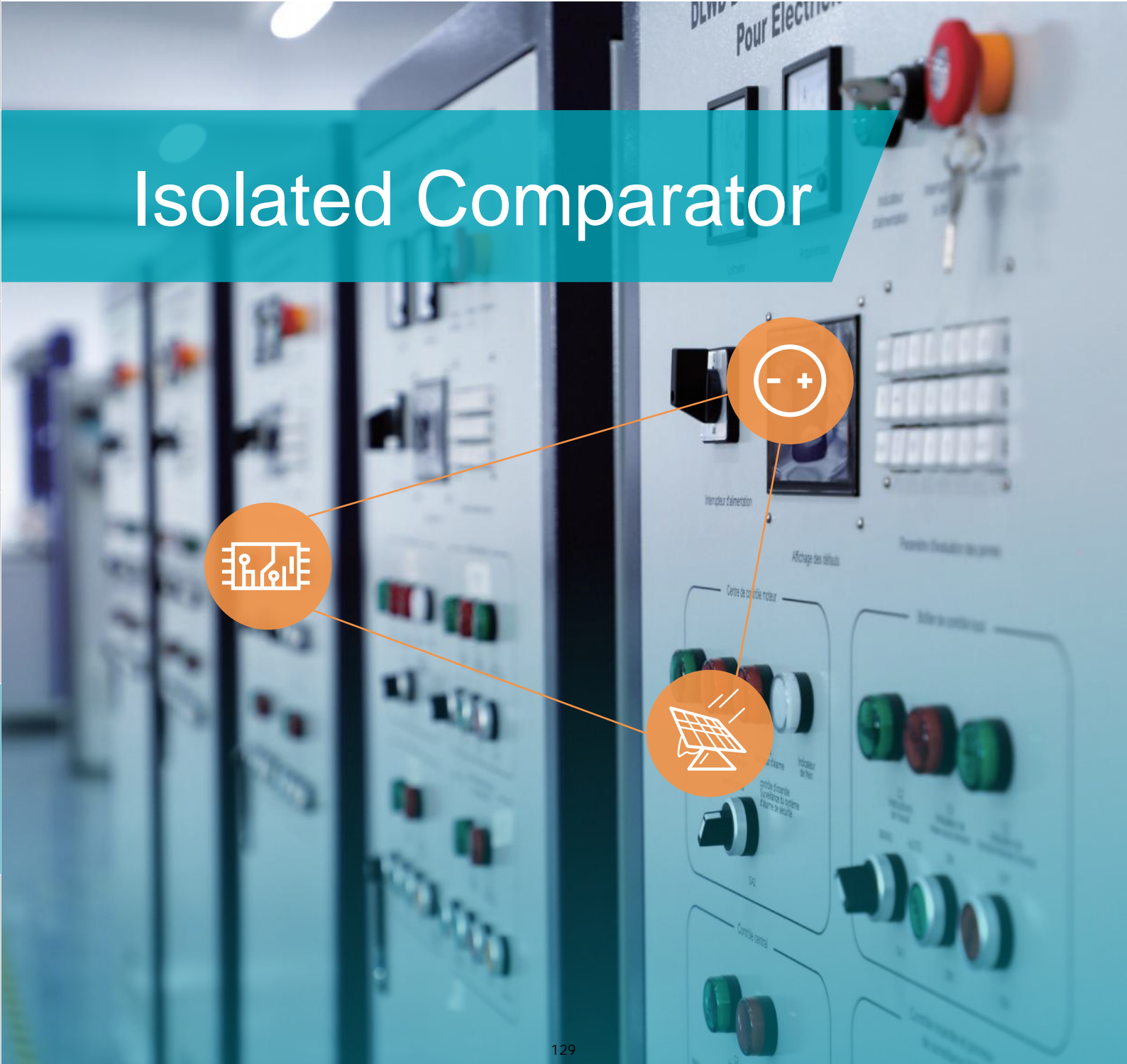


Power supply system

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated 485 with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator

# Isolated Comparator

NSi22C1x Isolated Comparator Series										
	Product	Part No.	ISO Rating (kVrms)	Input Power (V)	Reference Threshold (mV)	Output Type	CMTI (kV/μs)	Latching	Operating Temperature Range (°C)	Package
Isolated Comparator	NSi22C1x	NSi22C11	5	3-25	500-2000	Push-pull Open-drain	150		-40-125	SOW-8
										SOP-8
	NSi22C12		5	3-25	0-320	Open-drain	150	✓	-40-125	SOW-8
										SOP-8





# NSi22C1x: High-speed isolated comparators

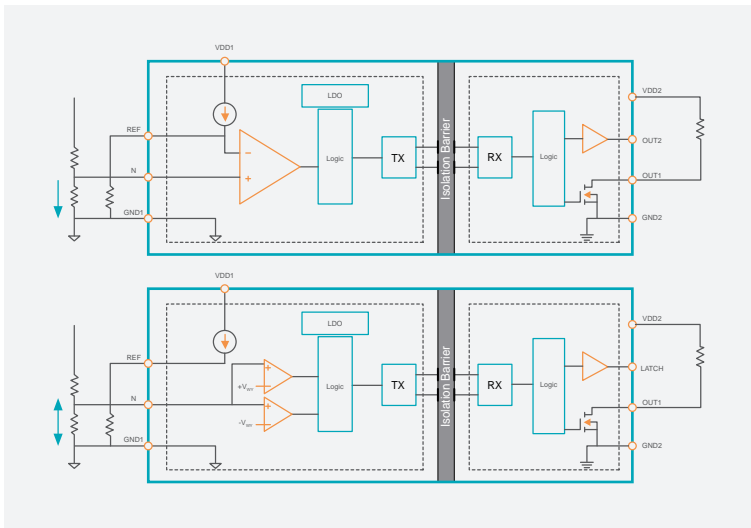
## ◆ Product introduction

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  $\pm 20\text{mV}$  to  $\pm 320\text{mV}$ . 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 voltage at input side: 3V ~ 27V
- Adjustable input reference range:  
NSi22C11:  $\pm 20\text{mV}$  to  $\pm 320\text{mV}$   
NSi22C12: 0.5V to 2V
- Internal reference current source:  $100\mu\text{A} \pm 1.5\%$  error (Max)
- Comparator threshold error:  
NSi22C11:  $\pm 0.25\%$  (Max)  
NSi22C12:  $\pm 1\%$  (Max)
- CMTI:  $\pm 150\text{kV}/\mu\text{s}$  (Typ)
- System-level diagnostic capabilities  
VDD1 monitoring
- Operating temperature:  $-40\sim 125^\circ\text{C}$
- RoHS compliant package: SOP-8(150mil), SOW-8(300mil)

## ◆ Functional block diagram



## ◆ Application



AC motor control



Power and solar inverters



UPS



Onboard charger

Isolated RS-485 Transceiver	Digital Isolator with Integrated Isolated Power Supply
Isolated CAN Transceiver	Isolated CAN with Integrated Isolated Power Supply
Isolated I <sup>2</sup> C	Isolated CAN with Integrated Isolated Power Supply
I <sup>2</sup> C Interface	Isolated ADC
RS-485 Transceiver	Isolated Current Amplifier
CAN Transceiver	Isolated Voltage Amplifier
LIN Transceiver	Isolated Error Amplifier
Digital Isolator	Isolated Comparator



# Isolated Half-bridge Driver





# Isolated Half-bridge Driver

Part Number	Peak output current (a)	VCC UVLO threshold (v)	Input side VCC voltage (Max)(V)	Output side VCC voltage (Max)(V)	CMTI (Min) (kV/us)	Feature	Isolation Withstand	Insulation grade	Operating temperature (°C)	Qualification	Package
NSi6602A-DLAR	4/-6	6	6	30	100	Disable, Programmable dead time	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6602B-DLAR	4/-6	8	6	30	100	Disable, Programmable dead time	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6602C-DLAR	4/-6	13	6	30	100	Disable, Programmable dead time	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6602A-DSPNR	4/-6	6	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSi6602B-DSPNR	4/-6	8	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSi6602C-DSPNR	4/-6	13	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSi6602A-DSWR	4/-6	6	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6602B-DSWR	4/-6	8	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6602C-DSWR	4/-6	13	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6602A-DSWKR	4/-6	6	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6602B-DSWKR	4/-6	8	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6602C-DSWKR	4/-6	13	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6602A-Q1SWR	4/-6	6	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6602B-Q1SWR	4/-6	8	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6602C-Q1SWR	4/-6	13	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6602A-Q1SWKR	4/-6	6	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6602B-Q1SWKR	4/-6	8	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6602C-Q1SWKR	4/-6	13	6	30	100	Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6602A-Q1SPNR	4/-6	6	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Automotive	SOP16
NSi6602B-Q1SPNR	4/-6	8	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Automotive	SOP16
NSi6602C-Q1SPNR	4/-6	13	6	30	100	Disable, Programmable dead time	3	Basic insulation	-40~125	Automotive	SOP16
NSi6622A-DLAR	4/-6	6	6	30	100	Disable	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6622B-DLAR	4/-6	8	6	30	100	Disable	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6622C-DLAR	4/-6	13	6	30	100	Disable	2.5	Basic insulation	-40~125	Industrial	LGA13
NSi6622A-DSPNR	4/-6	6	6	30	100	Disable	3	Basic insulation	-40~125	Industrial	SOP16
NSi6622B-DSPNR	4/-6	8	6	30	100	Disable	3	Basic insulation	-40~125	Industrial	SOP16
NSi6622C-DSPNR	4/-6	13	6	30	100	Disable	3	Basic insulation	-40~125	Industrial	SOP16
NSi6622A-DSWR	4/-6	6	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6622B-DSWR	4/-6	8	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6622C-DSWR	4/-6	13	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6622A-DSWKR	4/-6	6	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6622B-DSWKR	4/-6	8	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6622C-DSWKR	4/-6	13	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSi6622A-Q1SWR	4/-6	6	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6622B-Q1SWR	4/-6	8	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6622C-Q1SWR	4/-6	13	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6622A-Q1SWKR	4/-6	6	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6622B-Q1SWKR	4/-6	8	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6622C-Q1SWKR	4/-6	13	6	30	100	Disable	5.7	Reinforced insulation	-40~125	Automotive	SOW14
NSi6622A-Q1SPNR	4/-6	6	6	30	100	Disable	3	Basic insulation	-40~125	Automotive	SOP16
NSi6622B-Q1SPNR	4/-6	8	6	30	100	Disable	3	Basic insulation	-40~125	Automotive	SOP16
NSi6622C-Q1SPNR	4/-6	13	6	30	100	Disable	3	Basic insulation	-40~125	Automotive	SOP16

Part Number	Peak output current (a)	VCC UVLO threshold (v)	Input side VCC voltage (Max)(V)	Output side VCC voltage (Max)(V)	CMTI (Min) (kV/us)	Feature	Isolation Withstand	Insulation grade	Operating temperature (°C)	Qualification	Package
NSI6602MB-DSWTR	5/-5	9	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW18
NSI6602MC-DSWTR	5/-5	12	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW18
NSI6602MF-DSWTR	5/-5	15	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW18
NSI6602MB-Q1SWTR	5/-5	9	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW18
NSI6602MC-Q1SWTR	5/-5	12	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW18
NSI6602MF-Q1SWTR	5/-5	15	6	30	100	Miller clamp, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Automotive	SOW18
NSI6602VG-DLAR	6/-8	4	24	30	100	High performance, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	LGA13
NSI6602VA-DLAR	6/-8	6	24	30	100	High performance, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	LGA13
NSI6602VA-DLMAR	6/-8	6	24	30	100	High performance, 4mm* 4mm small package, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	LGA13
NSI6602VA-DSPNR	6/-8	6	24	30	100	High performance, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602VB-DSPNR	6/-8	8	24	30	100	High performance, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602VC-DSPNR	6/-8	13	24	30	100	High performance, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602VA-DSWR	6/-8	6	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602VB-DSWR	6/-8	8	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602VC-DSWR	6/-8	13	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602VA-DSWKR	6/-8	6	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6602VB-DSWKR	6/-8	8	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6602VC-DSWKR	6/-8	13	24	30	100	High performance, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6602NA-DLAR	6/-8	6	24	30	100	High performance, Enable, Programmable dead time	3	Basic insulation	-40~125	Industrial	LGA13
NSI6602NA-DSPNR	6/-8	6	24	30	100	High performance, Enable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602NA-DSPNR	6/-8	8	24	30	100	High performance, Enable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602NC-DSPNR	6/-8	13	24	30	100	High performance, Enable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6602NA-DSWR	6/-8	6	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602NB-DSWR	6/-8	8	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602NC-DSWR	6/-8	13	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6602NA-DSWKR	6/-8	6	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6602NB-DSWKR	6/-8	8	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6602NC-DSWKR	6/-8	13	24	30	100	High performance, Enable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6642A-DLAR	6/-8	6	24	30	100	PWM input, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	LGA13
NSI6642A-DSPNR	6/-8	6	24	30	100	PWM input, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6642A-DSPNR	6/-8	8	24	30	100	PWM input, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6642C-DSPNR	6/-8	13	24	30	100	PWM input, Disable, Programmable dead time	3	Basic insulation	-40~125	Industrial	SOP16
NSI6642A-DSWR	6/-8	6	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6642B-DSWR	6/-8	8	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6642C-DSWR	6/-8	13	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSI6642A-DSWKR	6/-8	6	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6642B-DSWKR	6/-8	8	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14
NSI6642C-DSWKR	6/-8	13	24	30	100	PWM input, Disable, Programmable dead time	5.7	Reinforced insulation	-40~125	Industrial	SOW14

# NSi66x2: Dual-channel Isolated Gate Driver

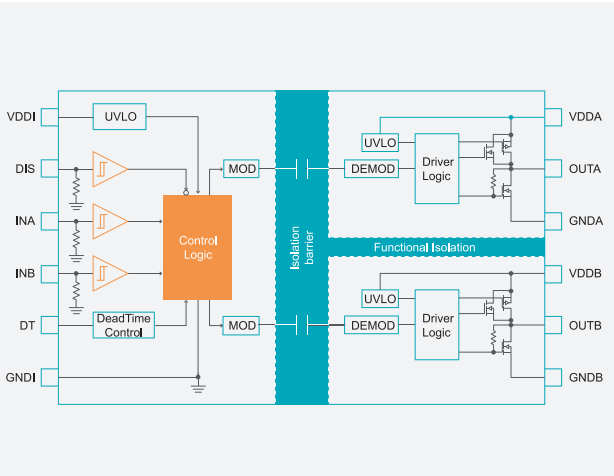
## ◆ Product introduction

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 100kV/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

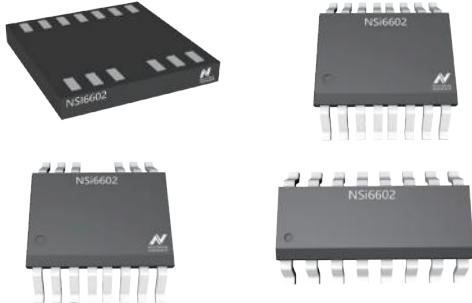
- Isolated dual channel driver
- Input side power supply voltage: 3V~5.5V
- Driver side power supply voltage: With UVLO, up to 30V
- Peak source and sink current 4A/6A
- High CMTI: 150kV/us
- Typical propagation delay: 25ns
- Maximum delay matching: 5ns
- Maximum pulse width distortion: 6ns
- Programmable 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(300mil), SOIC16(150mil)
- AEC-Q100 qualified

## ◆ Functional block diagram







## ◆ 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



## ◆ 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
--	---	--	--

# NSi6602V/NSi6602N: Second - generation High-performance Isolated Dual-channel Gate Driver

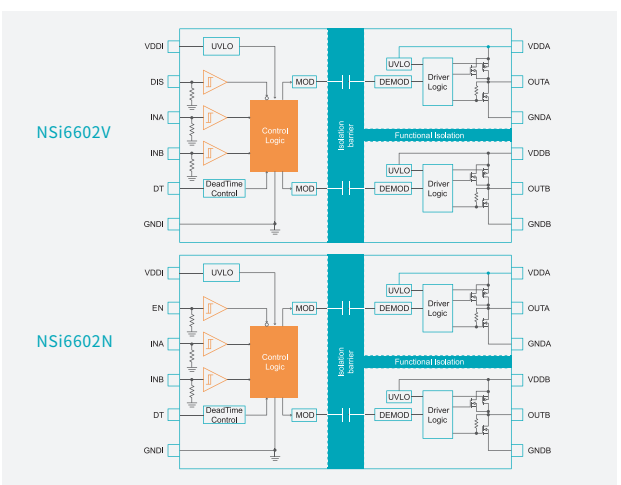
## ◆ Product introduction

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 100kV/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, 3000Vrms isolation with the SOIC16 (150mil) narrow-body package, 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

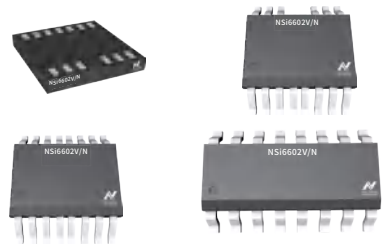
- Isolated dual-channel driver
- Input side supply voltage: 3V-18V
- Driver side supply voltage: With UVLO function, voltage of up to 30V
- Peak 6A/8A source/sink current capacity
- High CMTI: 150kV/us
- 25ns typical propagation delay
- 5ns maximum delay matching
- 6ns maximum pulse width distortion
- Programmable dead time
- Enabling pins: NSi6602N Disable (high level off), NSi6602N Enable (high level on)
- Acceptable minimum input pulse width 15ns
- Working temperature: -40°C~125°C
- Package form: LGA13 (4\*4mm), LGA13 (5\*5mm), SOIC14 (300mil), SOIC16(300mil), SOIC16 (150mil)
- AEC-Q100 qualified

## ◆ Functional block diagram







## ◆ Safety certification

- UL1577 certification:
  - LGA13: 2.5kVrms for 1 minute
  - SOIC14(300mil): 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



## ◆ 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
--	---	--	--



# NSi6602M: Isolated Dual-channel Gate driver with Integrated Miller Clamp

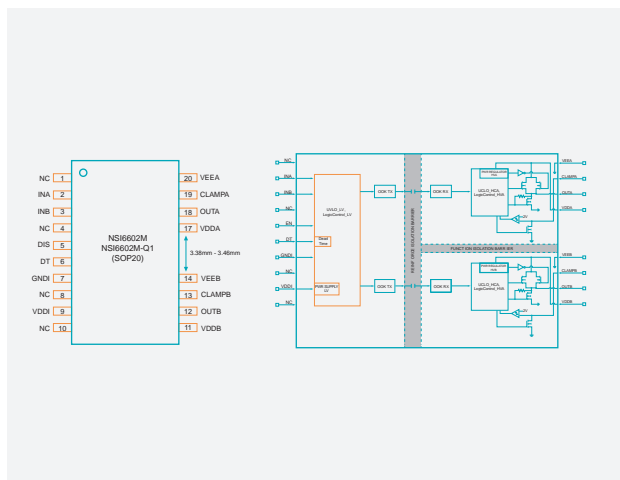
## ◆ Product introduction

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 /  $\mu$ s 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: With UVLO function, voltage of up to 32V
- Peak 5A/5A source/sink current capacity
- Support Miller Clamp, with current of up to 5A
- High CMTI: 150kV/ $\mu$ s
- 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

## ◆ Functional block diagram



## ◆ 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



## ◆ 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 Driver



# Isolated Single Driver

Part Number	Peak drive current (A)	VCC UVLO threshold (V)	Input side VCC voltage (Max)(V)	Output side VCC voltage (Max)(V)	CMTI (Min) (kV/us)	Feature	Isolation Withstand Voltage (kVrms)	Insulation grade	Operating temperature (°C)	Qualification	Package
NSi6801B-DSPR	5/-5	9	N/A	35	150	Opto-compatible input	3	Basic insulation	-40~125	Industrial	SOP8
NSi6801C-DSPR	5/-5	13	N/A	35	150	Opto-compatible input	3	Basic insulation	-40~125	Industrial	SOP8
NSi6801B-DSWFR	5/-5	9	N/A	35	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Industrial	SOW6
NSi6801C-DSWFR	5/-5	13	N/A	35	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Industrial	SOW6
NSi6801TB-DDBR	5/-5	9	N/A	35	150	Opto-compatible input	5	Basic insulation	-40~125	Industrial	DUB8
NSi6801TC-DDBR	5/-5	13	N/A	35	150	Opto-compatible input	5	Basic insulation	-40~125	Industrial	DUB8
NSi6801LC-DDBR	5/-5	13	N/A	35	150	Opto-compatible input	5	Basic insulation	-40~125	Industrial	DUB8
NSi68010B-DSWAR	0.7/-0.8	9	N/A	32	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Industrial	SOW6
NSi68011C-DSWAR	1.5/-2	13	N/A	32	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Industrial	SOW6
NSi6601B-DSPR	5/-5	9	17	35	150	Split output	3	Basic insulation	-40~125	Industrial	SOP8
NSi6601C-DSPR	5/-5	13	17	35	150	Split output	3	Basic insulation	-40~125	Industrial	SOP8
NSi6601B-DSWVR	5/-5	9	17	35	150	Split output	5.7	Reinforced insulation	-40~125	Industrial	SOW8
NSi6601C-DSWVR	5/-5	13	17	35	150	Split output	5.7	Reinforced insulation	-40~125	Industrial	SOW8
NSi6601MB-DSPR	5/-5	9	17	35	150	Miller clamp	3	Basic insulation	-40~125	Industrial	SOP8
NSi6601MC-DSPR	5/-5	13	17	35	150	Miller clamp	3	Basic insulation	-40~125	Industrial	SOP8
NSi6601MB-DSWVR	5/-5	9	17	35	150	Miller clamp	5.7	Reinforced insulation	-40~125	Industrial	SOW8
NSi6601MC-DSWVR	5/-5	13	17	35	150	Miller clamp	5.7	Reinforced insulation	-40~125	Industrial	SOW8
NSi6601WC-DSWVR	5/-5	13	17	35	150	Miller clamp	5.7	Reinforced insulation	-40~125	Industrial	SOW8
NSi6601MC-Q1SPR	5/-5	13	17	35	150	Miller clamp	3	Basic insulation	-40~125	Automotive	SOP8
NSi6601MC-Q1SWVR	5/-5	13	17	35	150	Miller clamp	5.7	Reinforced insulation	-40~125	Automotive	SOW8
NSi68010B-Q1SWAR	0.7/-0.8	9	N/A	35	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Automotive	SOW8
NSi68011C-Q1SWAR	1.5/-2	13	N/A	35	150	Opto-compatible input	5.7	Reinforced insulation	-40~125	Automotive	SOW8
NSi6801MB-DSWVR	5/-5	9	N/A	35	150	Opto-compatible input, Miller clamp	5.7	Reinforced insulation	-40~125	Industrial	SOP8
NSi6801MC-DSWVR	5/-5	13	N/A	35	150	Opto-compatible input, Miller clamp	5.7	Reinforced insulation	-40~125	Industrial	SOW8

# NSi6801: Optocoupler Compatible Single-Channel Isolated Gate Driver

## ◆ 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.

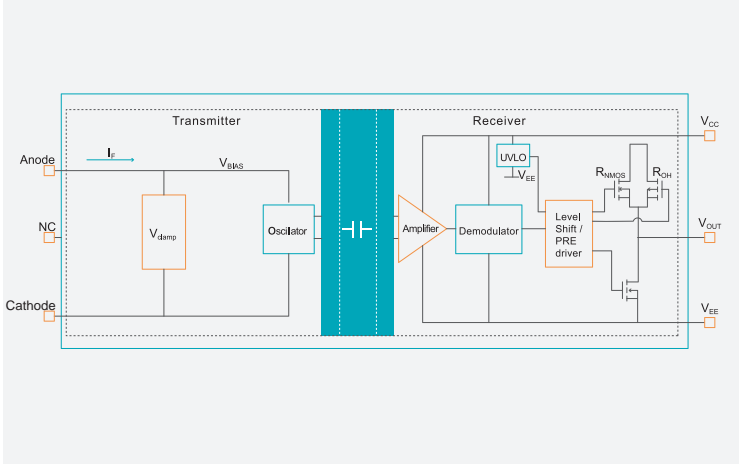
## ◆ Product feature

- P2P compatible with optocoupler drivers, but upgraded performance
- Driver side power supply voltage: up to 35V, UVLO is available
- Peak source/sink current of 5A/5A
- High CMTI: 150kV / μs
- Typical propagation delay: 75ns
- Maximum pulse width distortion: 30ns
- Operation ambient temperature: -40°C~125°C

## ◆ Safety certification

- 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
- CQC certification: GB4943.1-2011

## ◆ Functional block diagram



## ◆ Package

- SOIC-6 wide body (SOW6)
- DUB-8



## ◆ Application

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

# NSi6801x: Cost-effective Optocoupler Compatible Single-Channel Isolated Gate Driver

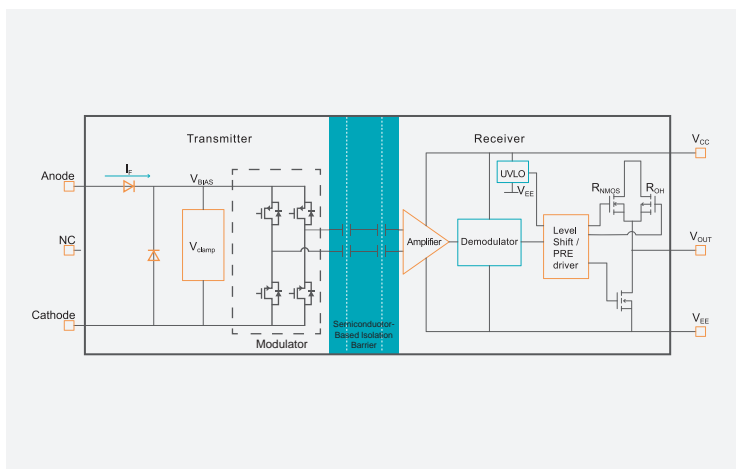
## ◆ Product introduction

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: up to 35V, UVLO is available
- 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 ~125 C
- AEC-Q100 qualified

## ◆ Functional block diagram



## ◆ 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)



## ◆ Application



Photovoltaic inverter



Motor driver



UPS power supply and battery charger



Isolation DC/DC and AC/DC power supplies



# NSi6601/NSi6601M: Single-Channel Isolated Gate Driver

## ◆ Product introduction

NSi6601/6601M 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 /  $\mu$ s 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.

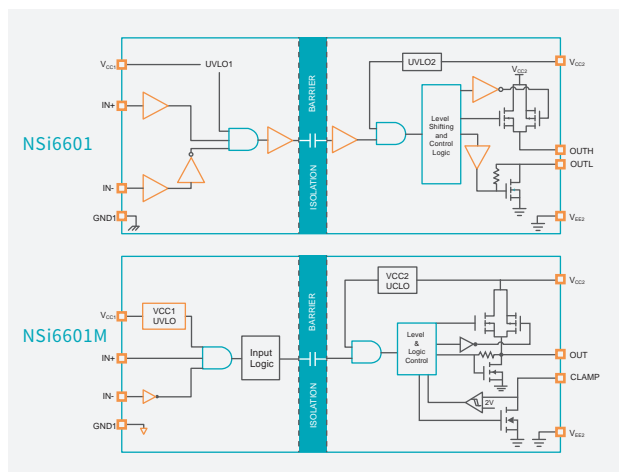
## ◆ Product feature

- Single-channel isolated driver
- Input side supply voltage: 3.1V to 17V
- Driver side supply voltage: UVLO options up to 32V, 9V and 13
- Version M supports Miller Clamp function (NSi6601M) with current up to 5A
- Peak source/sink current of 5A/5A
- High CMTI: 150kV /  $\mu$ s
- Typical propagation delay: 78ns
- Operation ambient temperature: -40°C to 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: CSA components has passed 5A approval
- CQC certification: GB4943.1-2011

## ◆ Functional block diagram



## ◆ Package

- SOP8
- SOIC-8 wide body (SOW8)



## ◆ Application



Photovoltaic inverter



Motor driver



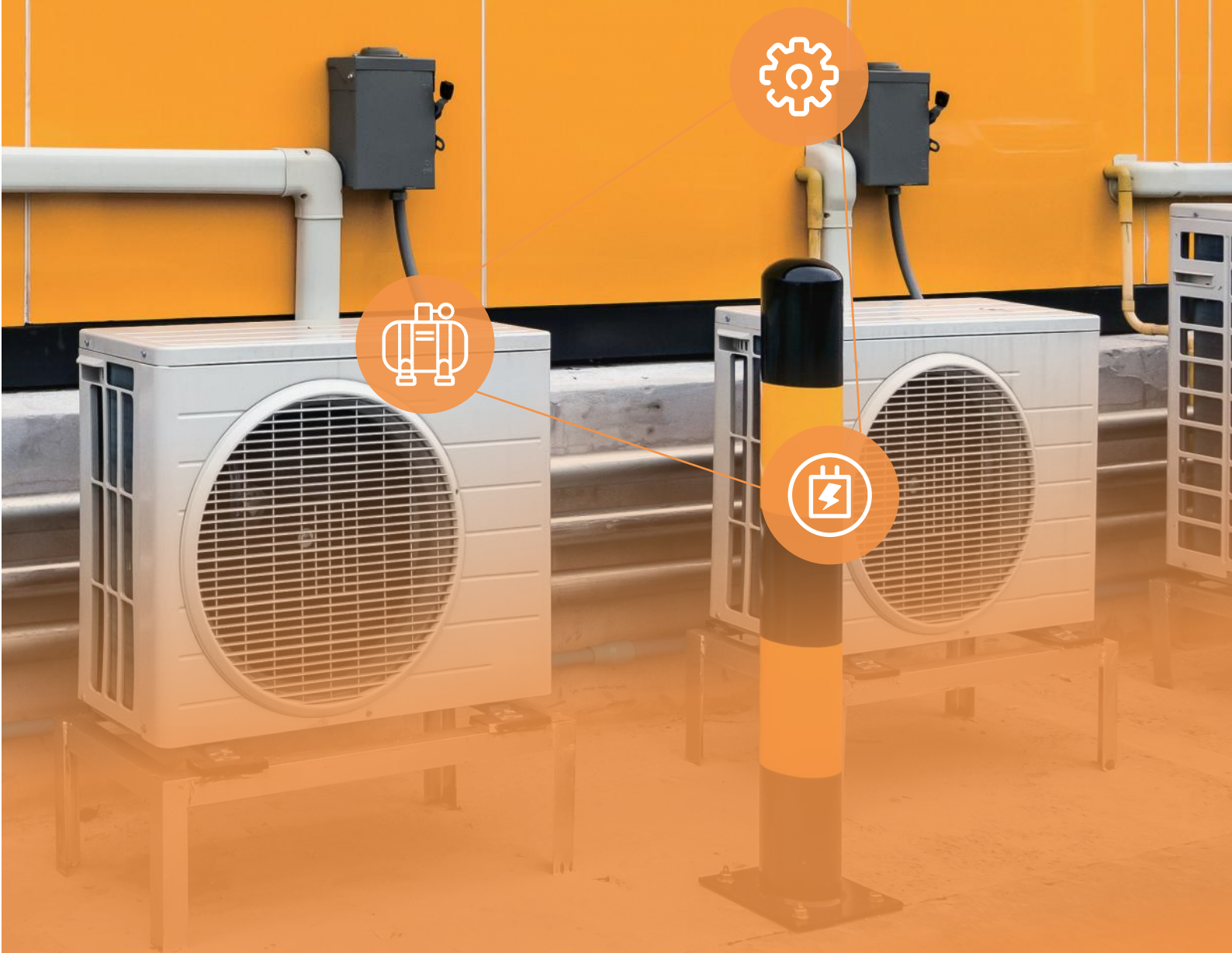
UPS power supply and battery charger



Isolation DC/DC and AC/DC power supplies



# Smart Isolated Driver



# Smart Isolated Driver

Part Number	Peak drive current (A)	VCC UVLO threshold (V)	Input side VCC voltage (Max)(V)	Output side VCC voltage (Max)(V)	CMTI(Min) (kV/us)	Feature	Isolation Withstand Voltage (kVrms)	Insulation grade	Operating temperature (°C)	Qualification	Package
NSi6611ASC-DSWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6651ASC-DSWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, Split output, and Fault alarm	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6651ALC-DSWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6631ASC-DSWR	10/-10	13	6	35	150	OCP short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi6611ASC-Q1SWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, ASC function, separate output, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6651ASC-Q1SWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, Split output, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6651ALC-Q1SWR	10/-10	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi6631ASC-Q1SWR	10/-10	13	6	35	150	OCP short circuit protection, soft shutdown, Miller clamp, ASC function, Split output, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi68515LC-DSWR	5/-5	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm	5.7	Reinforced insulation	-40~125	Industrial	SOW16
NSi68515UC-DSWR	5/-5	13	6	35	150	DESAT short circuit protection, soft shutdown, Miller clamp, and Fault alarm, UVLO alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi68515AC-DSWR	5/-5	13	6	35	150	DESAT short circuit protection, Auto Reset, soft shutdown, Miller clamp, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16
NSi68515RC-DSWR	5/-5	13	6	35	150	Non-Rail-to-Rail output, DESAT short circuit protection, Auto Reset, soft shutdown, Miller clamp, and Fault alarm	5.7	Reinforced insulation	-40~125	Automotive	SOW16

# NSi6611/NSi6651: Smart Isolated Gate Driver

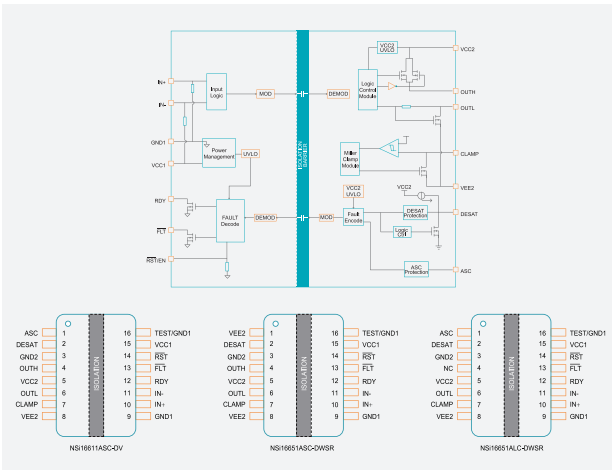
## ◆ Product introduction

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: With UVLO, up to 32V
- Peak source and sink current 10A/10A
- High CMTI: 150kV/us
- 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)



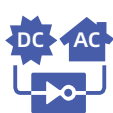
## ◆ Application



EV electric drive system



Air conditioning compressor



DC-AC solar inverter



Motor driver



UPS and battery charger



# NSi68515: Optocoupler-compatible Smart Isolated Gate Driver

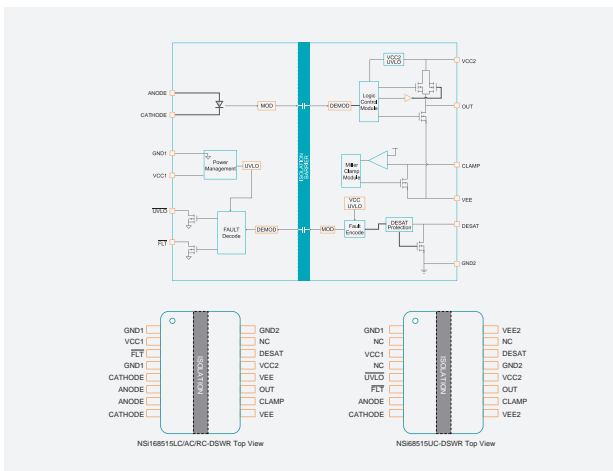
## ◆ Product introduction

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/-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: With UVLO function, voltage of up to 32V
- Peak 5A/5A source/sink current capacity
- High CMTI: 150kV/us
- 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 4.5A
- 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

## ◆ Functional block diagram



## ◆ 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)



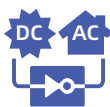
## ◆ Application



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

Part Number	Drive object	Peak drive current (A)	Output channel	VCC (V)	Propagation delay (Max) ton/off(ns)	Delay matching (ns)	Feature	Operating temperature (°C)	Qualification	Package
NSD1025-DSPR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	27/27	4	Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	SOP8
NSD1025-DHMSR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	27/27	4	Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	EP-MSOP8
NSD1025-DDAER	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	27/27	4	Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	DFN8
NSD1025-Q1HSPR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	27/27	4	Enable,Negative Voltage Handling on Input(-10V)	-40~125	Automotive	EP-SOP8
NSD1025-Q1HMSR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	27/27	4	Enable,Negative Voltage Handling on Input(-10V)	-40~125	Automotive	EP-MSOP8
NSD1025E-DSPR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	70/70	4	Input Deglitch, Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	SOP8
NSD1025E-DHMSR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	70/70	4	Input Deglitch, Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	EP-MSOP8
NSD1025E-DDAER	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	70/70	4	Input Deglitch, Enable,Negative Voltage Handling on Input(-10V)	-40~125	Industrial	DFN8
NSD1025E-Q1HSPR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	70/70	4	Input Deglitch, Enable,Negative Voltage Handling on Input(-10V)	-40~125	Automotive	EP-SOP8
NSD1025E-Q1HMSR	GaNfET/MOSFET /IGBT	5/-5	2	4.5-20	70/70	4	Input Deglitch, Enable,Negative Voltage Handling on Input(-10V)	-40~125	Automotive	EP-MSOP8
NSD1015T-DSPR	MOSFET/IGBT/SiC	5/-5	1	13-22	75/75	NA	DESAT protection, FAULT output, 5V supply output, bipolar voltage	-40~125	Industrial	SOP8
NSD1015MT-DSPR	MOSFET/IGBT/SiC	5/-5	1	13-22	75/75	NA	DESAT protection, FAULT output, 5V supply output, Miller Clamp	-40~125	Industrial	SOP8
NSD1015T-Q1SPR	MOSFET/IGBT/SiC	5/-5	1	13-22	75/75	NA	DESAT protection, FAULT output, 5V supply output, bipolar voltage	-40~125	Automotive	SOP8
NSD1015MT-Q1SPR	MOSFET/IGBT/SiC	5/-5	1	13-22	75/75	NA	DESAT protection, FAULT output, 5V supply output, Miller Clamp	-40~125	Automotive	SOP8

# NSD1025: High Speed Dual Low-side Gate Driver

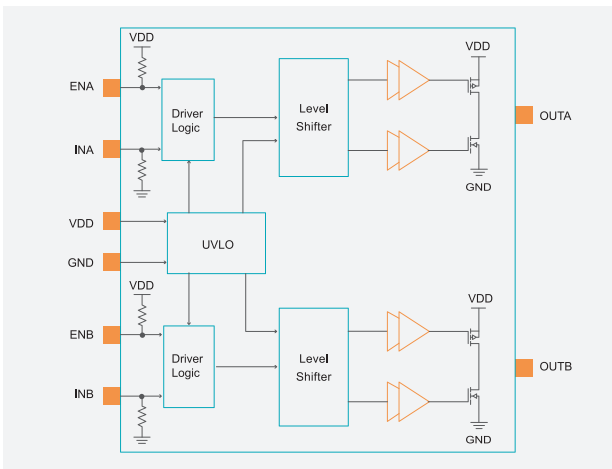
## ◆ Product introduction

NSD1025 is an in-phase dual-channel high-speed gate driver suitable for driving MOSFET, IGBT and GaN 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 NSD1025 series suitable for ideal 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 24V
- Source/sink drive current: 5A (peak)
- Each channel output is designed with two independent enable pins
- Supporting inputs as low as -10V
- Supporting parallel output to allow higher drive current
- 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

## ◆ Functional block diagram



## ◆ Package

- SOP8, EP-MSOP8, DFN8
- EP-SOP8(Q1), EP-MSOP8(Q1)



## ◆ Application



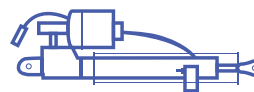
PFC, LLC, SR power supply topology



Power system (OBC/DCDC, industrial power, photovoltaic, communication, server)



Motor controller



Linear driver

# NSD1015T: Smart Non-isolated Low-side Gate Driver

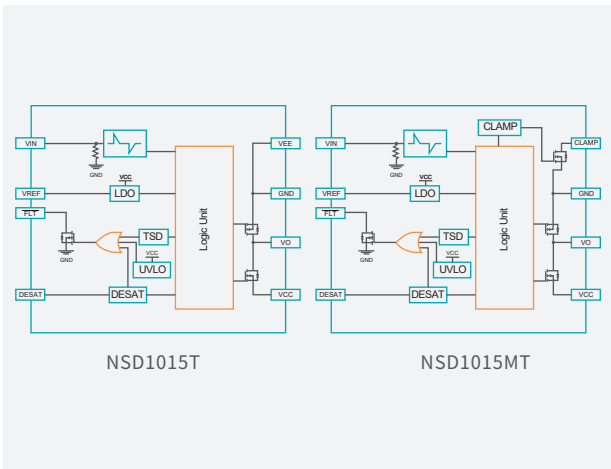
## ◆ Product introduction

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
- FAULT reporting function
- NSD1015T supports bipolar power supply and NSD1015MT supports Miller clamp
- Operating temperature range: -40°C~125°C
- SOP8 package

## ◆ Functional block diagram



## ◆ Package

- SOP8



## ◆ Application



Industrial servo driver, inverter



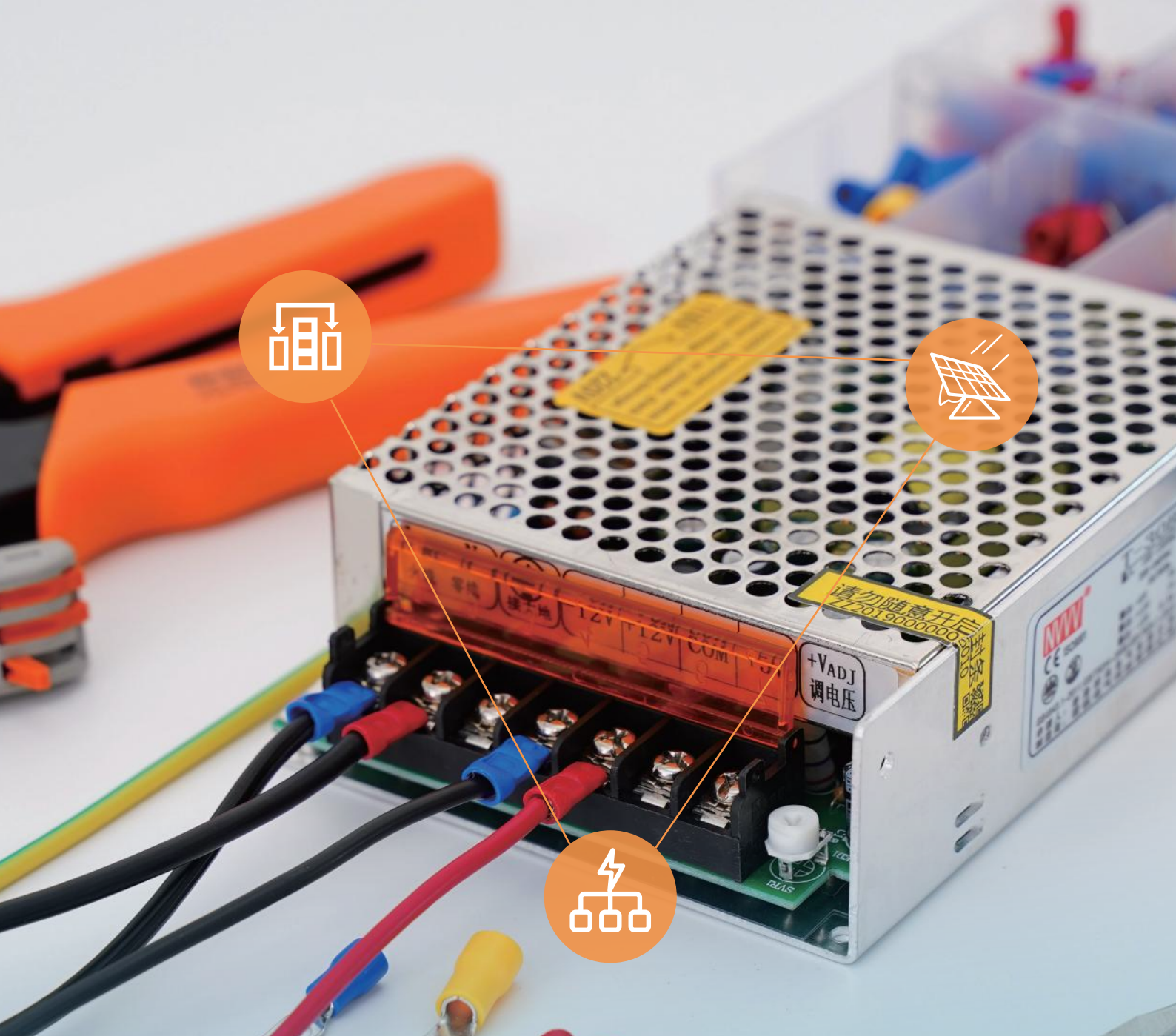
HEV/EV compressor controller



HEV/EV PTC

Brushed DC Motor	Multi-channel Low-side Driver	LDO Linear Regulator	Voltage Monitoring Reset IC Series	Smart High and Low Side Switch	LED Driver
Isolated Half-bridge Driver	Isolated Single Driver	Smart Isolated Driver	Non-Isolated Gate Driver_Low-side Driver	Non-Isolated Gate Driver_> 600V/Half-bridge Driver	GaN Power Stage IC





# Non-isolated Gate Driver \_> 600V Half-bridge Driver

## Non-isolated Gate Driver\_> 600V Half-bridge Driver

Part Number	Drive object	Peak drive current (A)	Output channel	BUS voltage (V)	VCC (V)	Propagation delay (Max) ton/off(ns)	Delay matching (ns)	Feature	Operating temperature (°C)	Qualification	Package
NSD1624-DLAJR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	LGA10
NSD1624-DSPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	SOP8
NSD1624-DSPKR	MOSFET/IGBT	4/-6	2	1200	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	SOP14
NSD1624-Q1SPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP8
NSD1624-Q1SPKR	MOSFET/IGBT	4/-6	2	1200	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP14
NSD1624-Q1SPKR	MOSFET/IGBT	4/-6	2	1200	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP14
NSD16241-DSPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	SOP8
NSD16241-DSPKR	MOSFET/IGBT	4/-6	2	1200	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	SOP14
NSD16241-Q1SPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP8
NSD16241-Q1SPKR	MOSFET/IGBT	4/-6	2	1200	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP14
NSD16242-DSPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Industrial	SOP8
NSD16242-Q1SPR	MOSFET/IGBT	4/-6	2	700	10-17	35/35	7	UVLO、Interlock	-40~125	Automotive	SOP8
NSD2621A-DQAGR	GaN FET	2/-4	2	700	9-15	60/60	10	UVLO, Interlock, Miller Clamp, and Enable, Integrated LDO	-40~125	Industrial	QFN15
NSD2621B-DQAGR	GaN FET	2/-4	2	700	9-15	60/60	10	UVLO, Interlock, Miller Clamp, and Enable, Integrated LDO	-40~125	Industrial	QFN15
NSD2621C-DQAGR	GaN FET	2/-4	2	700	9-15	60/60	10	UVLO, Interlock, Miller Clamp, and Enable, Integrated LDO	-40~125	Industrial	QFN15

# NSD1624 High Voltage Half-bridge Gate Driver

## ◆ Product introduction

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.

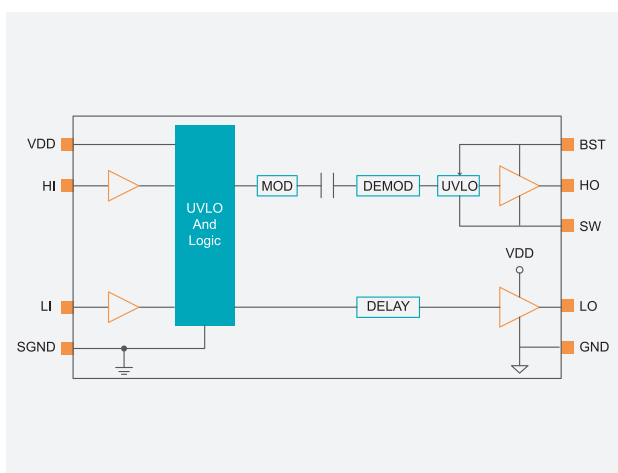
NSD1624 input logic is compatible with 3.3V TTL/CMOS for easy control. Both the high-voltage side and the low-voltage side are designed with independent power supply undervoltage protections (UVLO), which operate in the voltage range of 10~20V.

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
- Independent Logic Ground Pin (SOP14 package)
- Anti-interference of dV/dt on high voltage side up to 150kV/us

## ◆ Functional block diagram



## ◆ 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 200V/ns, and is designed with the Feature of low transmission delay and low delay between channels. Both channels can provide 1A/-2A driving capability.

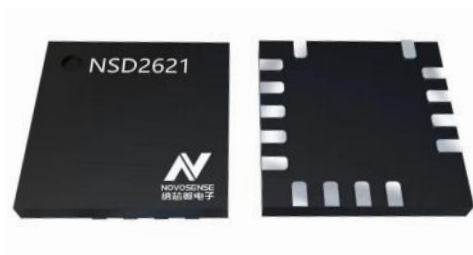
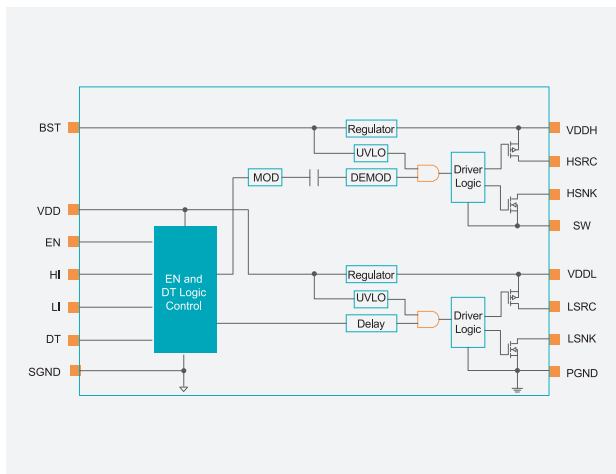
Both high-side drive stage and low-side drive stage are equipped with special voltage regulators to ensure that the driving voltage is in a stable range acceptable to GaN gate, so that GaN can work properly under any conditions. At the same time, it is designed with UVLO protection to protect the operation safety of the power supply system.

NSD2621 is designed with a highly integrated LGA (4\*4mm) package.

## ◆ Product feature

- Voltage range on high voltage side: +/-700V
- Independent UVLO protection for high and low sides
- 2/-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: 200kV/us
- 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



# GaN Power Stage IC

Part Number	Product type	Bus voltage (V)	Rds(on)(mΩ)	I <sub>ds</sub> (A)	Feature	Operating temperature (°C)	Qualification	Package
NSG65N15K-DQAFR	Half bridge	700	150	20	UVLO, Dead-time programmable, Integrated bootstrap diode	-40~125	Industrial	QFN32



# GaN Power Stage IC



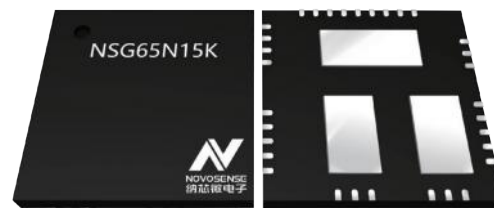
# NSG65N15K High-voltage Half-bridge GaN Power Stage

## ◆ Product introduction

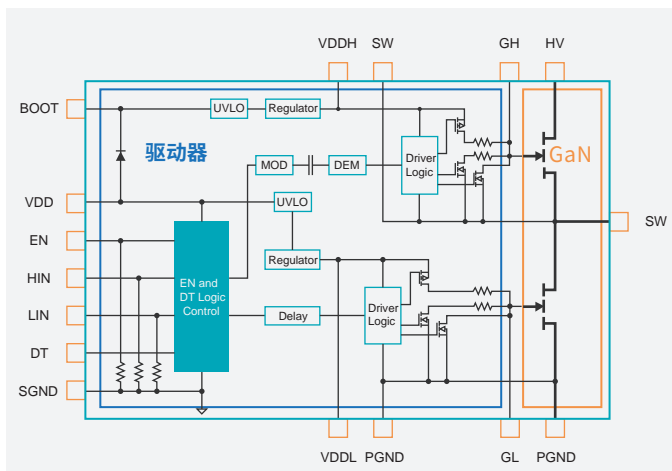
NSG65N15K is the latest GaN power stage device launched by NOVOSENSE. It is integrated with half-bridge driver NSD2621 and two pcs 650V GaN HEMT with 150mΩ conduction resistance, and the working current can reach 20A. Besides, NSG65N15K is integrated with the bootstrap diode, and built-in adjustable 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

# Brushed DC Motor



# Brushed DC Motor

Part Number	Load type	Rds (on) (HS+LS) mΩ	Peak current (A)	Number of half-bridge channels	VPower (Max)(V)	Integrated current detector	Interface	Load diagnosis	Feature	Operating temperature (°C)	Qualification	Package
NSD7310 -DHSPR	Brushed DC motor	520	3.6	2	5-40	No	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection	-40~125	Industrial	HSOP8
NSD7310A -DHSPR	Brushed DC motor	520	3.6	2	5-40	Yes	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection	-40~125	Industrial	HSOP8
NSD7312 -DHSPR	Brushed DC motor	520	3.6	2	5-40	No	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection, fault repor	-40~125	Industrial	HSOP8
NSD7312A -DHSPR	Brushed DC motor	520	3.6	2	5-40	Yes	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Industrial	HSOP8
NSD7312 -Q1HSPR	Brushed DC motor	520	3.6	2	5-40	No	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HSOP8
NSD7312A -Q1HSPR	Brushed DC motor	520	3.6	2	5-40	Yes	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HSOP8
NSD8308 -Q1HTSXR	Brushed DC motor/Stepping /LED	1700	1.3	8	4.5-40	-	SPI	Yes	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HTSSOP24
NSD8306 -Q1HTSXR	Brushed DC motor/Stepping /LED	1700	1.3	6	4.5-40	-	SPI	Yes	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HTSSOP24
NSD8310 -Q1HTSXR	Brushed DC motor/Stepping /LED	1700	1.3	8	4.5-40	-	SPI	Yes	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HTSSOP24
NSD8312 -Q1HTSXR	Brushed DC motor/Stepping /LED	1700	1.3	6	4.5-40	-	SPI	Yes	Over-current protection, over-temperature protection, under-voltage protection, fault report	-40~125	Automobile	HTSSOP24

# NSD731x/NSD731x-Q1 40V Peak Current 3.6A Brushed DC Motor Driver IC

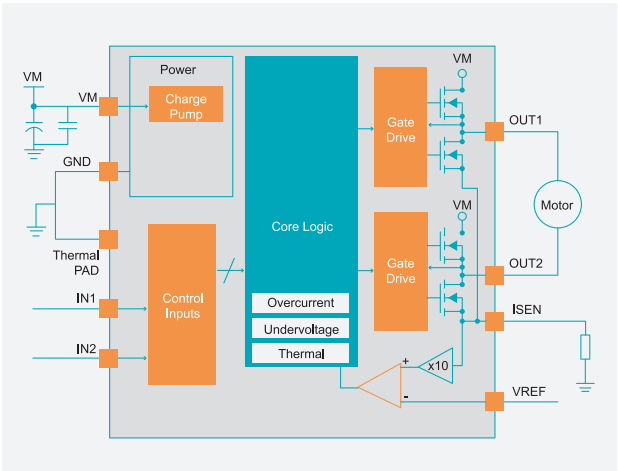
## ◆ Product introduction

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 (withstand voltage of 40V)
- On-resistance (HS + LS) 520m Ω
- Peak current 3.6A
- AEC-Q100 qualified
- Supporting current modulation
- Undervoltage protection
- Overcurrent protection
- Over-temperature protection
- Operating temperature: -40°C to 125°C

## ◆ Functional block diagram



## ◆ Package

- HSOP8



## ◆ Application



Home appliances



New energy vehicles



Brushed DC motor module

# NSD8312/NSD8310/NSD8308/NSD8306/ - Q1 40V 12/10/8/6-Channel Half-bridge Driver

## ◆ 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 type 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

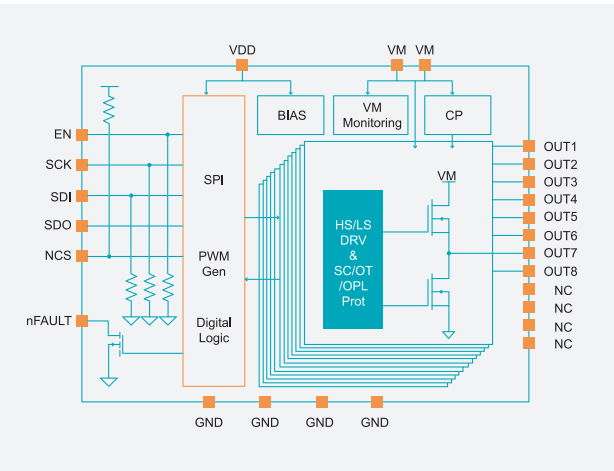
- Wide operating voltage range 4.5V –36V (withstand voltage 40V)
- On-resistance (HS + LS) 1.7 Ω
- Peak current 1.3A
- The PWM generator supports configurable frequency and duty cycle
- Open load diagnostics
- Undervoltage protection and overvoltage protection
- Working temperature: -40°C~125°C
- AEC-Q100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

## ◆ Package

- HTSSOP24



## ◆ Functional Block Diagram



## ◆ Application



Vehicle body controller



Vehicle area controller

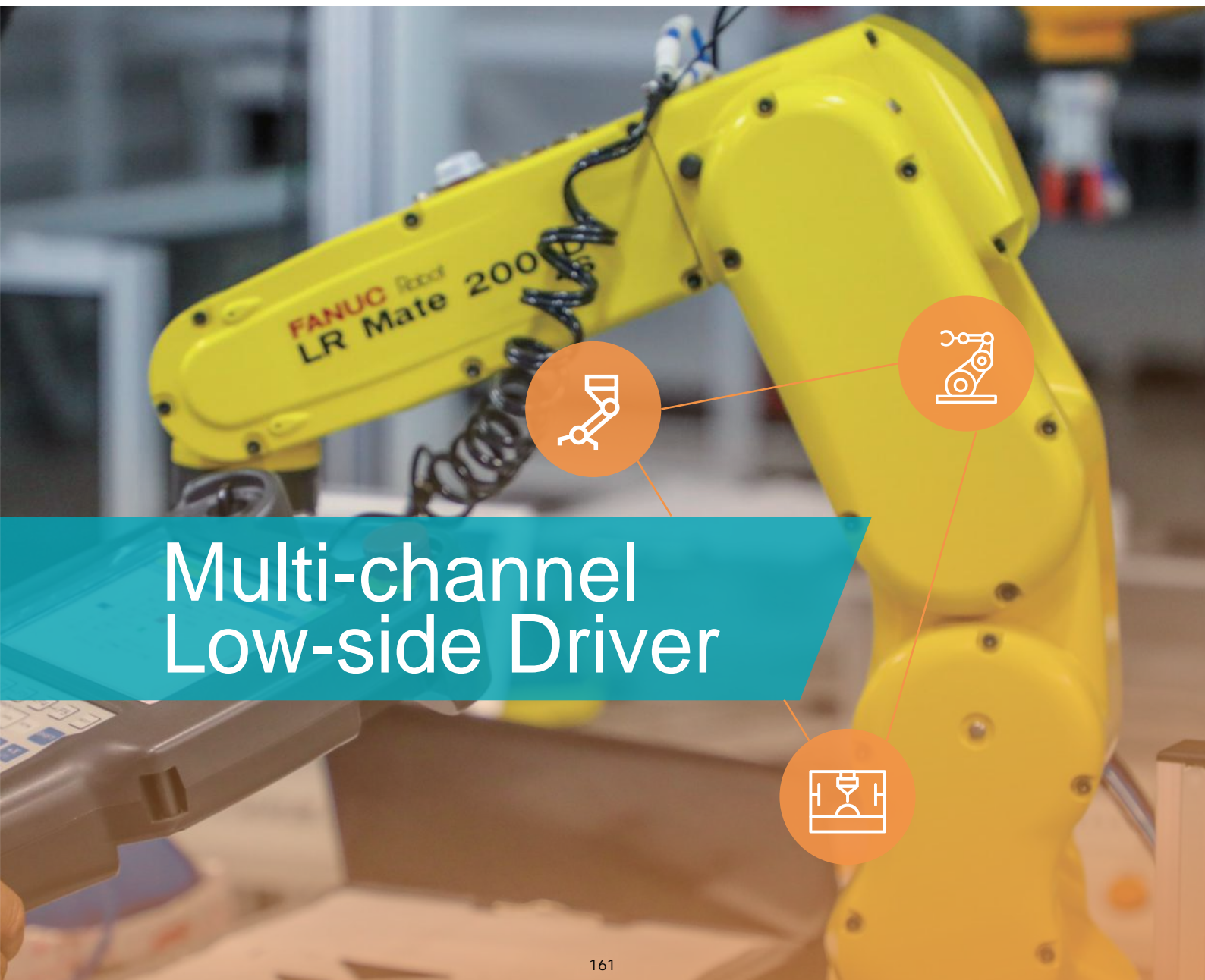


Vehicle A/C controller



## Multi-channel Low-side Driver

Part Number	Load type	Rds (on) (LS) mΩ	Peak current (A)	Number of low side channels	VPower (Max)(V)	Interface	LDO	Feature	Operating temperature (°C)	Qualification	Package
NSD5604E-DHTSTR	Relay /solenoid	260	3	4	8-55	Parallel	Yes	Over-current protection, over-temperature protection, under-voltage protection, clamp and configurable current limiting point	-40~125	Industrial	HTSSOP20
NSD5604-DHTSPR	Relay /solenoid	260	3	4	8-55	Parallel	Yes	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Industrial	HTSSOP16
NSD5604NE-DHTSTR	Relay /solenoid	260	3	4	8-55	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection, clamp and configurable current limiting point	-40~125	Industrial	HTSSOP20
NSD5604N-DHTSPR	Relay /solenoid	260	3	4	8-55	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Industrial	HTSSOP16
NSD5604N-Q1HTSPR	Relay /solenoid	260	3	4	8-55	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Automotive	HTSSOP16
NSD12416-Q1SPR	Relay /solenoid	160	2.5	2	40	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Automotive	SOP8
NSD12409-Q1SPR	Relay /solenoid	90	8	2	40	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Automotive	SOP8
NSD11416-Q1STBR	Relay /solenoid	160	2.5	1	40	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp	-40~125	Automotive	SOT223
NSD11416-Q1SPR	Relay /solenoid	160	2.5	1	40	Parallel	No	Over-current protection, over-temperature protection, under-voltage protection and clamp, open load diagnosis	-40~125	Automotive	SOP8



## Multi-channel Low-side Driver

# 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.

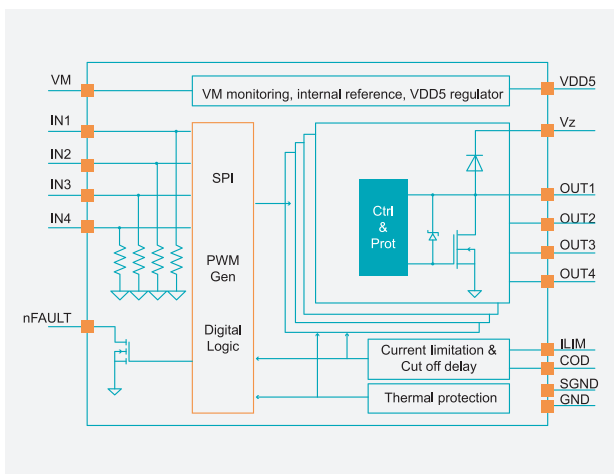
### ◆ Product feature

- Wide operating voltage range: 8V – 50V (withstand voltage of 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

### ◆ Package:

- HTSSOP16
- HTSSOP20

### ◆ Functional Block Diagram



### ◆ Application



Industrial automation



Industrial machinery



Digital machine tools



General resistive /capacitive/inductive loads

Brushed DC Motor  
Isolated Half-bridge Driver

Multi-channel Low-side Driver  
Isolated Single Driver

LDO Linear Regulator  
Smart Isolated Driver

Voltage Monitoring  
Reset IC Series  
Non-Isolated Gate  
Driver\_Low-side Driver

Smart High and Low Side Switch  
Non-Isolated Gate  
Driver\_> 600V Half-bridge Driver

LED Driver  
GaN Power Stage IC

## 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.

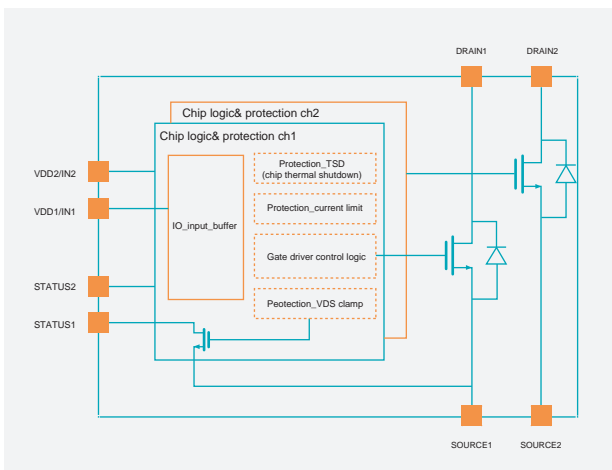
### ◆ Product feature

- 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~125°C
- AEC-Q100 qualified

### ◆ Package:

- SOP8

### ◆ Functional Block Diagram



### ◆ Application



Vehicle BMS system



Vehicle body controller



Vehicle controller



A/C control panel



PLC

Brushed DC Motor	Multi-channel Low-side Driver	LDO Linear Regulator	Voltage Monitoring Reset IC Series
Isolated Half-bridge Driver	Isolated Single Driver	Smart Isolated Driver	Non-Isolated Gate Driver_Low-side Driver
			Smart High and Low Side Switch
			Non-Isolated Gate Driver_> 600V Half-bridge Driver
			LED Driver
			Gain Power Stage IC

## 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 > 40V, 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.

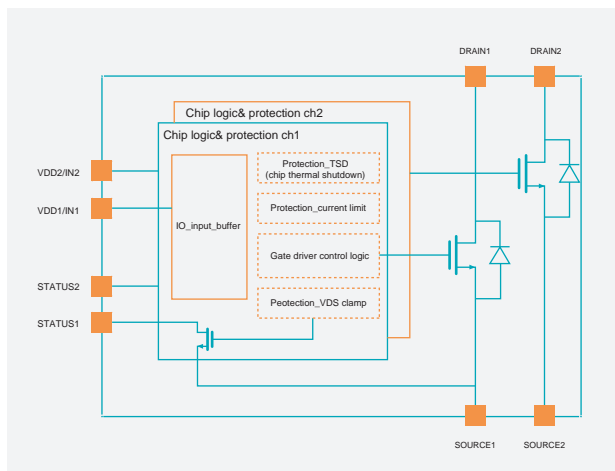
### ◆ Product feature

- 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

### ◆ Package:

- SOP8
- SOT223

### ◆ Functional Block Diagram



### ◆ Application



Vehicle BMS system



Vehicle body controller



Vehicle controller



A/C control panel



PLC



# LDO Linear Regulator

Part Number	Ambient temperature	Minimum input voltage	Maximum input voltage	Output Current	Output voltage	Iq-Quiescent Current	Other feature	Package	Typical application
NSR31xxx	-40°C~125°C	3V	40V	150mA	Fixed output 2.5V, 3.3V and 5V	5uA	Current limit protection, Over-temperature protection	SOT23(5), SOT223(4), DFN-8	In-vehicle entertainment and autopilot Body electronics and lighting Inverter and motor control OBC/DCDC and BMS
NSR33xxx	-40°C~125°C	3V	40V	300mA	Fixed output 2.5V, 3.3V and 5V Adjustable output 0.65V~18V	5uA	Enable, Power good indication PG, Current limit protection, Over-temperature protection	MSOP-8 EP, SOP-8 EP	
NSR35xxx	-40°C~125°C	3V	40V	500mA	Fixed output 2.5V, 3.3V and 5V Adjustable output 0.65V~18V	5uA	Enable, Current limit protection, Over-temperature protection	TO252-3 TO252-5 TO263-5	
NSE5702	-40°C~125°C	4.5V	40V	350mA/CH	Adjustable output 1.5V~20V	2CH	Current limiting protection, Reverse Current protection, Reverse polarity protection	HTSSOP-16	In-vehicle entertainment and autopilot, Antenna,GPS load supply, ADAS camera load supply
NSE5702	-40°C~125°C	4.5V	40V	350mA/CH	Adjustable output 1.5V~20V	2CH	Current limiting protection, Reverse Current protection, Reverse polarity protection	HTSSOP-16	

# LDO Linear Regulator





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

### ◆ 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.

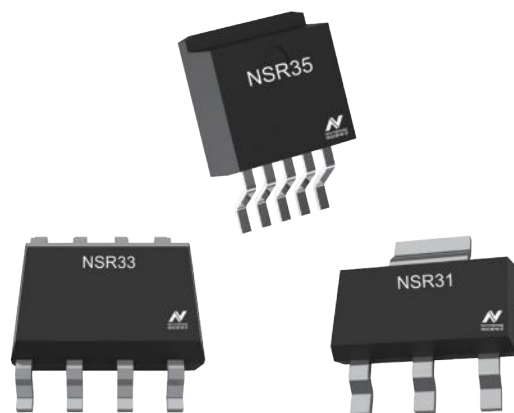
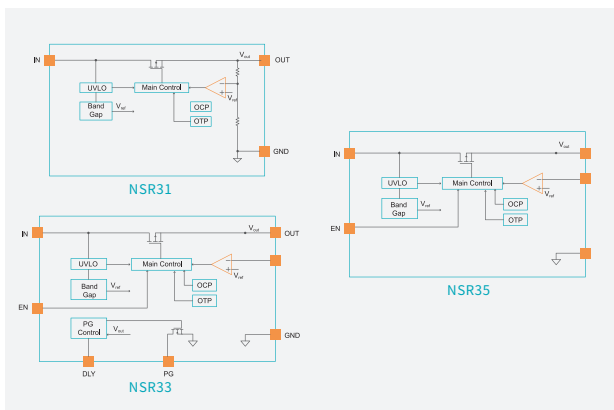
The NSR31/33/35 series provides sufficient solutions for hardware designers, with various fixed voltage versions: 2.5V, 3.3V and 5.0V, and also provides adjustable output options (0.65V to 18V). In addition, different series are designed with output currents of 150mA, 300mA and 500mA respectively. This 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, SOT23DFN-8, MSOP-8 EP, SOP-8EP, TO252, TO263 and other packages are made available to meet different design requirements.

### ◆ 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 lowquiescent 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

### ◆ Functional Block Diagram



### ◆ Application



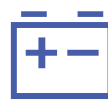
In-vehicle entertainment and autopilot



Body electronics and lighting



Inverter and motor control

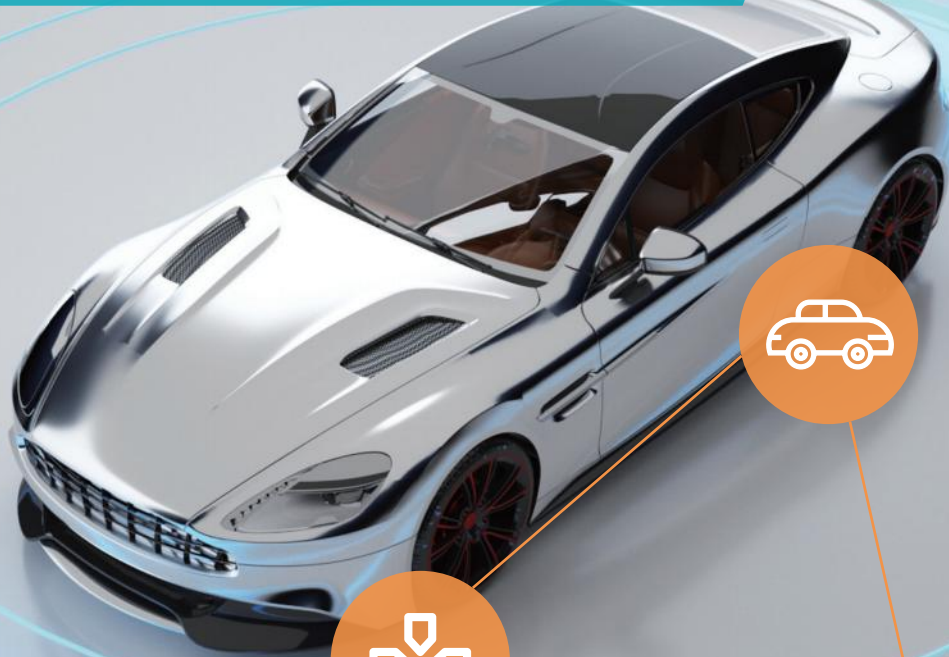


OBC/DCDC and BMS

## Voltage Monitoring Reset IC Series

Part Number	Threshold Voltage	Threshold Voltage Accuracy	Supply Voltage (V)	Iq-Quiescent Current	Other Features	Reset Delay Time	Output Type	Qualification	Package	Application
NSR7808Gxx-Q1	Adjustable, 0.84, 1.12, 1.16, 1.4, 1.67, 1.77, 2.33, 2.79, 3.07, 4.65	2%	1.8-6.5	3.6uA	With Manual Reset function	Programmable	Low active, Open Drain	Automotive	SOT23-6, DFN6	ADAS, DSP and MCU processor application, In-vehicle entertainment
NSR7808Gxx	Adjustable, 0.84, 1.12, 1.16, 1.4, 1.67, 1.77, 2.33, 2.79, 3.07, 4.65	2%	1.8-6.5	3.6uA	With Manual Reset function	Programmable	Low active, Open Drain	Industrial	SOT23-6, DFN6	DSP and MCU processor application, Portable devices, Laptop

# Voltage Monitoring Reset IC Series



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

### ◆ Product introduction

OVONSENSE 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 to 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.

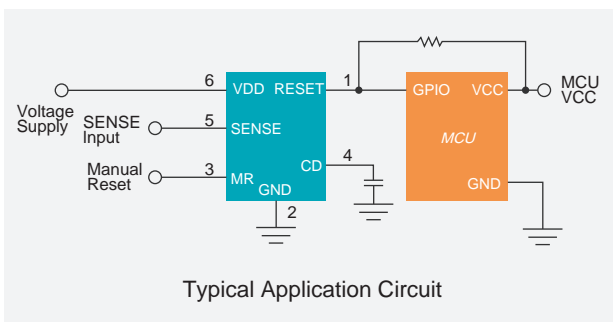
The NSR7808 series features a typical ultra-low static current of 3.6uA, which is ideal for automotive and industrial battery-powered applications. It provides an accurate reference voltage, achieving a threshold accuracy of  $\pm 1\%$ . The time to select the reset delay can be configured through the 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,
- Ultra-low static power consumption Iq: Typical 3.6uA
- Threshold voltage accuracy:  $\pm 1\%$
- With Manual Reset function
- Output: Open-Drain
- Package: SOT23-6, DFN-6

### ◆ Functional Block Diagram



### ◆ Application



IVI In-Vehicle  
infotainment



Camera



BCM



ADAS

# Smart High and Low Side Switch

Part Number	Ambient Temperature	Type	Number of Channels	MOS Impedance	Overcurrent value	Protection	Feature	Package	Application
NSE11409	-40°C~125°C	Low side switch	1CH	90mohm	8A	Open circuit diagnosis Overcurrent protection Over-temperature protection	Ultra low power consumption, Diagnostic output, VDD clamp	SO-8 SOT-223	Body electronic controller Vehicle controller Air conditioning controller BMS



# Smart High and Low Side Switch

## 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.

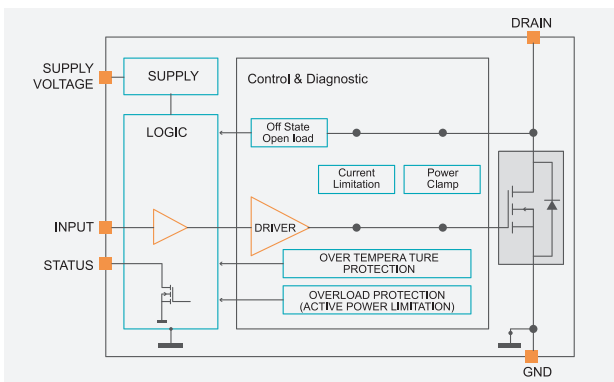
The IC is designed with an internal output current limiting function for overload protection and short circuit protection. Built-in absolute over-temperature protection and relative over-temperature protection to prevent the IC from overheating in multiple ways, slow down power accumulation, and improve 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  $I_q < 5\mu A$
- Package:  
NSE11409 series: SOT223, SO-8

### ◆ Functional Block Diagram



### ◆ Application



BMS



Body electronic controller



Vehicle controller



Air conditioning panel controller





# LED Driver

Part Number	Ambient temperature	Number of channels	Input voltage	Output current	Diagnosis and protection	Heat dissipation enhancement	Feature	Package	Typical application
NSL21610	-40°C~125°C	1CH	5-40V	300mA	Open circuit diagnosis Short circuit diagnosis Over-temperature protection	External resistor Automatic current sharing	PWM dimming Multiple diagnostic cascades Independent enable	MSOP-8 EP	Tail light Interior lights Other body lighting
NSL21611	-40°C~125°C	1CH	5-40V	450mA	Open circuit diagnosis Short circuit diagnosis Over-temperature protection	None	PWM dimming Multiple diagnostic cascades Independent enable	MSOP-8 EP	
NSL21630	-40°C~125°C	3CH	5-40V	200mA	Open circuit diagnosis Short circuit diagnosis Over-temperature protection	External resistor Automatic current sharing	PWM dimming Multiple diagnostic cascades	HTSSOP-16	
NSL21631	-40°C~125°C	3CH	5-40V	200mA	Open circuit diagnosis Short circuit diagnosis Over-temperature protection	External resistor Automatic current sharing	PWM dimming Multiple diagnostic cascades Independent enable	HTSSOP-16	

# LED Driver



## Automotive-qualified Three-channel High-side LED Driver with Heat Sharing Function NSL2163X Series

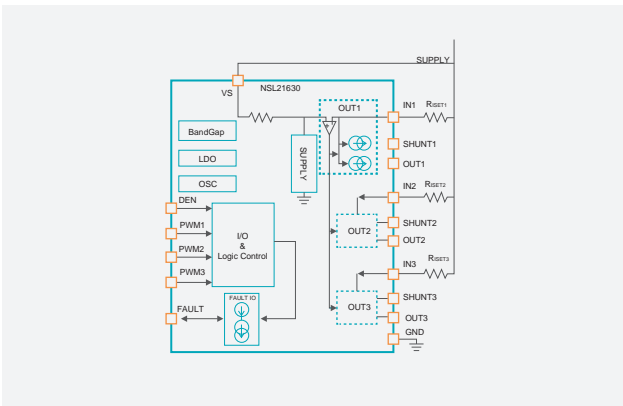
### ◆ Product introduction

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 (I<sub>out</sub>=100mA)
- Output current accuracy of ±5% in full temperature range
- Rich diagnostic and protection functions
- 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

Brushed DC Motor  
Isolated Half-bridge Driver

Multi-channel Low-side Driver  
Isolated Single Driver

LDO Linear Regulator  
Smart Isolated Driver

Voltage Monitoring  
Reset IC Series  
Non-Isolated Gate  
Driver\_Low-side Driver

Smart High and Low Side Switch  
Non-Isolated Gate  
Driver\_>600V Half-bridge Driver

LED Driver  
GaN Power Stage IC

## IMPORTANT NOTICE

The information given in this 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.

You are solely responsible for your use of Novosense' products and applications, and for the safety thereof. You 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.

The resources are 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. Novosense authorizes you to use these resources exclusively for the development of relevant applications designed to integrate Novosense's products. Using these resources for any other purpose, or any unauthorized reproduction or display of these resources is strictly prohibited. Novosense shall not be liable for any claims, damages, costs, losses or liabilities arising out of the use of these resources.

For further information on applications, products and technologies, please contact Novosense ([www.novosns.com](http://www.novosns.com) ).

Suzhou Novosense Microelectronics Co., Ltd.





# NOVOSENSE

Shanghai Stock Exchange (SSE) Code: 688052

Tel: 0086-512-62601802  
Email: [sales@novosns.com](mailto:sales@novosns.com)  
Website: [www.novosns.com](http://www.novosns.com)

Date: March 2023