Automotive, 125°C operation, 36V, supply voltage divided output, window voltage detector with delay function (external setting)

S-191L/N Series

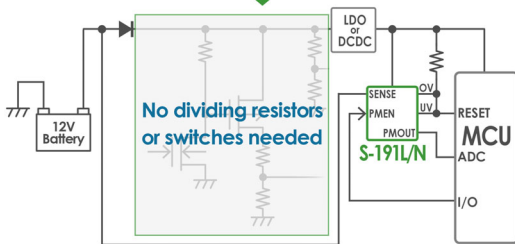**ABLIC**
MinebeaMitsumi Group

The industry's first* supply voltage divided output contributes to achieving functional safety

Built-in three voltage monitoring functions
Overvoltage + Undervoltage + Analog monitoring
Industry's first*
Supply Voltage Divided Output

No dividing resistors or switches needed

12V Battery
LDO or DCDC
SENSE / PMEN / PMOUT
OV / UV
S-191L/N
RESET
MCU
ADC
I/O

*Based on our research as of July 2021

Ultra-small package

HSNT-8(2030)

2.0×3.0 ×t0.5mm

No external parts needed due to **45V** withstand voltage
Further reduced footprint

Ultra-low current consumption of **0.9μA** typ.
Standby current reduction

±1.5% @-40°C to +125°C
Improved monitoring accuracy

Enables direct monitoring
a 12V battery

Reverse current protection diode
LDO or DCDC
VDD
S-191L/N
SENSE
Application of negative voltage
Reverse connection protection diode
VSS

⬤ Supporting the achievement of functional safety

The appearance of autonomous driving have made it imperative that ECUs in automotive systems provide a variety of monitoring functions to support functional safety. S-191L/N Series...

- **Has multiple voltage monitoring functions built in.**
Overvoltage and undervoltage monitoring functions are built in.
It also has **the industry's first* supply voltage divided output** to help the microcontrollers in monitoring voltage.
No external parts are required to convert the high voltage supplied by a battery or other source to the voltage that can be input to microcontrollers.
- **Needs fewer parts.**
The high withstand voltage of 45V eliminates the need for the dividing resistors or switches required so far.
- **Reduces standby current.**
Lower current consumption because no dividing resistors are needed.

⬤ Contributes to fewer parts and lower standby current

In addition to built-in supply voltage divided output, S-191L/N Series offers high withstand voltage, needs no dividing resistors and enables direct battery monitoring.
S-191L/N Series comes in an **ultra-small automotive HSNT-8(2030) package** and has an ultra-low current consumption of 0.9μA.
A detection voltage monitoring accuracy of ±1.5% (over the entire temperature range) helps improve voltage monitoring accuracy.

⬤ Application of negative voltage enables direct battery monitoring

The detection voltage input pin (SENSE pin) has a wide rated voltage of -30 to 45V that can handle not only high voltage but also negative voltage input.
As a result, the SENSE pin can be connected before the reverse current protection diode.
This enables the SENSE pin to cancel out the lowering of detection accuracy caused by manufacturing variations of the reverse current protection diode to further enhance the high accuracy of voltage monitoring.
And since a reverse connection protection diode is connected between the SENSE and VSS pins, it will be able to handle tests for reverse battery connection even if it is connected before the reverse current protection diode.
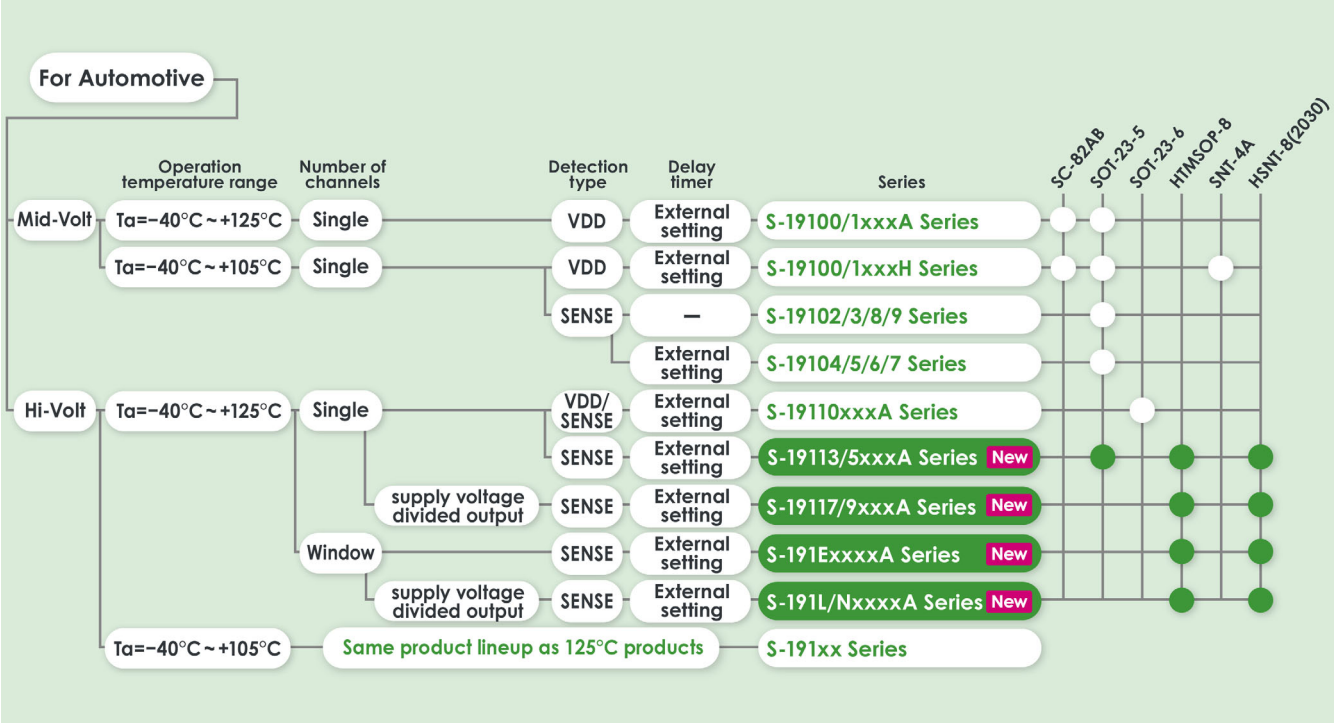
ABLIC Inc.
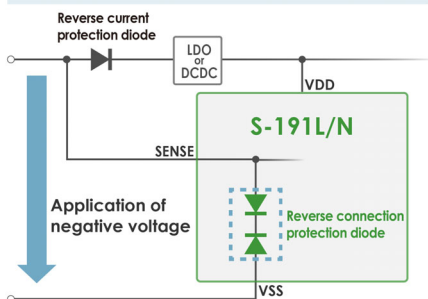
Applications

・ Overvoltage detection of power supply for automotive electric component
・ Automotive battery voltage detection

Automotive Battery Monitoring IC Product Lineup

Features

Product name	S-191L/N	S-19113	S-19115	S-19117/9	S-191E
Application			**For Automotive**		
Operation voltage range			3.0V to 36.0V		
Undervoltage detection	4.0V to 10.0V	4.0V to 10.0V	-	4.0V to 10.0V	4.0V to 10.0V
Overvoltage detection	16.0V to 18.0V	-	16.0V to 18.0V	-	16.0V to 18.0V
Detection voltage accuracy			±1.5% (Tj = -40°C to +125°C)		
Current consumption	0.9µA typ.	0.6µA typ.	0.6µA typ.	0.75µA typ.	0.9µA typ.
Supply voltage divided output	1/6, 1/8, 1/12, 1/14	-	-	1/6, 1/8, 1/12, 1/14	-
Package	HTMSOP-8, HSNT-8(2030)	SOT-23-5, HTMSOP-8, HSNT-8(2030)	SOT-23-5, HTMSOP-8, HSNT-8(2030)	HTMSOP-8, HSNT-8(2030)	HTMSOP-8, HSNT-8(2030)
Automotive quality			AEC-Q100 qualified PPAP capable		
Operation temperature range			Ta= -40°C to +125°C		

As of 1/19, 2023. All the information described herein is subject to change without notice.