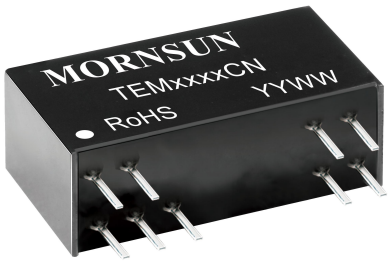
Signal conditioning modules



3 years Warranty

CE Report EN62368-1

RoHS

FEATURES

- Two-port isolation (signal input and signal output)
- High accuracy of 0.1% Full Scale
- High linearity of 0.1% Full Scale
- Isolation test voltage(2kVAC for 60s)
- Extremely low temperature coefficient of ≤50PPM/℃, range -40℃ to +85℃
- Industrial grade operating temperature range from -40℃ to +85℃
- High reliability, (MTBF >500,000 hours)
- Low ripple & noise: ≤35mVpp, 20MHz
- ESD protection(IEC/EN61000-4-2 Contact ±4kV perf. Criteria B)

TEMxxxxCN series are analog signal isolation modules with incoming millivolt positive/negative signal input and transformed positive/negative signal output. They are equipped with an efficient built-in micro-power source that supplies additionally power to the internal input signal circuitry. The adopted electromagnetic isolation technology has a better performance, a much higher accuracy and a lower temperature drift in comparison with photo/opto-coupler isolators. This type of product has in addition to low temperature drift and high linearity, a low power consumption and low ripple & noise. They have a two-terminal isolation from signal input to signal output/power input.

Selection Guide

Certification	Part No.	Power Supply Input Typ. (VDC)	Input Signal	Output Signal	Isolated Power Output (VDC)
EN	TEM4540CN	15VDC	±50mV	±10V	None
	TEM6540CN	15VDC	±100mV	±10V	None
	TEM6640CN	15VDC	±100mV	±5V	None
	TEM7650CN	12VDC	±200mV	±5V	None

Note: The isolated power output is able to provide a distribution voltage from ±5V to ±5.5V, load ≤5mA. Please add regulator circuit if needed.

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Power Input	Input Voltage		Typ.-5%	Typ.	Typ.+5%	VDC
	Input Power	Signal full load	--	--	1.0	W
	Input Protection		Input reverse polarity protection			
Signal Input	Input Signal		See selection guide			
	Input Impedance	In case of max. input of voltage signal	10	--	--	MΩ
	Overload	Maximum continuous over range	-10	--	+10	V

Output Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Signal Output	Output Signal		See selection guide			
	Load Capacity	Voltage output	2	--	--	kΩ
	Power Regulation		-0.05%FS	--	+0.05%FS	--
	Load Regulation		-0.05%FS	--	+0.05%FS	--
	Ripple & Noise	Bandwidth 20MHz	--	--	35	mVp-p

Transmission Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Zero Offset		-0.1%FS	--	+0.1%FS	--
Signal Precision		-0.1%FS	--	+0.1%FS	--
Temperature Coefficient	Operating temperature range from -40℃ to +85℃	--	--	50	PPM/℃
Band Width		2	--	--	kHz
Response Time		--	--	1	ms

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Electric Isolation		Power input and the signal output are on the common ground. Isolated between signal input terminal and signal output terminal.			
Isolation Test	Electric strength test for 1 minute with a leakage current <1mA, humidity <70%	2	--	--	kVAC
Insulation Resistance	500VDC	100	--	--	MΩ
Operating Temperature		-40	--	+85	℃
Transportation and Storage Temperature		-50	--	+105	℃
Case Temperature Rise	Ta=25℃	--	--	30	℃
Safety Standard		EN62368-1 (Report)			
Safety Class		CLASS III			
Application Environment		The presence of dust, severe vibration, shock and corrosive gas may cause damage to the product			

Mechanical Specifications

Case Material	Black plastic, flame-retardant heat- resistant
Package	DIP18
Weight	5.4g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
	EFT	IEC/EN61000-4-4	signal input port ±1kV (see Fig. 4 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	signal input port ±1kV(line-to-ground) (see Fig. 4 for recommended circuit)	perf. Criteria B

Application Precautions

1. Carefully read and follow the instructions before use; contact our technical support if you have any question;
2. Do not use the product in hazardous areas;
3. Use only DC power supply source for this product. 220VAC power supply is prohibited;
4. It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction;

After-sales service

1. Factory inspection and quality control are strictly enforced before shipping any product; please contact your local representative or our technical support if you experience any abnormal operation or possible failure of the module;
2. The products have a 3-year warranty period, from the date of shipment. The product will be repaired or exchanged free of charge within the warranty period for any quality problem that occurs under normal use.

Applied circuit

Please refer to Isolated Transmitter Application Notes.

Design Reference

1. Wiring diagram for product application

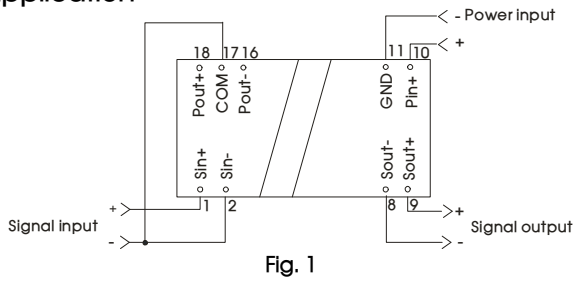


Fig. 1

Note: Except for the case shown in application circuit three(Fig.b), pin 2 and pin 17 must be shorted when working.

2. Typical application circuit

Typical application 1: Positive/Negative current signal detection solution

The signal conditioning module TEMxxxxCN can be used to detect the current value in any direction of a loop when the back-end meter detect positive /negative signals. As shown below, the current detecting resistor is connected in series and the loop current generates an mV-level voltage signal on the resistor, through the signal conditioning module completes the signal amplification and feed back to the back-end meter.

The value of the resistor, the current range to be tested, and the input range of the signal conditioning module should be matched. For example, if the current of ±5A needs to be detected and the signal conditioning module selects the model of ±100mV, the detection resistance should be 20mΩ, which could be achieved via the trace length of the PCB.

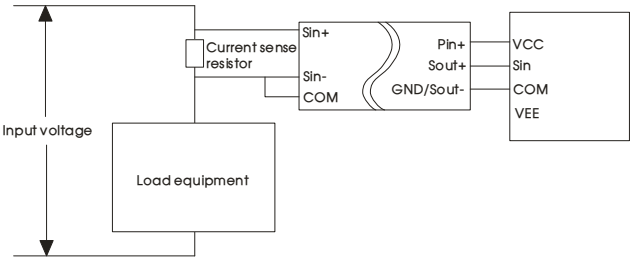


Fig. 2

Typical application 2: Signal + Absolute value circuit solution

Based on solution 1, if the back-end meter can only detect single signal, the absolute value of the output signal can be obtained by the external circuit shown below.

The Sout+ pin signal is a positive voltage, the diode does not work, the second stage op amp operates, the output voltage is equal to the voltage on the Sout+ pin; the Sout+ pin signal is a negative voltage, and the first stage op amp reverses the signal. The output voltage of the second stage op amp is numerically equal to the voltage on the Sout+ pin, but with opposite direction. Therefore, the absolute value calculation of the Sout+ pin voltage signal is realized. The values of the two output resistors in figure 3 need to take the power consumption into consideration and their voltage on the input impedance of the second-stage op amp. 10kΩ is recommended.

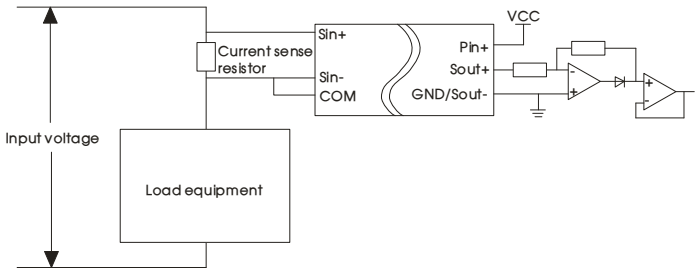


Fig. 3

Typical application 3: Pressure detection solution based on resistance bridge

As shown below, the pressure strain resistor is connected as a bridge, and the change of the pressure corresponds to the change of the resistance value. In the above bridge circuit, the change of the resistance will cause the voltage change between pin of Sin+ and Sin-. This voltage is typically mV-level and the signal conditioning module amplifies this mV-level signal to a V-level signal for use by the back end.

$$Vsin = Vref\left(\frac{R3}{R3+R4} - \frac{R2}{R1+R2}\right)$$

To match it, let R1=R2=R3=R, R3 is the pressure strain resistance, Vsin is the voltage between Sin+ and Sin- pins. The above equation can be simplified to

$$Vsin = Vref\left(\frac{R}{R+R3} - \frac{1}{2}\right)$$

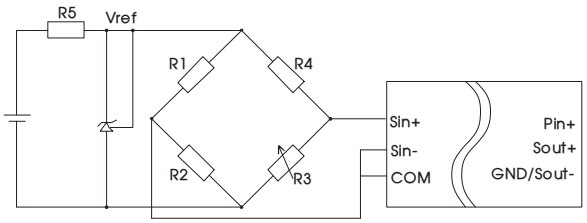


Fig. a

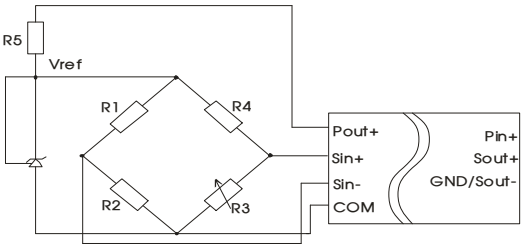


Fig. b

2. EMC compliance circuit

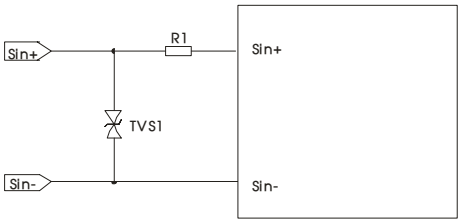
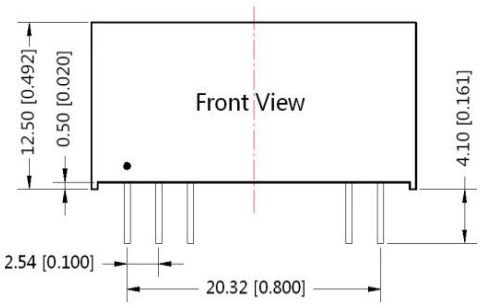


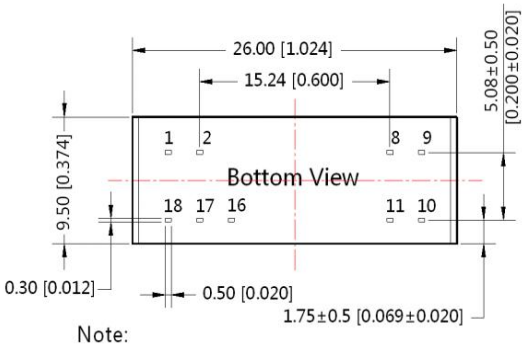
Fig. 4

Component	Recommended part, value
R1	12Ω/2W
TVS1	SMBJ5CA

3. For additional information please find the application notes on www.mornsun-power.com

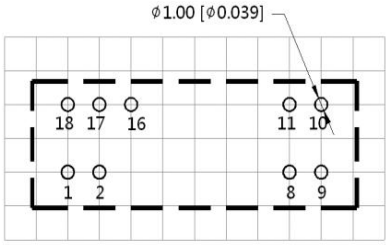
Dimensions and Recommended Layout





Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Function	
1	Sin+	Signal input(+)
2	Sin-	Signal input(-)
8	Sout-	Signal output(-)
9	Sout+	Signal output(+)
10	Pin+	Power input(+)
11	GND	GND
16	Pout-	Isolation Power output(-)
17	COM	COM
18	Pout+	Isolation Power output(+)

Note: The part of the signal input connection mode for product will be different according to the signal circuit, please refer to the wiring diagram for product application and typical applications.

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58240002;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load.
3. All index testing methods in this datasheet are based on company corporate standards;
4. The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements. For details, please contact our technical staff;
5. We can provide product customization service;
6. Products are related to laws and regulations: see "Features" and "EMC";

7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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