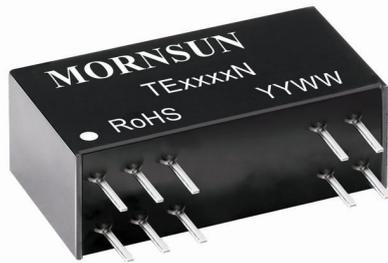


Active high precision isolated transmitter



FEATURES

- | Two-terminal isolation (signal input and signal output)
- | High precision grade (0.1% F.S.)
- | High linearity (0.1% F.S.)
- | Isolation voltage (2KVAC/60s)
- | Low ripple & noise ($\leq 30\text{mVpp}$, 20MHz)
- | Extremely low temperature drift ($\leq 50\text{PPM}/^\circ\text{C}$, within -40 to $+85^\circ\text{C}$)
- | Small size: DIP18 (26*9.5*12.5mm)
- | ESD protection (IEC/EN61000-4-2 Contact $\pm 4\text{KV}$ perf. Criteria B)
- | With load ability: $\geq 2\text{K}\Omega$ (@Max. signal output @10V)

The TExxxxN series is with preceding voltage/current signal input and backward voltage signal output, and with an inner high efficiency isolated micro-power source. It can provide isolation power to peripheral circuit at the same time of providing power to internal signal processing circuit. Adopting electromagnetism isolation technology, therefore compared with photo-coupler isolation, it has higher accuracy and lower temperature drift. This module is two-port isolation (input and output). There are external functions for the series as zeros and full adjustment, convenient for customer to design and adjust.

Selection Guide

Model	Power Supply input (VDC)	Input Signal	Output Signal	Isolation Power Output (VDC)
TE5534N	24V	0~10V	0~10V	15V
TE5544N	15V	0~10V	0~10V	15V
TE5554N	12V	0~10V	0~10V	15V
TE5634N	24V	0~10V	0~5V	15V
TE6634N	24V	0~5V	0~5V	15V
TE6644N	15V	0~5V	0~5V	15V
TE6654N	12V	0~5V	0~5V	15V
TE6664N	5V	0~5V	0~5V	15V
TE1533N	24V	4~20mA	0~10V	24V
TE1530N	24V	4~20mA	0~10V	None
TE1550N	12V	4~20mA	0~10V	None
TE1633N	24V	4~20mA	0~5V	24V
TE1630N	24V	4~20mA	0~5V	None
TE1660N	5V	4~20mA	0~5V	None
TE1430N	24V	4~20mA	1~5V	None
TE1433N	24V	4~20mA	1~5V	24V
TE1S34N-2.5	24V	4~20mA	0~2.5V	15V
TE1S60N-3.3	5V	4~20mA	0~3.3V	None
TE1S65N-3.3	5V	4~20mA	0~3.3V	12V
TE2530N	24V	0~20mA	0~10V	None
TE6S6SN-3.3-9	5V	0~5V	0~3.3V	9V

Input Specifications

Item	Operating Conditions	Value
Input Power Supply	Input voltage	(Nominal value of power supply input) $\pm 5\%$
	Input power	$\leq 1.0\text{W}$ (No isolation power output) $\leq 1.5\text{W}$ (isolation power output)
	Power supply protection	Reverse polarity protection(The product of 5V power input is without this function)

Input	Input signal		See selection guide
	Input impedance	in case of max. input of current signal	≤250mV
		in case of max. input of voltage signal	≥10MΩ
	Overload	in case of input of current signal	≤50mA
in case of input of voltage signal		≤30V	

Output Specifications

Item	Operating Conditions		Value
Output of Isolated Power Supply	Output voltage	Power, current full load	(Nominal value) ±10%
	Output current		≤25mA
Output	Output signal		See selection guide
	Load capacity		≥2KΩ
	Ripple & noise	Bandwidth 20MHz	≤30mVpp

Transmission Specifications

Item	Operating Conditions	Value
Zero Offset		0.1%FS.
Precision		0.1%FS.
Temperature Drift	Operating temperature range of -40 to +85℃	≤50PPM/℃
Adjustable Function	Full Degree Regulation	Can be adjusted within ±5% output signal range
	Zero Regulation	Can be adjusted within ±5% output signal range
bandwidth		≥2KHz
Response Time		≤1ms

General Specifications

Item	Operating Conditions	Value
Electric Isolation		Power input and the signal output are on the common ground. Power output and the signal input are on the common ground. Isolated between power input and the signal output or power input and power distribution output.
Degree of Isolation	testing for 1 minute, leakage current <1mA, humidity <70%	2KVAC
Insulation Resistance		100MΩ, 500VDC
Operating Temperature		-40~+85℃
Transportation and Storage Temperature		-50~+105℃
Application Environment		The presence of dust, fierce vibration, impulsion and corrosive gas may cause damage to the product

Physical Specifications

Casing Material	WH8100-F [1]
Package	DIP18
Weight	8g, typ.
Cooling Method	Natural cooling

EMC Specifications

EMI	Conducted Disturbance	CISPR22/EN55022	CLASS A (see Fig. 5 for recommended circuit)
EMS	Electrostatic Discharge	IEC/EN61000-4-2	Contact ±4KV perf. Criteria B
	EFT	IEC/EN61000-4-4	Power supply port ±2KV(see Fig. 5 for recommended circuit) perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5	Power supply ±1KV (see Fig. 5 for recommended circuit) perf. Criteria B

Application Precautions

1. Please read the instructions carefully before use; contact our technical support if you have any problem.
2. Do not use the product in hazardous areas.
3. Use DC power supply for the product and 220V AC power supply is prohibited.
4. Do not dismount and assemble the product without permission to avoid failure or malfunction of equipment.

After-sales service

1. Ex-factory inspection and quality control have been strictly conducted for the product; if there occurs abnormal operation or possibility of failure of internal module, please contact the local representative or our technical support.
2. The warranty period for the product is 3 years as calculated from the date of delivery. If any quality problem occurs under normal use within the warranty period, the product can be repaired or changed for free.

Applied circuit

See *Application Notes for Isolated Transmitter* for details.

Design Reference

1. Typical application

1) Schematic diagram

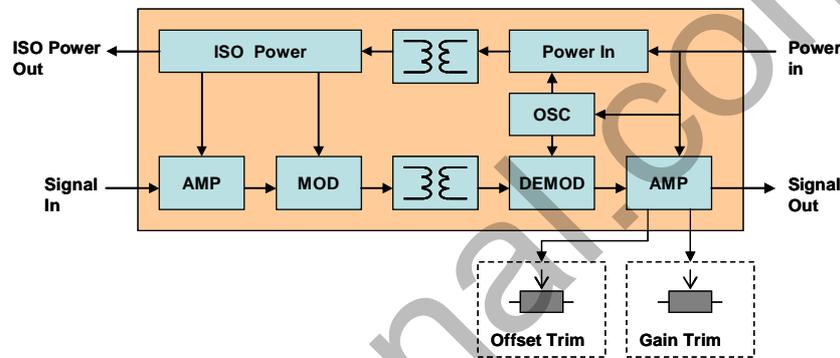


Fig. 1

2) Typical application—Multi-channel signal acquisition

Application circuit for typical multi-channel signal acquisition is as below:

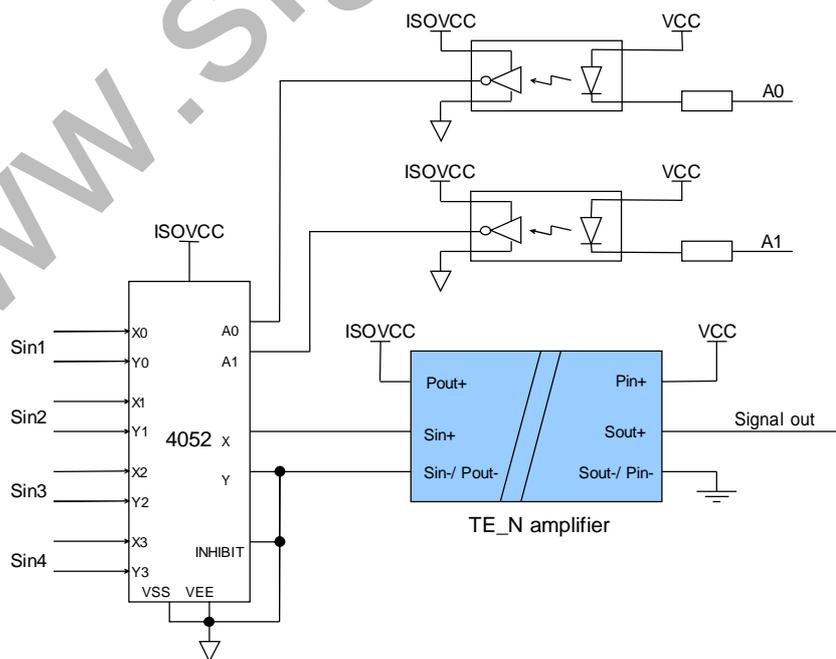


Fig. 2 Multi-channel signal acquisition application circuit

Function

In the figure 2, Sin1~Sin4 are external input signal,A0~A1 are strobe signal, and signal out is an external input signal of control system to accept.

The optocoupler in the circuit implements the isolated transmission of strobe signals. Amplifier of TE-N series implements the isolated transmission of signals and isolated power supplement. The multi-channel strobe chips 4052 implements selective transmission of multiplex signals.

Working principle

When the circuit works, the control system sends out the strobe signal A0~A1. Optical coupling isolation circuit transfers strobe signal to multi-channel strobe chips 4052, and control the chip to correspond channel. External signal Sin1~Sin4 input to multi-channel strobe chips 4052. After a chip strobe, strobe signal transfers to the signal input of TE _ N transmitter. TE_ N transmitter output the isolated input signal to control system, thus it implements the control system and the external signal isolation circuit. Input power of TE_N transmitter and the input Vcc of strobe signal transmission circuit are provided by control system. After strobe signal is isolated, transmission circuit power and multi-channel strobe chips 4052 power supply ISOVCC are provided by power distribution output Pout+.

3) Typical application ——Isolated transmission for electrical signals

Typical application of isolated transmission for electrical signals is below.

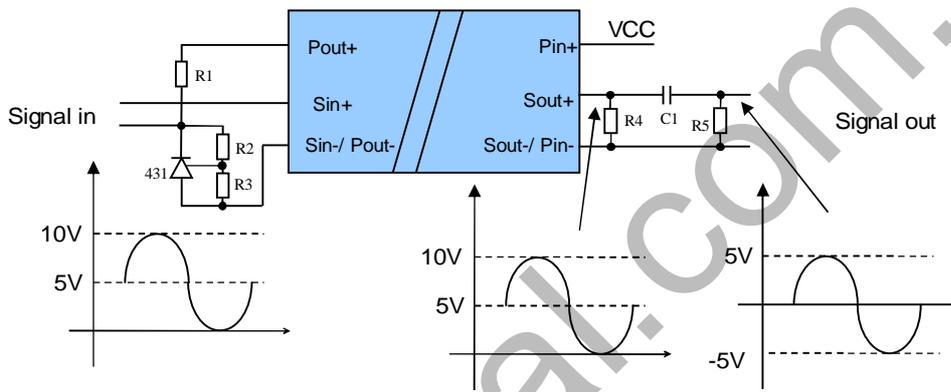


Fig. 3 Isolated transmission for electrical signals application

Function

In the figure 2, Signal in is detected electrical signals, Signal out is electrical signals for control system of isolation transmission. VCC is isolated power supply provided from control system. Typical power signal is positive and negative sine wave signal. 431 R1 R2 and R3 is voltage stabilizing circuit in the circuit, and they can achieve zero adjustment of the input signal. Amplifier of TE_N series achieve signal transmission function and power supply function of voltage stabilizing circuit. R4,R5,C1 achieve DC output signal filtering functions.

Working principle

Supposing detected signal is 5V sine wave signal. When the input signal is passed through stabilizing circuit which is composed of 431,R1,R2 and R3, input signal of TE_N transmitter become 0~10V sine wave signal. If the amplifier is the one which has 0~10V input and 0~10V output, TE_N transmitter output would be output 0~10 v sine wave signal at this time. After passed through filter circuit which is composed of R4,R5 and C1, the DC component of 0~10V sine wave signal is filtered, and the output only have ±5V sine wave signal.

Parameter

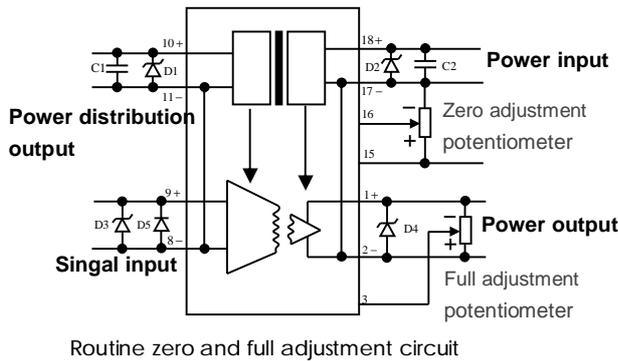
In the application, typical values of R1, R2 and R3 are 10KΩ, and reference Voltage of 413 is 2.5V. Component regulated voltage is 5V. Voltage accuracy can achieve a variety of application requirements of high precision according to the resistance tolerance precision. Typical application range of R4 is 2KΩ~5KΩ. Because signal output voltage is positive and negative, there will be a transmitter output signal current return-irrigation phenomenon when the voltage signal output is negative.R4 should choose a smaller value in order to reduce the influence of the return-irrigation current. C1 should be chosen low internal resistance capacitance. Normally ceramic capacitor with volume more than 10uF will be suitable. Because C1 achieves the function of getting through AC and preventing DC. Large capacitance resistance and small capacitance value can make AC signal distorted. The recommended value of R5 should be more than 100KΩ, and implements a DC signal to zero in the circuit. The increase of value of R5 can make the time of DC signal to zero longer, and make the startup time longer. If load in circuit is too small, then the load for AC will be increased, so that AC signal will be distorted.

Notice

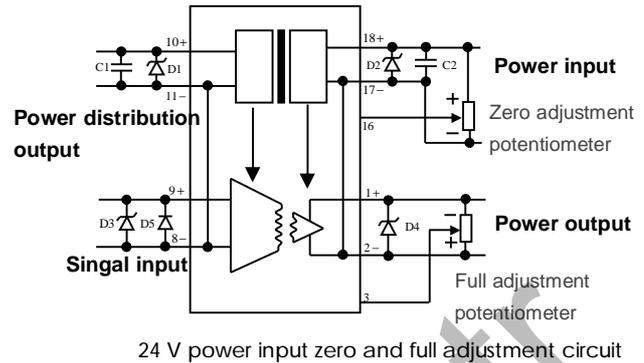
Because the transmitter of TE_N series can not input negative voltage signal, it need to pay attention to narrow signal voltage amplitude and have the necessary margin in the design. It can guarantee the normal work of the circuit and reduce the risk of signal distortion.

4) Application—Zero and full adjustment function

Zero and full adjustment recommended setting circuit is as shown



Routine zero and full adjustment circuit



24 V power input zero and full adjustment circuit

Fig. 4

Function

Zero adjustment function by setting up adjustment resistor at the zero point can change the zero signal transmission, which makes the output signal overall migration. Full adjustment function is also called the gain adjustment function, and it can change the ratio of signal transmission through the set up corresponding adjust resistance at the full adjustment, and the isolation transmission proportion of input and output signal value would be changed.

Usage

Adding and reducing negative zero resistance can reduce the zero of signal output. Adding and reducing positive zero resistance can increase the zero of signal output. Adding and reducing negative full adjustable resistance can reduce the ratio of signal transmission, Adding and reducing positive full adjustable resistance can increase the ratio of signal transmission. You can use potentiometer to adjust the output signal of zero and full in practical application. As shown in the figure 4, the terminal of full or zero adjustment is connected to the sliding of potentiometer, and the both ends of potentiometer is to the zero or full reference of positive and negative regulating reference. Sliding potentiometer to adjust signal full or changing the ratio of rise and fall can also adjust zero and full of the output signal.

As shown in the figure 4, zero positive reference adjusting is different between 24V input product and other power input products, so the zero adjustment circuit is also different. Adjusting the potentiometer to positive can increase zero or full of the corresponding signal. Adjusting the potentiometer to negative can reduce zero or full of the corresponding signal. The maximum recommended range of potentiometer is 10KΩ -1MΩ, detail resistance selection according to the adjustment accuracy. Choose larger resistance potentiometer for high precision fine-tuning. Choose smaller resistance potentiometer for a wide range of rough adjustment.

Notice

The accuracy of transmitter of TE_N series is already 0.1%FS during production and before shipment, using the function of zero and full adjustment will affect original accuracy. Due to the effect on temperature drift of external adjustment resistor and the stability of the potentiometer, temperature drift of product will be changed, too.

The 1:1 ratio for positive resistance and negative resistance of full adjustment potentiometer is desired full adjustment. For the zero adjustment potentiometer, the ratio between positive resistance and negative resistance, which makes the zero point of different products predetermined Zero point is diverse. Please set the value of potentiometer according to actual situation.

2. Recommended EMC circuit

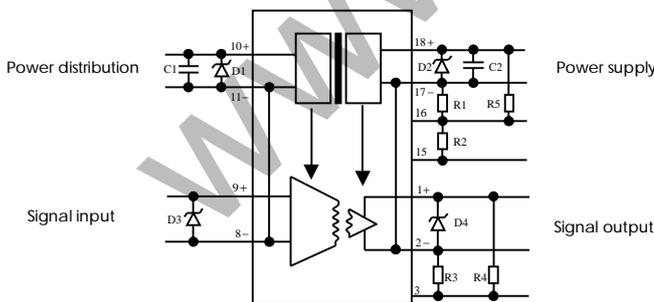
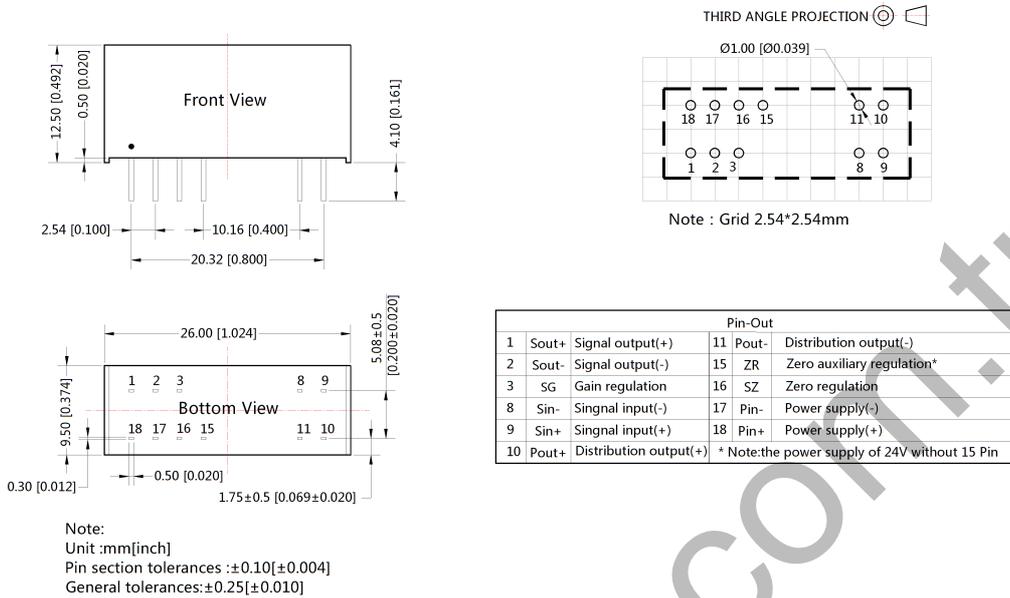


Fig. 5

C1	100uF/35V
C2	100uF/35V
R1	Negative zero adjustment resistance
R2	Positive zero adjustment resistance
R3	Positive gain adjustment resistance
R4	Negative gain adjustment resistance
R5	Positive zero adjustment resistance
D1	SMCJ30A
D2	SMCJ28A
D3	SMBJ15A
D4	SMBJ15A

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

Dimensions and Recommended Layout



Notes:

1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58240002;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this datasheet are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. Specifications of this product are subject to changes without prior notice.

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