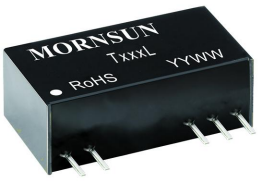
Signal conditioning modules
T_L Series

MORNSUN®

Two-wire loop power supply signal conditioning module
Voltage signal input & current signal output



Patent Protection
CE Report
EN62368-1

3 years Warranty
RoHS

FEATURES

- Small SIP9 size measuring 26 x 9.5 x 12.5mm
- High isolation test voltage of 2kVAC (60s/1mA)
- High accuracy of 0.1% Full Scale
- High linearity of 0.1% Full Scale
- Loop power collection
- Extremely low temperature temperature coefficient of 50PPM/℃
- Operating ambient temperature range -40℃ to +85℃
- ESD protection(±4kV without external components)

T_L series are voltage input and two-wire current output loop power collection signal conditioning module. The module powering the front-end equipment through the back-stage current loop collection mode and transmitting the voltage signal to an industry standard isolated output current. This accurate voltage signal to standard isolated current conversion can be used in a variety of analog instrument input ports such as PLC and DCS systems, or similar. In addition, this module has extremely small SIP9 form factor with excellent temperature drift characteristics of less than 50PPM / ℃ across the entire -40 ℃ to +85 ℃ operating temperature range. This module adopts unique electromagnetic isolation mode that allows it to withstand 2kVAC isolation test voltage between input and output.

Selection Guide

Certification	Model	Power Supply input Typ.(VDC)	Input Signal	Output Signal	Isolated Power Output (VDC)
EN	T747L	10-24	0-2.5V	3.7-22mA	3.3

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Signal Input	Input Signal		See selection guide			
	Input Impedance		10	--	--	MΩ
	Signal Input Range	Voltage signal input	--	--	5	V

Output Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Signal Output	Output Signal		See selection guide			
	Supply Voltage*		10	24	30	V
	The Power Port Equivalent Capacitance		--	--	2.2*1.05	μF
	Load capacity	T747L(Vin: Loop supply voltage)	--	--	(Vin-10)/0.022	Ω
	Load Regulation		--	--	0.05%/100	F.S./Ω
	Low Ripple & Noise	20MHz bandwidth, 250Ω/0.01uF load	--	--	30	mVp-p
Isolation Power Output	Output Voltage	When the input signal is 0V	Nominal -3%	Nominal	Nominal +3%	V
	Maximum Load Current		--	--	4	mA
	Short Circuit Protection		Continuous, auto-recovery			

Notes: *No long-term operation under no-load conditions at maximum voltage

Transmission Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Zero Offset		-0.1%FS	--	+0.1%FS	--
Transmission Error		-0.1%FS	--	+0.1%FS	--

Transmission Band Width	250Ω/0.01uF load	500	--	--	Hz
Response Time		--	--	5	ms
Temperature Coefficient	Operating temperature range: -40℃ to +85 ℃	--	--	50	PPM/℃

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Electric Isolation		Two-terminal (input to output) isolation, isolation power at input side			
Isolation Test	Electric strength test for 1 minute with a leakage current <1mA, humidity <70%RH	2	--	--	KVAC
Insulation Resistance	At 500VDC	100	--	--	MΩ
Operating Temperature		-40	--	+85	℃
Transportation and Storage Temperature		-50	--	+105	
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	SIP9
Weight	6.3g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emission	CE	CISPR22/EN55022	CLASS A (see Fig.3 for recommended circuit)	
	RE	CISPR22/EN55022	CLASS A (see Fig.3 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	Power port ±2kV (see Fig. 3-① for recommended circuit)	perf. Criteria B
		IEC/EN61000-4-4	Signal port ±1kV (see Fig. 3-② for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	Power port ±1kV(line to line) / ±2kV(line to ground) (see Fig. 3-① for recommended circuit)	perf. Criteria B
		IEC/EN61000-4-5	Signal port ±1kV (line to ground) (see Fig. 3-② for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

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 and 220V AC 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

See *Application Notes for Isolated Transmitter* for details.

Design Reference

1. Typical application

1) Schematic diagram

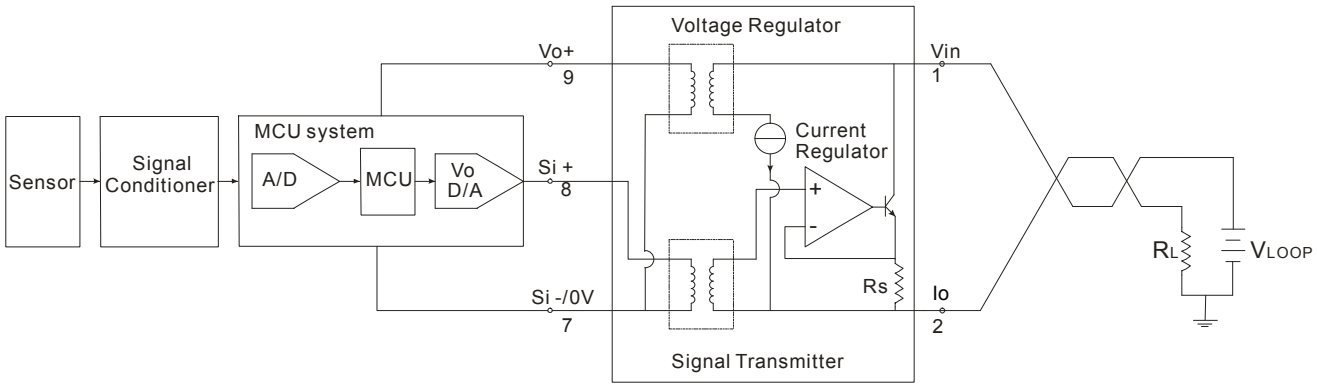


Fig. 1

Functional Description

The picture shows the way an application module with MCU system together constitute the signal conversion, isolation transfer functions.

How it Works

As shown, the signal conditioning unit VLoop take power from the output circuit for signal input device provides one isolated power Vo +; MCU for the first stage of the system power supply. The strain sensor output signal after signal conditioning unit into the MCU system, by the MCU system the collected signal processing, computing, and then the D/A converter, converted to a voltage signal. Module receives the voltage signal, the internal precision isolation transferred to the output, and converted to standard current signal output to VLoop loop.

The system of the sensor signal to the standard current signal isolation transmission, the output remotely, using the sampling resistor RL, the current signal can be converted to a voltage signal, the various instruments of the type of input signal to the output of the module match.

2) Schematic diagram of signal input and signal output(Ideal state)

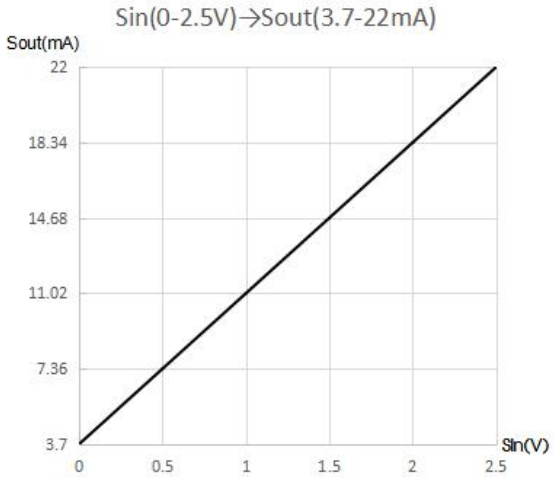


Fig. 2

2. EMC compliance, recommended circuit

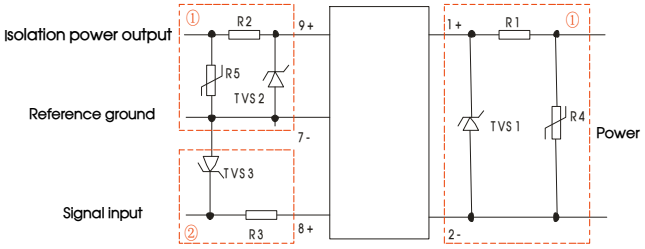


Fig.3

R1、R2、R3	12Ω/2W
R4、R5	14D330
TVS1	SMCJ30A
TVS2	SMCJ6.5A
TVS3	SMBJ5A

3. Wiring diagram for product application

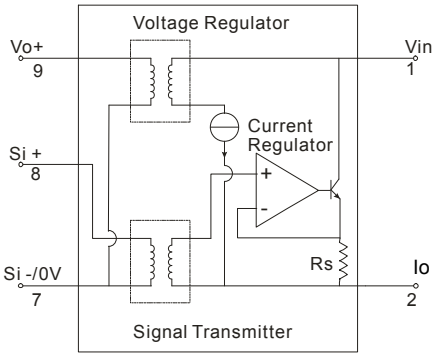
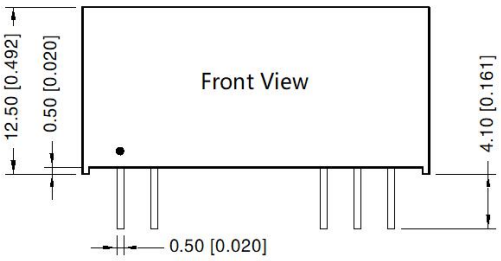
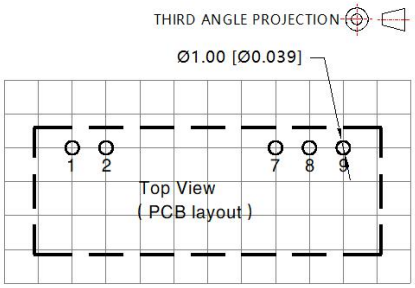


Fig.4

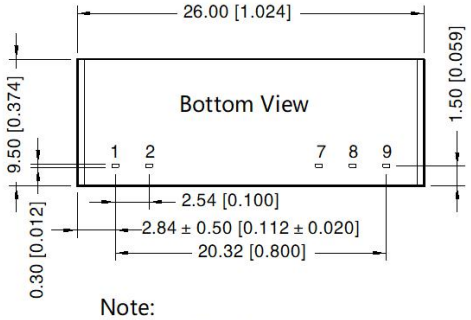
4. For additional information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout





Note: Grid 2.54*2.54mm



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

Pin-Out		
Pin	Function	
1	Vin	Power input
2	Io	Current output
7	0V/Si–	Signal input(–)
8	Si+	Signal input(+)
9	Vo+	Isolation Power output(+)

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58210006;
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, please contact our technicians directly for specific information;
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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