

Single high speed RS485 isolation transceiver module (automatic switching)



RoHS

## FEATURES

- Integrated high efficient isolated DC-DC converter
- High baud rate of up to 115200bps
- Two-port isolation test voltage(2.5kVDC)
- Operating ambient temperature range: -40°C to +85°C
- The bus supports maximum 32 nodes
- Set isolation and ESD bus protection in one
- Automatic send and receive data function
- EN60950 approval

The main function of the TD301D485H-A / TD501D485H-A series is to convert a logic level signal into isolated RS485 differential level signals. The special integrated IC technology of the RS485 transceiver achieves isolation between the power supply and the signal lines isolation, does RS485 communication and protects the bus all in one and the same module. The product's isolated power supply withstands a test voltage of up to 2500VDC. In addition, the product features an automatic switching function, that no longer requires the need to pass through the node to send and receive control signals, which to a certain extent, reduces the design complexity. Also, they can easily be embedded in the user's end equipment, to achieve fully functional RS485 network connections.

## Selection Guide

Certification	Part No.	Power input (VDC)	Baud rate (bps)	Static Current (mA)	Max. Operating Current (mA)	Number of Nodes
CE	TD301D485H-A	3.17-3.45	115200	40	70	32
	TD501D485H-A	4.75-5.25	115200	40	70	32

## Input Specifications

Item	Operating Conditions	Value	
Power Input	Static Current	Power on, no communication	≤40mA
	Send Current	115200bps Square wave communication	≤70mA
Input Port	Serial Interface	TD301D485H-A	Compatible with + 3.3 V UART interface only
		TD501D485H-A	Compatible with + 5V UART interface only
Pin Current		$I_{TXD} \leq 2mA; I_{RXD} \leq 2mA;$	

## Bus Interface

Item	Operating Conditions	Value
Output Port	RS485 Bus Interface	Standard RS485 interface, pull-up and pull-down resistors with 4.7kΩ each on A and B channels.

## Transmission Specifications

Item	Operating Conditions	Value				
Data Rate		115200bps (max.)				
Number of Nodes		Up to 32 nodes connected on one bus				
Transceiver Control		Half duplex, automatic transmission				
Truth Table	Send status	Input		Output		
		--	TXD	A	B	Line state
		--	1	1	0	Normal
	--	0	0	1	Normal	
	Receive status <sup>①</sup>	Input		Output		
		--	A-B	RXD		
		--	≥-10mV	1		
		--	≤-200mV	0		
		--	-200mV < V <sub>A</sub> -V <sub>B</sub> < -10mV	Undefined state		

Note: ①Receiving threshold varies with Vcc will produce subtle error.

### General Specifications

Item	Operating Conditions	Value
Electric Isolation		Two-terminal isolation (input and output are mutually isolated)
Isolation Test	Electric Strength Test for 1 min., leakage current <5mA	2.5kVDC
Operating Temperature		-40°C to +85°C
Transportation and Storage Temperature		-50°C to +105°C
Operating Humidity		10% - 90%
Max. Casing Temperature	Ta=25°C	25°C(Typ.)
Safety Standard		EN60950
Safety Certification		EN60950
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 flame-retardant heat-proof plastic (UL94-V0)
Dimensions	DIP10
Weight	4g (Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (see 2-②)	
	RE	CISPR32/EN55032	CLASS A (see 2-②)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
	EFT	IEC/EN61000-4-4	Power supply port ±2kV	(see 2-①) perf. Criteria B
		IEC/EN61000-4-4	Signal port ±1kV	(see 2-③) perf. Criteria B
	Surge	IEC/EN61000-4-5	Power supply port ±1kV (line to line)	(see 2-①) perf. Criteria B
			Signal port ±0.25kV (line to line)/ ±0.5kV (line to ground)	(see 2-③) perf. Criteria B
			Signal port ±0.5kV (line to line)/ ±1kV (line to ground)	(see 2-③) perf. Criteria B
			Signal port ±1kV (line to line)/ ±2kV (line to ground)	(see 2-③) perf. Criteria B
			Signal port ±2kV (line to line)/ ±4kV (line to ground)	(see 2-③) perf. Criteria B
Signal port ±4kV (line to line)/ ±6kV (line to ground)	(see 2-③) perf. Criteria B			

### Application Precautions

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

#### After-sales service

- 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;
- 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

Refer to the *RS485 Isolated Industrial Bus Interface Module Application Manual*.

Design Reference

1. Typical application circuit

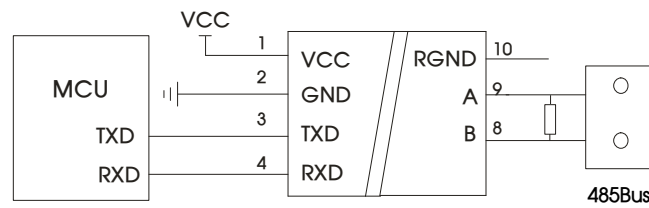


Fig. 1

2. Recommended port protection circuit

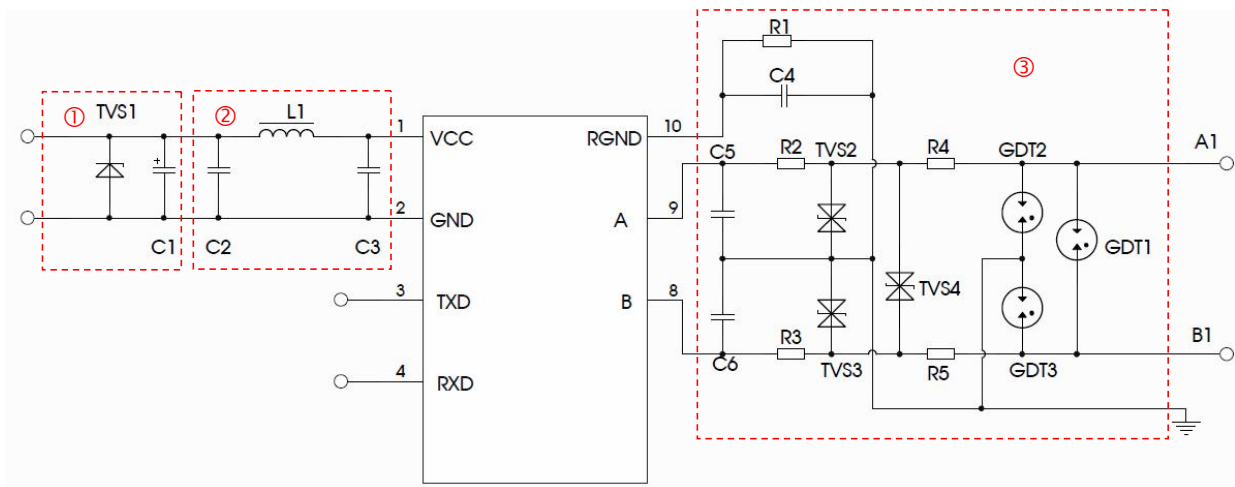


Fig. 2

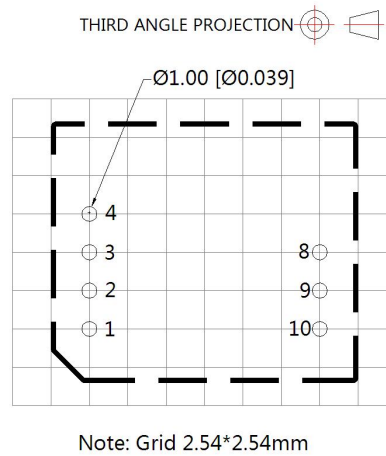
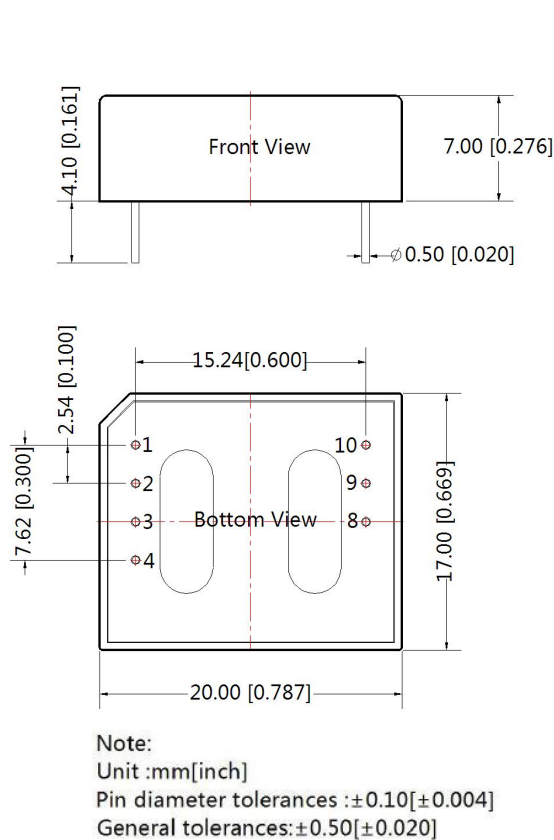
Recommended components and values:

Model	TD301D485H-A / TD501D485H-A				
	±0.25kV/±0.5kV	±0.5kV/±1kV	±1kV/±2kV	±2kV/±4kV	±4kV/±6kV
C1	220uF/10V(Electrolytic capacitor)		220uF/10V(Electrolytic capacitor)		
TVS1	SMCJ5.0A (TD301D485H-A) / SMCJ6.5A(TD501D485H-A)				
C2/C3	1uF/50V		1uF/50V		
L1	10uH		10uH		
C5/C6	100pF/100V		100pF/100V		
C4	1nF/2kV		1nF/2kV		
R1	1MΩ		1MΩ		
TVS2/TVS3/TVS4	SMBJ15CA		SMBJ15CA		
R4/R5	--	--	10Ω /2W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)
R2/R3	10Ω /1W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)	--	--	--
GDT1/GDT2/GDT3	--	--	G30-A90X	S30-A90X	S50-A90X

Notes: GDT1/GDT2/GDT3 can be replaced by a three terminal gas discharge tube.  
For example, GDT1/GDT2/GDT3 can be replaced by B3D090L-C.

3. For additional information, please refer to our application note on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Pin-Out		
Pin	Designation	Function
1	VCC	Input Power
2	GND	GND
3	TXD	TD_D485H Send Pin
4	RXD	TD_D485H Receiving Pin
8	B	TD_D485H B Pin
9	A	TD_D485H A Pin
10	RGND	Isolation Power Output RGND

Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). The Packaging bag number: 58040012;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, 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.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China  
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: sales@mornsun.cn