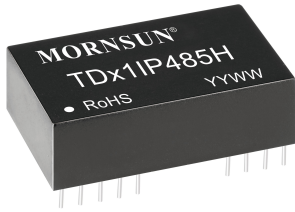


Dual high speed RS485 dual isolated transceiver module (Power distribution)



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

The main function of the TD31IP485H/TD51IP485H 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. It has two way independent of RS485 network function, and the two-port RS485 networks are isolated. 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)	Isolated power output (typ.)(VDC)	Number of Nodes
--	TD31IP485H	3.17-3.45	115200	50	121	5	32
	TD51IP485H	4.75-5.25	115200	30	80	5	32

Input Specifications

Item	Operating Conditions		Value
Power Input	Static Current	Power on, no communication	TD31IP485H≤50mA, TD51IP485H≤30mA
	Send Current	115200bps Square wave communication	TD31IP485H≤121mA, TD51IP485H≤80mA
Input	Serial Interface	TD31IP485H	Compatible with + 3.3V UART interface only
		TD51IP485H	Compatible with + 5V UART interface only
	Pin Current		I <sub>TXD</sub> ≤2mA; I <sub>RXD</sub> ≤2 mA; I <sub>CON</sub> ≤5mA

Bus Interface

Item	Operating Conditions		Value
Output	RS485 Bus Interface		Standard RS485 interface, pull-up and pull-down resistors with 4.7kΩ each on A and B channels.
	Isolated Power Output		Nominal 5V, ≤0.15W

Transmission Specifications

Item	Operating Conditions		Value			
Data Rate			115200bps (max.)			
Transceiver Switching Delay			30us -100us Delay time (min. to max.) for transition from receiving data to sending data			
Number of Nodes			Up to 32 nodes connected on one bus			
Transceiver Control			Refer to below truth table			
Truth Table	Sending status	Input		Output		
		CON	TXD	A	B	Line state
		0	1	1	0	Normal
		0	0	0	1	Normal
	Receiving status <sup>①</sup>	Input		Output		
		CON	A-B	RXD		
		1	≥-10mV	1		
		1	≤-200mV	0		
		1	-200mV < V <sub>A</sub> -V <sub>B</sub> < -10mV	Undefined state		

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

### General Specifications

Item	Operating Conditions	Value
Electric Isolation		Two-terminal isolation (input to output) isolation
Isolation Test	Electric Strength Test for 1 min., leakage current <5mA	2500VDC
Operating Temperature		-40°C to+85°C
Transportation and Storage Temperature		-50°C to+105°C
Operating Humidity		10% - 90%
Casing Temperature Rise	Ta=25°C	25°C (Typ.)
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)
Package	DIP24
Weight	11.0g (Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

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

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

Design Reference

1. Typical application circuit

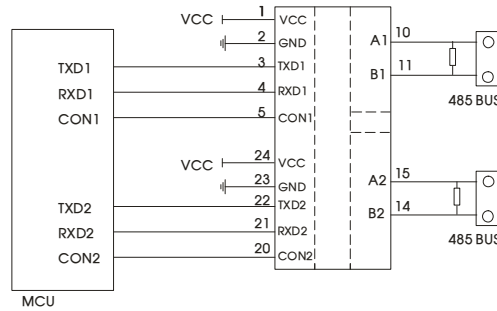


Fig. 1

Note: 1 pin and 24 pin are internal connected, 23 pin and 2 pin are internal connected.

2. Recommended port protection circuit

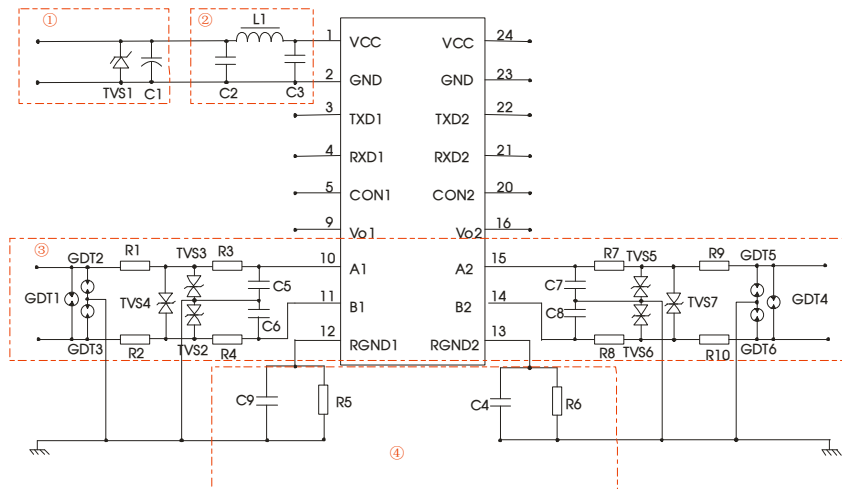


Fig. 2

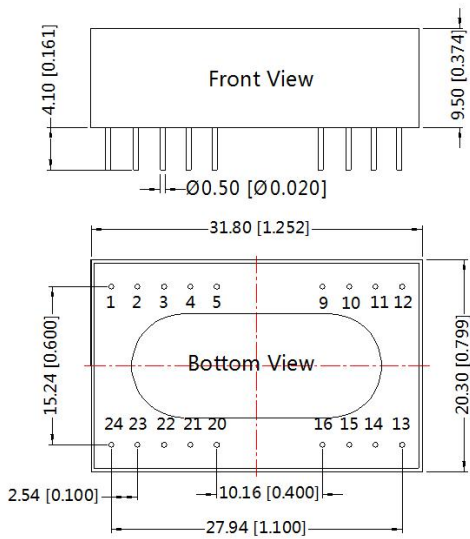
Recommended components and values:

Model	TD31IP485H / TD51IP485H				
	±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 (TD31IP485H) / SMCJ6.5A(TD51IP485H)				
C2/C3	1uF/50V		1uF/50V		
L1	10uH		10uH		
C5/C6/C7/C8	100pF/100V		100pF/100V		
C4/C9	1nF/2kV		1nF/2kV		
R5/R6	1MΩ		1MΩ		
TVS2/TVS3/TVS4	SMBJ15CA		SMBJ15CA		
TVS5/TVS6/TVS7	SMBJ15CA		SMBJ15CA		
R1/R2/R9/R10	--	--	10Ω /2W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)
R3/R4/R7/R8	10Ω /1W(Wire-wound resistor)	10Ω /2W(Wire-wound resistor)	--	--	--
GDT1/GDT2/GDT3	--	--	G30-A90X	S30-A90X	S50-A90X
GDT4/GDT5/GDT6	--	--	G30-A90X	S30-A90X	S50-A90X

Notes: GDT1/GDT2/GDT3 can be replaced by a three terminal gas discharge tube, the same as GDT4/GDT5/GDT6.  
For example, GDT1/GDT2/GDT3 and GDT4/GDT5/GDT6 can be replaced by B3D090L-C.

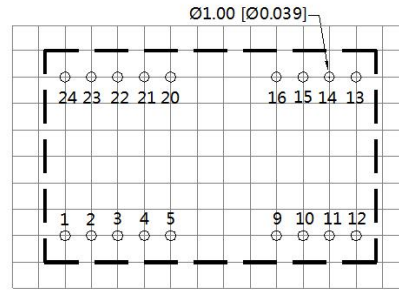
3. For additional information, please refer to our application note on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.50[\pm 0.020]$

THIRD ANGLE PROJECTION



Note : Grid 2.54\*2.54mm

Pin-Out					
Pin	Designation	Function	Pin	Designation	Function
1,24	VCC	Input Power +	12	RGND1	Channel 1 Isolation Power Output RGND
2,23	GND	GND	13	RGND2	Channel 2 Isolation Power Output RGND
3	TXD1	Channel 1 TD_P485H Send Pin	14	B2	Channel 2 B Pin
4	RXD1	Channel 1 TD_P485H Receiving Pin	15	A2	Channel 2 A Pin
5	CON1	Channel 1 Send&Receiving Control Pin	16	Vo2	Channel2 Isolation Power Output +5V
9	Vo1	Channel 1 Isolation Power Output +5V	20	CON2	Channel2 Send&Receiving Control Pin
10	A1	Channel 1 A Pin	21	RXD2	Channel2 TD_P485H Receiving Pin
11	B1	Channel 1 B Pin	22	TXD2	Channel1 TD_P485H Send Pin

Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). The Packaging bag number: 58210008;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on company corporate standards;
- 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;
- We can provide product customization service;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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