

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℃ to +85℃
- The bus supports maximum 128 nodes
- Set isolation and ESD bus protection in one
- Automatic send and receive data function

The main function of the TD301D485H-AB 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
--	TD301D485H-AB	3.17-3.45	115200	40	70	128

Input Specifications

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

Bus Interface

Item	Operating Conditions	Value
Output Port	RS485 Bus Interface	Standard RS485 interface, pull-up and pull-down resistors with $51\text{k}\Omega$ each on A and B channels.

Transmission Specifications

Item	Operating Conditions	Value			
Data Rate		115200bps (max.)			
Number of Nodes		Up to 128 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 ^①	Input		Output	
		A-B		RXD	
		≥-20mV		1	
		≤-220mV		0	
		-220mV<V _A -V _B <-20mV		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, humidity <95%RH.	2.5kVDC
Operating Temperature		-40℃ to +85℃
Transportation and Storage Temperature		-50℃ to +105℃
Operating Humidity		10% - 90%
Case Temperature	Ta=25℃	25℃(Typ.)
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	Typ. 4.0g
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 ±2kV (line to line)/ ±4kV (line to ground) (see 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;
5. If the external input of TXD is insufficient, the pull-up resistor should be added according to the situation;
6. Hot swapping is not supported.

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

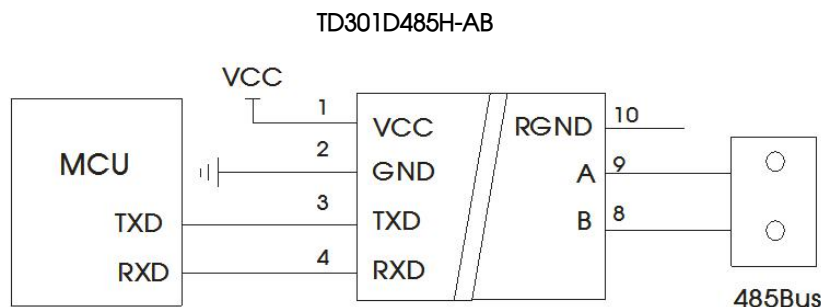


Fig. 1

2. Recommended port protection circuit

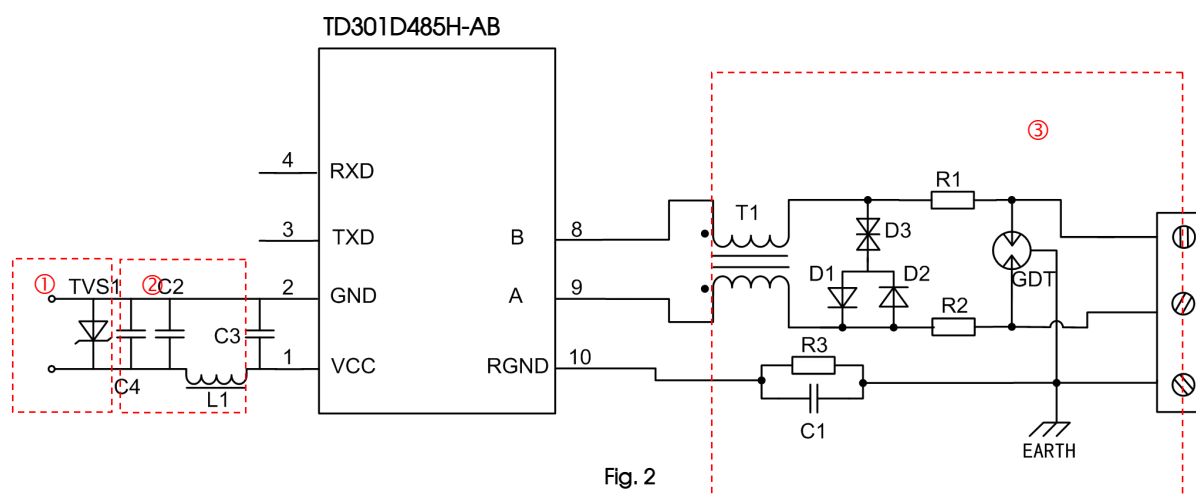


Fig. 2

Recommended components and values:

Component	Recommended part, value	Component	Recommended part, value
R3	1M Ω	R1, R2	2.7 Ω /2W
C1	1nF, 2kV	D1, D2	1N4007
T1	ACM2520-301-2P	D3	SMBJ8.5CA
GDT	B3D090L	L1	10uH
C2, C3	1uF/50V	TVS1	SMCJ5.0A
C4	220uF/10V(Electrolytic capacitor)		

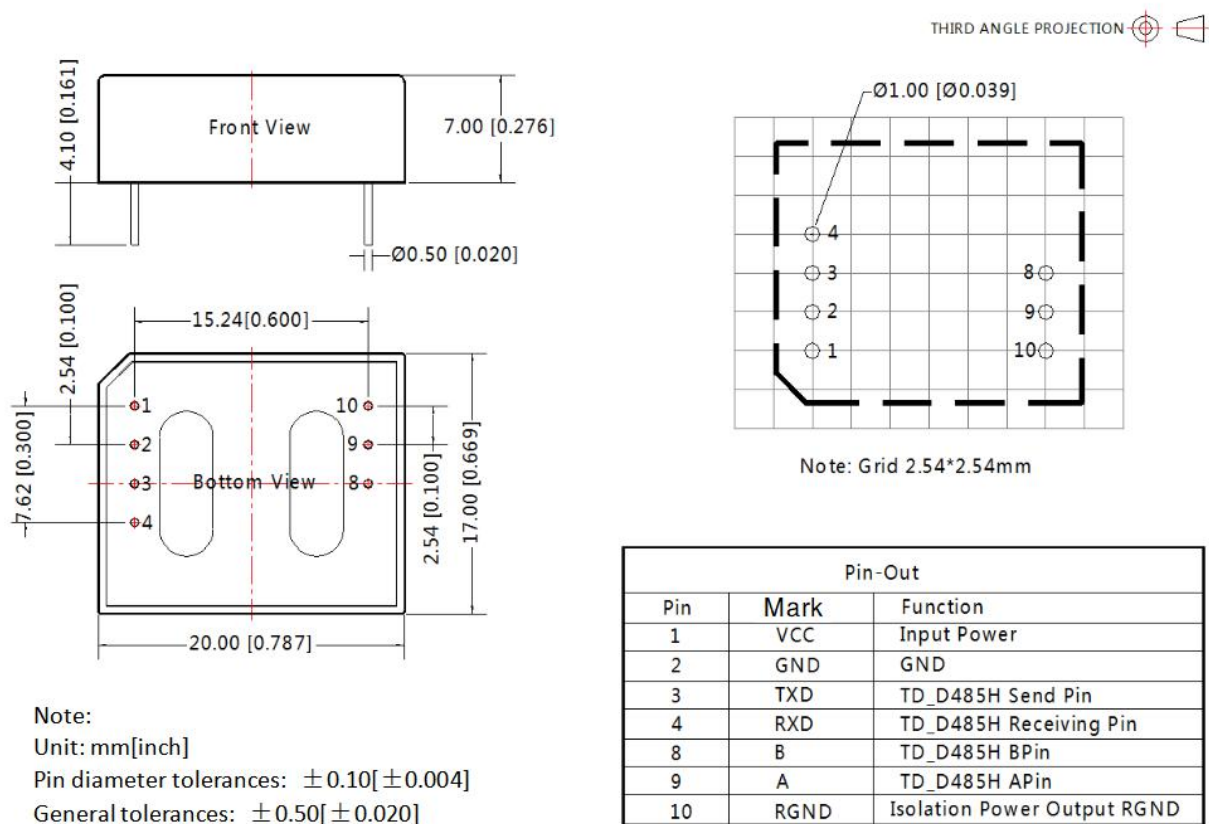
As the modules internal A / B lines come with its own ESD protection, which generally satisfy most application environments without the need for additional ESD protection devices, as shown in the typical circuit in Figure 1. For harsh and noisy application environments such as motors, high voltage/current switches, lightning and similar however, we recommended that the user protects the module's A / B lines with additional measures and external components such as TVS, common mode inductors, gas discharge tube, shielded twisted pair of wires with the same single network Earth point. Figure 2 shows our recommended circuit diagram for such type of applications with components and values given in the table above. This recommendation is for reference only and may have to be adapted accordingly with appropriate component values in order to match the actual situation and application.

3. Precautions

- 1) TD301D485H-AB is for 3.3V TTL level only (not compatible with 5V).
- 2) Pin5, 6, 7 are not drawn. Please leave pin 10 open if unused.
- 3) We recommend using a shielded twisted pair of wires for the Data transmission line and using same single point earth connection for each of the networks.
- 4) Reference the truth table characteristics: When the A / B line differential voltage of the series of embedded isolated RS-485 transceiver module is $\geq -20\text{mV}$, the modules receiving level is high and when the A / B line differential voltage is $\leq -220\text{mV}$ the modules receiving level is low; the modules receiving level is undefined when the A / B line differential voltage is greater than -220mV but less than -20mV , so the design is to ensure that the module will not be receiving this state. Depending on the actual situation, it is up to the user of the RS-485 network design or application to decide whether to add a 120Ω termination resistor. Avoiding data communication errors: Regardless if the RS-485 network is static or dynamic, it is essential to avoid that the differential voltage of A / B line ever comes between -220mV and -20mV .

4. For additional information, please refer to our application note on www.mornsun-power.com

Dimensions and Recommended Layout



Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58040012;
2. 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;
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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