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Duplex high speed RS485 isolation transceiver module (Automatic switch to send and receive)

3 years Warranty

CE **Report** EN62368-1 RoHS

FEATURES

- Integrated high efficient isolated DC-DC converter
- Automatic send and receive data function
- High baud rate of up to 120kbps
- Three-port isolation test voltage(2.5kVDC)
- Operating ambient temperature range:-40℃ to +85℃
- The bus supports support maximum 32 nodes
- Set isolation and ESD bus protection in one

The main function of the TD322D485H-A / TD522D485H-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 Supply input (VDC)	Baud rate (kbps)	Static Current (mA)	Max. Operating Current (mA)	Number of Nodes
EN	TD322D485H-A	3.15-3.45	120	38	120	32
	TD522D485H-A	4.75-5.25	120	35	120	32

Absolute Limits

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec.max.)	3.3V series	-0.7	--	5	VDC
	5.0V series	-0.7	--	7	
Pin Soldering Temperature	Soldering spot 1.5mm away from case, 10s max.	--	--	300	℃

3.3V Input Specifications

Item		Symbol	Min.	Typ.	Max.	Unit
Power Supply Input Voltage		VCC	3.15	3.3	3.45	VDC
TXD Logic Level	High-level	V_{IH}	0.7VCC	3.3	3.6	
	Low-level	V_{IL}	0	--	0.8	
RXD Logic Level	High-level	V_{OH}	VCC-0.4	3.1	--	
	Low-level	V_{OL}	--	0.2	0.4	
TXD Drive Current		I_T	2	--	--	mA
RXD Output Current		I_R	--	--	10	
Serial Interface	Compatible with + 3.3 V UART interface only					

5.0V Input Specifications

Item		Symbol	Min.	Typ.	Max.	Unit
Power Supply Input Voltage		VCC	4.75	5	5.25	VDC
TXD Logic Level	High-level	V_{IH}	0.7VCC	5	5.5	
	Low-level	V_{IL}	0	--	0.8	
RXD Logic Level	High-level	V_{OH}	VCC-0.4	4.8	--	
	Low-level	V_{OL}	--	0.2	0.4	
TXD Drive Current		I_T	2	--	--	mA
RXD Output Current		I_R	--	--	10	
Serial Interface	Compatible with + 5 V UART interface only					

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Transmission Specifications

Item		Symbol	Min.	Typ.	Max.	Unit
Data Delay	TXD Transmitter Delay	t_T	--	--	400	ns
	RXD Receiver Delay	t_R	--	50	110	

Output Specifications

Item	Symbol	Min.	Typ.	Max.	Unit
Difference Level	$V_{diff(d)}$, no load	1.5	--	5.5	VDC
Difference Input Impedance	$-7V \leqslant V_{CM} \leqslant +12V$	96	--	--	$k\Omega$
Built-in Pull-down Resistor		--	5.1	--	
Bus Interface Protection	ESD protection				

Truth Table Specifications

Transceiver Control	Input		Output		
Send Status	TXD		A	B	RXD
	1		1	0	1
	0		0	1	1
Receive Status[①]	V_A-V_B		RXD		
	$\geqslant$-20mV		1		
	$\leqslant$-220mV		0		
	-220mV$<$$V_A$-$V_B$$<$-20mV		Undefined state		

Note: The receive threshold varies slightly with Vcc.

General Specifications

Item	Operating Conditions	Value
Isolation Test	Electric strength test for 1 minute, leakage current <1mA	2500VDC
Insulation Resistance	At 500VDC	1000MΩ
Operating Temperature		-40℃ to +85℃
Transportation and Storage Temperature		-50℃ to +105℃
Operating Humidity	Non-condensing	10% - 90%
Max. Case Temperature	Ta=25℃, free air convection	25℃
Safety Standard		EN62368-1 (Report)
Safety Class		CLASS III

Physical Specifications

Item	
Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	20.00 x 17.00 x 7.00 mm
Weight	4.0g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without external components)	
Immunity	ESD	IEC/EN 61000-4-2	Contact±4kV/Air±8kV (without external components, Signal port)	Perf. Criteria B
	EFT	IEC/EN 61000-4-4	±2kV (see Fig.2, Signal port)	Perf. Criteria B
	Surge	IEC/EN 61000-4-5	±2kV (line to ground, without external components, Signal port)	Perf. Criteria B
	CS	IEC/EN 61000-4-6	3Vr.m.s (without external components)	Perf. Criteria A

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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 AC power supply is prohibited;

4. It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction.

5. Hot-swap is not supported.

6. If the external input of TXD is insufficient, the pull-up resistor should be added according to the situation.

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.

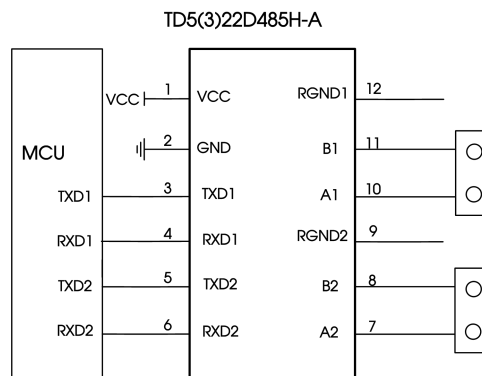## Design Reference

1. Typical application circuit

Fig.1: Typical application

Figure 1 shows a typical connection circuit for the isolated transceiver module TD322D485H-A and TD522D485H-A. The TD522D485H-A module's power supply must be 5V and match the module's TXD and RXD pin interface level of 5V (not supporting any 3.3V system levels). Accordingly, TD322D485H-A module's power supply must be 3.3V and match the module's TXD and RXD pin interface level of 3.3V (not supporting any 5V system levels).
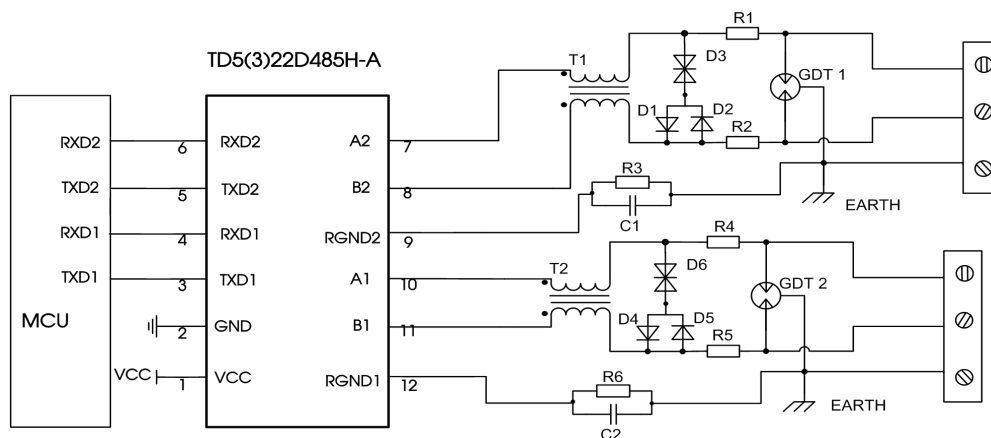
2. Recommended port protection circuit

Fig.2: Port protection circuit for harsh environments

Note: Ground shield of twisted wire pair reliably.

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Recommended components and values:

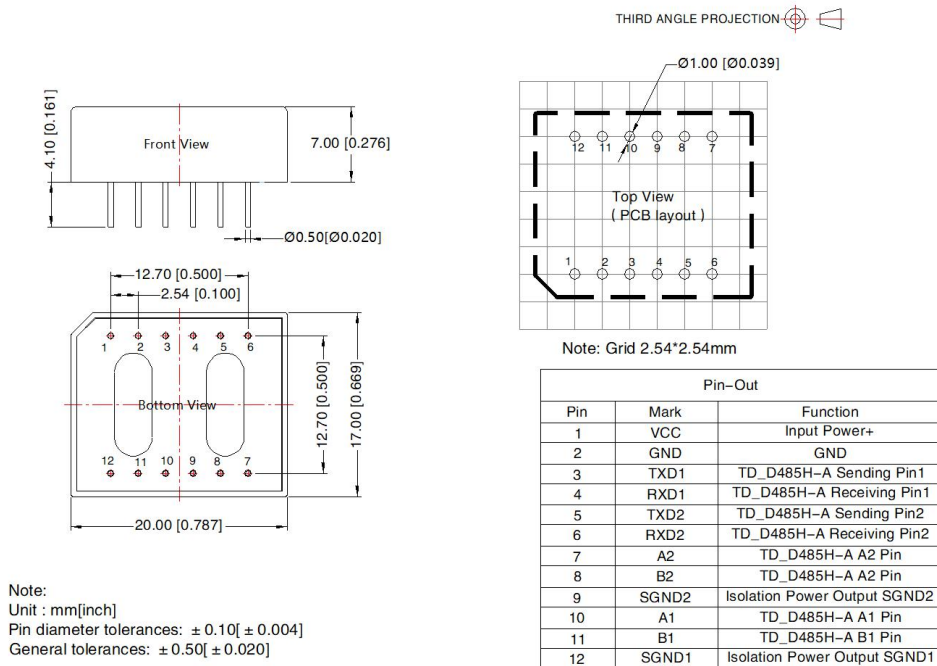| Component	Recommended part, value	Component	Recommended part, value
R3、R6	1MΩ	R1、R2、R4、R5	2.7Ω/2W
C1、C2	1nF, 2kV	D1、D2、D4、D5	1N4007
T1、T2	ACM2520-301-2P	D3、D6	SMBJ8.5CA
GDT 1、GDT 2	B3D090L		

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) TD522D485H-A is for 5V TTL level only (not compatible with 3.3V TTL level); TD322D485H-A is for 3.3V TTL level only (not compatible with 5V).

2) 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.

3) Reference the truth table characteristics: When the A / B line differential voltage of the series of embedded isolated RS-485 transceiver module is ≥ -20mV, the modules receiving level is high and when the A / B line differential voltage is ≤ -220mV 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 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 more information, please find the application note on www.mornsun-power.com

Dimensind Recommended Layout

THIRD ANGLE PROJECTION

Note: Grid 2.54*2.54mm

Note:
Unit : mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Pin-Out		
Pin	Mark	Function
1	VCC	Input Power+
2	GND	GND
3	TXD1	TD_D485H-A Sending Pin1
4	RXD1	TD_D485H-A Receiving Pin1
5	TXD2	TD_D485H-A Sending Pin2
6	RXD2	TD_D485H-A Receiving Pin2
7	A2	TD_D485H-A A2 Pin
8	B2	TD_D485H-A A2 Pin
9	SGND2	Isolation Power Output SGND2
10	A1	TD_D485H-A A1 Pin
11	B1	TD_D485H-A B1 Pin
12	SGND1	Isolation Power Output SGND1

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Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58040014;

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 technical staff;

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.