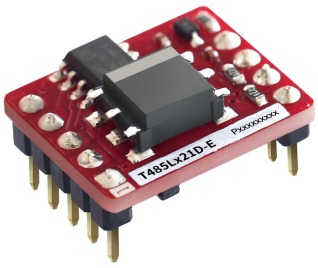
Descriptions

Single high-speed RS485 isolated transceiver module (enhanced)



RoHS

3 Years Warranty

CE Report UKCA Report

EN62368-1 BS EN62368-1

Features

- Integrated highly efficient isolated DC-DC converter
- High baud rate of up to 500kbps
- Two-port isolation test voltage(3.0kVDC)
- Operating ambient temperature range: -40℃ to +85℃
- The bus supports maximum 256 nodes
- Integrated isolation and ESD bus protection

Applications

- Industrial Automation
- Building Automation
- Smart Electricity Meter
- Remote Signal Interaction, Transmission

Selection Guide

Certification	Part No.	Mark	Power Input (VDC)	Baud Rate (kbps)	Static Current (mA)	Max. Operating Current (mA)	Isolated Power Output (typ.)(VDC)	Number Of Nodes
EN/BS EN	T485L321D-E	321RHE	3.15-3.45	500	40	130	5	256
	T485L521D-E	521RHE	4.75-5.25	500	42	130	5	256

Specifications

Product feature	Item		Operating Conditions	Min.	Typ.	Max.	Unit
Absolute Limits	Input Surge Voltage (1sec.max.)		3.3V series	-0.7	--	5	VDC
			5.0V series	-0.7	--	7	
	Pin Welding Resistance Temperature		Soldering time 10s max.	--	--	300	℃
3.3V Input Specifications	Power Supply Input Voltage		VCC	3.15	3.3	3.45	VDC
	TXD Logic Level	High-level	VIH	0.7VCC	3.3	3.6	
		Low-level	VIL	0	--	0.8	
	RXD Logic Level	High-level	VOH	VCC-0.4	3.1	--	
		Low-level	VOL	0	0.2	0.4	
	TXD Drive Current		IT	2	--	--	mA
	CON Drive Current		ICON	--	--	5	
	RXD Output Current		IR	--	--	2	
	Serial Interface		Compatible with + 3.3 V UART interface only				
5.0V Input Specifications	Power Supply Input Voltage		VCC	4.75	5	5.25	VDC
	TXD Logic Level	High-level	VIH	0.7VCC	5	5.5	
		Low-level	VIL	0	--	0.8	
	RXD Logic Level	High-level	VOH	VCC-0.4	4.8	--	
		Low-level	VOL	0	0.2	0.4	
	TXD Drive Current		IT	2	--	--	mA
	CON Drive Current		ICON	--	--	5	
	RXD Output Current		IR	--	--	2	
	Serial Interface		Compatible with + 5 V UART interface only				
Transmission Specifications	Data Delay	TXD Transmitter Delay	tT	--	--	110	ns
	Differential load resistance	RXD Receiver Delay	tR	--	--	110	
	Transceiver switching delay time		Switch from receiving data to sending data	--	5	18	us
			Switch from sending data to receiving data	--	30	100	
Output Specifications	Difference Level		Vdiff(d), R_L=54Ω	1.5	2	--	VDC
	Difference load resistance			54	--	--	Ω
	Difference Input Impedance		-7V≤V_{CM}≤+12V	96	--	--	kΩ
	Built-in pull-down resistor			--	120	--	
	Isolated power output voltage①		Nominal input voltage	4.9	5	5.3	VDC
	Bus Interface Protection		ESD protection				
General Specifications	Isolation Test		Electric Strength Test for 1 min., leakage current <1mA	3000VDC			
	Insulation Resistance		At 500VDC	1000MΩ (input-output)			

	Operating Temperature	-40℃ to +85℃				
	Transportation and Storage Temperature	-50℃ to +105℃				
	Operating Humidity	Non-condensing	10% - 90%			
	Safety Class	CLASS III				
Mechanical Specifications	Dimensions	DIP10				
	Weight	1.9g (Typ.)				
	Cooling Method	Free air convection				
Truth Table Specifications	Send status	CON	TXD	A	B	RXD
		0	1	1	0	1
		0	0	0	1	1
	Receive status②	CON	V_A-V_B	RXD		
		1	≥-20mV	1		
		1	≤-220mV	0		
		1	-220mV < V_A-V_B < -20mV	Undefined state		

Note:
①Isolated output power pins are for external pull-up, pull-down resistors only (recommended maximum current <25mA) and are not meant for any other purpose;
②Receiving threshold varies with Vcc will produce subtle error.

Electromagnetic Compatibility (EMC)

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

Application Precautions

1.Carefully read and follow the instructions before use;

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. 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;

7. The various components of the product may have inconsistent screens due to different production batches, it does not affect the product performance.

Design Reference

1.Typical application circuit

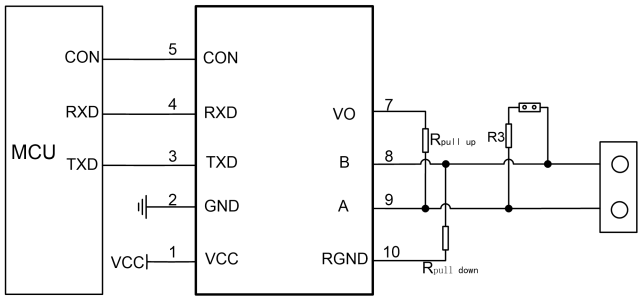


Fig. 1: Typical application

Figure 1 shows a typical connection circuit for the isolated transceiver module T485L321D-Eand T485L521D-E. The T485L521D-E module's power supply must be 5V and match the module's TXD, RXD and CON pin interface level of 5V (not supporting any 3.3V system levels). Accordingly, T485L321D-Emodule's power supply must be 3.3V and match the module's TXD, RXD and CON pin interface level of 3.3V (not supporting any 5V system levels).

The module has a built-in 120kΩ pull-down resistor, which under normal circumstances meets the demand for the use of internal pull-up and pull-down resistors. Depending on the actual circuit, the use of additional external R pull-up and R pull-down resistor may be chosen.

2.Recommended port protection circuit

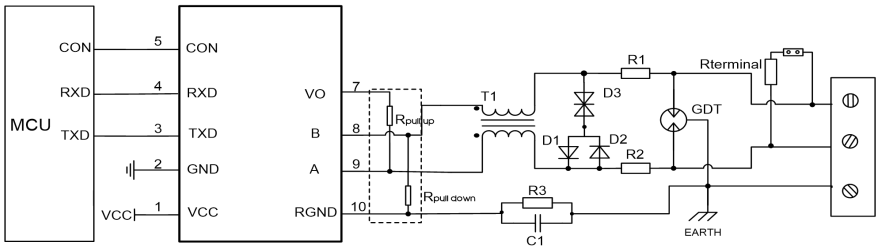


Fig. 2: Port protection circuit for harsh environments

Note: Ground shield of twisted wire pair reliably.

Recommended components and values:

Component	Recommended part, value	Component	Recommended part, value
R3	1MΩ	R1、R2	2.7Ω/2W
C1	1nF, 2kV	D1、D2	1N4007
T1	ACM2520-301-2P	D3	SMBJ8.5CA
GDT	B3D090L	$R_{terminal}$	120Ω

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.

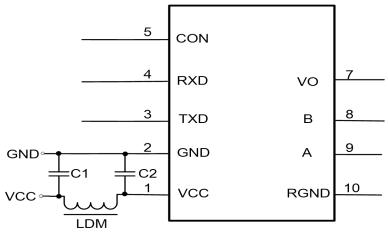


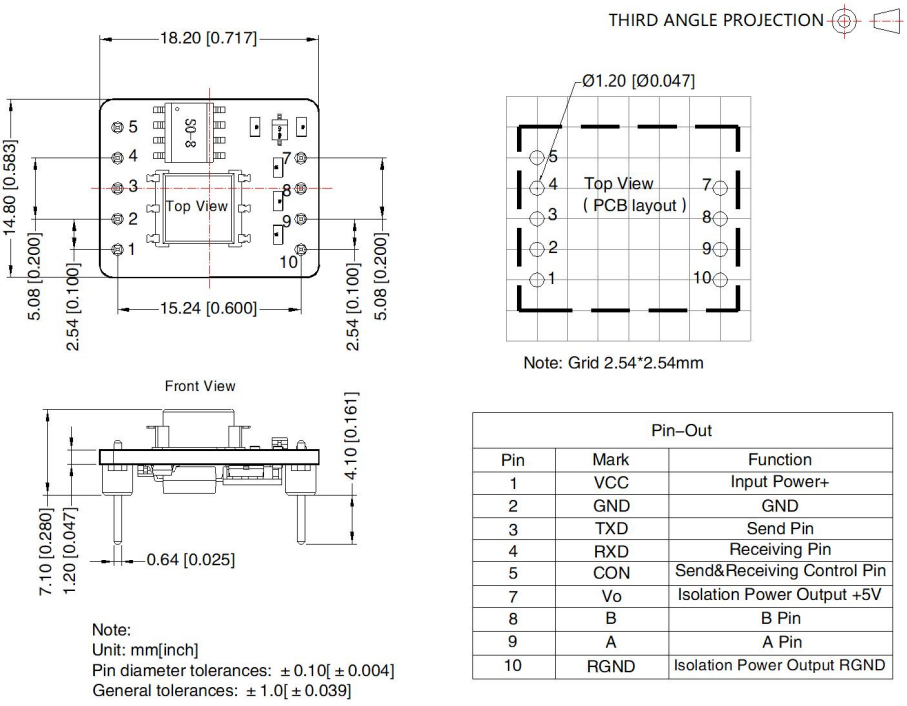
Fig.3

Component	Recommended part, value
C1, C2	1uF/16V
LDM	CD43-12uH

3.Precautions

1. T485L521D-E is for 5V TTL level only (not compatible with 3.3V); T485L321D-Eis for 3.3V TTL level only (not compatible with 5V).
2. Pin6 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. From the truth table characteristics, it can be derived that the isolated RS-485 transceiver module's CON pin is low to send data and high when receiving data. Note that the general 485 transceiver chip control level is exactly the opposite, therefore, if the customer desires to change the level to the ordinary 485 transceiver chip control level, we recommend using a transistor circuit between the MCU and the CON feed to reverse this signal.
5. 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 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.

Dimensions and Recommended



Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±1.0[±0.039]

Pin–Out		
Pin	Mark	Function
1	VCC	Input Power+
2	GND	GND
3	TXD	Send Pin
4	RXD	Receiving Pin
5	CON	Send&Receiving Control Pin
7	Vo	Isolation Power Output +5V
8	B	B Pin
9	A	A Pin
10	RGND	Isolation Power Output RGND

Notes:

1.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;

2.There may be slight colour difference on the surface of the PCB, which is normal and does not affect product use;

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;

5.Products are related to laws and regulations: see "Features" and "EMC";

6.Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.