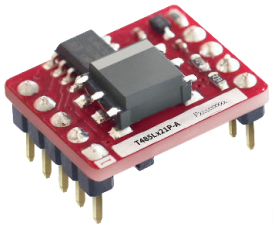
Descriptions

Industrial bus



RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Integrated highly efficient isolated DC-DC converter
- Automatic send and receive data function
- High baud rate of up to 500kbps
- Two-port isolation test voltage(3kVDC)
- Operating ambient temperature range -40℃ to +85℃
- The bus supports support maximum 128 nodes
- Set isolation and ESD bus protection in one

Applications

- Communication

Selection Guide

Certification	Part No.	Power input (VDC)	Baud rate (kbps)	Static Current (mA)	Max. Operating Current (mA)	Isolation Power Output (VDC)	Number of Nodes
EN/BS EN	T485L321P-A	3.15-3.45	500	37	90	5	128
	T485L521P-A	4.75-5.25	500	40	90	5	128

Specifications

Product feature	Item		Symbol	Min.	Typ.	Max.	Unit
Absolute Limitsts	Input Surge Voltage (1sec.max.)		3.3V series	-0.7	--	5	VDC
			5V series	-0.7	--	7	
	Pin Soldering 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
	RXD Output Current		IR	--	--	10	
	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	--	0.2	0.4	
	TXD Drive Current		IT	2	--	--	mA
	RXD Output Current		IR	--	--	10	
	Serial Interface		Compatible with + 5 V UART interface only				
Transmission Specifications	Data Delay	TXD Transmitter Delay	tT	--	--	250	ns
		RXD Receiver Delay	tR	--	--	110	
Output Specifications	Difference Level		Vdiff(d), No load	1.5	--	--	VDC
	Difference Input Impedance		-7V≤VCM≤+12V	96	--	--	kΩ
	Built-in pull-down resistor			--	47	--	
	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 minute, 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	Transceiver Control		Input	Output			
	Send status		TXD	A	B	RXD	

Specifications		1	1	0	1
		0	0	1	1
	Receive status②	VA-VB	RXD		
		≥-20mV	1		
		≤-220mV	0		
		-220mV < VA-VB < -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.
②The receive threshold varies slightly with Vcc.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS A (see Fig. 3)	
Immunity	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 (line to ground) (see Fig.2, A, B port)	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. 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;
7.The various components of the product may have inconsistent screens due to different production batches, it does not affect the product performance.

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.

Design Reference

1.Typical application circuit

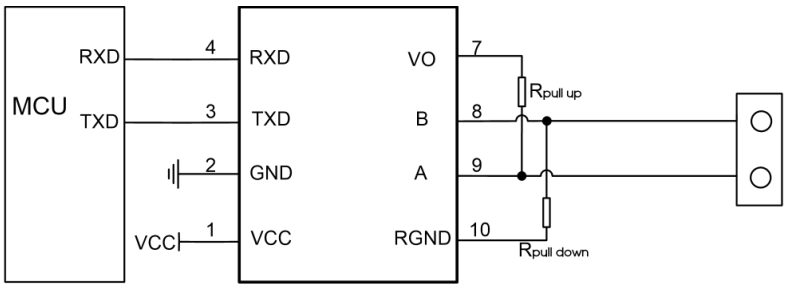


Fig. 1

Figure 1 shows a typical connection circuit for the isolated transceiver module T485L321P-A and T485L521P-A. The T485L521P-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, T485L321P-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).

The module has a built-in 47kΩ 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 EMC circuit

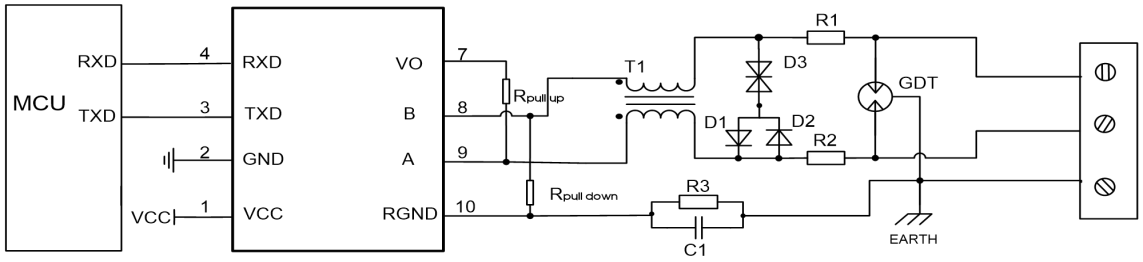
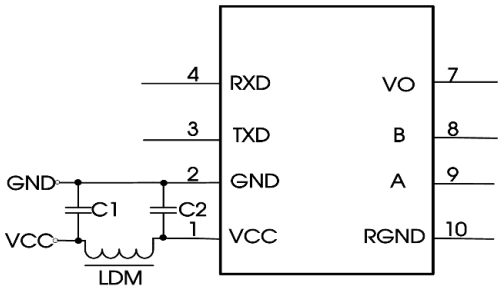


Fig. 2

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		

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.



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

Fig.3

3.Precautions

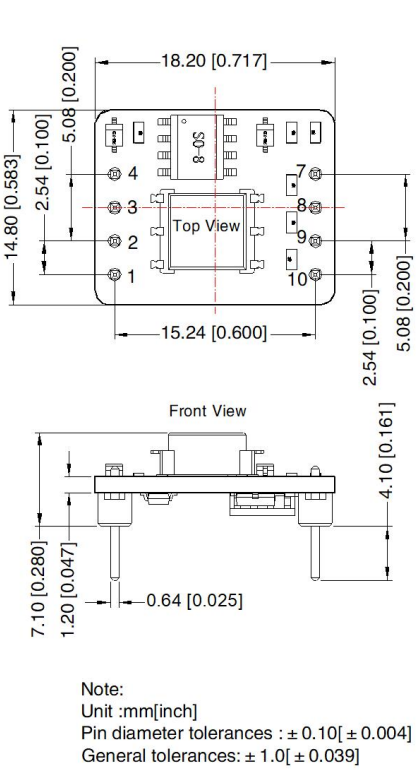
1) T485L521P-A is for 5V TTL level only (not compatible with 3.3V TTL level); T485L321P-A is for 3.3V TTL level only (not compatible with 5V).

2) Pin5, 6 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.

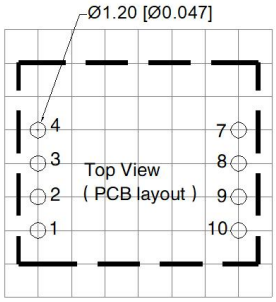
4) Reference the truth table characteristics: When the A / B line differential voltage of the series of embedded isolated RS-485 transceiver module is ≥ -20mV, the modules receiving level is high and when the A / B line differential voltage is ≤ -220mV the modules receiving level is low; the modules 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.

Dimensions and Recommended Layout



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

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin–Out		
Pin	Name	Function
1	VCC	Input Power+
2	GND	GND
3	TXD	Send Pin
4	RXD	Receiving 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 a slight color difference on the surface of the PCB, which is a normal phenomenon and does not affect the use of the product
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.