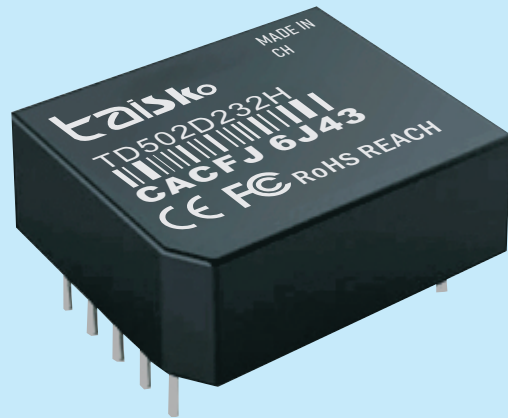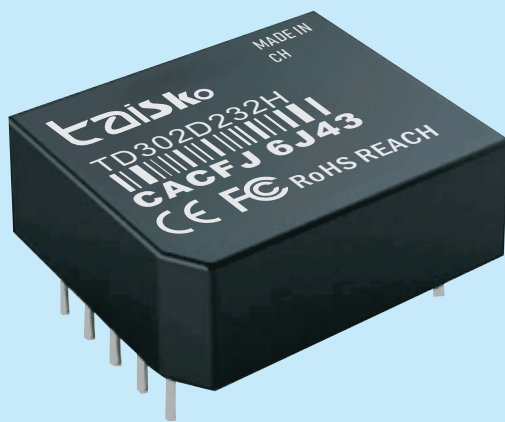|										
Medical electric equipment	Power Factor Correction	World wide	Safety Approvals	EMI	Inrush current limiting	OCP	OVP	Remote ON/OFF	Parallel Operation	1U

TD-series

■ Feature

RS485 isolated transceiver
It is an integrated transceiver chip
Isolation chip and DC/DC
Integrated isolated power supply
The interface isolation transceiver module
Can completely replace tradition
The optocoupler isolation scheme
In the past, we needed to send and receive chips
Isolation chip/optocoupler
Only by isolating the power supply can it be achieved
The entire isolation and transmission plan
Now we only need to collect
Using an RS485
Isolation transceiver module
It can be easily achieved
Greatly simplified the customer's design.

■ Safety agency approval

ENI 55032:2015/A1:2020
EN IEC 62368-1:2020+A11:2020
IEC 62321-1:2013IEC 62321-2:2021IEC 62321-3-1:2013,

■ Up to 5-year warranty (Refer to Instruction Manual)

■ CE FCC marking

Low Voltage Directive
RoHS Directive

■ ROHS REACH marking

Electrical Equipment Safety Regulations
RoHS Regulations

■ EMI

· PCA300F, PCA600F
  Complies with FCC-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B
· PCA1000F, PCA1500F
  Complies with FCC-A, CISPR32-A, EN55011-A, EN55032-A, VCCI-A

■ EMS Compliance : EN61204-3, EN61000-6-2
IEC60601-1-2 (2014), EN60601-1-2 (2015)

EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-4-11

Dual isolation RS-232 transceiver

Product Features:

Single input power supply

Non isolated output power pin

Point to Point

Electromagnetic radiation EMI is extremely low

Working temperature range: -40 ℃~+85 ℃

The bus has ESD protection capability up to 15kV

2 Product Description:

TD302D232H and TD502D232H are high-speed dual channel isolated RS-232 transceivers suitable for bidirectional data communication, with a maximum baud rate of 115200bps.The transceiver integrates an isolated DC/DC converter internally, which can achieve electrical isolation between the controller and the RS-232 transceiver with only a single power supply. The maximum isolation voltage can reach 2500VDC, and there is no need to configure an isolated power supply, making it convenient for users to apply.

Scope of application:

Industrial communication, coal mining industry, power monitoring, petrochemical industry, building automation, communication between PLC and frequency converter..
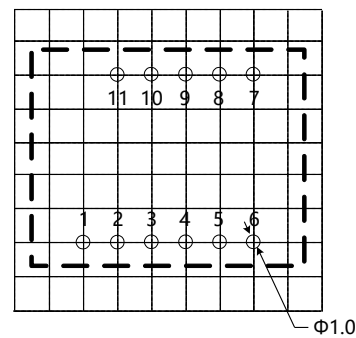
4. Appearance dimensions and pin specifications:

4.1 Appearance dimension diagram
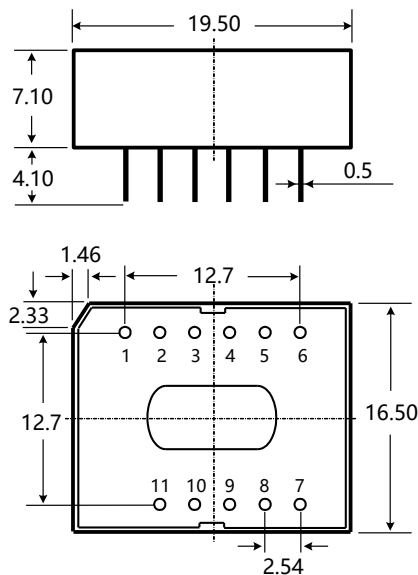
Note:
Dimensional unit: mm
Terminal diameter tolerance: ±0.10
Unmarked tolerance: ±0.25

4.2 Suggested Printing Drawings

Note: The grid spacing is 2.54 * 2.54mm

4.3 Pin Definition

Pin		describe
Serial Number	name	
1	VCC	Positive power input
2	GND	Power input ground
3	TXD1	Sending foot 1
4	RXD1	Receiving foot 1
5	TXD2	Sending foot 2
6	RXD2	Receiving foot 2
7	R2IN	RS-232 receiver input 2
8	T2OUT	RS-232 receiver output 2
9	R1IN	RS-232 receiver input 1
10	T1OUT	RS-232 receiver output 1
11	RGND	Isolation output power ground

5 Product Model Table

PRODUCT MODEL	Power supply voltage range (VDC)	static current （mA,Typ）	maximum operating current （mA）	Transmission baud rate (kbps)	Nodes （pcs）	type
TD302D232H	3.3（3.15~3.45）	60	100	235	2	high speed
TD502D232H	5 (4.75~5.25)	30	90	235	2	high speed

6 specification parameters

6.1 Maximum limit parameters

Using beyond the following limit values may cause permanent damage to the module,

project	condition	minimum value	Nominal value	Maximum value	unit
Input Voltage	TD302D232H	-0.7	3.3	5	V dc
Input Voltage	TD502D232H	-0.7	5	7	V dc
Pin soldering temperature resistance	Manual welding @ 3-5 seconds	--	370	--	℃
Pin soldering temperature resistance	Wave soldering @ 5-10 seconds	--	265	--	℃
hot plugging	--	Not Supported			

Note: This series of modules does not have input anti reverse connection function. It is strictly prohibited to input positive and negative connections in reverse, otherwise it will cause irreversible damage to the module.

6.2 Input Characteristics

project		symbol	condition	minimum value	Nominal value	Maximum value	unit
INPUT VOLTAGE		V_{CC}	TD302D232H	3.15	3.3	3.45	V dc
INPUT VOLTAGE		V_{CC}	TD502D232H	4.75	5	5.25	V dc
TXD logic level	high level	V_{IH}		$0.7V_{CC}$	--	$V_{CC}+0.5$	V dc
TXD logic level	Low Level	V_{IL}		0	--	$0.3V_{CC}$	V dc
RXD logic level	high level	V_{OH}	$I_{RXD}=-2mA$	2.0	--	--	V dc
RXD logic level	Low Level	V_{OL}	$I_{RXD}=2mA$	--	--	0.8	V dc
TXD driving current		I_{TXD}		--	--	2	mA
RXD output current		I_{RXD}		--	--	2	mA
TXD pull-up resistor		R_{TXD}			5.1		kΩ
serial interface			TD302D232H	3.3V standard UART interface			
serial interface			TD502D232H	5V standard UART interface			

6.3 Output Characteristics

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
Built in isolated output power supply voltage	V_O	Rated input voltage	--	--	--	V dc
Output voltage of transmitter	V_{OD}	Nominal input voltage, differential load of 3K Ω	±5	±5.4	--	V dc
Receiver input voltage	I_{OD}		-15	--	+15	V dc
Bus interface protection		ESD electrostatic protection				

6.4 Transmission Characteristics

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
Input impedance of transceiver		-7V≤VCM≤+12V	3	5	7	kΩ
Data transmission delay			100	--	1000	ns

6.5 General Characteristics

project	condition	minimum value	Nominal value	Maximum value	unit
Electrical isolation		Isolation at both ends (input and output are isolated from each other)			
Isolation Voltage	Test time 1 minute, leakage current<5mA, humidity<95%	--	2.5K	--	V dc
Working temperature range	Output as full load	-40	--	+85	°C
storage temperature	--	-55	--	+125	°C
Storage humidity	No condensation	--	--	95	%
Temperature rise of the casing during operation		--	20	--	°C
Usage environment	The presence of dust, strong vibrations, impacts, and gases that corrode product components in the surrounding environment may cause damage to the product				

6.6 Physical Characteristics

project	condition
Housing material	Black flame retardant and heat-resistant plastic (UL94-V0)
Package Size	19.50*16.50*7.10mm
weight	4.0g (nominal)
Cooling method	Natural air cooling

6.7 EMC Characteristics

classification	project	parameter	grade
EMS	Electrostatic Discharge	IEC/EN 61000-4-2 Contact ±4KV/Air ±8KV (bare metal, RS-232 port)	Perf.Criteria B
		IEC/EN 61000-4-2 Contact ±8KV/Air ±15KV (recommended circuit shown in Figure 2)	Perf.Criteria B
	Pulse group immunity	IEC/EN 61000-4-4 ±2KV	Perf.Criteria B
	Lightning surge immunity	IEC/EN 61000-4-5 common mode ±2KV (bare metal, RS-232 port)	Perf.Criteria B
		IEC/EN 61000-4-5 differential mode ±2KV, common mode ±4KV (recommended circuit shown in Figure 2)	Perf.Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 3Vr.m.s	Perf.Criteria A

Note: (1) The input voltage cannot exceed the specified range value, otherwise it may cause permanent irreparable damage.

(2) This parameter is only applicable to 232 communication ports, namely RIN, TOUT, RGND, and the module primary is not grounded during testing.

(3) Unless otherwise specified, the parameters in this manual are measured at 25 °C, humidity of 40%~75%, and input nominal voltage.

7 Design references

7.1 Typical Applications

The matching level of the TXD and RXD pin interfaces of TD502D232H is 5V, and the matching level of the TXD and RXD pin interfaces of TD302D232H is 3.3V, which can be directly embedded in the circuit board and communicate with external devices through the serial interface.If users need to connect external devices through the DB9 serial port cable, they need to consider the internal connection of the DB9 serial port cable. The DB9 serial port cable has two types: direct connection and cross connection of pins 2 and 3.Figure 1 shows the typical connection circuit between the TDx02D232H module and the MCU serial interface, where the 232 channel communicates with external devices using direct or cross serial cables.
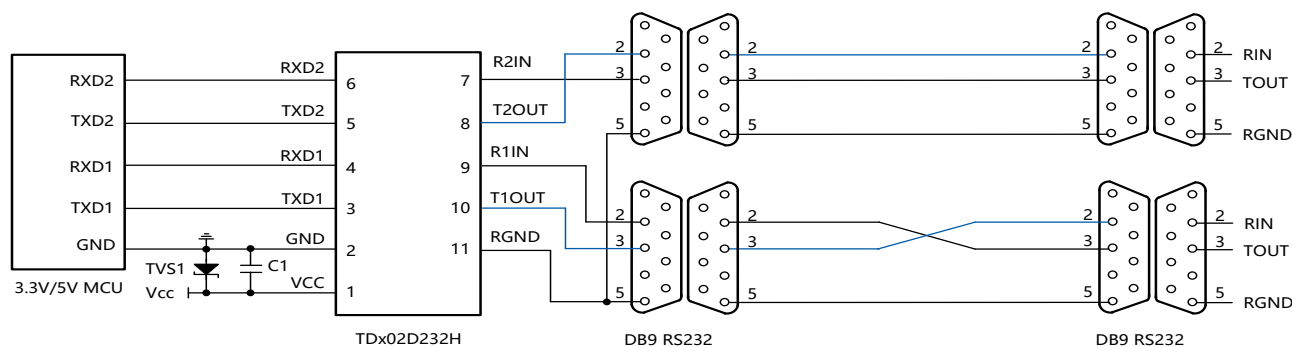
Figure 1Typical Connection Circuit Diagram

7.2 Typical Recommended EMC Circuits

If the TDx02D232H module is applied in harsh environments such as high voltage power, lightning strikes, etc., to ensure reliable operation of the module, it is recommended that users add TVS tubes, lightning protection tubes, and other devices to the TOUT and RIN terminals of the module to form a port protection circuit.The specific recommended application circuit is shown in Figure 2, and the recommended parameters are shown in Table 1.The recommended circuit diagram and parameter values are for reference only. Please determine whether the components in the circuit diagram are needed based on the actual situation.
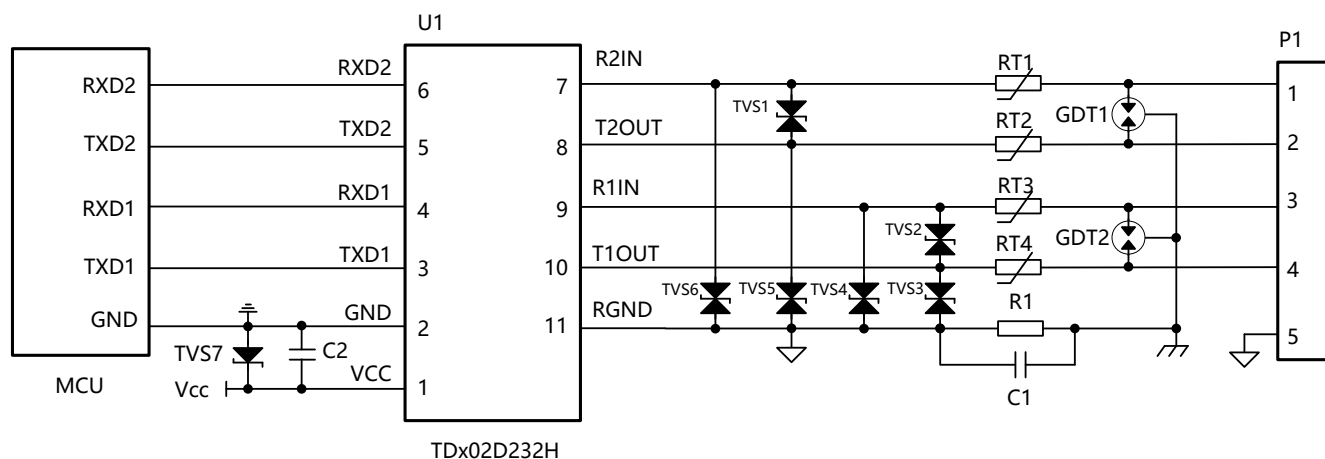

Figure 2EMC Recommended Circuit

If specific surge level requirements need to be met, it is recommended to use the recommended protection circuit shown in Figure 3. Table 1 provides a set of recommended device parameters, and the recommended circuit diagram and parameter values are for reference only. Please determine the appropriate parameter values based on the actual situation.

Table 1. Recommended EMC Parameters

label	model	label	model
C1	102，2KV,1206	TVS1, TVS2	SMBJ30CA
R1	1MΩ, 1206	TVS3, TVS4, TVS5, TVS6	SMBJ18CA
RT1, RT2, RT3, RT4	SMD1206-010	TVS7	SMBJ5.0A
C2	10μF，25V	GDT1, GDT2	B3D090L
U1	TDx02D232H module		