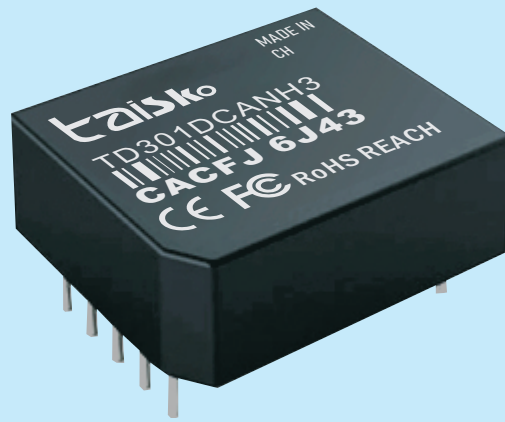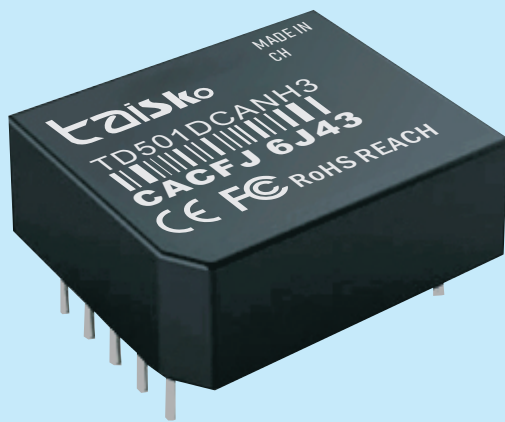|										
Medical electric equipment	Power Factor Correction	World wide	Safety Approvals	EMI	Inrush current limiting	OCP	OVP	Remote ON/OFF	Parallel Operation	1U

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

High speed CAN **isolation transceiver**

1 Product features:

- Compliant with ISO 11898-2 standard

- Unpowered nodes do not affect the bus

- A single network can connect at least 110 nodes

- The shell and sealing material comply with UL94-V0 standard

- Has extremely low electromagnetic radiation and high resistance to electromagnetic interference

- Good high and low temperature characteristics, meeting the requirements of industrial grade products

2 Product Description:

The high-speed CAN isolation transceiver module series TD301DCANH3/TD501DCANH3 is a CAN bus transceiver module that integrates isolation power supply, signal isolation chip, and CAN transceiver chip. The main function of the product is to convert the logic level into the differential level of the CAN bus, achieving signal isolation; The product comes with a constant voltage isolation power supply, which can achieve electrical isolation of 2500VDC and has high ESD protection function. The product can be easily embedded into user devices, making it easy for the devices to connect to the CAN bus network.

3 Scope of application:

Automotive electronics, instruments, meters, railway transportation, petrochemicals, power monitoring, industrial control, smart homes ..
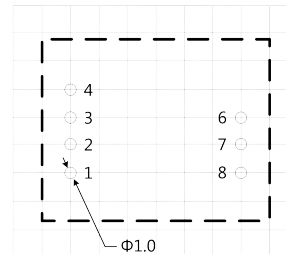
4 Appearance dimensions and pin specifications:

4.1 Appearance dimension diagram
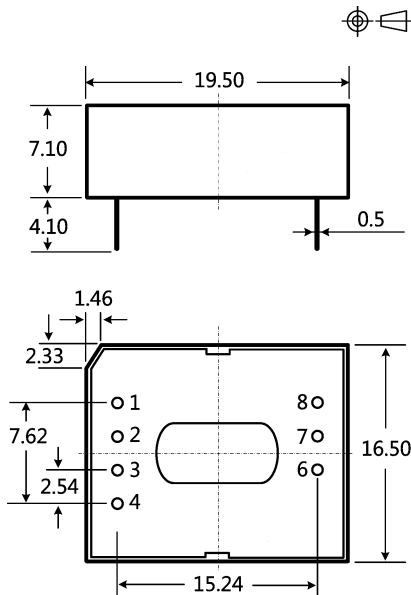
Note:

Dimension unit: mm

Terminal diameter tolerance: ± 0.10

Unmarked tolerance: ± 0.25

4.2 Suggested printing image

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	TXD	CAN controller connection end
4	RXD	CAN controller connection end
6	CANH	CAN signal connection terminal
7	CANL	CAN signal connection terminal
8	CANG	Isolation power output ground

5 Product Model Table

PRODUCT MODEL	Power supply voltage range (VDC)	static current （mA,Typ）	maximum operating current （mA）	Transmission baud rate (bps)	Nodes （pcs）	type
TD301DCANH3	3.3（3.15~3.45）	44	100	40k～1M	110	high speed
TD501DCANH3	5 (4.75~5.25)	35	90			

6 Specification parameters

6.1 Maximum limit parameter

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

project	condition	minimum value	Nominal value	Maximum value	unit
Input Voltage	TD301DCANH3	-0.7	3.3	5	V dc
	TD501DCANH3	-0.7	5	7	
Pin soldering temperature resistance	Manual welding @ 3-5 seconds	--	370	--	℃
	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		VCC	TD301DCANH3	3.15	3.3	3.45	VDC
			TD501DCANH3	4.75	5	5.25	
TXD logic level	high level	VIH		0.7_{VCC}	--	$_{VCC}+0.5$	
	Low Level	VIL		0	--	0.3_{VCC}	
RXD logic level	high level	VOH	I_{RXD}=4mA	$_{VCC}-0.4$	$_{VCC}-0.2$	--	
	Low Level	VOL	I_{RXD}=4mA	--	0.2	0.4	
TXD driving current		ITXD		2			mA
RXD output current		IRXD				10	
serial interface			TD301DCANH3	3.3V standard UART interface			
			TD501DCANH3	5V standard UART interface			

6.3 output characteristic

project		symbol	minimum value	Nominal value	Maximum value	unit
Explicit level (logic 0)	CANH	$V_{(OD)CANH}$	2.75	3.5	4.5	VDC
	CANL	$V_{(OD)CANL}$	0.5	1.5	2.25	
Logic level (logic 1)	CANH	$V_{(OR)CANH}$	2	2.5	3	
	CANL	$V_{(OR)CANL}$	2	2.5	3	
Differential voltage level	Explicit (Logic 0)	Vdiff(d)	1.5	2	3	
	Implicit (Logic 1)	Vdiff(r)	-0.05	0	0.05	
Maximum withstand voltage of bus pins		Vx	-58	--	+58	
Bus transient voltage		Vtrt	-150	--	+100	
Bus pin leakage current		(V_{CC}=0V, $V_{CANH/L}$=5V)	-5	--	+5	μA
Bus interface protection			Compliant with ISO/DIS 11898 standard, twisted pair output			

6.4 Transmission characteristics

project		symbol	minimum value	Nominal value	Maximum value	unit
Data latency	TXD transmission delay	tT	--	55	115	ns
	RXD receiving delay	tR	--	65	135	
	Loop Delay	tPD(TXD-RXD)	--	120	250	
TXD explicit timeout		$Tto_{(dom)TXD}$	0.3	1	12	ms

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%	--	2500	--	VDC
Working temperature range	Output as full load	-40	--	+85	℃
storage temperature	--	-55	--	+125	℃
Storage humidity	No condensation	--	--	95	%
Temperature rise of the casing during operation		--	20	--	℃
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 property

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)	Perf.Criteria B
		IEC/EN 61000-4-2 Contact ± 8KV/Air ± 15KV (recommended circuit shown in Figure 2/Figure 3)	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)	Perf.Criteria B
		IEC/EN 61000-4-5 differential mode ± 2KV, common mode ± 4KV (recommended circuit shown in Figure 2/Figure 3)	Perf.Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 3Vr.m.s	Perf.Criteria A

7 design reference

7.1 Typical applications
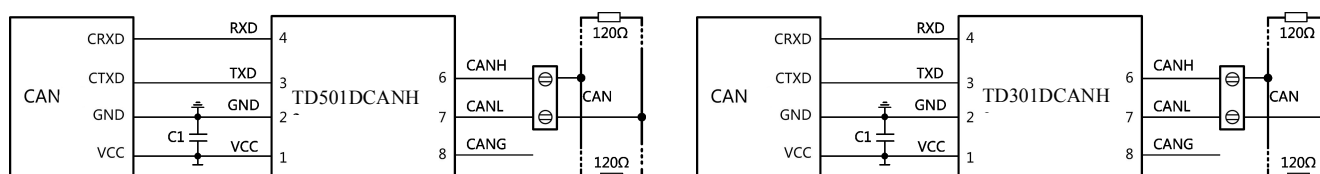
In general, the module is connected to the power supply, port, CAN controller, and CAN network bus, and can be used directly without the need for external components. The connection diagram between the 5V CAN controller interface and the TD501DCANH3 isolated transceiver module is shown in Figure 1. The module must be powered by a 5V power supply, and the TXD and RXD pin interfaces of the module are matched with a voltage level of 5V and do not support a 3.3V system level. Figure 2 shows the connection diagram between the 3.3V CAN controller interface and the TD301DCANH3 isolated transceiver module. The module must be powered by a 3.3V power supply, and the TXD and RXD pin interfaces of the module are matched with a voltage level of 3.3V and do not support 5V system voltage.
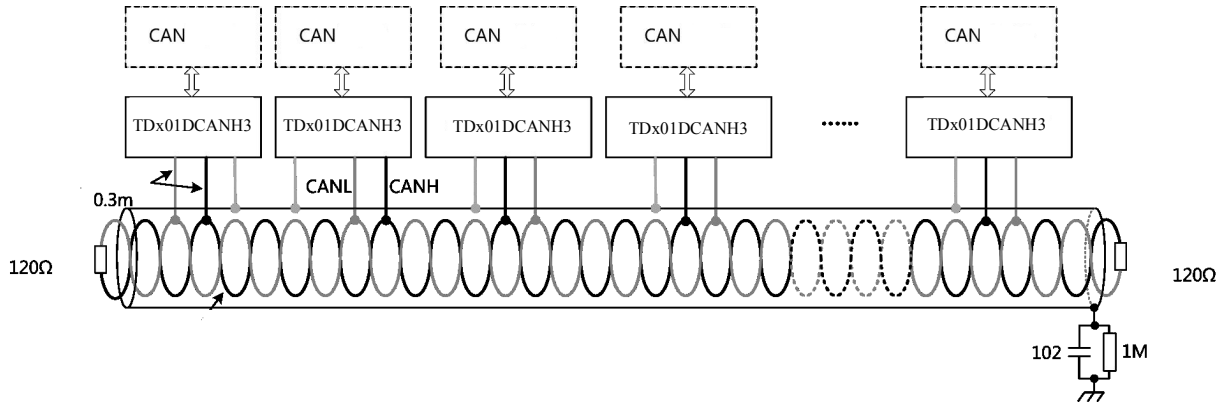

Figure 3. Schematic diagram of typical network connection for a single CAN Bus

A typical CAN Bus network is shown in the figure above, with each network capable of connecting 110 single CTM isolated CAN transceiver modules. The longest communication distance for general modules is 10km, while high-speed modules support a minimum baud rate of 40kbps and a longest communication distance of 1km. If more nodes or longer communication distances need to be connected, they can be extended through devices such as CAN repeaters.

Note: The bus communication distance is related to communication speed and field applications, and can be designed according to actual applications and reference to relevant standards. Communication cables should be selected as twisted pair or shielded twisted pair and kept as far away from interference sources as possible. When communicating over long distances, the terminal resistance value needs to be selected based on the communication distance, cable impedance, and number of nodes.

7.2 EMC **Typical Recommended Circuit**

When generally used in environments with good conditions, there is no need to add ESD protection devices, as shown in the typical connection circuit diagram in 7.1 Typical Applications. But if the application environment is relatively harsh (such as high voltage power, lightning strikes, etc.), it is recommended that users must add TVS tubes, common mode inductors, lightning protection tubes, shielded twisted pair cables, or single point grounding of the same network to the CANH/CANL terminal of the module for protection.
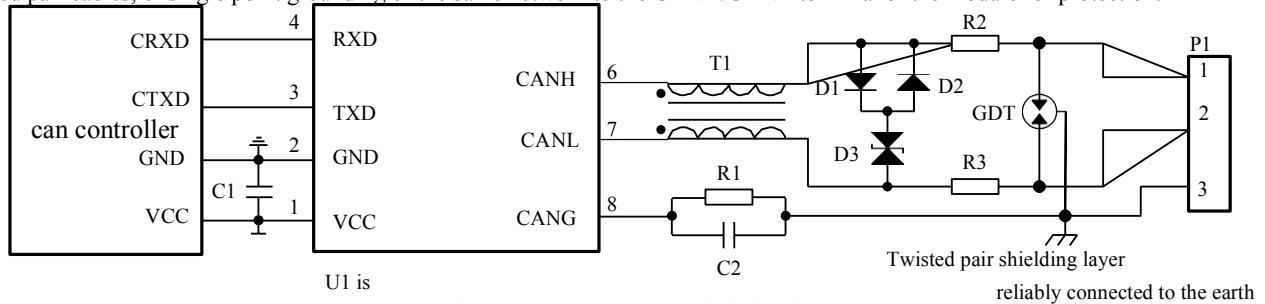

Figure 4 EMC Recommended Circuit

If specific surge level requirements need to be met, it is recommended to use the recommended protection circuit shown in Figure 4. 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	10μF, 25V	D1, D2	1N4007
C2	102, 2KV, 1206	D3	SMBJ15CA
GDT	3RL090M-5-S	T1	B8279S0513N201
R1	1MΩ, 1206	U1	TDx01DCANH3 module
R2, R3	2.7Ω, 2W		

8 Product usage precautions

8.1 CAN controller IO port level matching

The TXD and RXD pin interfaces of TD501DCANH3 are matched with a voltage level of 5V and do not support a 3.3V system level; The TXD and RXD pin interfaces of TD301DCANH3 match a voltage level of 3.3V and do not support 5V system voltage.

8.2 Module Pin Description

When pin 5 of the module is not connected and pin 8 is not in use, please suspend this pin.

8.3 Bus terminal matching resistor

When forming a CAN bus network, regardless of the number of nodes, distance, or working speed, terminal resistors need to be added to the bus.

8.4 The use of shielded wires

Please use shielded twisted pair cables for data transmission, and connect the shielding layer of the same network to the ground at a single point; If better anti-interference capability is required for the CAN network, double-layer shielded twisted pair cables can be used, with each node's CANG connected to the inner shielding layer and the outer shielding layer connected to the ground at a single point.