

Medical  
electric  
equipmentPower  
Factor  
Correction

World wide

Safety  
Approvals

EMI

Inrush  
current  
limiting

OCP

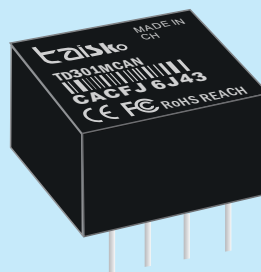
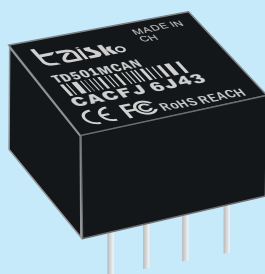


OVP

Remote  
ON/OFFParallel  
Operation

1U

# TD-series



## Feature

CAN isolated transceiver module  
It is an integrated transceiver chip  
Isolation chip and DC/DC  
Interface integrating isolated power supply  
Isolation transceiver module  
Can be completely replaced  
Traditional 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 only one needs to be adopted  
CAN isolated 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 62321-1:2013 IEC 62321-2:2021 IEC 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

## Single High-Speed Small Form Factor CAN Isolated Transceiver

### 1 Product Features:

Complies with "ISO 11898-2" standard.

Unpowered nodes do not affect the bus

At least 110 nodes can be connected to a single network

Shell and potting material comply with UL94-V0 standard.

Very low electromagnetic radiation and high anti-electromagnetic interference.

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

### 2 Product Description:

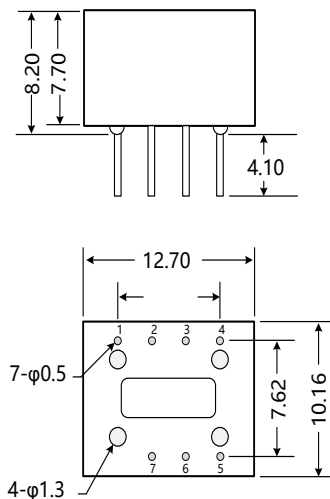
High-speed CAN isolation transceiver module series TD301MCAN/TD501MCAN is a CAN bus transceiver module integrating isolated power supply, signal isolation chip and CAN transceiver chip. The main function of the product is to convert logic level to CAN bus differential level to realize signal isolation; the product comes with fixed voltage isolation power supply, which can realize 2500VDC electrical isolation and has high ESD protection function. The product can be conveniently embedded in the user's equipment, so that the equipment can easily realize the connection function of CAN bus network.

### 3 Scope of application:

Automotive electronics, instruments, meters, railroad transportation, petrochemical, power monitoring, industrial control, smart home...

### 4 Appearance Dimension and Pin Description:

#### 4.1 Appearance Dimension



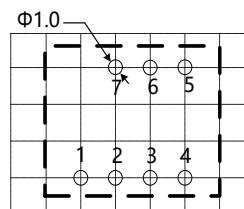
Note:

Size unit: mm

Tolerance of terminal diameter:  $\pm 0.10$

Tolerance of unmarked:  $\pm 0.25$

#### 4.2 Suggested Printing Diagram



Note: Grid spacing is 2.54\*2.54mm

#### 4.3 Pin Definition

Pin		Description
Serial Number	Name	
1	RXD	Receive pin for CAN controller connection
2	TXD	Transmit pin of CAN controller connection
3	GND	Power input ground
4	VCC	Power input positive
5	CANG	Isolated Power Output Ground
6	CANL	CAN signal connection CANL pin
7	CANH	CAN signal connection CANH pin

#### 5 Model number table

Model Number	Supply Voltage Range (VDC)	Quiescent Current (mA, Typ)	Maximum Operating Current (mA)	Transmission Baud Rate (bps)	Number of nodes (pcs)	Type
TD301MCAN	3.3 (3.15~3.45)	44	100	40k~1M	110	High speed
TD501MCAN	5 (4.75~5.25)	35	90			

#### 6 Specifications

##### 6.1 Maximum Limit Parameters

Use beyond the following limit values may result in permanent damage to the module.

Item	Condition	Minimum value	Nominal value	Maximum value	Unit
Input Voltage Range	TD301MCAN	-0.7	3.3	5	V dc
	TD501MCAN	-0.7	5	7	
Pin Soldering Temperature	Hand soldering @ 3~5 sec	--	370	--	°C
	Wave soldering @5~10 sec	--	265	--	
Thermal Unplugging	--	Not support			

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

## 6.2 Input Characteristics

Item		Symbol	Condition	Minimum value	Nominal value	Maximum value	Unit
Input Voltage		V <sub>CC</sub>	TD301MCAN	3.15	3.3	3.45	V <sub>DC</sub>
			TD501MCAN	4.75	5	5.25	
TXD Logic Level	High Level	V <sub>IH</sub>		0.7V <sub>CC</sub>	--	V <sub>CC</sub> +0.5	
	Low Level	V <sub>IL</sub>		0	--	0.3V <sub>CC</sub>	
RXD Logic Level	High Level	V <sub>OH</sub>	I <sub>RXD</sub> = -2mA	2.0	--	--V(OH) - 2mA	
	Low level	V <sub>OL</sub>	I <sub>RXD</sub> = 2mA	----- ----- -----	--	0.8	
TXD drive current		I <sub>TXD</sub>		--	--	2	mA
RXD output current		I <sub>RXD</sub>		---	--	2	
Serial Interface			TD301MCAN	3.3V Standard CAN Controller Interface			
			TD501MCAN	5V standard CAN controller interface			

## 6.3 Output Characteristics

Item		Symbol	Minimum value	Nominal value	Maximum value	Unit
Dominant 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 level	Explicit (logic 0)	$V_{diff(d)}$	1.5	2	3	
	Implicit (logic 1)	$V_{diff(r)}$	-0.05	0	0.05	
Maximum withstand voltage at bus pins		$V_x$	-58	---	+58	

Item	Symbol	Minimum value	Nominal value	Maximum value	Unit
Bus Transient Voltage	$V_{\text{trt}}$	-150	--	+100	
Bus pin leakage current	$(V_{\text{CC}}=0\text{V}, V_{\text{CANH/L}}=5\text{V})$	$V(\text{CANH/L}=5\text{V}) -5$	----- ----- +5	+5	$V(\text{CANH/L}=5\text{V}) -5 \sim +5 \mu\text{A}$
Bus interface protection	ISO/DIS 11898 compliant, twisted pair outputs				

## 6.4 Transmission characteristics

Item		Symbol	Minimum value	Nominal value	Maximum value	Unit
Data Delay	TXD transmission delay	t <sub>T</sub>	--	55	115	ns
	RXD receive delay	t <sub>R</sub>	--	65	135	
	Cyclic delay	t <sub>PD(TXD-RXD)</sub>	--	120	250	
TXD dominant timeout		T <sub>to(dom)TXD</sub>	0.3	1	12	ms

## 6.5 General Characteristics

Item	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
Operating Temperature Range	Output is full load	-40	--	+ 105	°C
Storage temperature	--	-55	--	+125	°C
Storage humidity	Non-condensing	--	--	95	%
Temperature rise of the housing during operation		--	20	----- ----- -----	°C
Operating environment	The product may be damaged by the presence of dust, strong vibrations, shocks, and gases that corrode the components of the product.				

## 6.6 Physical Characteristics

Item	Condition
Enclosure Material	Black flame retardant heat resistant plastic (UL94-V0)
Package size	12.70*10.16*7.70mm
Weight	2.0g (nominal)
Cooling Method	Natural air cooling

## 6.7 EMC Characteristics

Classification	Item	Parameter	Class
EMS	Electrostatic discharge immunity	IEC/EN 61000-4-2 Contact $\pm 4\text{KV}$ /Air $\pm 8\text{KV}$ (bare metal)	Perf.Criteria B
		IEC/EN 61000-4-2 Contact $\pm 8\text{KV}$ /Air $\pm 15\text{KV}$ (see Figure 4 for recommended circuit)	Perf.Criteria B
	Pulse group immunity	IEC/EN 61000-4-4 $\pm 2\text{KV}$	Perf.Criteria B
	Lightning surge immunity	IEC/EN 61000-4-5 Common mode $\pm 2\text{KV}$ (bare metal)	Perf.
		IEC/EN 61000-4-5 Differential mode $\pm 2\text{KV}$ , common mode $\pm 4\text{KV}$ (see Figure 4 for recommended circuitry )	Perf.Criteria B
	Conducted Nuisance Immunity	IEC/EN 61000-4-6 3Vr.m.s	Perf.

## 7 Design Reference

### 7.1 Typical Applications

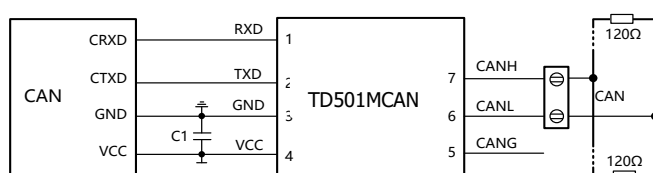


Figure 1. CAN Controller 5V Supply Application Circuitry

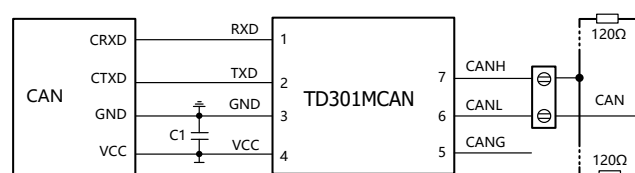


Figure 2. CAN Controller 3.3V Power Supply Application Circuitry

Generally, the module is connected to the power supply, the port and the CAN controller and the CAN network bus, and can be used directly without additional devices. Figure 1 shows the 5V CAN controller interface with the TD501MCAN isolated transceiver module connection diagram, the module must be powered by a 5V power supply, the module's TXD, RXD pin interface to match the level of 5V, does not support 3.3V system level. Figure 2 shows the connection diagram of the 3.3V CAN controller interface with the TD301MCAN isolated transceiver module. The module must be powered by a 3.3V power

supply, and the module's TXD and RXD pin interfaces match the level of 3.3V, and do not support 5V system levels.

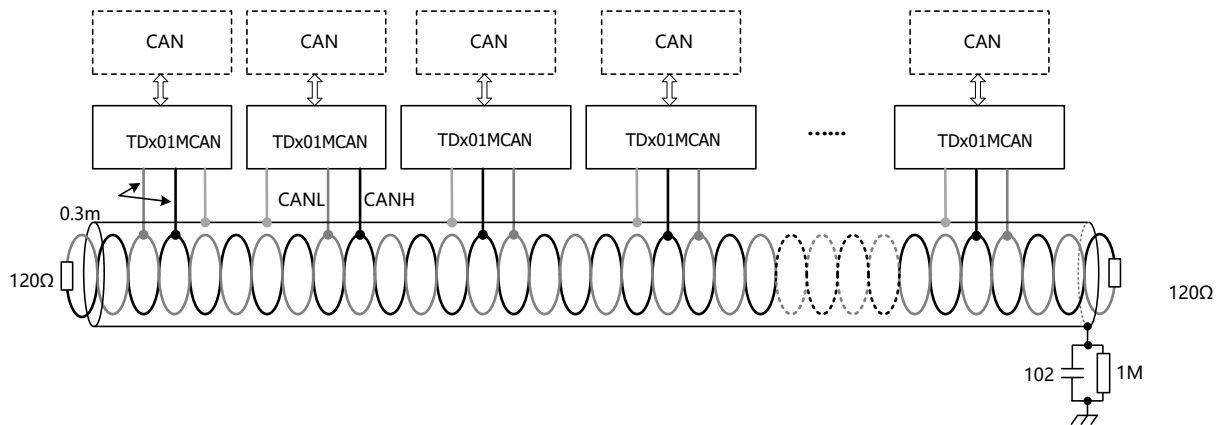


Figure 3. Typical Network Connection Diagram of Single CAN-Bus

Single CAN-Bus typical network as shown in the above figure, each network can access 110 single CTM isolated CAN transceiver modules, the longest communication distance for general-purpose modules is 10km, high-speed modules support a minimum baud rate of 40kbps, the longest communication distance of 1km. if you need to access more nodes or longer communication distance, you can expand the equipment through the CAN repeater, etc. Note that the communication distance is related to the communication distance.

Note: The bus communication distance is related to the communication rate and field application, which can be designed according to the actual application and reference to the relevant standards, and the communication cable should be twisted pair or shielded twisted pair and away from the interference source as far as possible. When communicating over long distances, the termination resistance needs to be selected according to the communication distance as well as the cable impedance and the number of nodes.

## 7.2 EMC Typical Recommended Circuit

Generally used in a good environment, there is no need to add ESD protection devices, such as 7.1 typical applications shown in the typical connection circuit diagram. However, if the application environment is harsh (such as high-voltage power, lightning and other environments), it is recommended that the user must add TVS tubes, common mode inductors, lightning tubes, shielded twisted-pair cables, or a single point of the same network connected to the earth and other protective measures on the CANH/CANL line end of the module.

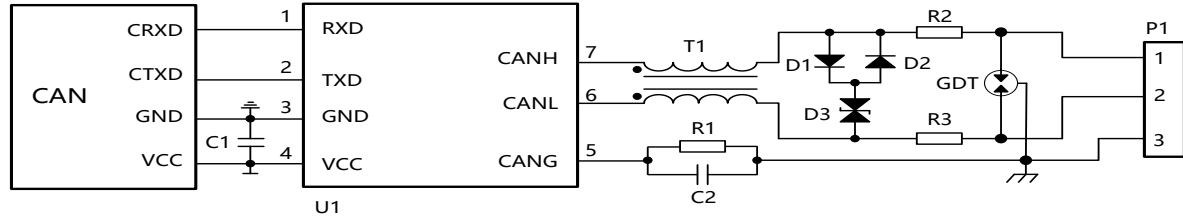


Figure 4. EMC Recommended Circuitry

If you need to meet the specific surge level requirements, it is recommended to use the recommended protection circuit shown in Figure 4, Table 1 gives a set of recommended device parameters, the recommended circuit diagram and parameter values are for reference only, please determine the appropriate parameter values according to the actual situation.

Table 1. EMC Recommended Parameters

Label	Model	Marker	Model No.
C1	10 $\mu$ F, 25V	D1, D2	1N4007
C2	102, 2KV, 1206	D3	SMBJ15CA
GDT	3RL090M-5-S	T1	B82793S0513N201
R1	1M $\Omega$ , 1206	U1	TDx01MCAN Module
R2, R3	2.7 $\Omega$ , 2W		

## 8.1 CAN Controller IO Port Level Matching

The TXD and RXD pins of TD501MCAN interface matching level is 5V, 3.3V system level is not supported; the TXD and RXD pins of TD301MCAN interface matching level is 3.3V, 5V system level is not supported.

## 8.2 Module Pinout

Module pin 8 is not pinned out. When pin 5 is not used, please leave this pin dangling.

## 8.3 Bus Termination Matching Resistor

When the CAN bus is networked, regardless of the number of nodes, the distance, and the operating rate, it is necessary to add termination resistors to the bus.

## 8.4 Use of Shielded Wire

Please use shielded twisted-pair cable for data transmission line, and connect the shielding layer of the same network to the earth at a single point; if CAN network is required to have better anti-jamming ability, double shielded twisted-pair cable can be used, and the CANG of each node is connected to the inner shielding layer, and the outer shielding layer is then connected to the earth at a single point.