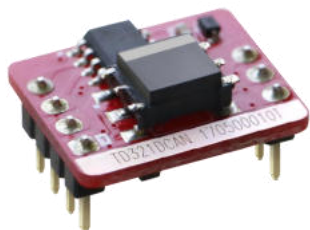


Single universal CAN isolation transceiver module



CE Report RoHS

EN62368-1

FEATURES

- Two-port isolation test voltage(3.0kVDC)
- High baud rate of up to 1 Mbps
- Operating ambient temperature range: -40℃ to +105℃
- The bus supports maximum 110 nodes
- Set isolation and ESD bus protection in one

The TD321DCAN / TD521DCAN series' main function is to convert TTL / CMOS level into isolated CAN bus differential level signals. The use of IC integrated technology allows for power isolation, signal isolation, CAN transceiver and bus protection all in one single CAN bus transceiver module, which withstands an isolation test voltage of 3000VDC. Also, they can easily be embedded in the user's end equipment, to achieve fully functional CAN bus network connectivity.

Selection Guide

| Certification | Part No. | Power input (VDC) | Baud Rate (bps) | Static Current (mA) | Maximum Operating Current(mA) | Maximum Bus Voltage (VDC) | Number of Nodes |
|---------------|-----------|-------------------|-----------------|---------------------|-------------------------------|---------------------------|-----------------|
| -- | TD321DCAN | 3.3 | 5k-1M | 29 | 100 | ±30 | 110 |
| EN | TD521DCAN | 5 | 5k-1M | 38 | 80 | ±30 | 110 |

Absolute Limits

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------------------|------|------|------|------|
| Input Surge Voltage (1sec.max.) | 3.3V series | -0.7 | -- | 5 | VDC |
| | 5.0V series | -0.7 | -- | 7 | |
| Pin Soldering Resistance Temperature | Soldering time 10s (Max.) | -- | -- | 300 | ℃ |

3.3V Input Specifications

| Item | | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|------------|---|----------------------|------|------|------|
| Power Supply Input Voltage | | VCC | 3.15 | 3.3 | 3.45 | VDC |
| TXD Logic Level | High-level | V _{IH} | 0.7V _{CC} | -- | 3.6 | |
| | Low-level | V _{IL} | 0 | -- | 0.8 | |
| RXD Logic Level | High-level | V _{OH} | V _{CC} -0.4 | 3.1 | — | |
| | Low-level | V _{OL} | — | 0.2 | 0.4 | |
| TXD Drive Current | | I _T | 2 | -- | — | mA |
| RXD Output Current | | I _R | — | -- | 10 | |
| Serial Interface | | Standard CAN controller interface for +3.3V | | | | |

5.0V Input Specifications

| Item | | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|------------|---|----------------------|------|------|------|
| Power Supply Input Voltage | | VCC | 4.75 | 5 | 5.25 | VDC |
| TXD Logic Level | High-level | V _{IH} | 0.7V _{CC} | -- | 5.5 | |
| | Low-level | V _{IL} | 0 | -- | 0.8 | |
| RXD Logic Level | High-level | V _{OH} | V _{CC} -0.4 | 4.8 | -- | |
| | Low-level | V _{OL} | -- | 0.2 | 0.4 | |
| TXD Drive Current | | I _T | 2 | -- | -- | mA |
| RXD Output Current | | I _R | -- | -- | 10 | |
| Serial Interface | | Standard CAN controller interface for +5.0V | | | | |

Transmission Specifications

| Item | | Symbol | Min. | Typ. | Max. | Unit |
|------------|-----------------------|--------------------|------|------|------|------|
| Data Delay | TXD Transmitter Delay | t_r | -- | 60 | 115 | ns |
| | RXD Receiver Delay | t_R | -- | 70 | 135 | |
| | Cycle Delay | $t_{PRO(TXD-RXD)}$ | -- | 130 | 250 | |

Output Specifications

| Item | | Symbol | Min. | Typ. | Max. | 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 | |
| Recessive Level (Logic 1) | CANH | $V_{(OR)CANH}$ | 2 | 2.5 | 3 | |
| | CANL | $V_{(OR)CANL}$ | 2 | 2.5 | 3 | |
| Differential Level | Dominant Level (Logic 0) | $V_{diff(d)}$ | 1.5 | 2 | 3 | |
| | Recessive Level (Logic 1) | $V_{diff(r)}$ | -0.05 | 0 | 0.05 | |
| Bus Pin Maximum Withstand Voltage | | V_X | -30 | -- | +30 | |
| OBus Transient Voltage | | V_{trt} , Meet ISO7637-3 standard | -100 | -- | +100 | |
| Bus Pin Leakage Current | | ($V_{CC}=0V$, $V_{CANH/L}=5V$) | -5 | -- | 5 | uA |
| Load Resistance Differential | | R_L | 50 | 60 | 65 | Ω |
| Input Impedance Differential | | R_{diff} | 20 | -- | 100 | k Ω |
| CAN Bus Interface | | Meets ISO/DIS 11898 standard twisted-pair output | | | | |

General Specifications

| Item | Operating Conditions | Value |
|--|---|-------------------------------|
| Isolation Test | Electric Strength Test for 1 min., leakage current <1mA | 3.0kVDC |
| Insulation Resistance | At 500VDC | 1000M Ω (input-output) |
| Operating Temperature | | -40°C to +105°C |
| Transportation and Storage Temperature | | -50°C to +125°C |
| Operating Humidity | Non-condensing | 10% - 90% |
| Safety Standard | | EN62368-1 (Report) |
| Safety Class | | CLASS III |

Mechanical Specifications

| | |
|----------------|--|
| Package | DIP8; Dimension 18.20 x 14.80 x 7.10mm |
| Weight | 1.9g (Typ.) |
| Cooling Method | Free air convection |

Electromagnetic Compatibility (EMC)

| Emission | CE | CISPR32/EN55032 | CLASS A (see Fig. 3) | |
|----------|-------|------------------|---|------------------|
| Immunity | ESD | IEC/EN 61000-4-2 | Contact $\pm 4kV$ (without external components, Signal port) | Perf. Criteria A |
| | RS | IEC/EN 61000-4-3 | 10V/m (without external components) | Perf. Criteria A |
| | EFT | IEC/EN 61000-4-4 | $\pm 2kV$ (without external components, Signal port) | Perf. Criteria B |
| | Surge | IEC/EN 61000-4-5 | $\pm 2kV$ (line to ground) (without external components, Signal port) | Perf. Criteria A |
| | CS | IEC/EN 61000-4-6 | 3Vr.m.s (without external components) | Perf. Criteria A |

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. 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.

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.

Applied circuit

Refer to the CAN Industrial Bus Interface Isolating Module Application Manual.

Design Reference

1. Typical application circuit

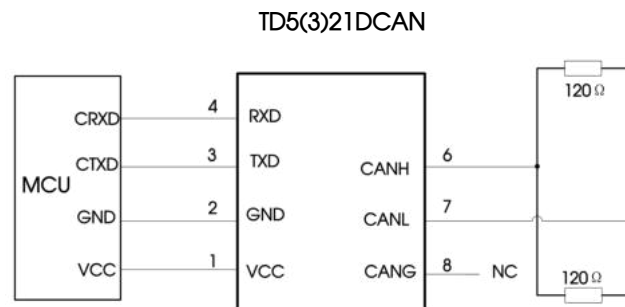


Fig.1

Figure 1 shows a typical application circuit for connecting a module. The module with its integrated power supply, CAN controller and CAN bus network interface can generally be used by customers as is, without the need of adding peripheral circuits.

Note: The logic level of the CAN controller should be compatible with the TD5(3)21DCAN.

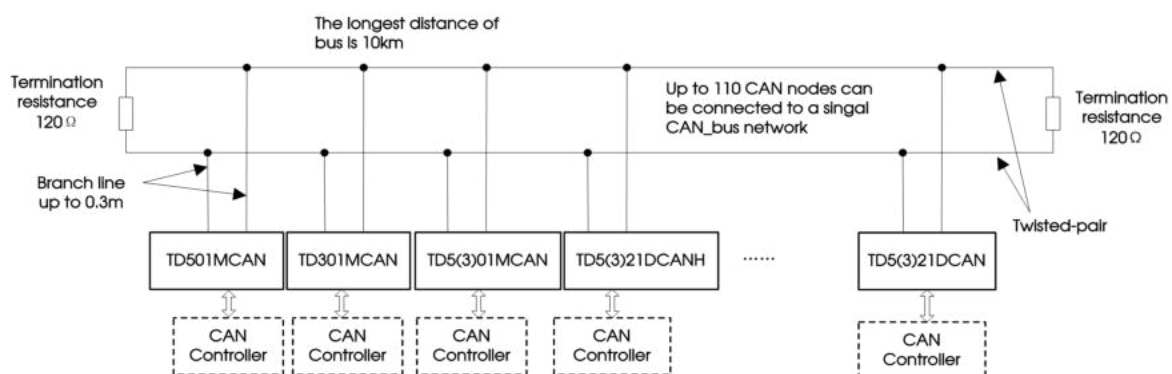
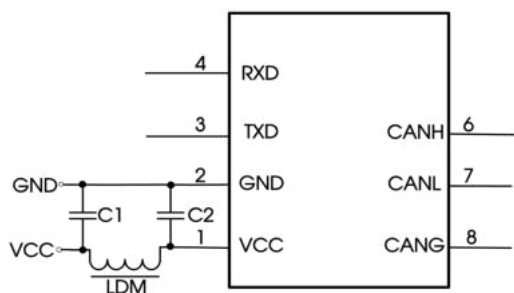


Fig.2

As shown in Figure 2, a single CAN-bus network allows connecting as many as 110 isolated single-channel TD_CAN transceiver modules. This universal type module supports a maximum communication distance of 10km while the high-speed type module can support a maximum communication distance of 1km with a baud rate beyond 40kbps. For accessing more nodes or achieving longer communication distances, CAN repeaters or other expansion equipment can easily be used.

Note: The communication distance of the bus is related to the communication speed and its field application. It can be designed according to the actual application and reference standard. We recommended the use of a twisted pair or shielded twisted pair as the communication cable and it should be kept away from any sources of interference. For long-distance communication, the terminal resistance value needs to be selected in accordance with the communication distance, the cable impedance and the number of nodes.



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

Fig.3

2. Recommended port protection circuit

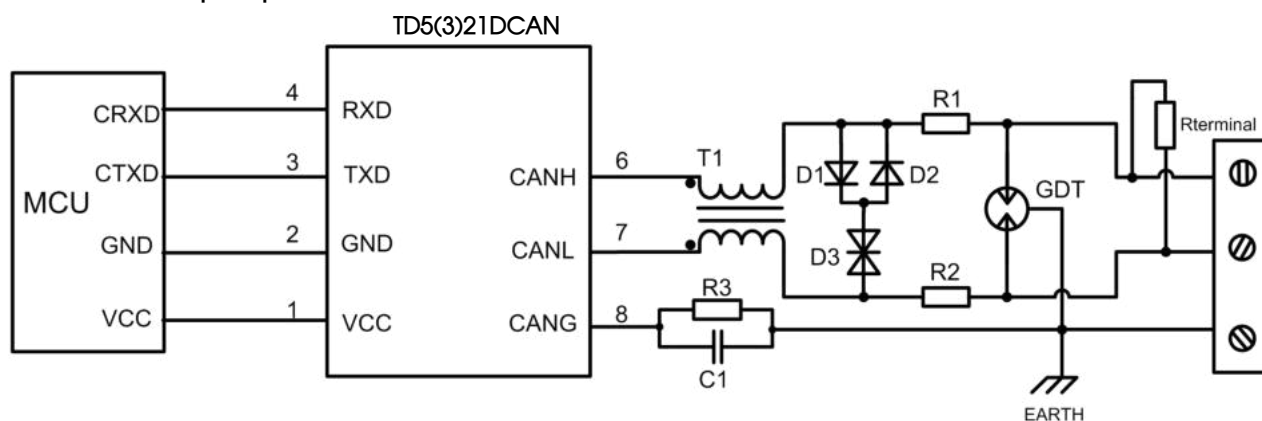


Fig.4

Note: Ground shield of twisted wire pair reliably.
Recommended components and values:

| Component | Recommended part, value | Component | Recommended part, value |
|-----------|-------------------------|-----------|-------------------------|
| R3 | 1M Ω | R1, R2 | 2.7 Ω /2W |
| C1 | 1nF, 2kV | D1, D2 | 1N4007 |
| T1 | ACM2520-301-2P | D3 | SMBJ30CA |
| GDT | B3D090L | Rterminal | 120 Ω |

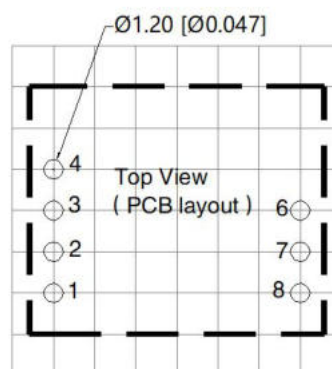
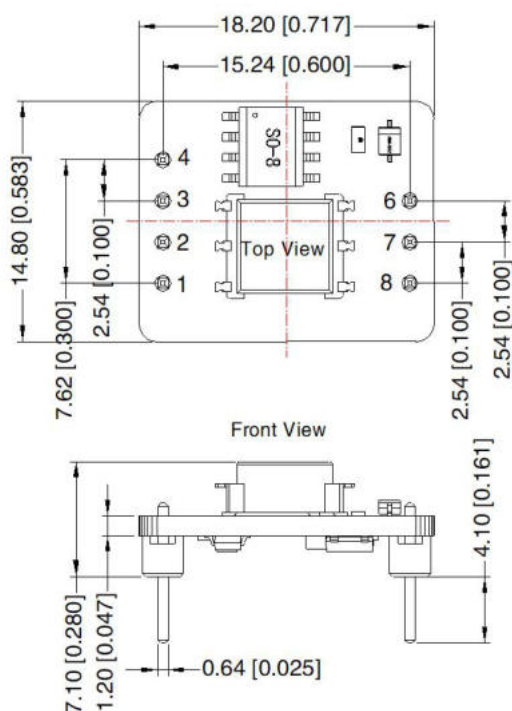
When the module is used in applications with harsh environment, it can be susceptible to large energy like lightning strike, etc. in which case, it is essential to add an adequate protection circuit to the CAN signal ports to protect the system from failure and maintain a reliable bus communication. Figure 4 provides a recommended protection circuit design for high-energy lightning surges, with a degree of protection related to the selected protection device. Parameter description lists a set of recommended circuit parameters, which can be adjusted according to the actual application situation. Also, when using the shielded cable, the reliable single-point grounding of the shield must be achieved.

Note: The recommended components that will change the Specifications of Bus Pin Maximum Withstand Voltage by D3 and its values is a general guideline only. It must be verified for the actual user's application. We recommended using PTC's for R1 and R2 and to use fast recovery diodes for D1 and D2.

3. For additional information, please refer to our application note on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note: Grid 2.54*2.54mm

| Pin-Out | | |
|---------|------|-----------------------------|
| Pin | Mark | Function |
| 1 | VCC | Input Power+ |
| 2 | GND | GND |
| 3 | TXD | Send Pin |
| 4 | RXD | Receiving Pin |
| 6 | CANH | CANH Pin |
| 7 | CANL | CANL Pin |
| 8 | CANG | Isolation Power Output CANG |

Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 1.0[\pm 0.039]$

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58220095;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
- There may be slight colour difference on the surface of the PCB, which is normal and does not affect product use;
- All index testing methods in this datasheet are based on company corporate standards;
- 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. For details, please contact our technical staff;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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