

Dual high speed RS485 isolation transceiver
(Power distribution)



FEATURES

- Integrated high efficient isolated DC-DC converter
- High baud rate of up to 200Kbps
- Two-port isolation test voltage(2.5kVDC)
- Operating ambient temperature range: -40°C to +85°C
- The bus supports maximum 32 nodes
- Set isolation and ESD bus protection in one

The main function of the TD312P485H/TD512P485H series is to convert a logic level signal into isolated RS485 differential level signals. The special integrated IC technology of the RS485 transceiver achieves isolation between the power supply and the signal lines isolation, does RS485 communication and protects the bus all in one and the same module. The product's isolated power supply withstands a test voltage of up to 2500VDC and the function of RS485 two-port network connection. Also, they can easily be embedded in the user's end equipment, to achieve fully functional RS485 network connections.

Selection Guide

| Certification | Part No. | Power input (VDC) | Baud rate (Kbps) | Static Current (mA) | Max. Operating Current (mA) | Isolated power output (typ.)(VDC) | Number of Nodes |
|---------------|------------|-------------------|------------------|---------------------|-----------------------------|-----------------------------------|-----------------|
| -- | TD312P485H | 3.17-3.45 | 200 | 60 | 121 | 5 | 32 |
| | TD512P485H | 4.75-5.25 | 200 | 50 | 80 | 5 | 32 |

Input Specifications

| Item | Operating Conditions | | Value |
|-------------|----------------------|------------|--|
| Power Input | Static Current | | TD312P485H≤60mA, TD512P485H≤50mA |
| | Send Current | | TD312P485H≤121mA, TD512P485H≤80mA |
| Input | Serial Interface | TD512P485H | Compatible with + 5V UART interface only |
| | | TD312P485H | Compatible with + 3.3V UART interface only |
| | Pin Current | | I _{TXD} ≤2mA; I _{RXD} ≤2 mA; I _{CON} ≤5mA |

Bus Interface

| Item | Operating Conditions | | Value |
|-------------|-----------------------|------|--|
| Output Port | RS485 Bus Interface | | Standard RS485 interface, pull-up and pull-down resistors with 4.7kΩ each on A and B channels. |
| | Isolated Power Output | 20mA | Nominal 5V, ≤0.15W |

Transmission Specifications

| Item | Operating Conditions | | Value | | | |
|-----------------------------|-------------------------------|-------|---|-----------------|---|------------|
| Data Rate | | | 200kbps (max.) | | | |
| Transceiver Switching Delay | | | 30us -100us Delay time (typ. to max.) for transition from sending data (receiving data) to receiving data (sending data) | | | |
| Number of Nodes | | | Up to 32 nodes connected on one bus | | | |
| Transceiver Control | | | Refer to below truth table | | | |
| Truth Table | Sending Status | Input | Output | | | |
| | | CON | TXD | A | B | Line state |
| | | 0 | 1 | 1 | 0 | Normal |
| | | 0 | 0 | 0 | 1 | Normal |
| | Receiving Status ^① | Input | Output | | | |
| | | CON | A-B | RXD | | |
| | | 1 | ≥-20mV | 1 | | |
| | | 1 | ≤-220mV | 0 | | |
| | | 1 | -220mV < V _A -V _B < -20mV | Undefined state | | |

Note: ①Receiving threshold varies with Vcc will produce subtle error.

General Specifications

| Item | Operating Conditions | Value |
|--|---|---|
| Electric Isolation | | Two- port isolation (input and output are mutually isolated) |
| Isolation Test | Electric Strength Test for 1 min., leakage current <5mA | 2.5kVDC |
| Operating Temperature | | -40°C to +85°C |
| Transportation and Storage Temperature | | -50°C to +105°C |
| Operating Humidity | | 10% - 90% |
| Casing Temperature Rise | Ta=25°C | 25°C (Typ.) |
| Application Environment | | The presence of dust, severe vibration, shock and corrosive gas may cause damage to the product |

Mechanical Specifications

| | | | |
|----------------|--|--|--|
| Case Material | Black flame-retardant heat-proof plastic (UL94-V0) | | |
| Package | DIP24 | | |
| Dimensions | 31.80x20.30x9.50 mm | | |
| Weight | 11.0g(Typ.) | | |
| Cooling Method | Free air convection | | |

Electromagnetic Compatibility (EMC)

| | | | | |
|-----------|-------|-----------------|--|---|
| Emissions | CE | CISPR32/EN55032 | CLASS A (see Fig.2-②) | |
| | RE | CISPR32/EN55032 | CLASS A (see Fig.2-②) | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±4kV | perf. Criteria B |
| | EFT | IEC/EN61000-4-4 | ±2kV (Power supply port) | (see Fig.2-①) perf. Criteria B |
| | | IEC/EN61000-4-4 | ±1kV (Signal port) | (see Fig.2-③) perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | ±1kV (Power supply port) ±4kV/±6kV (line to ground) (Signal port) | (see Fig.2-①) (see Fig.2-③) 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. 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.

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 *RS485 Isolated Industrial Bus Interface Module Application Manual*.

Design Reference

1. Typical application circuit

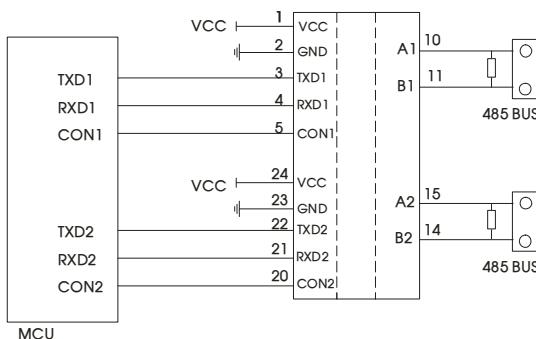


Fig. 1

Note: 1 pin and 24 pin are internal connected, 23 pin and 2 pin are internal connected.

2. Recommended port protection circuit

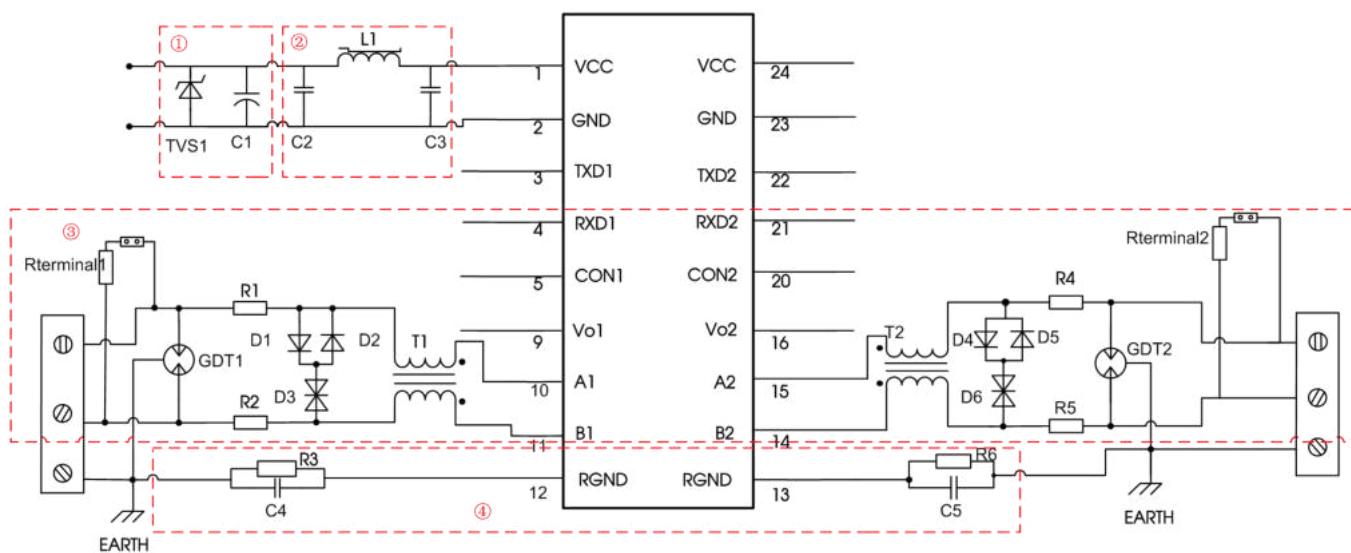


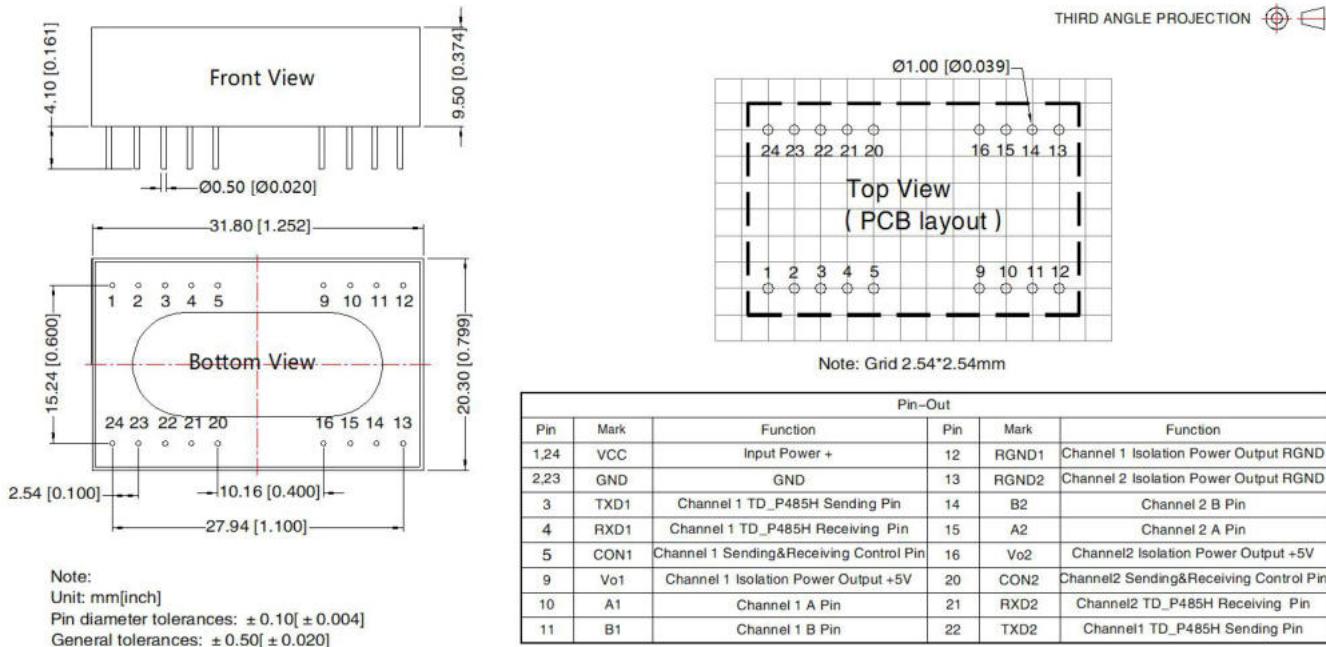
Fig. 2

Recommended components and values:

| Component | Recommended part, value | Component | Recommended part, value |
|-----------|-----------------------------------|--------------------------|--|
| C1 | 220uF/10V(Electrolytic capacitor) | TVS1 | SMCJ5.0A (TD312P485H) / SMCJ6.5A(TD512P485H) |
| C2、C3 | 1uF/50V | L1 | 10uH |
| R3、R6 | 1M Ω | R1、R2、R4、R5 | 2.7 Ω /2W |
| C4、C5 | 1nF, 2kV | D1、D2、D4、D5 | 1N4007 |
| T1、T2 | ACM2520-301-2P | D3、D6 | SMBJ8.5CA |
| GDT1、GDT2 | B3D090L | Rterminal1 Rterminal2 | 120Ω |

3. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number: 58210008;
- 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;
- 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;
- 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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