## Descriptions Industrial Bus




RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

cULus UL62368-1

## 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℃ to +85℃
- The bus supports maximum 32 nodes
- Set isolation and ESD bus protection in one

## Applications

- Industrial control
- Power
- Communication

## Selection Guide

| Certification | Part No. | Power input (VDC) | Baud rate (kbps) | Static Current (mA) | Max. Operating Current (mA) | Number of Nodes |
|---|---|---|---|---|---|---|
| EN/BS EN/UL | T485L301D | 3.15-3.45 | 200 | 20 | 130 | 32 |
| EN/BS EN | T485L501D | 4.75-5.25 | 200 | 20 | 130 | 32 |
| | T485L301DG | 3.15-3.45 | 200 | 20 | 130 | 32 |
| | T485L501DG | 4.75-5.25 | 200 | 20 | 130 | 32 |

Notes: *Product images are for reference only; the actual product shall prevail.

## Specifications

| Product feature | Item | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| 3.3V Input Specifications | Power Supply Input Voltage | | VCC | 3.15 | 3.3 | 3.45 | VDC |
| | TXD Logic Level | High-level | VIH | 0.7VCC | 3.3 | 3.6 | |
| | | Low-level | VIL | 0 | -- | 0.8 | |
| | RXD Logic Level | High-level | VOH | VCC-0.4 | 3.1 | -- | |
| | | Low-level | VOL | 0 | 0.2 | 0.4 | |
| | Pin Current | | ITXD≤2mA; IRXD≤2mA; ICON≤5mA | | | | |
| | Serial Interface | | Compatible with + 3.3 V UART interface only | | | | |
| 5.0V Input Specifications | Power Supply Input Voltage | | VCC | 4.75 | 5 | 5.25 | VDC |
| | TXD Logic Level | High-level | VIH | 0.7VCC | 5 | 5.5 | |
| | | Low-level | VIL | 0 | -- | 0.8 | |
| | RXD Logic Level | High-level | VOH | VCC-0.4 | 4.8 | -- | |
| | | Low-level | VOL | -- | 0.2 | 0.4 | |
| | Pin Current | | ITXD≤2mA; IRXD≤2mA; ICON≤5mA | | | | |
| | Serial Interface | | Compatible with + 5 V UART interface only | | | | |
| Output Specifications | Difference Level | | Vdiff(d), RL=54Ω | 1.5 | 2 | -- | VDC |
| | Difference load resistance | | | 54 | -- | -- | Ω |
| | Difference Input Impedance | | -7V≤VCM≤+12V | 96 | -- | -- | kΩ |
| | Bus Interface Protection | | ESD protection | | | | |
| Bus interface | Output | | RS485 Bus Interface | Standard RS485 interface, pull-up and pull-down resistors with 5.1kΩ each on A and B channels. | | | |
| Transmission Specifications | Data Rate | | 200kbps (max.) | | | | |
| | Transceiver Switching Delay | | Delay time of switching from receiving (sending) data to sending (receiving) data: typically 30us, maximum 100us . | | | | |
| | Number of Nodes | | Up to 32 nodes connected on one bus | | | | |
| | Transceiver control | | CON pin low level: sending data, CON pin high level: receiving data | | | | |
| | Truth Table | | Sending status | Input | | Output | |
| | | | | CON | TXD | A | B | Line state |
| | | | | 0 | 1 | 1 | 0 | Normal |
| | | | | 0 | 0 | 0 | 1 | Normal |
| | | | Receiving status① | Input | | Output | |
| | | | | CON | A-B | RXD | | |
| | | | | 1 | ≥-20mV | 1 | | |
| | | | | 1 | ≤-220mV | 0 | | |
| | | | | 1 | -220mV < VA-VB < -20mV | Undefined state | | |
| General Specifications | Electric Isolation | | Two-terminal isolation (input and output are mutually isolated) | | | | |
| | Isolation Test | | Electric Strength Test for 1 min., leakage current <5mA | 2.5kVDC | | | |
| | Operating Temperature | | -40℃ to +85℃ | | | | |
| | Transportation and Storage | | -50℃ to +105℃ | | | | |

| | | | |
|---|---|---|---|
| | Temperature | | |
| | Operating Humidity | Non-condensing | 10%RH - 90%RH |
| | Temperature Rising | Ta=25℃ | ≤50℃ |
| | Application Environment | The presence of dust, severe vibration, shock and corrosive gas may cause damage to the product | |
| | Safety Class | CLASS III | |
| Mechanical Specifications | Case Material | Black flame-retardant heat-proof plastic (UL94 V-0) | |
| | Dimensions | DIP10 | |
| | Weight | 4.0g(Typ.) | |
| | Cooling Method | Free air convection | |
| Note: ①Receiving threshold varies with Vcc will produce subtle error. | | | |

## Electromagnetic Compatibility (EMC)

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

## Design Reference

1. Typical application circuit

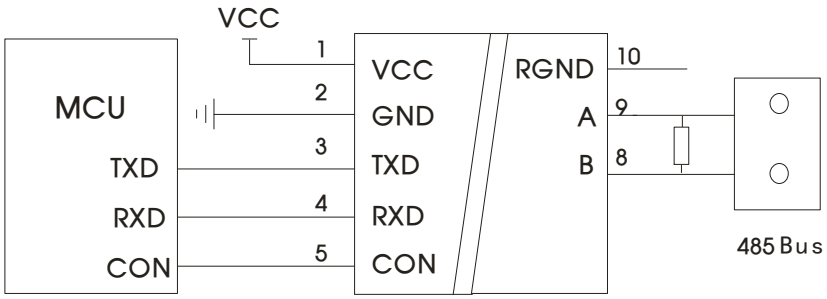



Fig. 1

2. Recommended EMC circuit

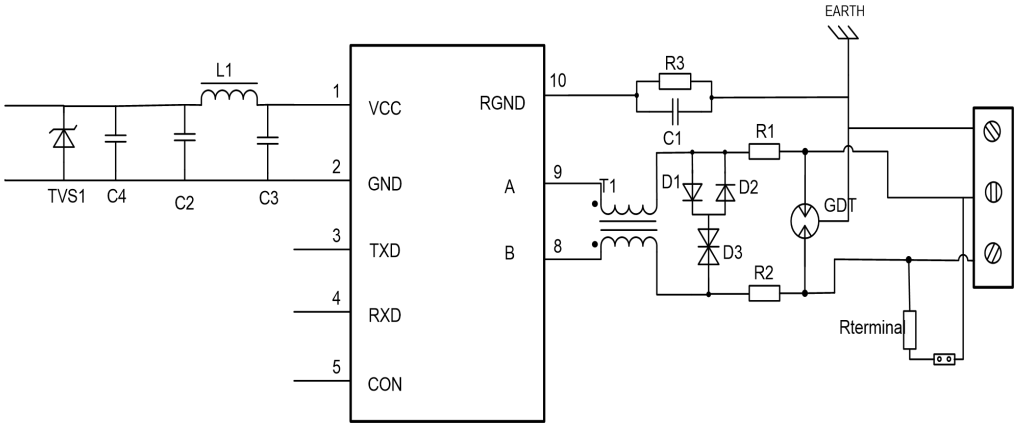
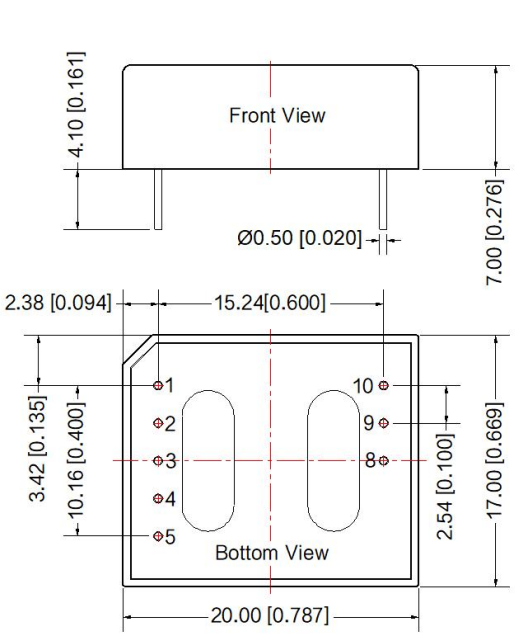



Fig. 2

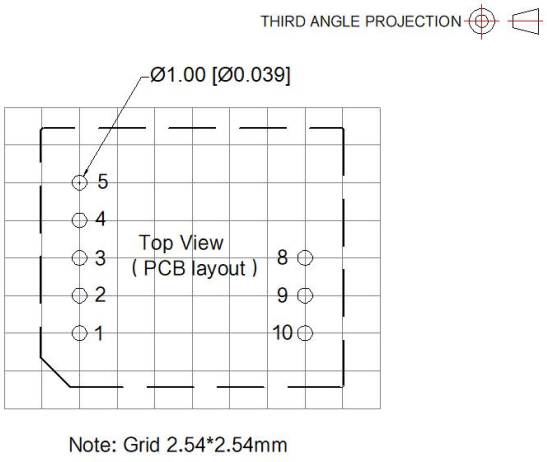
Recommended components and values:

| Component | Recommended part, value | Component | Recommended part, value |
|---|---|---|---|
| R3 | 1MΩ | R1, R2 | 2.7Ω/2W |
| C1 | 1nF, 2kV | D1, D2 | 1N4007 |
| T1 | ACM2520-301-2P | D3 | SMBJ8.5CA |
| GDT | B3D090L | $R_{terminal}$ | 120Ω |
| C2/C3 | 1uF/50V | L1 | 10uH |
| TVS1 | SMCJ5.0A (T485L301D(G)) / SMCJ6.5A(T485L501D(G)) | | |
| C4 | 220uF/10V(Electrolytic capacitor) | | |

## Dimensions and Recommended Layout




Note:
Unit : mm[inch]
Pin diameter tolerances: ± 0.10[ ± 0.004]
General tolerances: ± 0.50[ ± 0.020]
The layout of the device is for reference only，please refer to the actual product




Note: Grid 2.54*2.54mm

| Pin-Out | | |
|---|---|---|
| Pin | Mark | Function |
| 1 | VCC | Input Power |
| 2 | GND | GND |
| 3 | TXD | Sending Pin |
| 4 | RXD | Receiving Pin |
| 5 | CON | Sending&Receiving Control Pin |
| 8 | B | B Pin |
| 9 | A | A Pin |
| 10 | RGND | Isolation Power Output RGND |

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on company corporate standards;
3. 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;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
6. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.