

SMD Single high speed RS232 isolated transceiver

FEATURES

- Products meet EIA/TIA-232-F standard
- Small SMD12 size measuring 17.00 x 12.14 x 9.45mm
- High baud rate up to 115200bps
- Isolation test voltage: 2500 VDC
- Integrated isolated DC/DC converter
- Operating ambient temperature range: -40°C to +85°C
- Enhanced EMC performance with recommended external circuit



RoHS

The TD331S232H/TD531S232H series of isolated single high speed 232 transceivers are all-in-one modules with isolated power supply, isolated signal and RS232 transceiver chip integrated in one RS232 interface solution. The main products function is to switch from logic level to 232 protocols level and achieving signal isolation and the product features a constant-voltage source isolated power supply which withstands a test voltage of 2500 VDC. The products also can easily be embedded in the user's end equipment, to achieve fully functional RS232 protocols network connections.

Selection Guide

Certification	Part No.	Power Input (VDC)	Baud Rate (bps)	Static Current (mA) (Typ.)	Maximum Operating Current (mA)
EN	TD331S232H	3.15-3.45	115200	20	60
	TD531S232H	4.75-5.25	115200	20	60

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	
Reflow Soldering Temperature	Peak temp. ≤245°C, duration ≤60s max.at 217°C. For details, please refer to IPC/JEDEC J-STD-020D.1.				

3.3V Input Specifications

Item	Symbol	Min.	Typ.	Max.	Unit
Power Supply Input Voltage	V <sub>CC</sub>	3.15	3.3	3.45	VDC
TXD Logic Level	High-level	V <sub>IH</sub>	0.7V <sub>CC</sub>	3.6	
	Low-level	V <sub>IL</sub>	0	0.8	
RXD Logic Level	High-level	V <sub>OH</sub>	V <sub>CC</sub> -0.4	3.1	
	Low-level	V <sub>OL</sub>	0	0.2	
TXD Drive Current	I <sub>T</sub>	2	--	--	mA
RXD Output Current	I <sub>R</sub>	--	--	10	
Serial Interface	Compatible with + 3.3 V UART interface only				

5.0V Input Specifications

Item	Symbol	Min.	Typ.	Max.	Unit
Power Supply Input Voltage	V <sub>CC</sub>	4.75	5	5.25	VDC
TXD Logic Level	High-level	V <sub>IH</sub>	0.7V <sub>CC</sub>	5.5	
	Low-level	V <sub>IL</sub>	0	0.8	
RXD Logic Level	High-level	V <sub>OH</sub>	V <sub>CC</sub> -0.4	4.8	
	Low-level	V <sub>OL</sub>	0	0.2	

TXD Drive Current	$I_T$	2	--	--	mA
RXD Output Current	$I_R$	--	--	10	
Serial Interface	Compatible with + 5 V UART interface only				

### Transmission Specifications

Item	Symbol	Min.	Typ.	Max.	Unit	
Data Delay	TXD Transmitter Delay	$t_T$	--	3	--	us
	RXD Receiver Delay	$t_R$	--	3	--	

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Driver Output	High-level	$R_L=3k\Omega$ to GND	3.2	3.5	--	VDC
	Low-level	$R_L=3k\Omega$ to GND	--	-3.5	-3.2	
Receiver Input Voltage		-20	--	20		

### Truth Table Specifications

Transceiver Control	Input	Output
Send Status	TXD	T_OUT
	L	H
	H	L
Receive Status <sup>①</sup>	R_IN	RXD
	$\geq 2.8V$	L
	$\leq 0.8V$	H
	$0.8V < RXD < 2.8V$	Undefined state

Note: ①The receiving threshold voltage will vary slightly with Vcc

### General Specifications

Item	Operating Conditions	Value
Isolation Test	Electric strength test for 1 minute, leakage current <1mA	2500VDC
Insulation Resistance	At 500VDC	1000M $\Omega$ (Input-output)
Operating Temperature		-40°C to +85°C
Transportation and Storage Temperature		-50°C to +105°C
Operating Humidity	Non-condensing	10% - 90%
Safety Standard		EN62368-1 (Report)
Safety Class		CLASS III
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1

### Mechanical Specifications

Case Material	WH9100-F (UL94 V-0)
Dimensions	SMD12 (17.00 x 12.14 x 9.45mm)
Weight	2.8g(Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (see Fig. 2-①)
Immunity	ESD	IEC/EN 61000-4-2	Contact $\pm 4kV$ (without external components, Signal port) Perf. Criteria B
	RS	IEC/EN 61000-4-3	10V/m Perf. Criteria B
	EFT	IEC/EN 61000-4-4	$\pm 1kV$ (without external components, Signal port) Perf. Criteria B

Surge	IEC/EN 61000-4-5	±4kV (line to line, Signal port, see Fig. 2-②)	Perf. Criteria B
	IEC/EN 61000-4-5	±6kV (line to ground, Signal port, see Fig. 2-②)	Perf. Criteria B
CS	IEC/EN 61000-4-6	3Vr.m.s	Perf. Criteria A

### Application Precautions

- Carefully read and follow the instructions before use; contact our technical support if you have any question;
- Do not use the product in hazardous areas;
- Use only DC power supply source for this product. 220V AC power supply is prohibited;
- Hot-swap is not supported;
- If the external input of TXD is insufficient, the pull-up resistor should be added according to the situation;
- It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction.

### After-sales service

- 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;
- 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

See *Application Notes for Isolated Transmitter* for details.

### Design Reference

#### 1. Typical application circuit

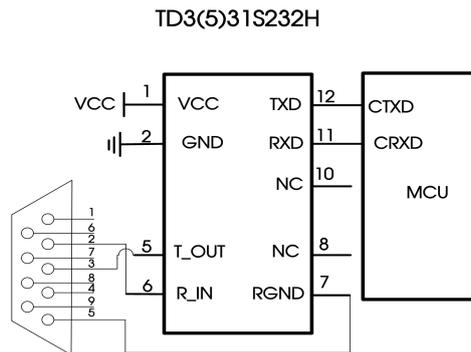


Fig.1

Note: There are two connection modes of DB9 interface connection: direct line and cross line, which are selected according to the actual application.

#### 2. Recommended port protection circuit

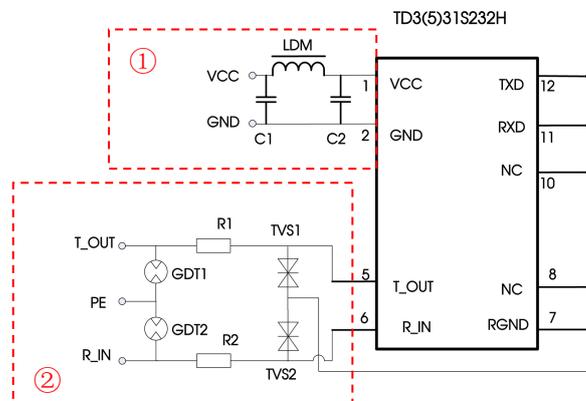


Fig.2

Recommended components and values:

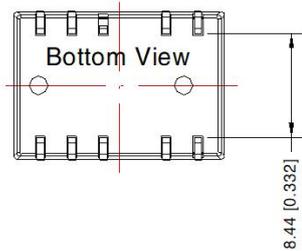
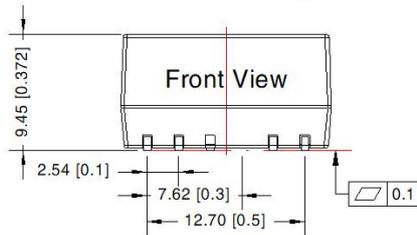
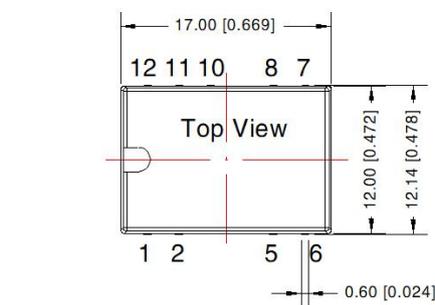
Components	Recommended part, value
C1, C2	1uF/16V
LDM	CD43-12uH
TVS1, TVS2	SMCJ15CA
R1, R2	12Ω /2W(Wire-wound resistor)
GDT1, GDT2	S30-A90X

### 3. Precautions

1) TD531S232H is for 5V TTL level only (not compatible with 3.3V TTL level); TD331S232H is for 3.3V TTL level only (not compatible with 5V).

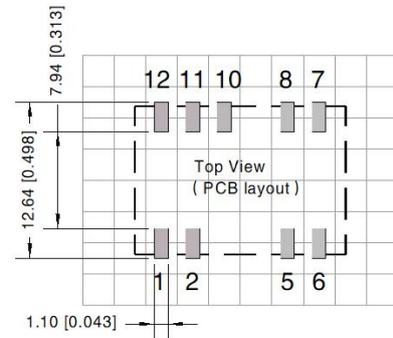
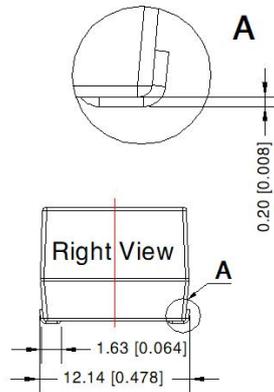
4. For additional information, please refer to our application note on [www.mornsun-power.com](http://www.mornsun-power.com)

## Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin section tolerances: ± 0.10[± 0.004]  
General tolerances: ± 0.25[± 0.010]

THIRD ANGLE PROJECTION

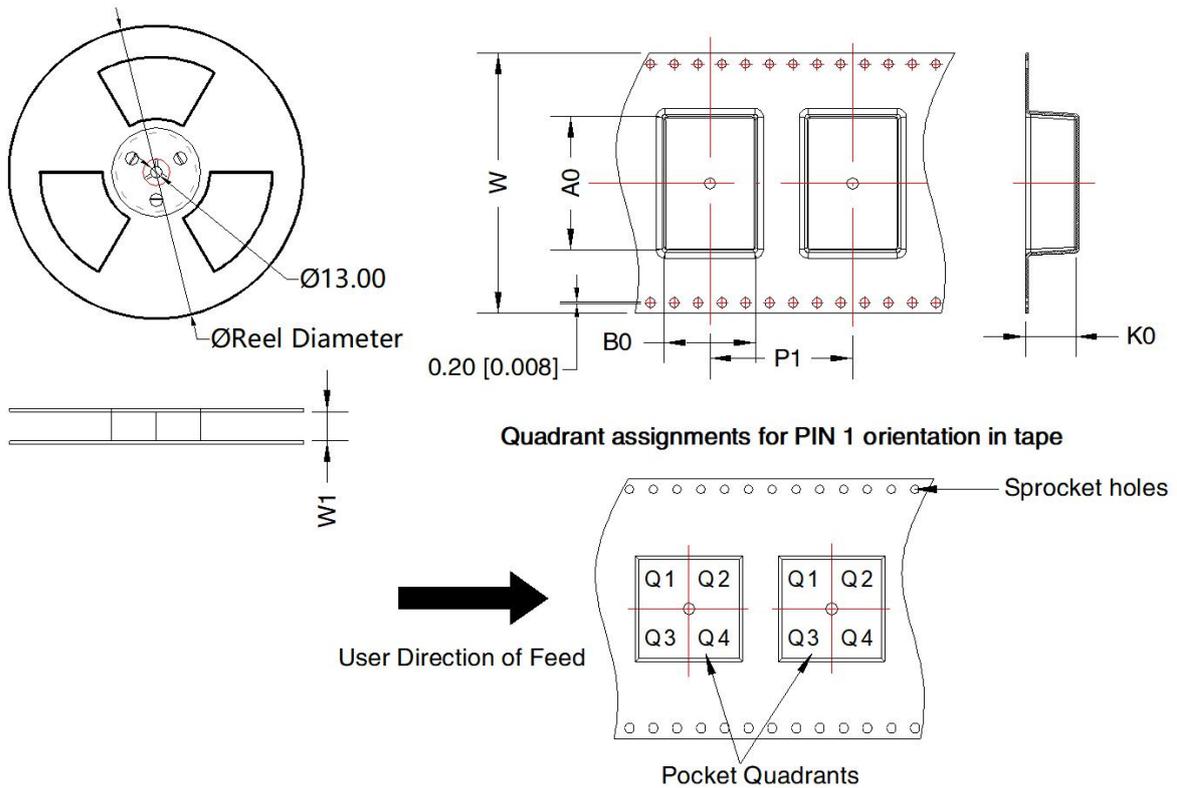


Note: Grid 2.54\*2.54mm

Pin-Out		
Pin	Mark	Function
1	VCC	Input Power+
2	GND	Input Power Ground
5	T_OUT	RS-232 Actuator Output
6	R_IN	RS-232 Acceptor Input
7	RGND	Isolation Power Output Ground
8	NC	No Function Pin
10	NC	No Function Pin
11	RXD	TTL/CMOS Acceptor Input
12	TXD	TTL/CMOS Actuator Output

NC: Pin to be isolated from circuitry

Package diagram:



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TDx31S232H	SMD	9	300	330.0	32.5	17.72	12.92	10.5	20.0	32.0	Q1

Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). The Tube Packaging bag number: 58240014; The Roll Packaging bag number: 58240013;
2. 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;
3. All index testing methods in this datasheet are based on company corporate standards;
4. 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;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China  
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: [info@mornsun.cn](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)