

Medical
electric
equipmentPower
Factor
CorrectionWorld
wideSafety
Approvals

EMI

Inrush
current
limiting

OCP

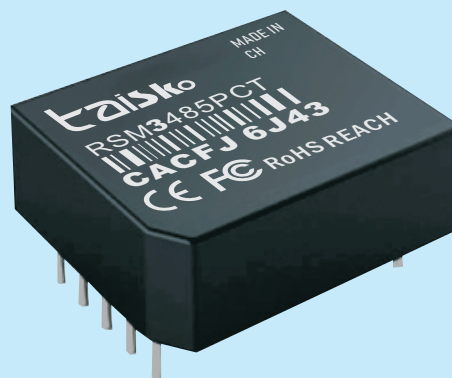
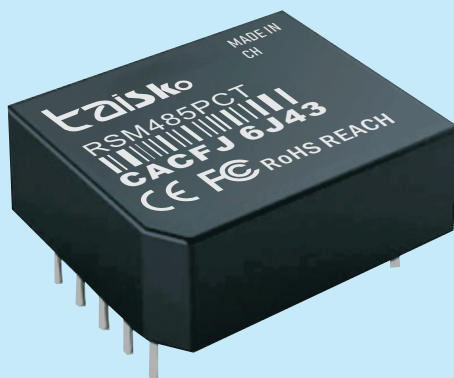


OVP

Remote
ON/OFFParallel
Operation

1U

RSM-series



Feature

RS485 isolated transceiver
It is an integrated transceiver chip
Isolation chip and DC/DC
Integrated isolated power supply
The interface isolation transceiver module
Can completely replace tradition
The 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 we only need to collect
Using an RS485
Isolation 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 Low Speed RS-485 Isolated Transceiver

1 Product Features:

Single input power supply

With isolated output power pin

Up to 64 nodes can be connected

Extremely low electromagnetic radiation EMI

Operating temperature range: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

Integrated power isolation, signal isolation, and bus
ESD protection

2 Product Description:

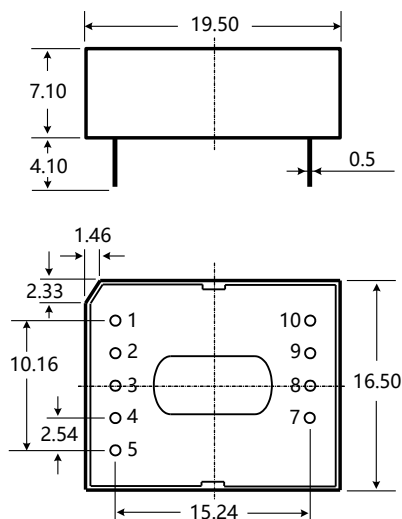
RSM3485PCT / RSM485PCT, the main function will be the logic level conversion to RS-485 protocol differential level, signal isolation; is an IC integration technology, power isolation, signal isolation, RS-485 communication and bus protection in one RS-485 protocol transceiver module. The product comes with fixed-voltage isolation power supply, which can realize 3500VDC electrical isolation. The product can be easily embedded in the user's equipment, so that the equipment can easily realize the RS-485 protocol network connection function.

3 Scope of application:

Industrial communication, coal mining industry, power monitoring, building automation...

4 Appearance Dimension and Pin Description:

4.1 Appearance Dimension



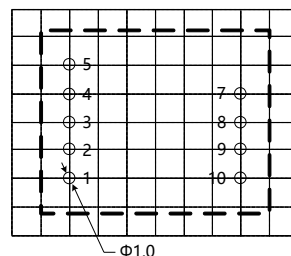
Note:

Size unit: mm

Tolerance of terminal diameter: ± 0.10

Tolerance of unmarked: ± 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	VCC	Power input positive
2	GND	Power input ground
3	TXD	Data transmit pin
4	RXD	Data receive pin
5	CON	Transceiver control pin
7	VO	Isolated output power supply positive
8	RS-485 B	RS-485 pin B
9	RS-485 A	RS-485 A pin
10	RGND	Isolated output power ground

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
RSM3485PCT	3.3 (3.15~3.45)	30	130	19200	64	Low Speed
RSM485PCT	5 (4.75~5.25)	28	130	19200	64	Low speed

6 Specification parameters

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	RSM3485PCT	-0.7	3.3	5	V dc
	RSM485PCT	-0.7	5	7	
Pin Soldering Temperature	Manual soldering @ 3~5 seconds	--	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 _{CC}	RSM3485PCT	3.15	3.3	3.45	V _{DC}
		RSM485PCT	4.75	5	5.25	
TXD Logic Level	High Level	V _{IH}	0.7V _{CC}	--	V _{CC} +0.5	
	Low Level	V _{IL}	0	--	0.3V _{CC}	
RXD Logic Level	High Level	V _{OH}	I _{RXD} = -2mA	2.0	--	
	Low level	V _{OL}	I _{RXD} = 2mA	----- ----- -----	-- 0.8	
CON control level	High level	V _{CON_H}	RSM3485PCT	2.3	--	V _{CC} +0.5
			RSM485PCT	3.8	--	V _{CC} +0.5
	Low Level	V _{CON_L}		0	--	0.3V _{CC}
TXD drive current	I _{TXD}		--	--	2	mA
CON drive current	I _{CON}		--	5	--	
RXD output current	I _{RXD}		--	--	2	
TXD pull-up resistor	R _{TXD}			5.1		kΩ
Serial Interface		RSM3485PCT	3.3V Standard UART Interface			
		RSM485PCT	5V standard UART interface			

6.3 Output Characteristics

Item	Symbol	Condition	Minimum value	Nominal value	Maximum value	Unit
Isolated output supply voltage	V _O	Nominal Input Voltage	4.95	5.15	5.35	VDC
Isolated Output Supply Current	I _O		--	--	100	mA
Differential Output Voltage (A-B)	V _{OD}	Nominal input voltage with differential load of 54 Ω	1.5	--	VO	VDC
Differential Output Current (A-B)	I _{OD}		28	--	--	mA
Bus Interface Protection			ESD static protection			

6.4 Transmission characteristics

Item	Symbol	Condition	Minimum value	Nominal value	Maximum value	Unit
Built-in pull-up and pull-down resistors			--	22	--	k Ω
Transceiver Input Impedance		$-7V \leq V_{CM} \leq +12V$	96	--	--	
Data transmission delay			--	--	80	μs
Data reception delay			--	--	80	
Transmit/receive state delay	T_{RTT}, T_{TTR}	--	--	25	--	μs

6.5 Truth Table Characteristics

Item	Input		Output	
Transmit Function	CON	TXD	A	B
	A B	1	1	0
	0	0	0	1
Receive Function	CON	$V_A - V_B$	RXD	
	1	$\geq -10mV$	1	
	1	$\leq -200mV$	0	
	1	$-200mV < V_A - V_B < -10mV$	Uncertain state	

6.6 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%	--	3.5K	--	VDC
Operating Temperature Range	Output is full load	-40	--	+85	°C
Storage temperature	--	-55	--	+105	°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.				

6.7 Physical Characteristics

Item	Condition
Enclosure Material	Black flame retardant heat resistant plastic (UL94-V0)
Package size	19.50*16.50*7.10mm
Weight	4.0g (nominal)
Cooling Method	Natural air cooling

6.8 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 5 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 5 for recommended circuitry)	Perf.Criteria B
	Conducted Nuisance Immunity	IEC/EN 61000-4-6 3Vr.m.s	Perf.

7 Product Characterization Curve

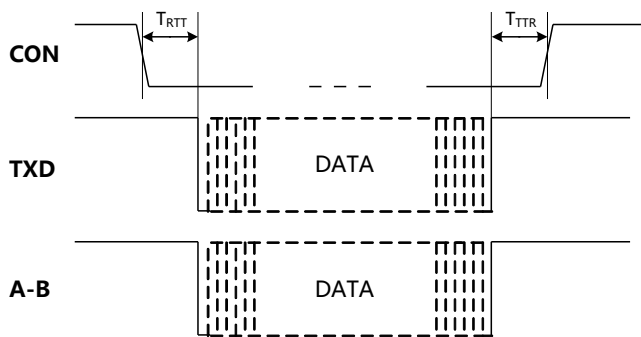


Figure 1. RSM(3)485PCT Module Data Transmission Timing Chart

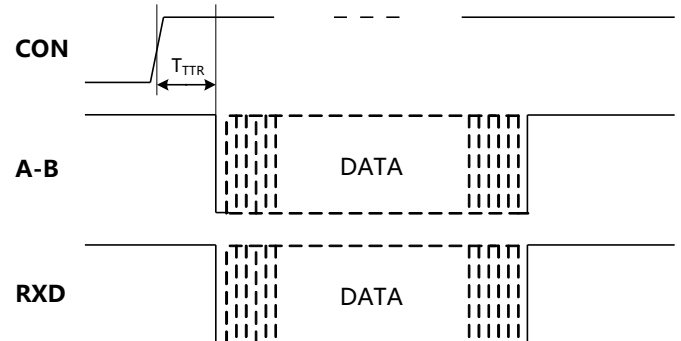


Figure 2. RSM(3) 485PCT Module Data Receiving Timing Diagram

8 Design Reference

8.1 Typical Application

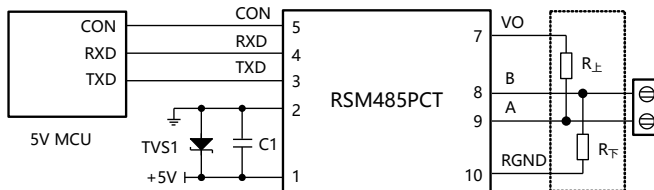


Figure 3. MCU 5V Power Supply Application Circuitry

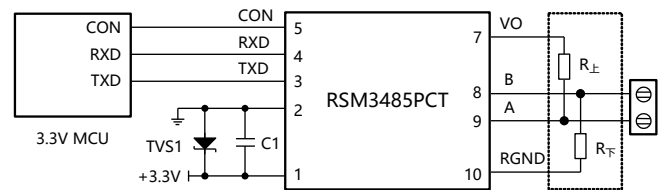


Figure 4. MCU 3.3V Power Supply Application Circuitry

Figure 3 shows the connection diagram between the 5V MCU system UART interface and the RSM485PCT isolated transceiver module. The module must be powered by a 5V power supply, and the module's TXD, RXD, and CON pin interfaces match the level of 5V, and do not support the 3.3V system level. Figure 4 shows the 3.3V MCU system UART interface and RSM3485PCT isolated transceiver module connection diagram, the module must be powered by a 3.3V power supply, the module's TXD, RXD and CON pin interface matching level is 3.3V, does not support 5V system level.

8.2 EMC Typical Recommended Circuit

Since the module internal A/B line with pull-up and down resistors and ESD protection devices, so generally used in good environmental conditions without the need to add ESD protection devices, such as 8.1 typical applications shown in the typical connection circuit diagram. However, if the application environment is more severe (such as high-voltage power, lightning and

other environments), it is recommended that the user must be in the module at the A/B line end of the external TVS tubes, common-mode inductors, lightning tubes, shielded twisted-pair cables, or the same network of single-point ground and other protective measures.

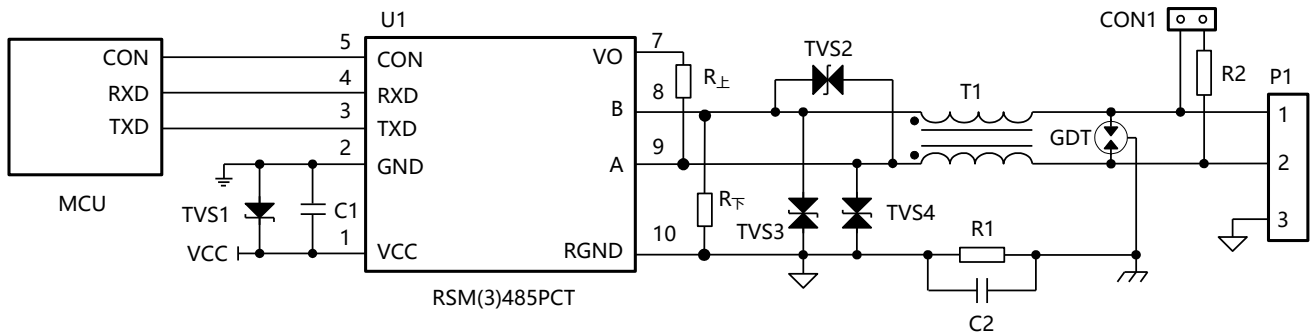


Figure 5. EMC Recommended Circuitry

If you need to meet specific surge level requirements, it is recommended to use the recommended protection circuit shown in Figure 5, 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 μ F, 25V	TVS1	SMBJ5.0A
C2	102, 2KV, 1206	TVS2	SMBJ12CA
GDT	3RL090M-5-S	TVS3, TVS4	SMBJ6.5CA
R1	1M Ω , 1206	T1	B82793S0513N201
R2	120 Ω , 1206	U1	RSM(3) 485 Module

9 Precautions for Product Use

9.1 MCU IO Port Level Matching

The interface matching level of TXD, RXD and CON pins of RSM485PCT is 5V, 3.3V system level is not supported; the interface matching level of TXD, RXD and CON pins of RSM3485PCT is 3.3V, 5V system level is not supported.

9.2 Module RS485 A-B Bus Level Threshold Description

From the truth table characteristics can be seen, the series of embedded isolated RS-485 transceiver module when the A/B line differential voltage is greater than or equal to -10mV, the module receives a high level; when the A/B line differential voltage is less than or equal to -200mV, the module receives a low level; when the A/B line differential voltage is greater than -

200mV and less than -10mV, the module receives the level of uncertainty, the design should ensure that the module receives not in the state, the module receives the level of -200mV and less than -10mV. When the design should ensure that the module reception is not in this state. Therefore, when designing or applying RS-485 network, users should decide whether to add 120 Ω termination resistor according to the actual situation. Principle of use: No matter the RS-485 network is in static or dynamic condition, it must be ensured that the differential voltage of A/B line is not between -200mV and -10mV, or there will be communication error.

9.3 Module RS485 Transmit and Receive Data Control Pin CON Level Description

As can be seen from the truth table characteristics, this series of embedded isolated RS-485 transceiver modules are sending data when the CON pin is low, and receiving data when the CON pin is high, which is the opposite of the ordinary RS-485 transceiver chip transceiver control level. Therefore, if the customer wants to change to the same send/receive control level as the common RS-485 transceiver chip, then it is recommended that the user add an inverting circuit between the MCU and the module's CON pin.

9.4 Module Pin Description

Module pin 6 is not pinned out, when not using pins 7 and 10, please leave this pin empty.

Users must avoid short-circuiting the VO pin with RGND pin, otherwise the module will be damaged, in addition, the VO pin is best used only for pull-up resistor circuit, do not use it for other circuits to supply power.

9.5 Shielded Cable

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 you require RS-485 network to have better anti-jamming ability, you can use double-shielded twisted-pair cable, and the RGND 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.