

RSMXX422

Medical
electric
equipmentPower
Factor
CorrectionWorld
wideSafety
Approvals

EMI

Inrush
current
limiting

OCP

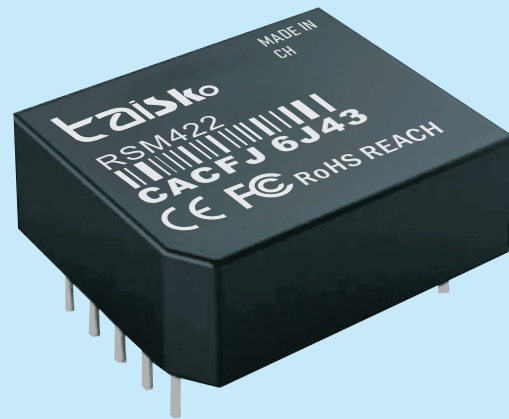
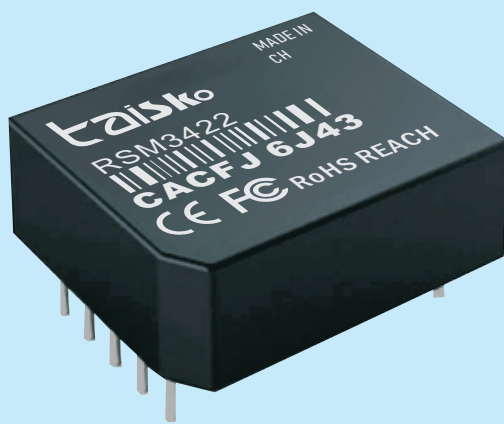


OVP

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

Embedded isolated RS-422 transceiver

Product Features:

- Single input power supply
- Isolated output power pin
- Can connect up to 256 nodes
- Good electromagnetic radiation immunity
- Integrated power isolation, signal isolation, and bus
- ESD protection functions

2 Product Description:

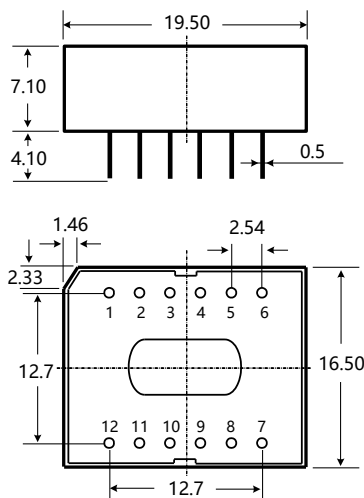
RSM3422 / RSM422, The main function will be to convert logical levels into differential levels of RS-422 protocol, achieving signal isolation; It is an RS-422 protocol transceiver module that uses IC integration technology to achieve power isolation, signal isolation, RS-422 communication, and bus protection. The product comes with a constant voltage isolation power supply, which can achieve 2500VDC electrical isolation. Conveniently embed user devices to enable easy connection to RS-422 protocol networks.

Scope of application:

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

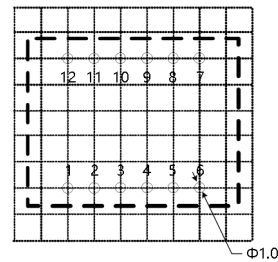
4. Appearance dimensions and pin specifications:

4.1 Appearance Dimensions



Note:
Dimension unit: mm
Terminal diameter tolerance: ± 0.10
Unmarked tolerance: ± 0.25

4.2 Suggested Printing Drawings



Note: The grid spacing is 2.54 * 2.54mm

4.3 Pin Definition

Pin		describe
Serial Number	name	
1	VCC	Positive power input
2	GND	Power input ground
3	TXD	Sending feet
4	RXD	Receiving feet
5	DE	Send Enable Foot
6	RE	Receiving Enabling Feet
7	RGND	Isolation power output ground
8	Y	Y foot
9	Z	Z foot
10	B	B foot
11	A	A foot
12	Vo	Isolation power output positive

5 Product Model Table

PRODUCT MODEL	Power supply voltage range (VDC)	static current (mA, Typ)	maximum operating current (mA)	Transmission baud rate (Mbps)	Nodes (pcs)	type
RSM3422	3.3 (3.15~3.45)	38	130	10	256	ultra high-speed
RSM422	5 (4.75~5.25)	36	110	10	256	ultra high-speed

6 specification parameters

6.1 Maximum limit parameters

Using beyond the following limit values may cause permanent damage to the module,

project	condition	minimum value	Nominal value	Maximum value	unit
Input Voltage	RSM3422	-0.7	3.3	5	V dc
	RSM422	-0.7	5	7	
Pin soldering temperature resistance	Manual welding @ 3-5 seconds	--	370	--	℃
	Wave soldering @ 5-10 seconds	--	265	--	
hot plugging	--	Not Supported			

Note: This series of modules does not have input anti reverse connection function. It is strictly prohibited to input positive and negative connections in reverse, otherwise it will cause irreversible damage to the module.

6.2 Input Characteristics

project		symbol	condition	minimum value	Nominal value	Maximum value	unit
INPUT VOLTAGE		V _{CC}	RSM3422	3.15	3.3	3.45	V _{DC}
			RSM422	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	
DE logic level	high level	V _{IH}		0.7V _{CC}	--	V _{CC} +0.5	
	Low Level	V _{IL}		0	--	0.3V _{CC}	
RE logic level	high level	V _{OH}		0.7V _{CC}	--	V _{CC} +0.5	
	Low Level	V _{OL}		0	--	0.3V _{CC}	
TXD driving current		I _{TXD}		--	--	2	mA
DE driving current		I _{DE}		--	--	2	
RE driving current		I _{RE}		--	--	2	
RXD output current		I _{RXD}		--	--	2	
serial interface			RSM3422	3.3V standard UART interface			
			RSM422	5V standard UART interface			

6.3 Output Characteristics

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
Isolation output power supply voltage	V _O	Rated input voltage	4.95	5.15	5.35	VDC
Isolate output power supply current	I _O		100	--	--	mA

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
Differential output voltage (Y-Z)	V _{OD}	Nominal input voltage, differential load of 100 Ω	2	--	VO	VDC
		Nominal input voltage, differential load of 54 Ω	1.5	--	VO	VDC
Differential output current (Y-Z)	I _{OD}	Nominal input voltage, differential load of 100 Ω	20	--	--	mA
		Nominal input voltage, differential load of 54 Ω	28	--	--	mA
Bus interface protection		Y/Z A/B feet	ESD electrostatic protection			

6.4 Transmission Characteristics

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
Input impedance of transceiver		-7V≤V _{CM} ≤+12V	96	--	--	kΩ
Data transmission delay			--	40	--	ns
Data reception delay			--	50	--	
Drive enable/disable delay			--	200	--	
Receive enable/disable delay			--	1400	--	

6.5 Characteristics of Truth Table

project	input			output	
Sending function	RE	DE	TXD	Y	Z
	X	1	1	1	0
	X	1	0	0	1
	0	0	X	High-Z	
	1	0	X	Shutdown	
Receiving function	RE	DE	V_A-V_B	RXD	
	0	X	≥-10mV	1	
	0	X	≤-200mV	0	
	0	X	Open/Shorted	1	
	1	X	X	1	

6.6 General Characteristics

project	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%	--	2.5K	--	VDC
Working temperature range	Output as full load	-40	--	+85	℃
storage temperature	--	-55	--	+105	℃
Storage humidity	No condensation	--	--	95	%
Temperature rise of the casing during operation		--	20	--	℃
Usage environment	The presence of dust, strong vibrations, impacts, and gases that corrode product components in the surrounding environment may cause damage to the product				

6.7 Physical Characteristics

project	condition
Housing material	Black flame retardant and 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	project	parameter	grade
EMS	Electrostatic Discharge	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 $\pm 15\text{KV}$ (recommended circuit shown in Figure 3)	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.Criteria B
		IEC/EN 61000-4-5 differential mode $\pm 2\text{KV}$, common mode $\pm 4\text{KV}$ (recommended circuit shown in Figure 3)	Perf.Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 3Vr.m.s	Perf.Criteria A

7 Design references

7.1 Typical Applications

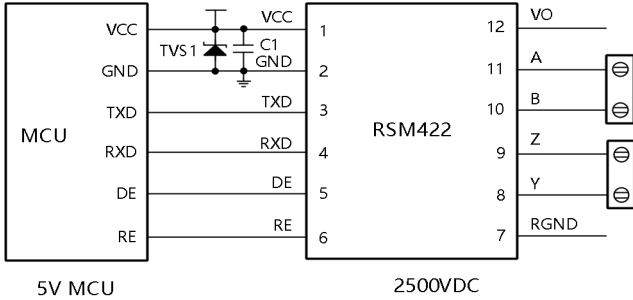


Figure 1. MCU 5V Power Supply Application Circuit

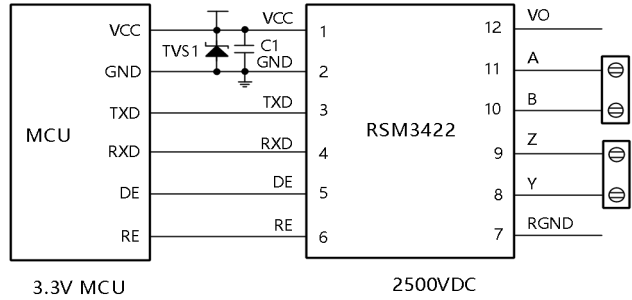


Figure 2. MCU 3.3V Power Supply Application Circuit

Figure 1 shows the connection diagram between the UART interface of the 5V MCU system and the RSM422 isolated transceiver module. The module must be powered by a 5V power supply, and the TXD and RXD pin interfaces of the module are matched with a voltage level of 5V and do not support 3.3V system voltage. Figure 2 shows the connection diagram between the UART interface of the 3.3V MCU system and the RSM3422 isolated transceiver module. The module must be powered by a 3.3V power supply, and the TXD and RXD pin interfaces of the module are matched with a voltage level of 3.3V, which does not support 5V system voltage.

7.2 Typical Recommended EMC Circuits

Due to the built-in ESD protection devices on the Y/Z A/B lines inside the module, there is generally no need to add ESD protection devices when applied in environments with good conditions, as shown in the typical connection circuit diagram in 7.1 Typical Applications. But if the application environment is relatively harsh (such as high voltage power, lightning strikes, etc.), it is recommended that users must add protective measures such as TVS tubes, common mode inductors, lightning protection tubes, shielded twisted pair cables, or single point grounding of the same network to the Y/Z A/B terminal of the module.

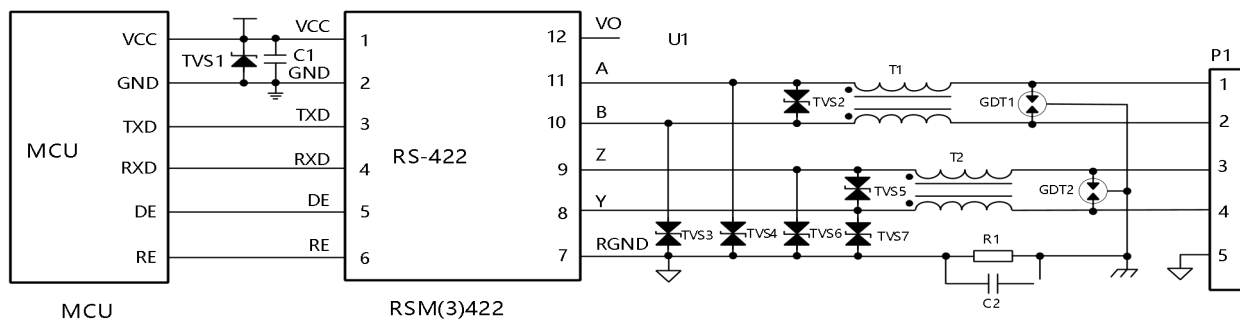


Figure 3 EMC Recommended Circuit

If specific surge level requirements need to be met, it is recommended to use the recommended protection circuit shown in Figure 3. Table 1 provides a set of recommended device parameters, and the recommended circuit diagram and parameter values are for reference only.

Please determine the appropriate parameter values based on the actual situation.

Table 1. Recommended EMC Parameters

label	model	label	model
C1	10 μ F, 25V	TVS1	SMBJ5.0A
C2	102, 2KV, 1206	TVS2,TVS5	SMBJ12CA
GDT	3RL090M-5-S	TVS3, TVS4,TVS6,TVS7	SMBJ6.5CA
R1	1M Ω , 1206	T1,T2	B82793S0513N201
R2	120 Ω , 1206	U1	RSM (3) 422 module

8 Product usage precautions

8.1 MCU IO port level matching

The TXD, RXD, DE, and RE pin interfaces of RSM422 are matched with a voltage level of 5V and do not support a 3.3V system level;The TXD, RXD, DE, and RE pin interfaces of RSM3422 are matched with a voltage level of 3.3V and do not support 5V system voltage.

8.2 Module RS422 A-B Bus Level Threshold Explanation

According to the characteristics of the truth table, the embedded isolated RS-422 transceiver module of this series has a high receiving level when the A/B line differential voltage is greater than or equal to -10mV;When the A/B line differential voltage is less than or equal to -200mV, the module's receiving level is low;When the differential voltage between A/B lines is greater than -200mV and less than -10mV, the module's receiving level is in an uncertain state, and the design should ensure that the module's receiving is not in this state.So when designing or applying RS-422 networks, users need to decide whether to add a 120 Ω terminal resistor based on the actual situation.Usage principle: Regardless of whether the RS-422 network is in a static or dynamic state, it is necessary to ensure that the A/B line differential voltage is not between -200mV and -10mV, otherwise communication errors may occur.

8.3 Module Pin Description

When module pins 7 and 12 are not in use, please suspend this pin.