

Medical
electric
equipmentPower
Factor
Correction

World wide

Safety
Approvals

EMI

Inrush
current
limiting

OCP

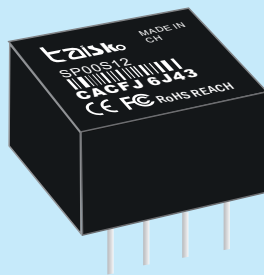


OVP

Remote
ON/OFFParallel
Operation

1U

SP-series



Feature

SP00S12 can be used for various signals
Transmission system to suppress lightning strikes
Interference signals such as surges and overvoltages,
And protect the device signal port.
This product is particularly suitable for CAN and
Surge protection in communication fields such as RS-485.

Application:

Widely used in

CAN RS-485

Surge protection in the field of communication

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 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

SP00S12 signal surge suppressor

Product Features:

- Low loss and fast response
- Suppress surge at the signal end
- Small size
- Current capacity: $\leq 500A$ (8/20 μS simulated lightning waveform)
- Meet the surge level requirements of IEC/EN 61000-4-5 $\pm 4KV$
- The shell and sealing material comply with UL94 V-0 standard

2 Product Description:

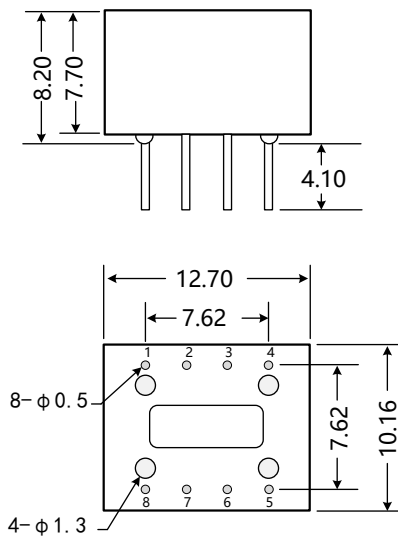
SP00S12 can be used in various signal transmission systems to suppress interference signals such as lightning strikes, surges, and overvoltages, and to protect equipment signal ports. This product is particularly suitable for surge protection in communication fields such as CAN and RS-485.

Scope of application:

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

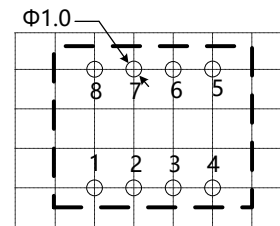
4. Appearance dimensions and pin specifications:

4.1 Appearance dimension diagram



Note:
Dimensional 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	A2	Signal A output pin
2	PE	ground
3		
4	B2	Signal B output pin
5	B1	Signal B input pin
6	GND	signal ground
7		
8	A1	Signal A input pin

5 Product Model Table

PRODUCT MODEL	Maximum operating voltage (VDC)	Maximum transmission baud rate (Mbps)	Rated current (mA)	Maximum current capacity (A)
SP00S12	12	10	50	500

6 specification parameters

6.1 Protection Characteristics

project	symbol	minimum value	Nominal value	Maximum value	unit
current capacity	Id	--	--	500	A

6.2 Transmission Characteristics

project	symbol	condition	minimum value	Nominal value	Maximum value	unit
working voltage	Uc		-7	--	12	V
transfer rate	Vs		--	--	10	Mbps
Rated current	Ie		--	--	50	mA
equivalent series resistance	$R_{S(A1-A2)}$	normal temperature	--	12	--	Ω
	$R_{S(B1-B2)}$	normal temperature	--	12	--	
	$R_{S(A1-A2)}$	Full temperature range	1	--	25	
	$R_{S(B1-B2)}$	Full temperature range	1	--	25	
Pin to pin capacitance	$C_{(A1-B1)}$		--	25	--	pF
	$C_{(A2-B2)}$		--	25	--	
	$C_{(A1-GND) (B1-GND)}$		--	50	--	
	$C_{(A2-PE) (B2-PE)}$		--	2	--	

6.3 Design Standards

parameter	test configuration	Meet standards
Surge immunity	Unshielded symmetrical communication line, external resistance of 80 Ω , as shown in Figures 3 and 4	IEC/EN 61000-4-5 $\pm 4KV$ 1.2/50 μs
	Unshielded symmetrical communication line, external resistance 50 Ω , as shown in Figures 3 and 4	IEC/EN 61000-4-5 $\pm 4KV$ 10/700 μs

6.4 General Characteristics

project	condition	minimum value	Nominal value	Maximum value	unit
Working temperature range	Output as full load	-40	--	+85	$^{\circ}C$
storage temperature	--	-40	--	+85	$^{\circ}C$
Storage humidity	No condensation	--	--	95	%
Temperature rise of the casing during operation		--	5	10	$^{\circ}C$
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				

6.5 Physical Characteristics

project	condition
Housing material	Black flame retardant and heat-resistant plastic (UL94-V0)
Package Size	12.70*10.16*7.70mm

project	condition
weight	2.0g (nominal)
Cooling method	Natural air cooling

7 Design references

7.1 Typical Applications

The SP00S12 signal surge suppressor can be used on various bus nodes that require protection to achieve the design required protection level.

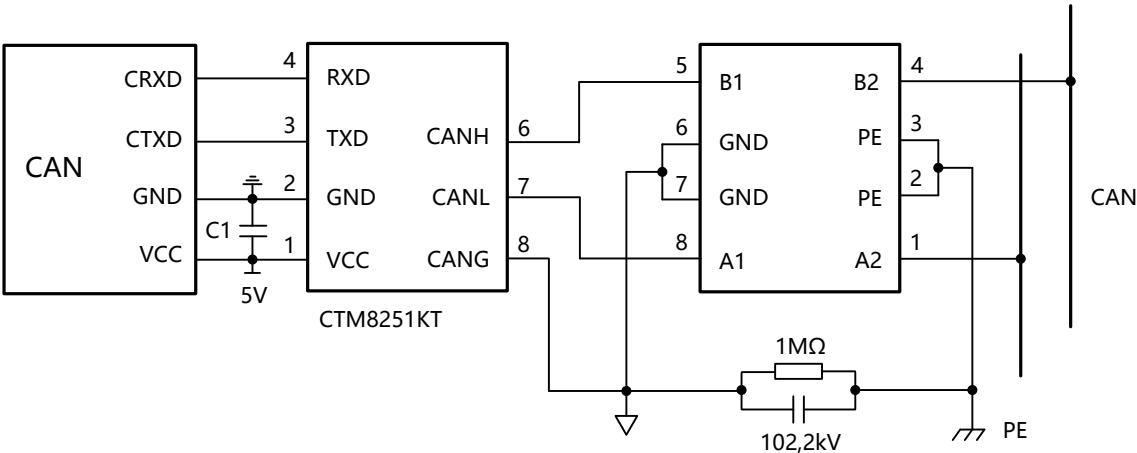


Figure 1. CTM8251KT application circuit

Figure 1 shows the application of SP00S12 in CAN serial communication. Adding SP00S12 to the communication port of a CAN transceiver circuit CTM8251KT can easily meet the surge level requirements of IEC/EN 61000-4-5 common mode and differential mode $\pm 4\text{KV}$ for the CAN signal port.

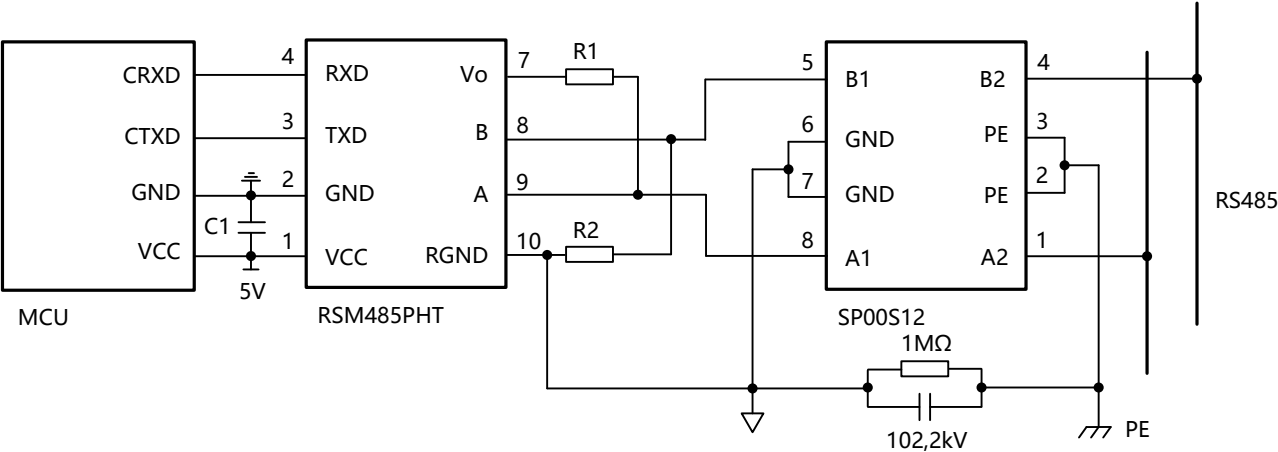


Figure 2. RSM485PHT application circuit

Figure 2 shows the application of SP00S12 in RS485 serial communication. By connecting the signal port of SP00S12 to the differential

signal ports A and B of the RSM485PHT module, the 485 communication port can meet the surge level requirements of IEC/EN 61000-4-5 common mode $\pm 4\text{KV}$ and differential mode $\pm 2\text{KV}$

7.2 Surge immunity test

The surge suppression level of the product meets the IEC/EN 61000-4-5 $\pm 4\text{KV}$ protection requirements, and the test configuration is based on the unshielded symmetrical communication line in IEC/EN 61000-4-5. The specific test circuit is shown in Figure 3. During the testing process, apply different levels of surge voltage to the surge suppressor and measure the voltage waveform at its signal input and output terminals.

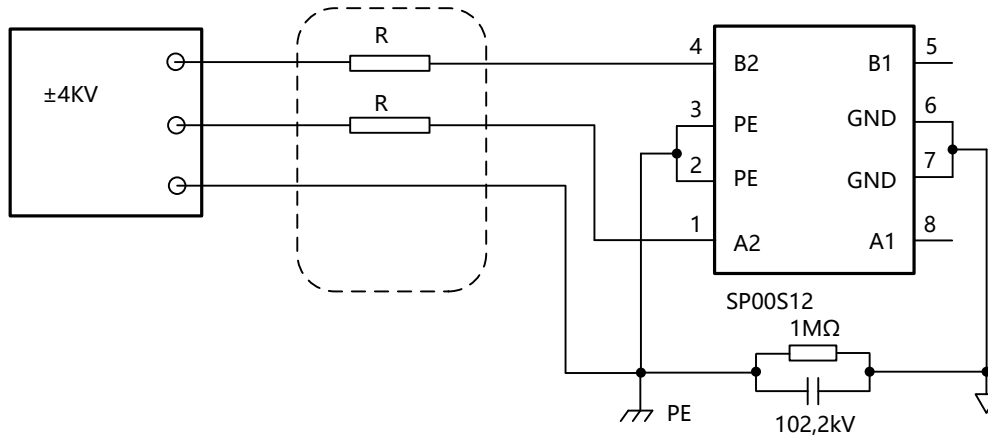


Figure 3 Common mode surge test

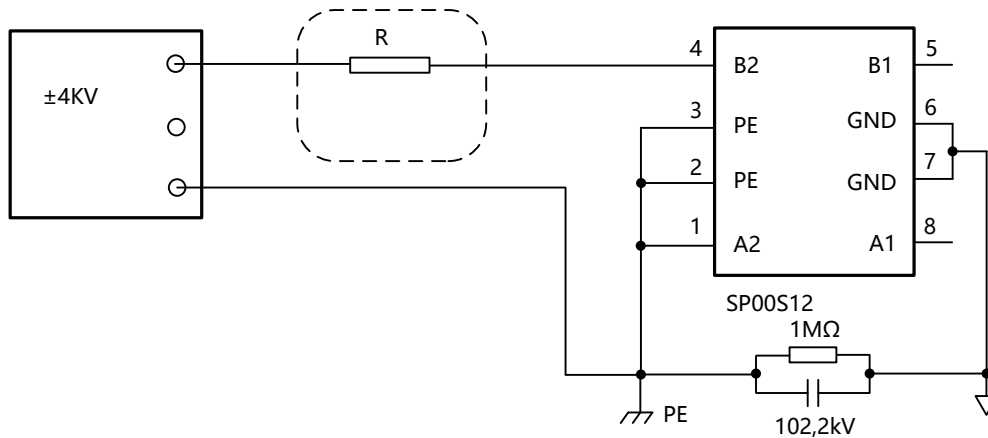


Figure 4 Differential surge test

Calculation of R when using a 1.2/50uS generator: $R = 2 \times 40 \Omega = 80 \Omega$
 Calculation of R when using a 10/700uS generator: $R = 2 \times 25 \Omega = 50 \Omega$