



## DESCRIPTION

The SM712 transient voltage suppressor (TVS) diode is designed for asymmetrical (12V to 7V) protection in multi-point data transmission standard RS-485 applications. The SM712 may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (FET), and lightning. The SM712 features 400 Watts ( $t_p=8/20\mu s$ ) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. This provides higher equipment reliability and eliminates the “guess work” required when using zener diodes that are not rated to handle such transient conditions. The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the SM712 minimizes the stress on the protected transceiver.

The SM712 is available in SOT-23 package

## ORDERING INFORMATION

Package Type	Part Number
SOT-23	SM712
Note	SPQ: 3,000pcs/Reel
AiT provides all RoHS Compliant Products	

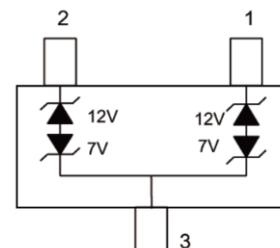
## FEATURES

- 400 watts peak pulse power ( $t_p=8/20\mu s$ )
- Transient protection for asymmetrical data lines to  
-IEC 61000-4-2 (ESD)  $\pm 15kV$ (air),  $\pm 8kV$ (contact)  
-IEC 61000-4-4 (FET) 40A (5/50ns)  
-IEC 61000-4-5 (Lightning) 12A (8/20 $\mu s$ )
- Protects two +12V to -7V lines
- Low capacitance
- Low leakage current
- Low clamping voltage
- Solid-state silicon avalanche technology
- High temperature soldering guaranteed:260°C/10s
- Available in SOT-23 package

## APPLICATIONS

- Protection of RS-485 transceivers with extended
- Security systems
- Automatic Teller Machines (ATMs)
- Lighting Control – DALI
- Communication Equipments
- Fieldbus
- Modbus
- Profibus
- DMX512
- HFC systems
- Networks

## PIN CONFIGURATION





## ABSOLUTE MAXIMUM RATINGS

P <sub>PP</sub> , Peak Pulse Power (8/20us)		400W
I <sub>PP</sub> , Peak Pulse Current (8/20us)		17A
V <sub>ESD</sub> , ESD per IEC 61000-4-2	Air	±15kV
	Contact	±8kV
T <sub>OPT</sub> , Operating Temperature		-55°C~150°C
T <sub>STG</sub> , Storage Temperature		-55°C~150°C

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ELECTRICAL CHARACTERISTICS

T<sub>amb</sub>=25°C

Parameter	Symbol	Conditions	Pin 1 or Pin 2 to Pin 3 (12V) TVS			Pin 3 to Pin 1 or Pin 2 (7V) TVS			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
			Reverse Working Voltage	V <sub>RWM</sub>	Pin 3 to 1 or Pin 2 to 1	-	-	12	
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>T</sub> = 1mA	13.3	-	-	7.5	-	-	V
Reverse Leakage Current	I <sub>R</sub>	V <sub>R</sub> = V <sub>RWM</sub>	-	-	1	-	-	20	μA
Clamping Voltage 1	V <sub>C1</sub>	I <sub>PP</sub> = 5A, t <sub>p</sub> = 8/20μs	-	-	20	-	-	10	V
Clamping Voltage 2	V <sub>C2</sub>	I <sub>PP</sub> = 17A, t <sub>p</sub> = 8/20μs	-	-	26	-	-	12	V
Junction Capacitance 1	C <sub>J1</sub>	V <sub>R</sub> = 0V, f = 1MHz	-	-	75	-	-	75	pF
Junction Capacitance 2	C <sub>J2</sub>	V <sub>R</sub> = V <sub>RWM</sub> , f = 1MHz	-	45	-	-	45	-	pF



## TYPICAL CHARACTERISTICS

Figure 1. Non-Repetitive Peak Pulse Power vs. Pulse Time

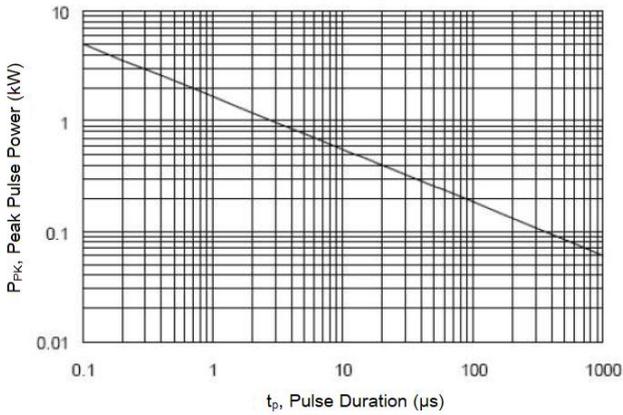


Figure 2. Power Derating Curve

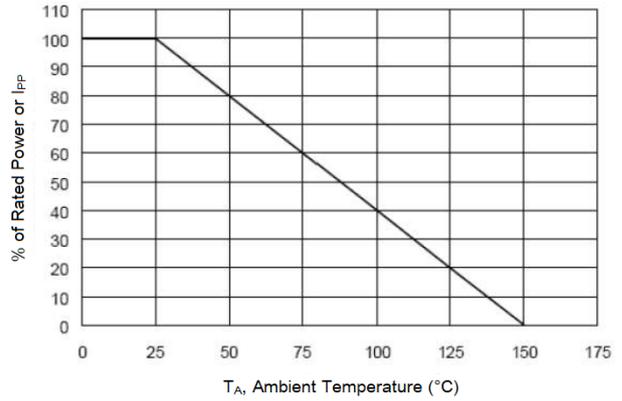


Figure 3. Pulse Waveform

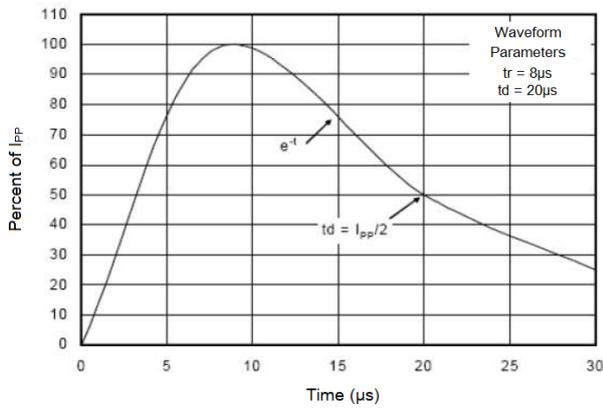


Figure 4. Clamping Voltage vs. Peak Pulse Current

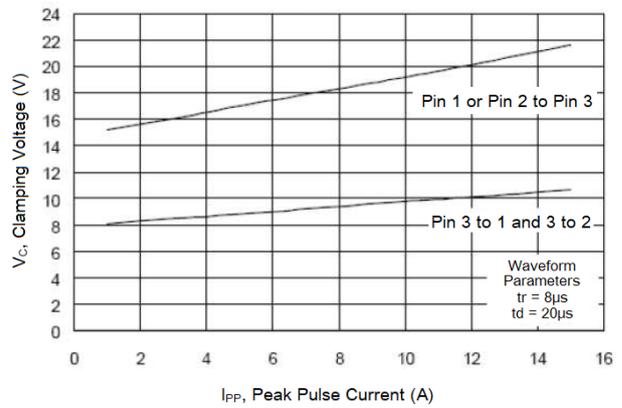
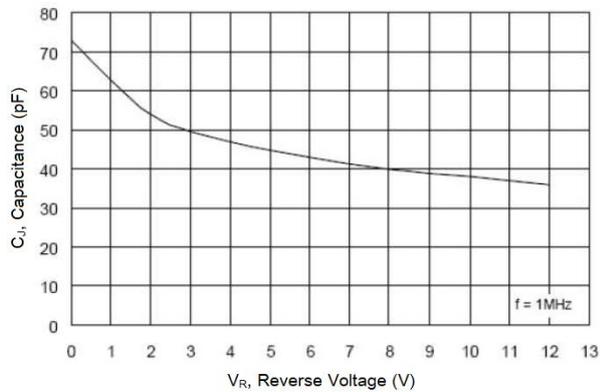


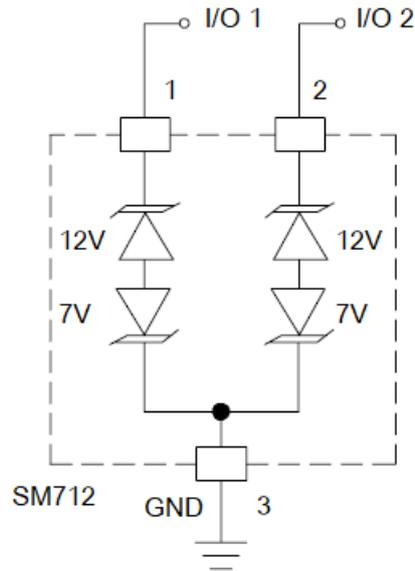
Figure 5. Capacitance vs. Reverse Voltage



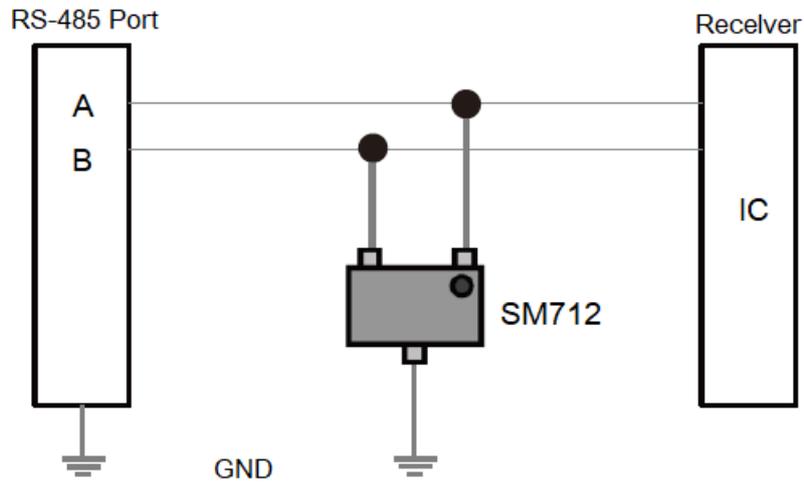


## DETAILED INFORMATION

### Circuit Diagram



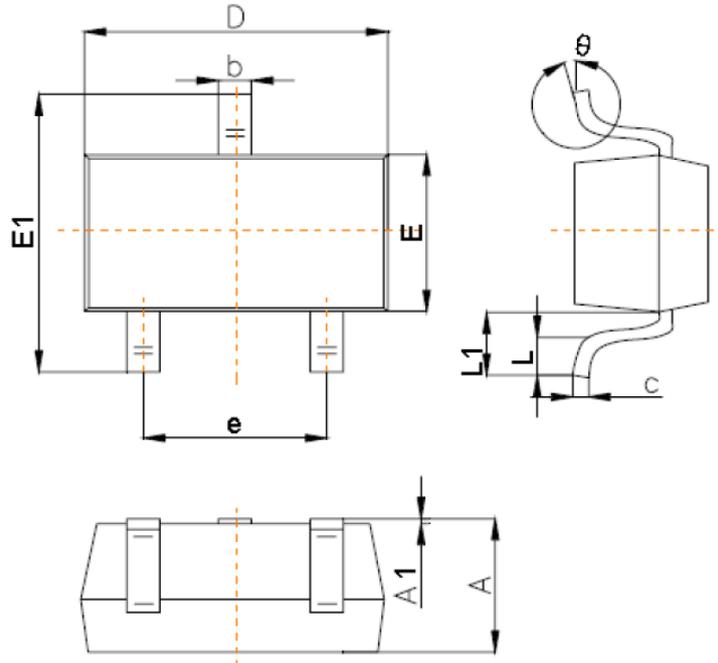
### RS-485 Application Example





## PACKAGE INFORMATION

Dimension in SOT-23 (Unit: mm)



Symbol	Min	Max
A	1.00	1.40
A1	-	0.10
b	0.35	0.50
c	0.10	0.20
D	2.70	3.10
E	1.40	1.60
E1	2.40	2.80
e	1.90 TYP	
L	0.10	0.30
L1	0.40	-
$\theta$	0°	10°



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