



Asymmetrical TVS Diode

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 (EFT), and lightning.

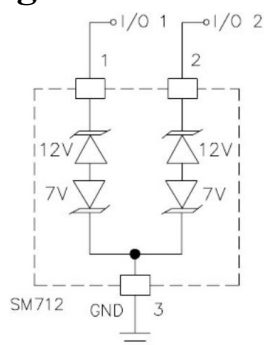
The SM712 features 400 Watts ($t_p=8/20\mu s$) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. This provides higher equipment reliability and eliminates the “guess work” required when using zener diodes that are 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 SOT-23 package allows flexibility in the design of “crowded” circuit boards.

Ordering Information

- Device:SM712
- Package:SOT-23
- Marking:712
- Material:Halogen free
- Packing:Tape & Reel
- Quantity per reel:3,000pcs

Pin Configuration



Features

- Transient protection for asymmetrical data lines
- IEC 61000-4-2(ESD) $\pm 8kV$ (Contact)
 $\pm 15kV$ (Air)
- IEC61000-4-4(EFT) 40A(5/50ns)
- IEC61000-4-5(Lighting) 12A(8/20 μs)
- 450W peak pulse power($t_p=8/20\mu s$)
- Protects two +12V to -7V lines
- Low capacitance
- Low leakage current
- Low clamping voltage
- Solid-state silicon avalanche technology
- RoHS compliant

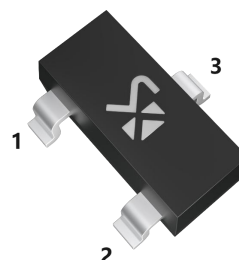
Mechanical Data

- SOT-23 package
- Flammability Rating: UL 94V-0
- Terminal: Matte tin plated
- Packaging: Tape and Reel
- High temperature soldering guaranteed:
260°C/10s
- Reel size: 7 inch

Applications

- Protection of RS-485 transceivers with extended common-mode range
- Security systems
- Automatic Teller Machines
- HFC systems
- Networks

Package Outline



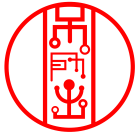


Absolute Maximum Rating

Parameter	Symbol	Value	Unit
ESD per IEC 61000-4-2(Air)	V_{ESD}	15	kV
ESD per IEC 61000-4-2(Contact)		± 8	kV
Peak Pulse Power(8/20 μ s)	P_{PP}	450	W
Peak Pulse Current(8/20 μ s)	I_{PP}	19	A
Operating Temperature	T_{OPT}	-55~+150	°C
Storage Temperature	T_{STG}	-55~+150	°C

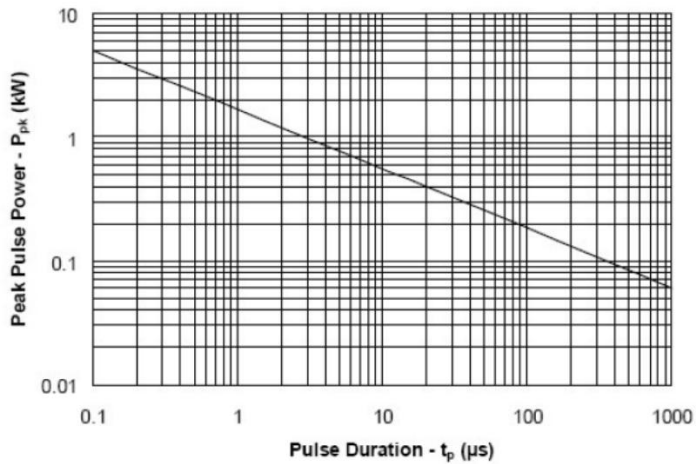
Electrical Characteristics ($T_A=25^{\circ}\text{C}$)

Parameter	Symbol	Test Condition	Pin 1 to 3 and Pin 2 to 3 (12V)TVS			Pin 3 to 1 and Pin 3 to 2 (7V)TVS			Unit
			Min	Typ	Max	Min	Typ	Max	
Reverse Working Voltage	V_{RWM}	Pin 3 to 1 or Pin 2 to 1			12			7	V
Reverse Breakdown Voltage	V_{BR}	$I_T=1\text{mA}$	13.3			7.5			V
Reverse Leakage Current	I_R	$V_R=V_{RWM}$			1			20	μA
Clamping Voltage	V_C	$I_{PP}=5\text{A}, T_P=8/20\mu\text{s}$			20			12	V
		$I_{PP}=19\text{A}, T_P=8/20\mu\text{s}$			26			16	V
Junction Capacitance	C_J	$V_R=0\text{V}, f=1\text{MHz}$			75			75	pF
		$V_R=V_{RWM}, f=1\text{MHz}$		45			45		pF

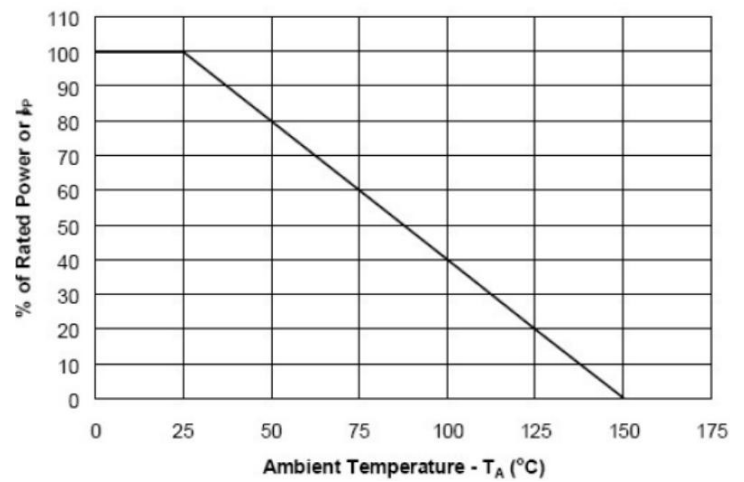


Typical Characteristics

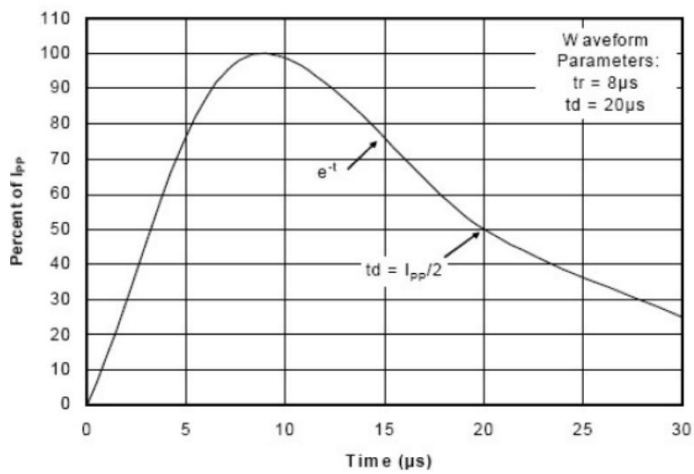
Non-Repetitive Peak Pulse Power vs. Pulse Time



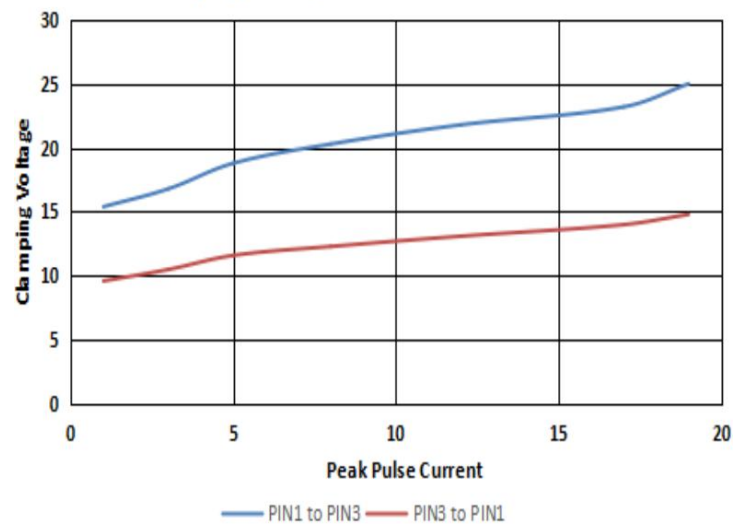
Power Derating Curve



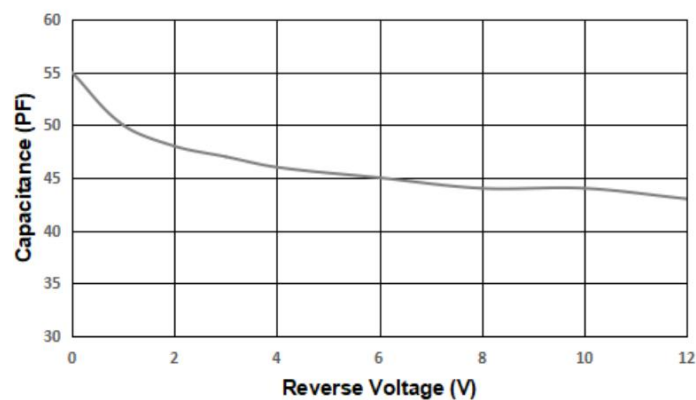
Pulse Waveform



Clamping Voltage vs. Peak Pulse Current



Capacitance vs. Reverse Voltage

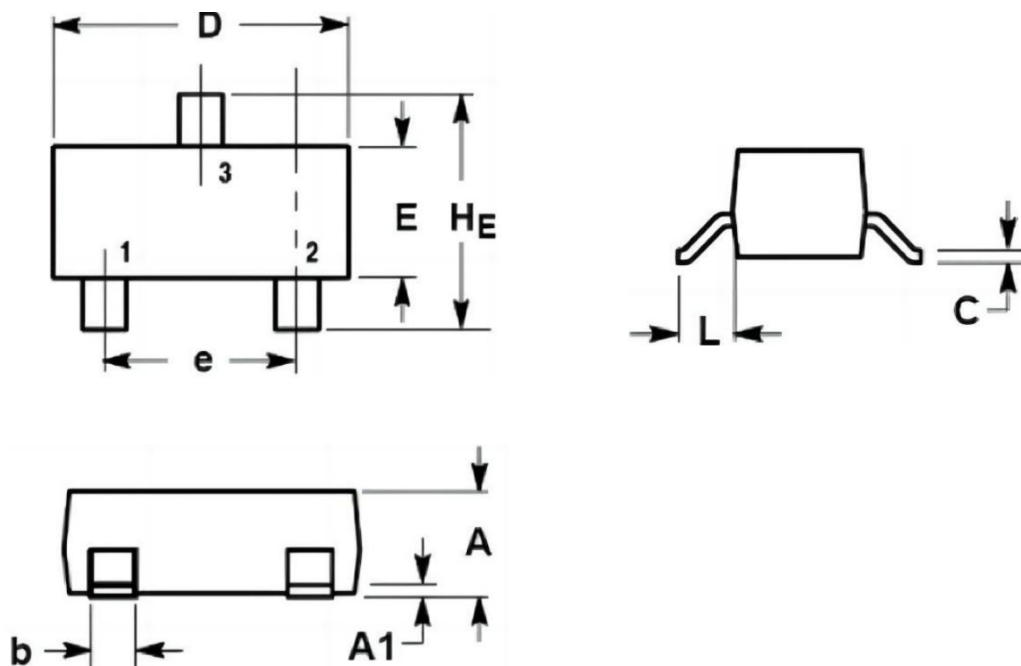




Package Information

SOT-23

Dimensions in mm



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104



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