

SOT-23 Plastic-Encapsulate ESD Protection Diodes**DESCRIPTION**

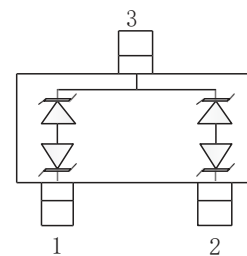
The SM712 transient voltage suppressor (TVS) diode is designed for asymmetrical (12V to -7V) protection in multi-point data transmission standard RS-485 applications. The SM712 may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (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.

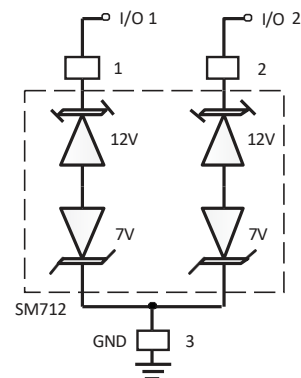
The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the SM712 minimizes the stress on the protected transceiver. The SOT-23 package allows flexibility in the design of “crowded” circuit boards.

Features

- ◆ 400 Watts Peak Pulse Power per (8/20 μs)
- ◆ Transient protection for asymmetrical data lines to
IEC61000-4-2 (ESD) $\pm 15kV$ (air), $\pm 8kV$ (contact)
IEC61000-4-4 (EFT) 40A (5/50ns)
IEC61000-4-5 (Lightning) 12A (8/20 μs)
- ◆ Protects two +12V to -7V lines
- ◆ Low capacitance
- ◆ Low leakage current
- ◆ Low clamping voltage
- ◆ Solid-state silicon avalanche technology
- ◆ Meets MSL 1 Requirements

Schematic & Pin Configuration

SOT23 (Top View)

Circuit Diagram

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20us)	P_{PP}	400	W
Peak Pulse Current(8/20us)	I_{PP}	17	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 15 ± 8	KV
Operating Temperature	T_{OPT}	-55 to +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Lead Solder Temperature – Maximum (10 Second Duration)	T_L	260(10 sec.)	$^{\circ}\text{C}$

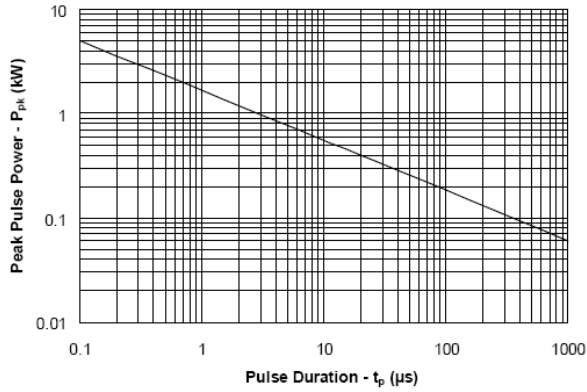
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parame	Test Condition	Pin 1 to 3 and Pin 2 to 3 (12V) TVS			Pin 3 to 1 and Pin 3 to 2 (7V TVS)			Units
			Min	Typ	Max	Mi	Typ	Max	
V_{RWM}	Reverse Working Voltage	Pin 3 to 1 or Pin 2 to 1			12			7	V
V_{BR}	Reverse Breakdown Voltage	$I_T = 1\text{mA}$	13.3			7.5			V
I_R	Reverse Leakage Current	$V_R = V_{RWM}$			1			20	μA
V_{C1}	Clamping Voltage 1	$I_{PP} = 5\text{A}$, $t_p = 8/20\mu\text{s}$			20			12	V
V_{C2}	Clamping Voltage 2	$I_{PP} = 17\text{A}$, $t_p = 8/20\mu\text{s}$			26			16	V
C_{J1}	Junction Capacitance 1	$V_R = 0\text{V}$, $f = 1\text{MHz}$			75			75	pF
C_{J2}	Junction Capacitance 2	$V_R = V_{RWM}$, $f = 1\text{MHz}$		45			45		pF

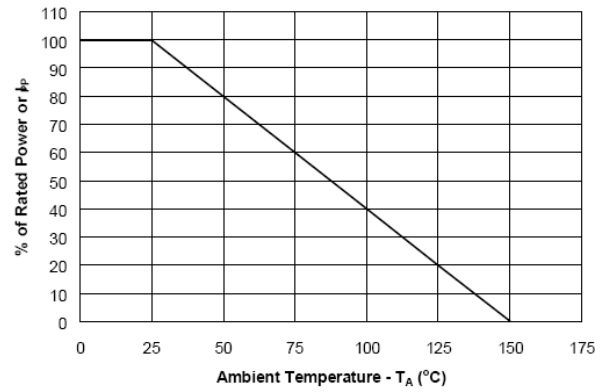
The above data are for reference only.

ELECTRICAL CHARACTERISTICS CURVE

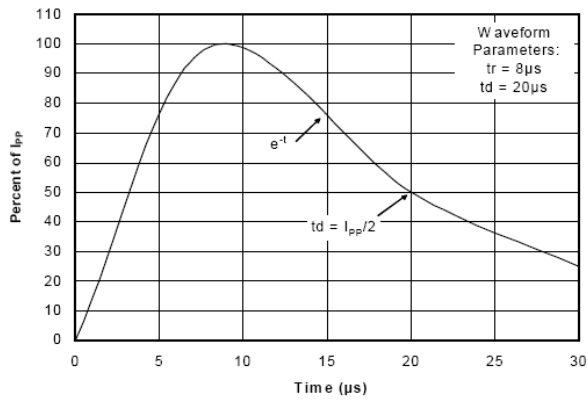
Non-Repetitive Peak Pulse Power vs. Pulse Time



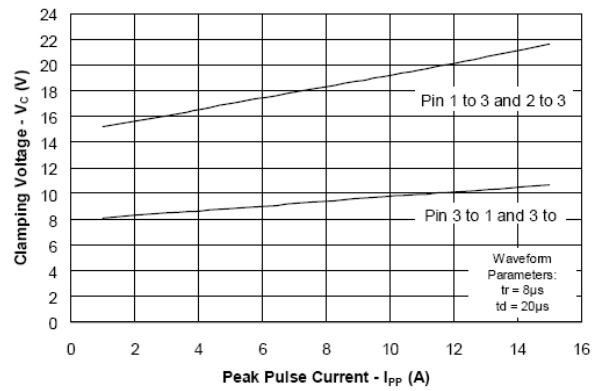
Power Derating Curve



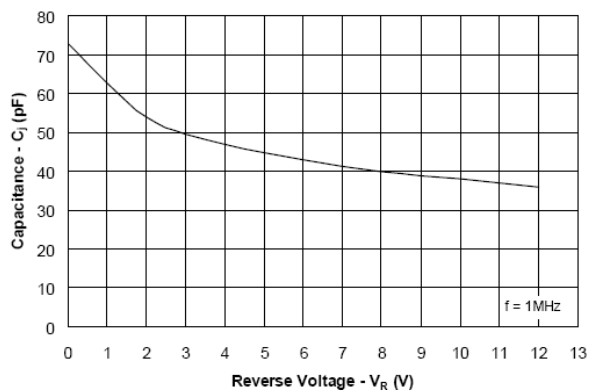
Pulse Waveform



Clamping Voltage vs. Peak Pulse Current



Capacitance vs. Reverse Voltage



The curve above is for reference only.