

Asymmetrical TVS Diode Array

General description

The SM712 TVS Diode Array is designed to protect RS-485 applications with asymmetrical working voltages (-7V to 12V) from damage due to electrostatic discharge (ESD), electrical fast transients (EFT), and lightning induced surges. The SM712 can absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation and safely dissipate up to 15A of 8/20 μ s induced surge current (IEC- 61000-4-5 2nd edition) with very low clamping voltages.

Features and benefits

- Transient Protection to
IEC 61000-4-2 (ESD): $\pm 15\text{kV}$ (Air), $\pm 8\text{kV}$ (Contact)
IEC 61000-4-5 (Lightning): 10A for 12V TVS
& 15A for 7V TVS ($t_p = 8/20\mu\text{s}$)
- Peak pulse power ($t_p = 8/20\mu\text{s}$): 500-700W
- Protects two +12V to -7V lines
- Low capacitance
- Low clamping voltage
- Solid-State Silicon-Avalanche Technology
- RoHS compliant and lead-free

Application information

- RS-485 transceivers with extended common mode range
- Security systems
- Automatic Teller Machines
- Lighting Control - DALI
- Communication Equipments
- HFC systems
- Networks

Ordering information

Device	Package	Marking	Packaging
SM712	SOT23	712	3000/Tape & Reel

Schematic & Pin configuration

Schematic and Pin Configuration	Circuit diagram
Top View	

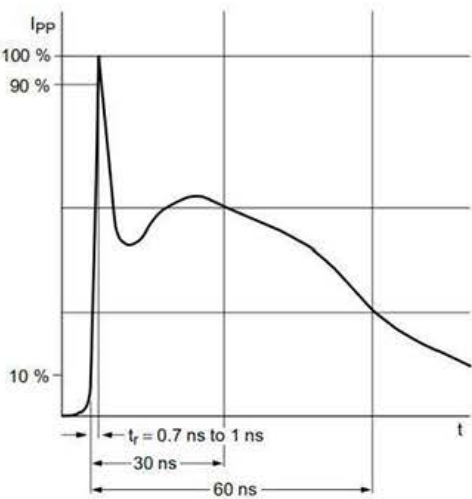
Maximum Ratings ($T_{OP} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power ($t_p = 8/20\mu\text{s}$), ($V_{RWM}=7\text{V}/V_{RWM}=12\text{V}$)	P_{PPM}	300/300	W
Peak Pulse Current ($t_p = 8/20\mu\text{s}$), ($V_{RWM}=7\text{V}/V_{RWM}=12\text{V}$)	I_{PPM}	15/10	A
ESD voltage IEC 61000-4-2 (air discharge)	V_{ESD}	15	kV
ESD voltage IEC 61000-4-2 (contact discharge)	V_{ESD}	8	kV
Maximum lead temperature for soldering during 10s	T_L	260	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$
Operating Temperature Range	T_{OP}	-40 to +125	$^{\circ}\text{C}$

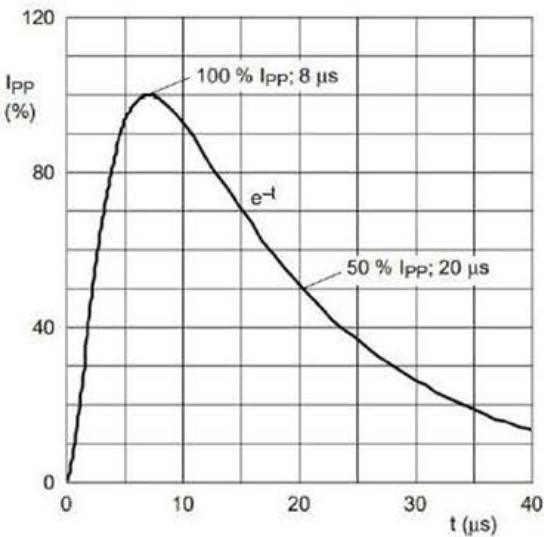
Electrical Characteristics ($T_{OP} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Reverse Working Voltage	V_{RWM}	--	--	7.0	V	Pin3 to Pin1 or 2
		--	--	12.0		Pin1 or 2 to Pin3
Breakdown Voltage	V_{BR}	7.5	--	--	V	$I_T=1\text{mA}$, Pin3 to Pin1 or 2
		13.3	--	--		$I_T=1\text{mA}$, Pin1 or 2 to Pin3
Leakage Current I_{Leak}	I_R	--	--	1.0	μA	$V_{RWM}=7\text{V}$, Pin3 to Pin1 or 2
		--	--	1.0		$V_{RWM}=12\text{V}$, Pin1 or 2 to Pin3
Clamping Voltage	V_C	--	--	20.0	V	$I_{pp}=15\text{A}$, $T_p=8/20\mu\text{s}$, Pin3 to Pin1 or 2
		--	--	30.0		$I_{pp}=10\text{A}$, $T_p=8/20\mu\text{s}$, Pin1 or 2 to Pin3
Junction Capacitance	C_J	--	--	20.0	pF	$V_R=0\text{V}$, $f=1\text{MHz}$, Pin1 or 2 to Pin3

Typical Characteristics



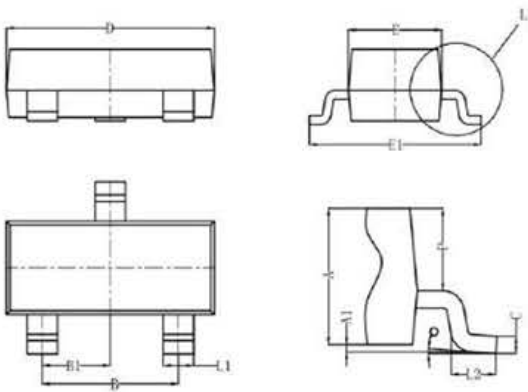
IEC61000-4-2 Waveform



IEC 61000-4-5 Waveform(8/20 μs pulse)

Package Outline Dimensions

SOT23



Symbol	Dimensions (mm)		
	Min	Typ	Max
A	0.900	1.000	1.1100
A1	0.000	0.050	0.100
L1	0.350	0.400	0.500
C	0.100	0.110	0.120
D	2.800	2.900	3.000
E	1.250	1.300	1.350
E1	2.250	2.400	2.550
B	1.800	1.900	2.000
B1	0.950 Typ		
L2	0.200	0.350	0.450
P	0.550	0.575	0.600