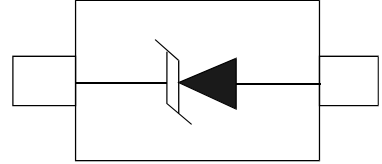


Description

Unidirectional ElectroStatic Discharge (ESD) protection diodes in a very small Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and transient overvoltage.



Features

- Transient Voltage Suppression (TVS) protection of one line
- Max. peak pulse power: $P_{PP} = 890$ W
- Low clamping voltage: $V_{CL} = 19$ V
- Low leakage current: $I_{RM} = 300$ nA
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PP} = 47$ A
- AEC-Q101 qualified

Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Communication systems
- Portable electronics
- Medical and industrial equipment

Quick reference data

$T_{amb} = 25$ °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage					
	PESD5V0S1UJ		-	-	5	V
	PESD12VS1UJ		-	-	12	V
C_d	diode capacitance	$f = 1$ MHz; $V_R = 0$ V				
	PESD5V0S1UJ		-	480	530	pF
	PESD12VS1UJ		-	160	180	pF

Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
P _{pp}	peak pulse power	t _p = 8/20 μs [1][2]			
	PESD5V0S1UJ		-	890	W
	PESD12VS1UJ		-	600	W
I _{pp}	peak pulse current	t _p = 8/20 μs [1][2]			
	PESD5V0S1UJ		-	47	A
	PESD12VS1UJ		-	22.5	A

Limiting values ...continued

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C [3]	-	420	mW
		[4]	-	720	mW
T _j	junction temperature		-	150	°C
T _{amb}	ambient temperature		-55	+150	°C
T _{stg}	storage temperature		-65	+150	°C

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

[2] Soldering point of cathode tab.

[3] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

ESD maximum ratings

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Max	Unit	
V _{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[1]	-	30	kV
		machine model		-	400	V
		MIL-STD-883 (human body model)		-	16	kV

[1] Device stressed with ten non-repetitive ESD pulses.

ESD standards compliance

Standard	Conditions
IEC 61000-4-2; level 4 (ESD)	> 15 kV (air); > 8 kV (contact)
MIL-STD-883; class 3 (human body model)	> 4 kV

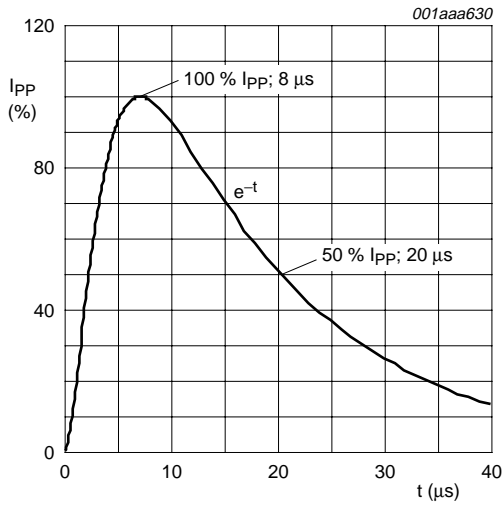


Fig 1. 8/20 μs pulse waveform according to IEC 61000-4-5

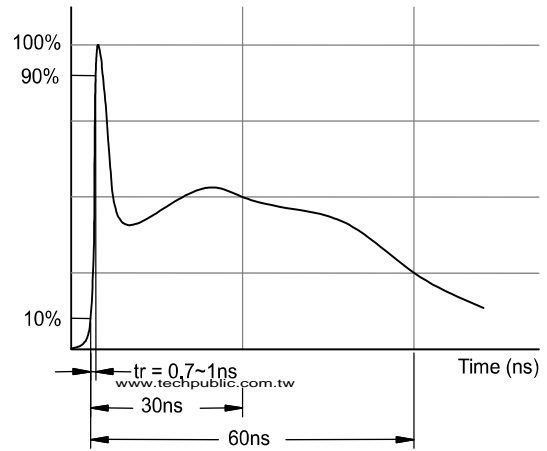


Fig 2. ESD pulse waveform according to IEC 61000-4-2

Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	290	K/W
			[2]	-	170	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point		[3]	-	35	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

[3] Soldering point of cathode tab.

Characteristics

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{RWM}	reverse standoff voltage					
	PESD5V0S1UJ		-	-	5	V
	PESD12VS1UJ		-	-	12	V
I _{RM}	reverse leakage current					
	PESD5V0S1UJ	V _{RWM} = 5 V	-	0.3	4	μA
	PESD12VS1UJ	V _{RWM} = 12 V	-	< 1	100	nA
V _{BR}	breakdown voltage	I _R = 5 mA				
	PESD5V0S1UJ		6.2	6.8	7.3	V
	PESD12VS1UJ		13.3	14.5	15.75	V
C _d	diode capacitance	f = 1 MHz; V _R = 0 V				
	PESD5V0S1UJ		-	480	530	pF
	PESD12VS1UJ		-	160	180	pF
V _{CL}	clamping voltage					
	PESD5V0S1UJ	I _{PP} = 47 A	-	-	19	V
		I _{PP} = 25 A	-	-	13.5	V
		I _{PP} = 5 A	-	-	9.8	V
	PESD12VS1UJ	I _{PP} = 22.5 A	-	-	27	V
		I _{PP} = 15 A	-	-	23.5	V
I _{PP} = 5 A		-	-	19	V	
r _{dif}	differential resistance	I _R = 5 mA				
	PESD5V0S1UJ		-	2	100	Ω
	PESD12VS1UJ		-	5	100	Ω

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.

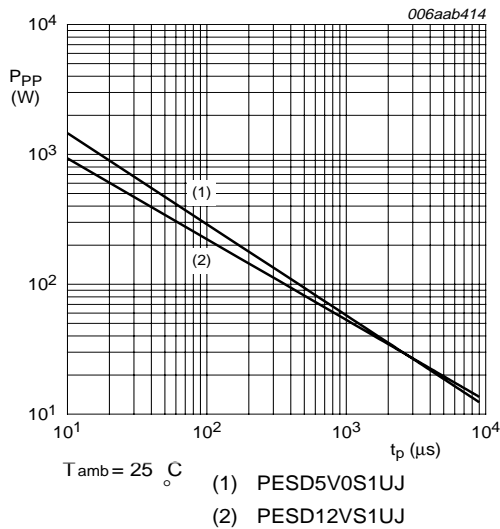


Fig 3. Peak pulse power as a function of exponential pulse duration; typical values

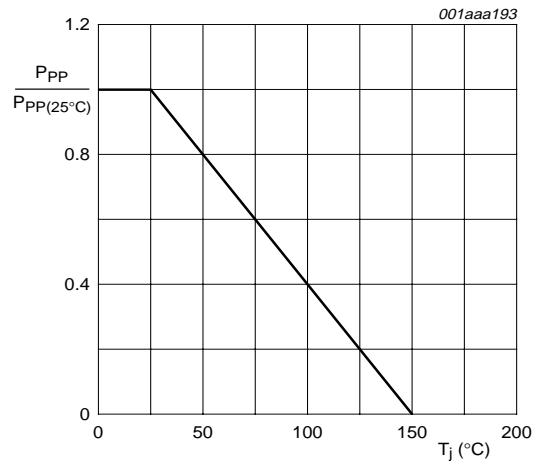


Fig 4. Relative variation of peak pulse power as a function of junction temperature; typical values

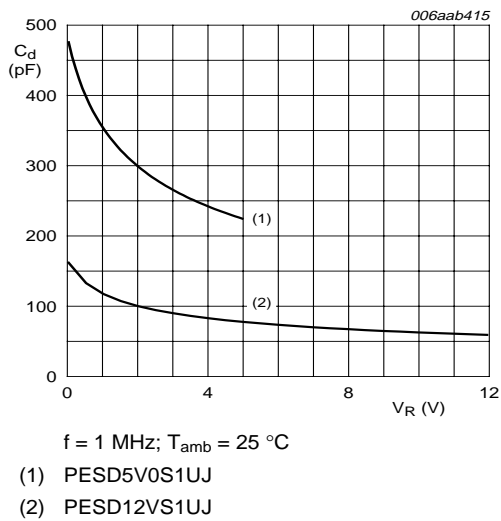


Fig 5. Diode capacitance as a function of reverse voltage; typical values

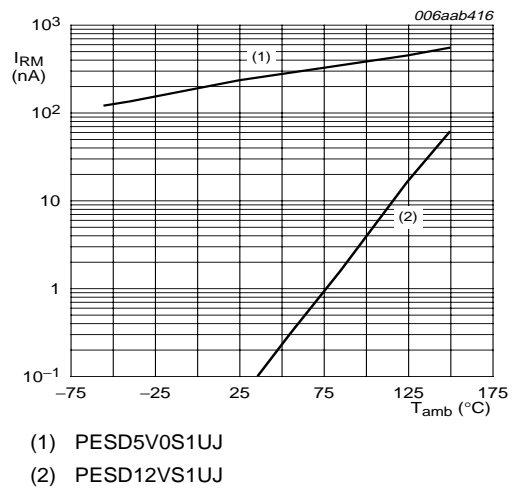
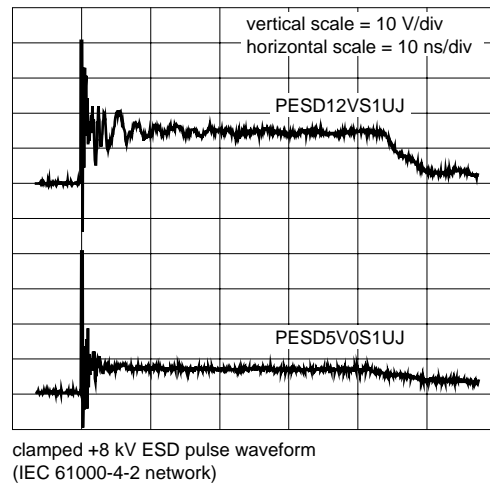
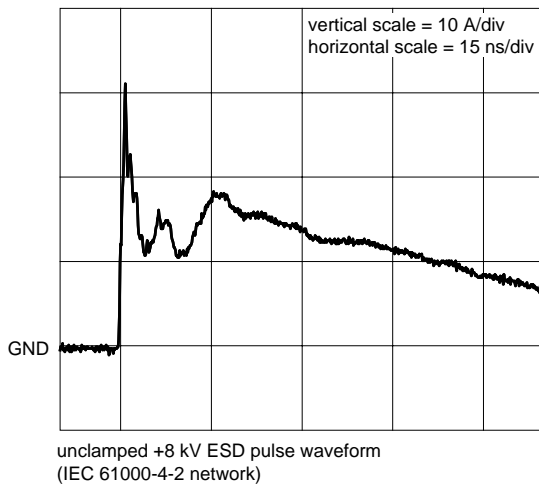
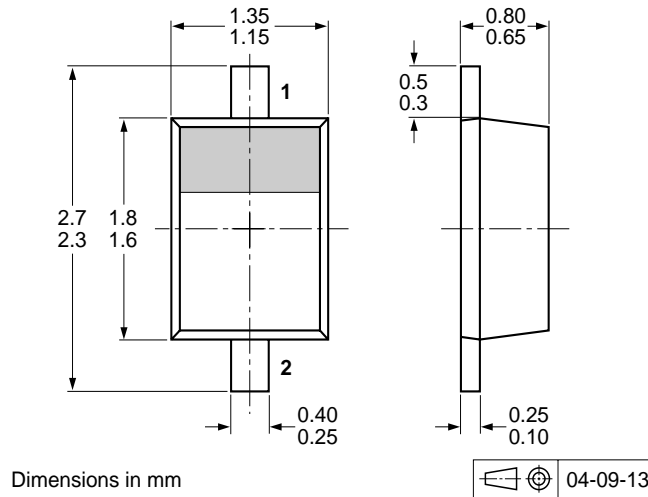


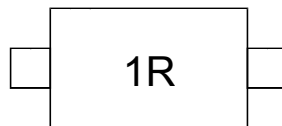
Fig 6. Reverse leakage current as a function of ambient temperature; typical values



Outline Drawing – SOD-323F



Marking



Ordering information

Order code	Marking code	Package	Baseqt	Deliverymode
UMW PESD5V0S1UJ	1Q	SOD-323F	3000	Tape and reel
UMW PESD12VS1UJ	1R	SOD-323F	3000	Tape and reel

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