

1.Description

Unidirectional ESD protection diode in a SOD523 plastic package designed to protect one transmission or data line from the damage caused by ESD (ElectroStatic Discharge) and other transients.

3.Features

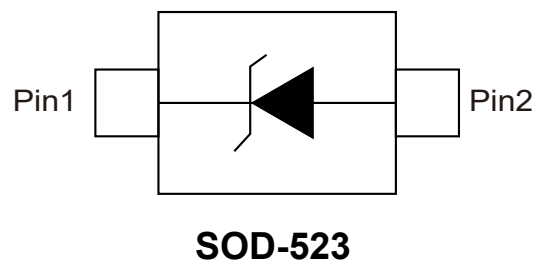
- Unidirectional ESD protection of one line
- Max. peak pulse power: $P_{PP}=330W$ at $t_p=8/20\mu s$
- Low clamping voltage: $V_{CL}=20V$ at $I_{PP}=18A$
- Ultra low leakage current: $I_{RM}<700nA$

2.Applications

- Computers and peripherals
- Communication systems
- Audio and video equipment
- Data lines
- CAN bus protection

- ESD protection > 23 kV
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge);
 $I_{PP}=18A$ at $t_p=8/20\mu s$

4.Pinning information





5.Quick reference data

Parameter	Symbol	Conditions	Value	Units
reverse standoff voltage	V_{RWM}			
PESD3V3S1UB			3.3	V
PESD5V0S1UB			5	V
PESD12VS1UB			12	V
PESD15VS1UB			15	V
PESD24VS1UB			24	V

Parameter	Symbol	Conditions	Value	Units
diode capacitance	C_d	$V_R=0V$; $f=1MHz$		
PESD3V3S1UB			207	pF
PESD5V0S1UB			152	pF
PESD12VS1UB			38	pF
PESD15VS1UB			32	pF
PESD24VS1UB			23	pF
number of protectedlines			1	



6. Limiting values

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

Parameter	Symbol	Conditions	Min	Max	Units
peak pulse power	V_{RWM}	8/20 μ s(1)			
PESD3V3S1UB				330	W
PESD5V0S1UB				260	W
PESD12VS1UB				180	W
PESD15VS1UB				160	W
PESD24VS1UB				160	W
peak pulse current	I_{PP}	8/20 μ s(1)			
PESD3V3S1UB				18	A
PESD5V0S1UB				15	A
PESD12VS1UB				5	A
PESD15VS1UB				5	A
PESD24VS1UB				3	A
junction temperature	T_J			150	°C
Junction ambient temperature	T_{amb}		-65	150	°C
storage temperature	T_{STG}		-65	150	°C

Notes: (1) Non-repetitive current pulse 8/20 μ s exponentially decay waveform; see Figure 1.



7.ESD maximum ratings

Parameter	Symbol	Conditions	Min	Max	Units
electrostatic discharge capability	ESD	IEC 61000-4-2(contact discharge) (1)			
PESD3V3S1UB				30	kV
PESD5V0S1UB				30	kV
PESD12VS1UB				30	kV
PESD15VS1UB				30	kV
PESD24VS1UB				23	kV
PESDxS1UB series		HBM MIL-STD883		10	kV

Notes:(1) Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses; see Figure 2.

8.ESD standards compliance

Standard	Conditions
IEC 61000-4-2, level 4 (ESD)	> 15 kV (air);>8 kV(contact)
HBM MIL-STD883, class 3	> 4 kV



9. Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
reverse standoff voltage	V_{RWM}					
PESD3V3S1UB					3.3	V
PESD5V0S1UB					5	V
PESD12VS1UB					12	V
PESD15VS1UB					15	V
PESD24VS1UB					24	V
reverse leakage current	I_{RM}	see Figure 7				
PESD3V3S1UB		$V_{RWM}=3.3V$		0.7	2	μA
PESD5V0S1UB		$V_{RWM}=5V$		0.1	1	μA
PESD12VS1UB		$V_{RWM}=12V$		<1	50	nA
PESD15VS1UB		$V_{RWM}=15V$		<1	50	nA
PESD24VS1UB		$V_{RWM}=24V$		<1	50	nA
breakdown voltage	V_{BR}	$I_R=5mA$				
PESD3V3S1UB			5.2	5.6	6	V
PESD5V0S1UB			6.4	6.8	7.2	V
PESD12VS1UB			14.7	15	15.3	V
PESD15VS1UB			17.6	18	18.4	V
PESD24VS1UB			26.5	27	27.5	V
diode capacitance	C_d	$V_R=0V, f=1MHz, \text{see Figure 5 and 6}$				
PESD3V3S1UB				207	300	pF
PESD5V0S1UB				152	200	pF
PESD12VS1UB				38	75	pF
PESD15VS1UB				32	70	pF
PESD24VS1UB				23	50	pF



Parameter	Symbol	Conditions	Min	Typ	Max	Units
clamping voltage (1)						
PESD3V3S1UB	$V_{(CL)R}$	$I_{PP}=1A$			7	V
		$I_{PP}=18A$			20	V
PESD5V0S1UB		$I_{PP}=1A$			9	V
		$I_{PP}=15A$			20	V
PESD12VS1UB		$I_{PP}=1A$			19	V
		$I_{PP}=5A$			35	V
PESD15VS1UB		$I_{PP}=1A$			23	V
		$I_{PP}=5A$			40	V
PESD24VS1UB		$I_{PP}=1A$			36	V
		$I_{PP}=3A$			70	V

$T_{amb}=25^{\circ}C$ unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ	Max	Units
differential resistance						
PESD3V3S1UB	R_{diff}	$I_R=1mA$			400	Ω
PESD5V0S1UB		$I_R=1mA$			80	Ω
PESD12VS1UB		$I_R=1mA$			200	Ω
PESD15VS1UB		$I_R=1mA$			225	Ω
PESD24VS1UB		$I_R=0.5mA$			300	Ω

Notes:(1) Non-repetitive current pulse 8/20 μs exponentially decay waveform; see Figure 1.



10.1 Typical characteristic

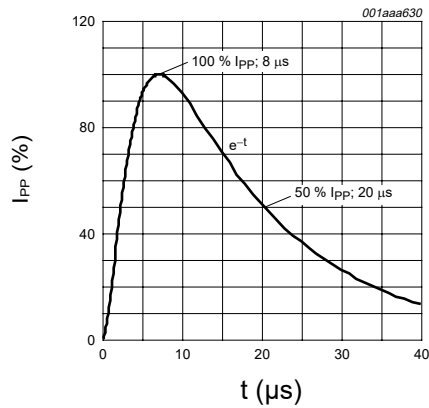


Figure 1: 8/20 μ s pulse waveform according to IEC 61000-4-5

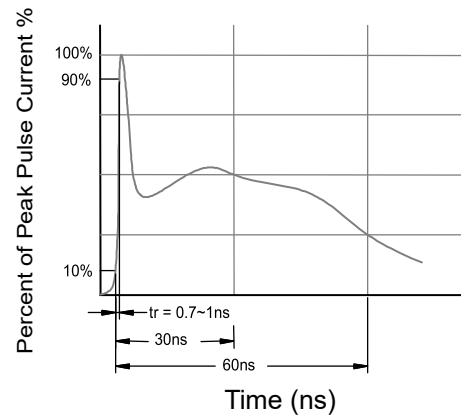


Figure 2: ElectroStatic Discharge (ESD) pulse waveform according to IEC 61000-4-2

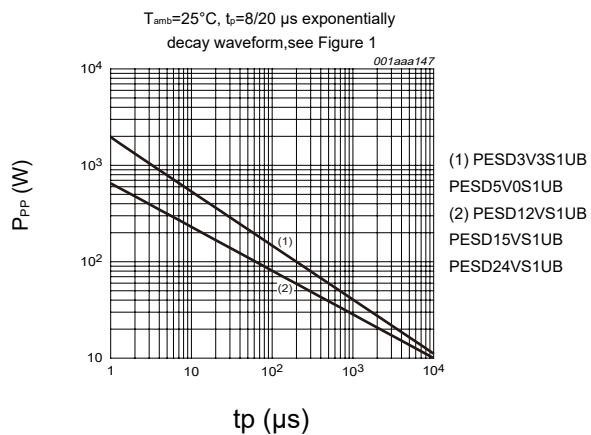


Figure 3: Peak pulse power dissipation as a function of pulse time; typical values

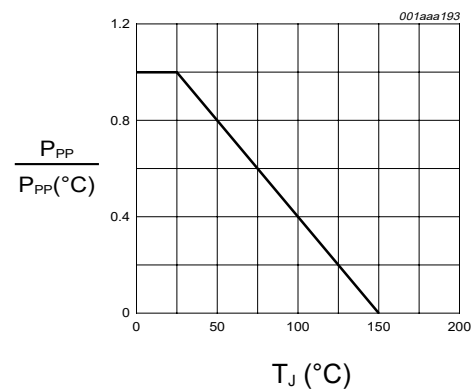


Figure 4: Relative variation of peak pulse power as a function of junction temperature; typical values

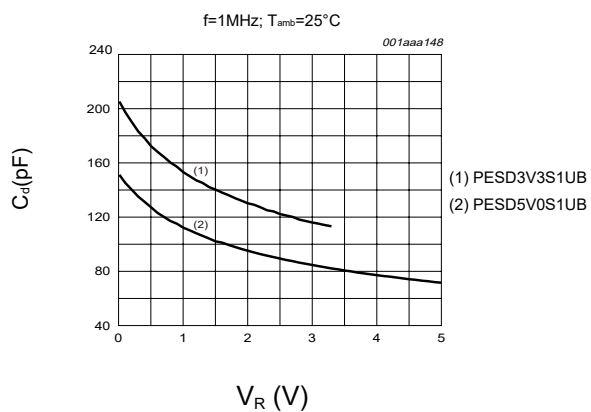


Figure 5: Diode capacitance as a function of reverse voltage; typical values

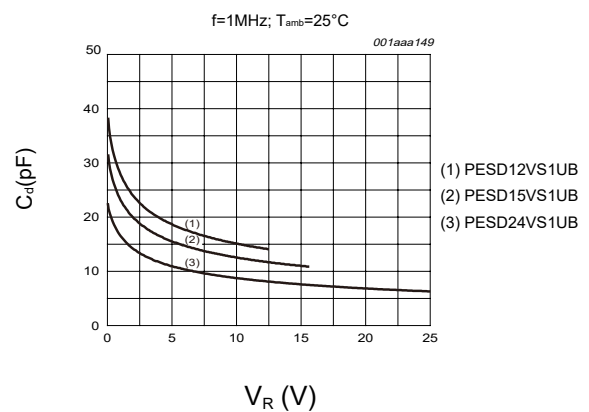
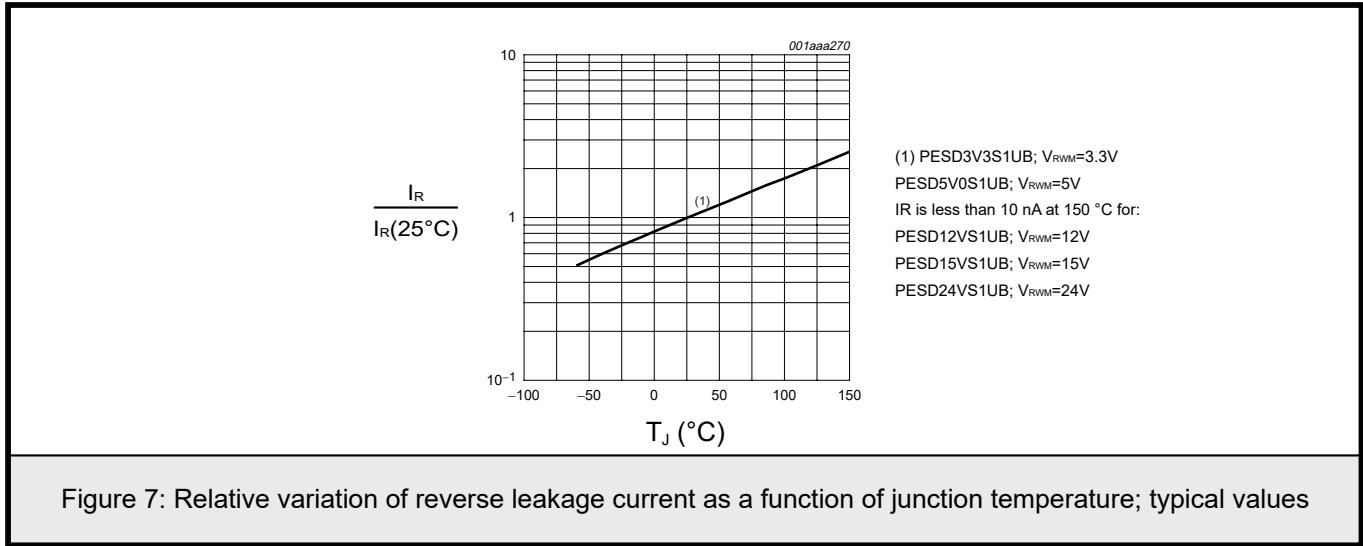


Figure 6: Diode capacitance as a function of reverse voltage; typical values



10.2Typical characteristic





10.3 Typical characteristic

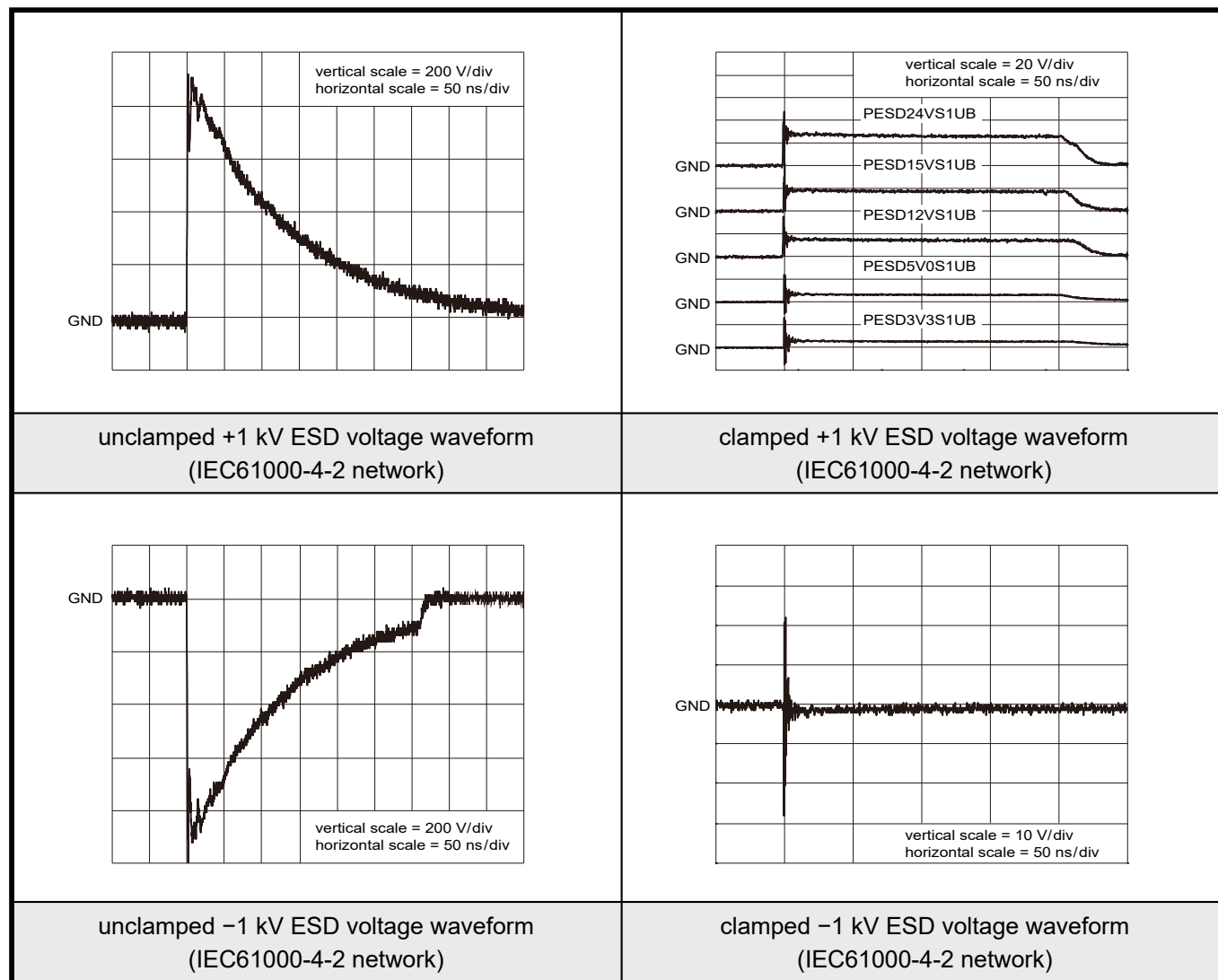
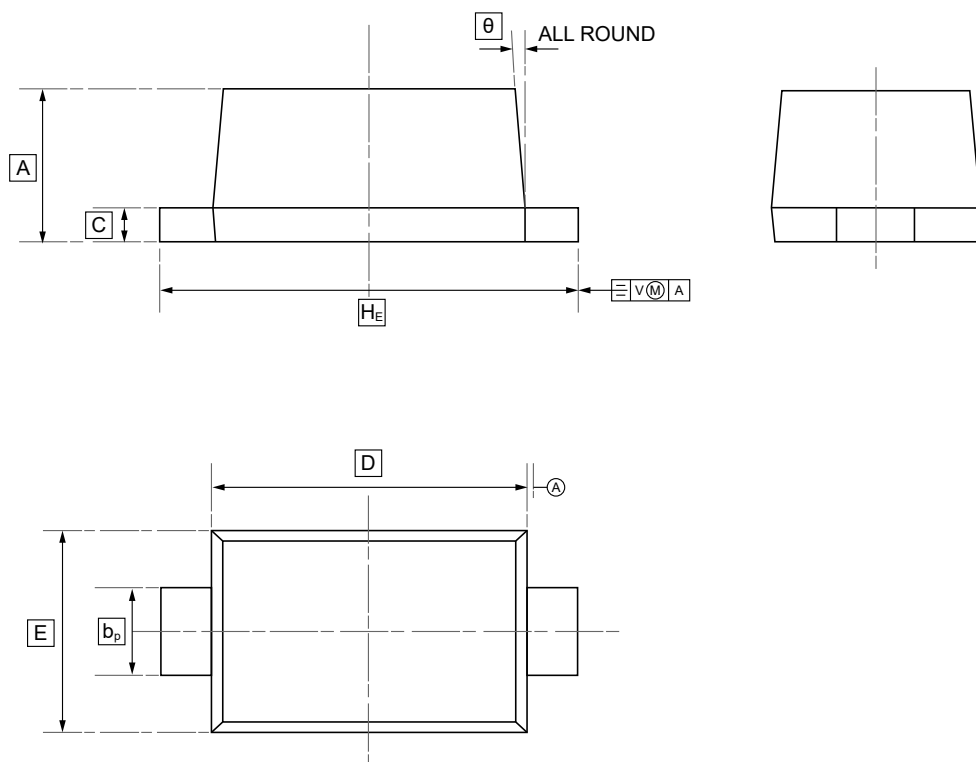


Figure 8: ESD clamping test setup and waveforms



11.SOD-523 Package Outline Dimensions

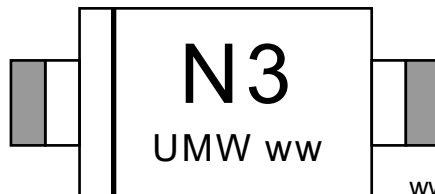


DIMENSIONS (mm are the original dimensions)

Symbol	A	b _p	C	D	E	H _E	θ
Min	0.58	0.3	0.100	1.15	0.75	1.5	5°
Max	0.68	0.4	0.135	1.25	0.85	1.7	



12.Ordering information



ww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW PESD3V3S1UB	N1	SOD-523	3000	Tape and reel
UMW PESD5V0S1UB	N2	SOD-523	3000	Tape and reel
UMW PESD12VS1UB	N3	SOD-523	3000	Tape and reel
UMW PESD15VS1UB	N4	SOD-523	3000	Tape and reel
UMW PESD24VS1UB	N5	SOD-523	3000	Tape and reel



13.Disclaimer

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