lune 2022 Product data sheet

# 1. General description

Bidirectional ElectroStatic Discharge (ESD) protection diode in very small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and other transients.

## 2. Features and benefits

- · Bidirectional ESD protection of one line
- Max. peak pulse power: P<sub>PPM</sub> = 130 W
- Low clamping voltage: V<sub>(CL)R</sub> = 14 V
- Low leakage current: I<sub>RM</sub> = 5 nA
- ESD protection > 30 kV
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge); I<sub>PPM</sub> = 12 A
- Very small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

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

### 4. Quick reference data

#### Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$V_{RWM}$	reverse standoff voltage	T <sub>amb</sub> = 25 °C	-	-	5	V
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 0 V; T <sub>amb</sub> = 25 °C	-	35	45	pF



# 5. Pinning information

### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	1 2	W [4 N] W
2	K2	cathode (diode 2)		K1   K2
			SOD323	sym045

# 6. Ordering information

### **Table 3. Ordering information**

Type number Package							
		Name	Description	Version			
	PESD5V0S1BA-Q		plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body	SOD323			

# 7. Marking

### Table 4. Marking codes

Type number	Marking code
PESD5V0S1BA-Q	E6

# 8. Limiting values

#### Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode					'	
P <sub>PPM</sub>	rated peak pulse power	t <sub>p</sub> = 8/20 μs	[1] [2]	-	130	W
I <sub>PPM</sub>	rated peak pulse current		[1] [2]	-	12	Α
Tj	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C
ESD maximun	n ratings			·		,
V <sub>ESD</sub>	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[2] [3]	-	30	kV
		HBM MIL-Std 883		-	10	kV

- [1] Non-repetitive current pulse 8/20 µs exponentially decaying waveform according to IEC 61000-4-5
- [2] Measured from pin 1 to pin 2.
- [3] Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses

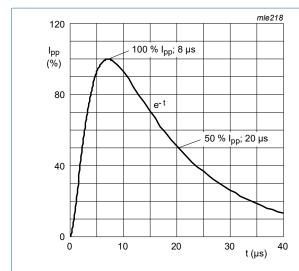


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5

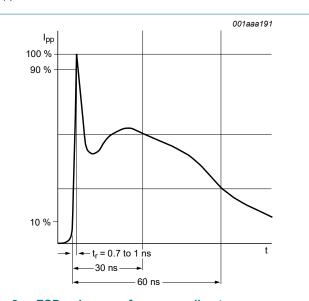


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

## 9. Characteristics

**Table 6. Characteristics** 

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V <sub>RWM</sub>	reverse standoff voltage	T <sub>amb</sub> = 25 °C		-	-	5	V
$V_{BR}$	breakdown voltage	$I_R$ = 1 mA; $T_{amb}$ = 25 °C		5.5	-	9.5	V
I <sub>RM</sub>	reverse leakage current	V <sub>RWM</sub> = 5 V; T <sub>amb</sub> = 25 °C		-	5	100	nA
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 0 V; T <sub>amb</sub> = 25 °C		-	35	45	pF
V <sub>CL</sub>	clamping voltage	I <sub>PP</sub> = 1 A; T <sub>amb</sub> = 25 °C	[1] [2]	-	-	10	V
		I <sub>PPM</sub> = 12 A; T <sub>amb</sub> = 25 °C	[1] [2]	-	-	14	V
R <sub>diff</sub>	differential resistance	I <sub>R</sub> = 1 mA; T <sub>amb</sub> = 25 °C		-	-	50	Ω

- [1] Non-repetitive current pulse 8/20 µs exponentially decaying waveform according to IEC61000-4-5.
- [2] Measures from pin 1 to pin 2.

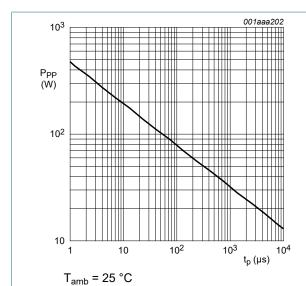


Fig. 3. Peak pulse power as a function of exponential pulse duration; typical values

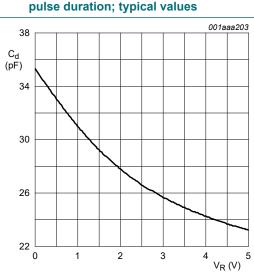


Fig. 5. Diode capacitance as a function of reverse voltage; typcial values

 $f = 1 MHz; T_{amb} = 25 °C$ 

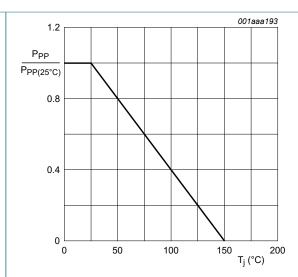


Fig. 4. Relative variation of peak pulse power as a function of junction temperature; typical values

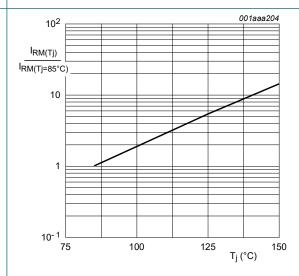
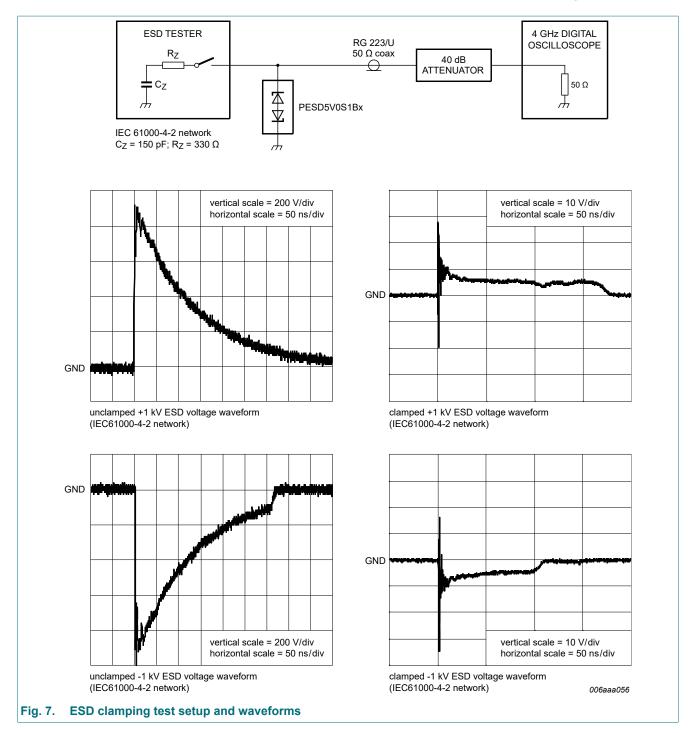
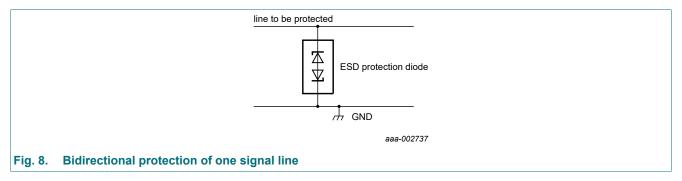


Fig. 6. Relative variation of reverse leakage current as a function of junction temperature; typical values



## 10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and/or other surge pulses. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground. It provides a surge capability of 130 W per line for an  $8/20 \text{ }\mu\text{s}$  waveform.



#### Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

- 1. Place the device as close to the input terminal or connector as possible.
- 2. Minimize the path length between the device and the protected line.
- 3. Avoid running protected conductors in parallel with unprotected conductors.
- 4. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
- 5. Minimize the length of the transient return path to ground.
- 6. Avoid using shared transient return paths to a common ground point.
- 7. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

## 11. Test information

#### **Quality information**

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

# 12. Package outline

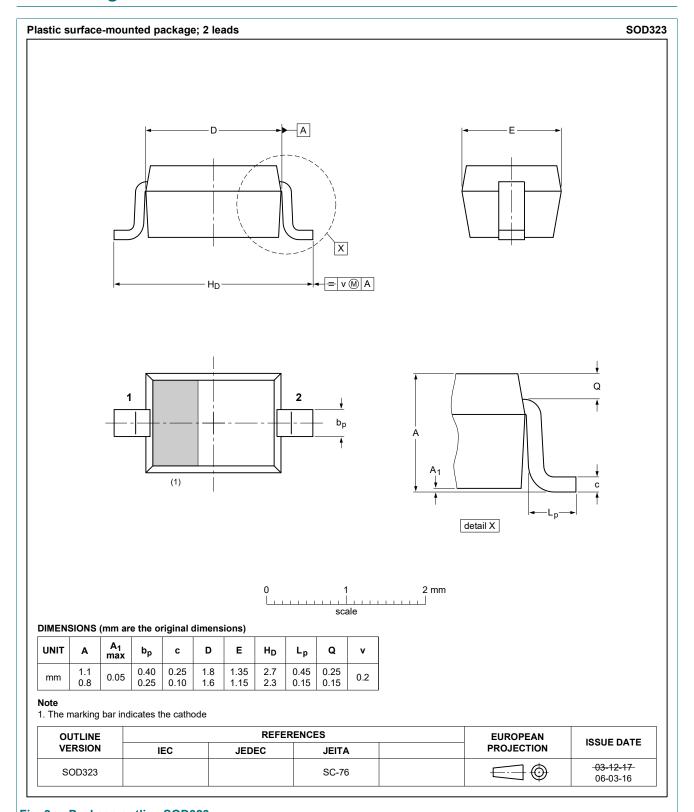
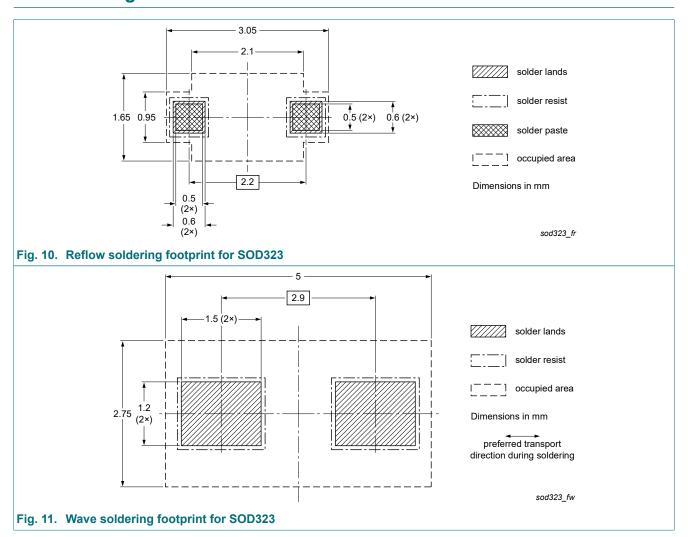


Fig. 9. Package outline SOD323

# 13. Soldering



# 14. Revision history

### **Table 7. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0S1BA-Q v.1	20220610	Product data sheet	-	-

## 15. Legal information

#### **Data sheet status**

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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