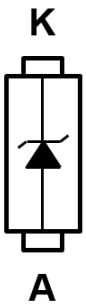
ESDA051-1JY

Datasheet

Automotive 5 V TVS in SOD323

SOD323



Product status link
ESDA051-1JY

Features

- AEC-Q101 qualified
- Low leakage current: 50 nA max. at 3.6 V
- Unidirectional devices
- ECOPACK2 compliant component
- ISO 10605 / IEC 61000-4-2: C = 150 pF, R = 330 Ω, exceeds level 4
  - ±30 kV (air discharge)
  - ±30 kV (contact discharge)
- ISO 10605: C = 330 pF, R = 330 Ω, exceeds level 4
  - ±30 kV (air discharge)
  - ±30 kV (contact discharge)
- IEC 61000-4-4
- ISO 7637-3
  - Fast transient pulse a: Vs = -150 V
  - Fast transient pulse b: Vs = +150 V
  - Slow transient negative pulse: Vs = -85 V
  - Slow transient positive pulse: Vs = +85 V

Applications

Protection of electronic circuits in ICE vehicles, electrical vehicle, and hybrid electric vehicles such as e-bike, cars, and buses.

Protection of battery monitoring systems (BMS)

The low clamping voltage during ESD and EOS surges provides an efficient protection of the equipment to ensure the robustness and longevity of the vehicle.

The low leakage current is compatible with a precise read-out of the state of charge of cells to maximize the global battery charge.

Description

This ESDA051-1JY is unidirectional single TVS protection devices designed to protect sensitive equipement against ESD transients and EOS surges.

This device is packaged in SOD323.

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter		Value	Unit
V_{PP}	Peak pulse voltage	ISO10605 / IEC 61000-4-2 (C = 150 pF, R = 330 Ω): Contact discharge Air discharge	 30 30	kV
		ISO10605 (C = 330 pF, R = 330 Ω) Contact discharge Air discharge	 30 30	
		ISO 10605 - C = 330 pF, R = 2 kΩ	30	
I_{PP}	Peak pulse current	8/20 µs	20	A
T_j	Operating junction temperature range		-55 to +150	°C
T_{stg}	Storage temperature range		-55 to +150	°C
T_L	Maximum lead temperature for soldering during 10 s		260	°C

Figure 1. Electrical characteristics - parameter definitions

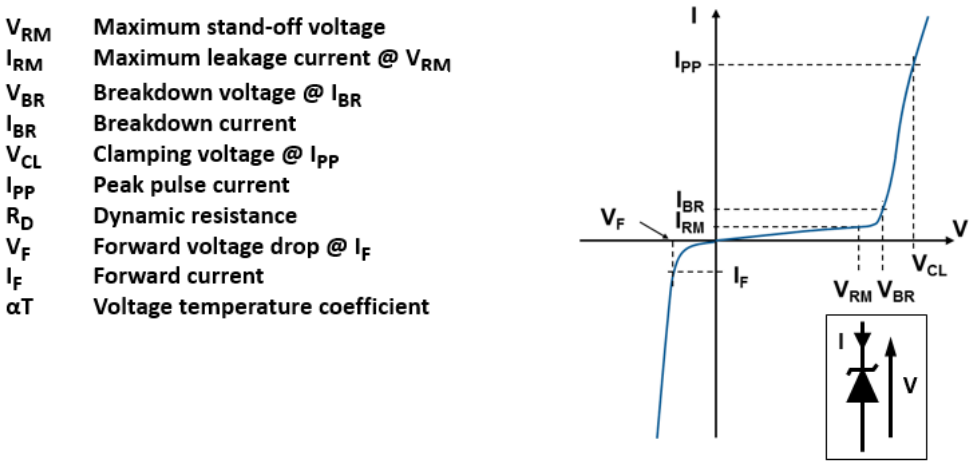


Table 2. Electrical characteristics - parameter values (T_{amb} = 25 °C, unless otherwise specified)

Type	I_{RM} at V_{RM}				V_{BR} at 1 mA			V_F at 10 mA		8 / 20µs			C at 0 V
										V_{CL}(1)	I_{PP}	R_D	
	Max.		Max.		Min.	Typ.	Max.	Typ.	Max.	Max.		Max.	Typ.
	µA	V	µA	V	V	V	V	V	V	V	A	Ω	pF
ESDA051-1JY	3	5	0.05	3.6	6.2	6.5	6.8	0.78	0.90	12.8	20	0.3	190

1. *To calculate V_{CL} max versus I_{PP} appli: V_{CL} max = V_{BR} max + R_D x I_{PP}appli.*

1.1 Characteristics (curves)

Figure 2. Maximum peak current dissipation versus initial junction temperature

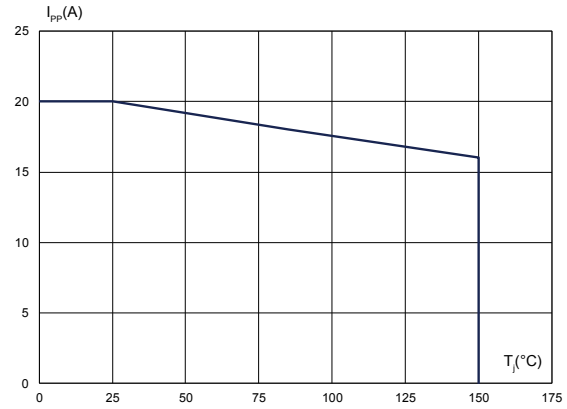


Figure 3. Maximum peak pulse current versus exponential pulse duration

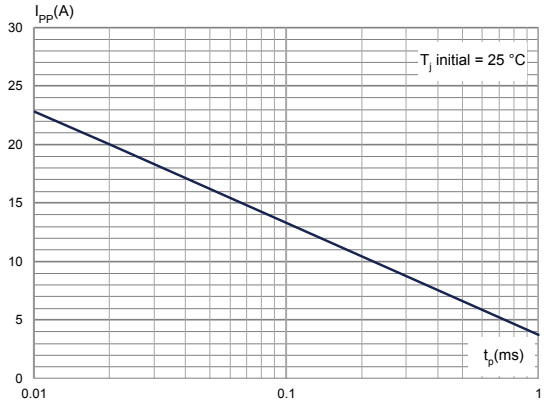


Figure 4. Peak pulse current versus clamping voltage

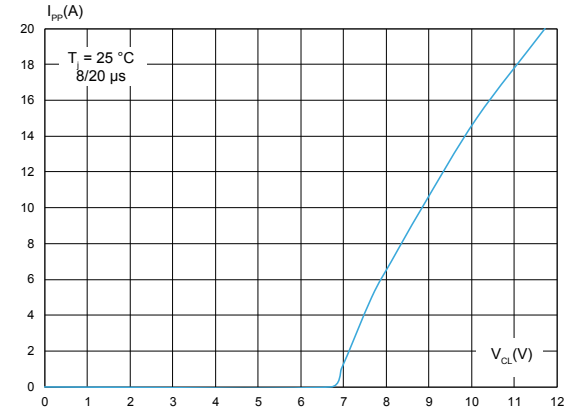


Figure 5. Leakage current versus junction temperature

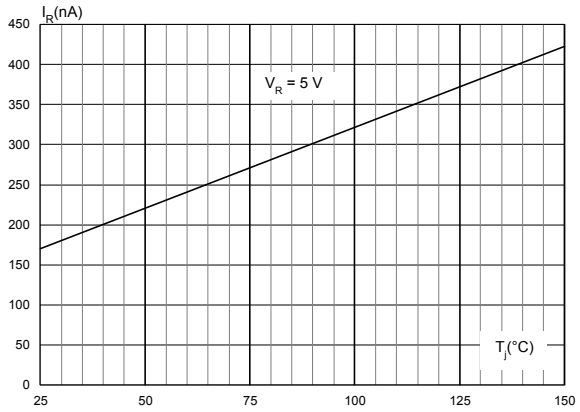


Figure 6. Leakage current versus reverse voltage

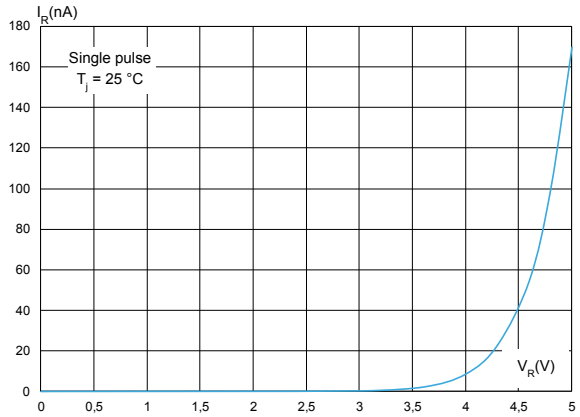


Figure 7. Forward current versus forward voltage drop

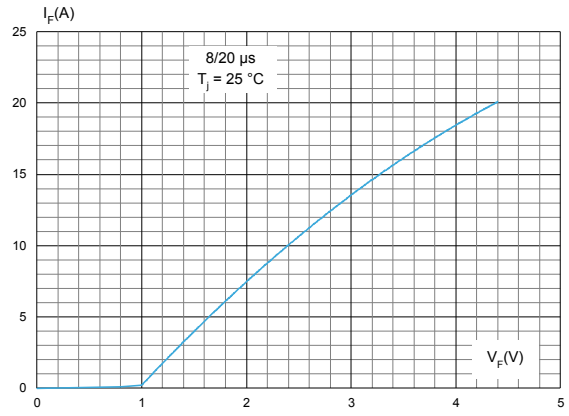


Figure 8. Response to ISO 10605 -C = 150 pF, R = 330 Ω (-8 kV contact)

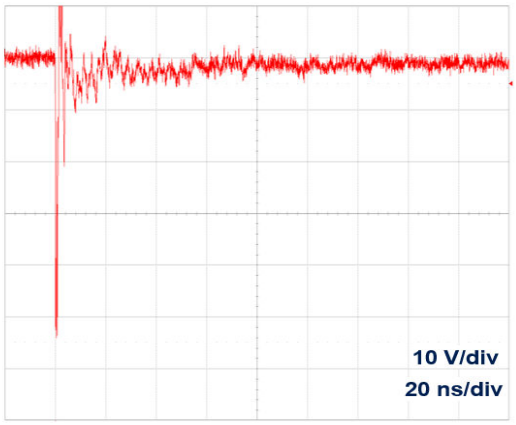


Figure 9. Response to ISO 10605 -C = 150 pF, R = 330 Ω (+8 kV contact)

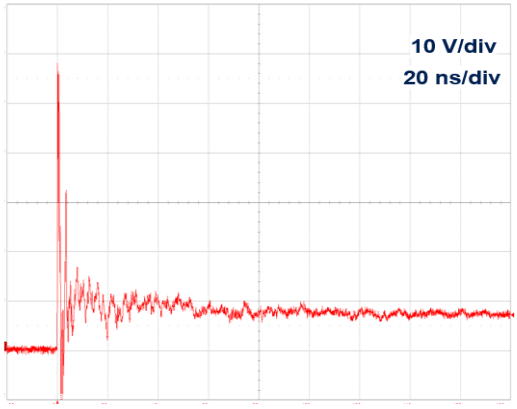


Figure 10. Response to ISO 7637-3 fast transient pulse a: -150 V

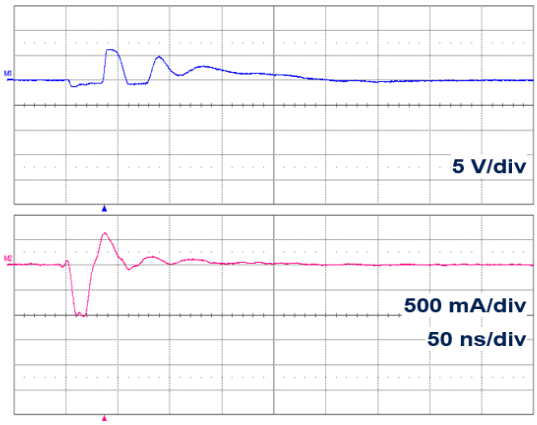


Figure 11. Response to ISO 7637-3 fast transient pulse b: +150 V

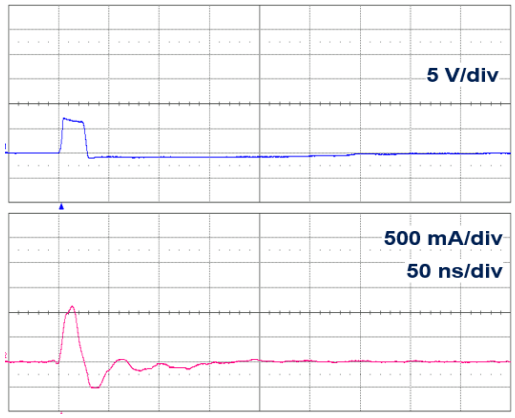


Figure 12. Response to ISO 7637-3 slow transient negative pulse: -85 V

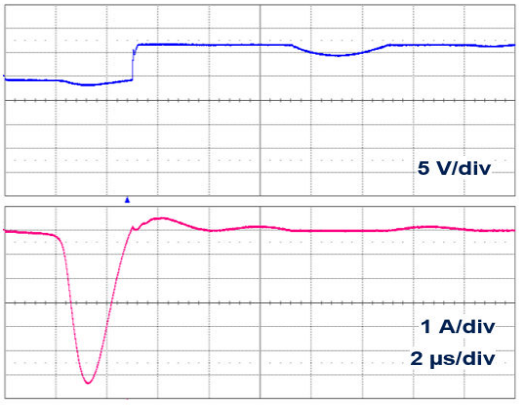


Figure 13. Response to ISO 7637-3 slow transient positive pulse: +85 V

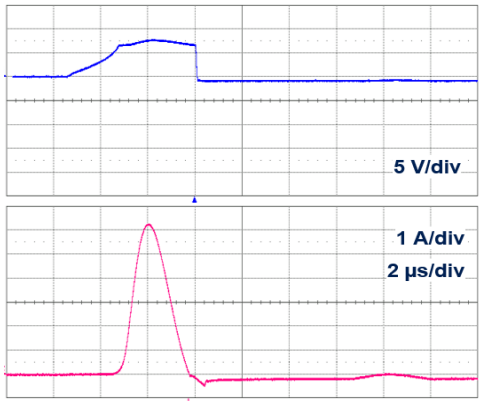
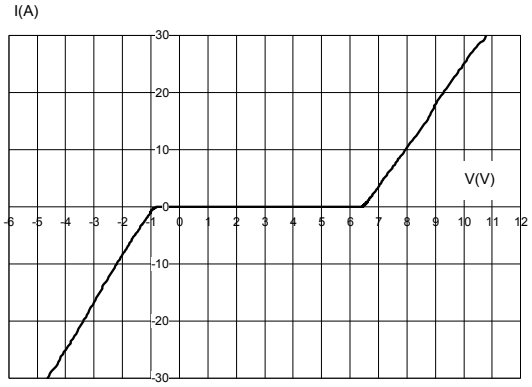


Figure 14. **TLP**



2 Package information

To meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

2.1 SOD323 package information

Figure 15. SOD323 package outline

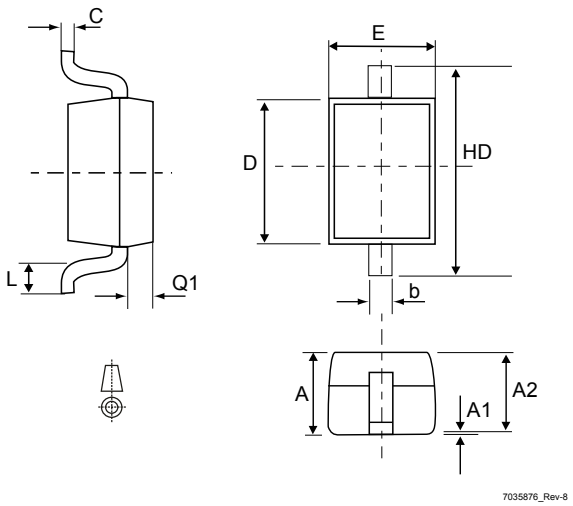


Table 3. SOD323 package mechanical data

Ref.	Dimensions			
	Millimeters		Inches[1]	
	Min.	Max.	Min.	Max.
A		1.17		0.046
A1	0.00	0.10	0.000	0.004
A2				
b	0.25	0.44	0.010	0.018
c	0.10	0.25	0.003	0.010
D	1.52	1.80	0.059	0.071
E	1.11	1.45	0.043	0.058
HD	2.30	2.70	0.090	0.107
L	0.10	0.46	0.003	0.019
Q1	0.10	0.41	0.003	0.017

1. *Values in inches are converted from mm and rounded to 3 decimal digits*

2.2 SOD323 packing information

Figure 16. **SOD323 footprint in mm**

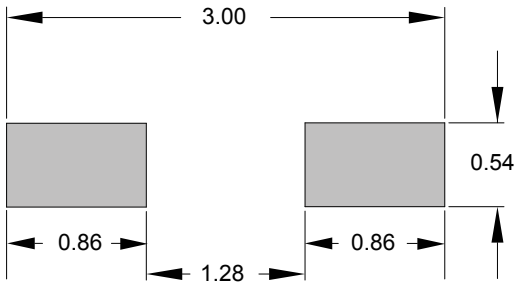


Figure 17. **SOD323 marking**

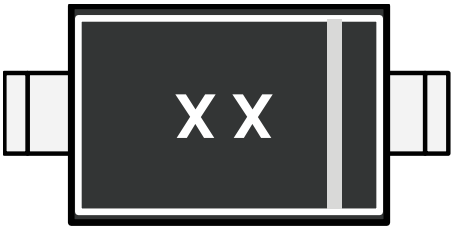
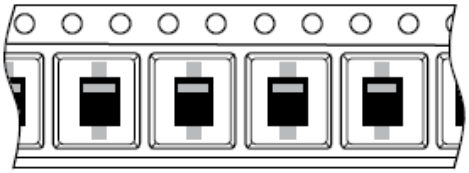


Figure 18. **Package orientation in reel**



Taped according to EIA-481
Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package

Figure 19. **Tape and reel orientation**

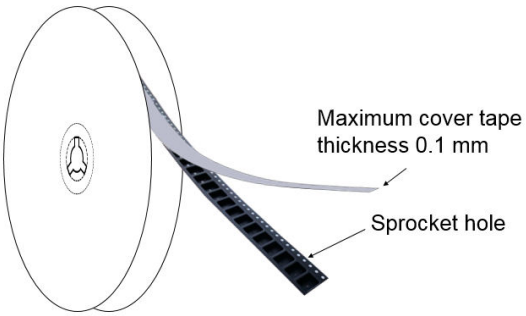


Figure 20. **7" reel dimension values**

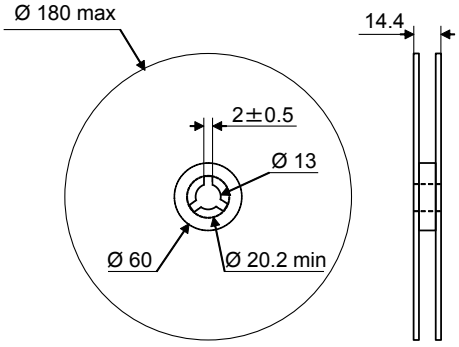


Figure 21. **Inner box dimension values**

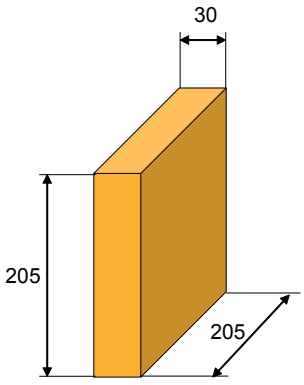
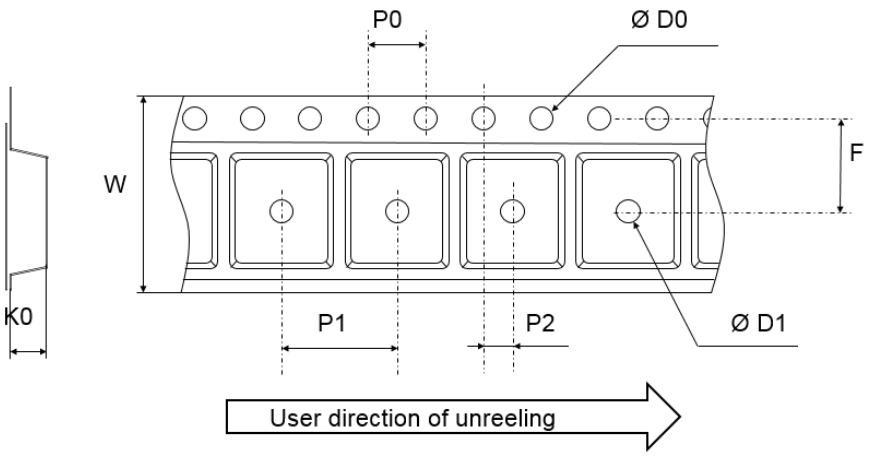


Figure 22. **Tape outline**



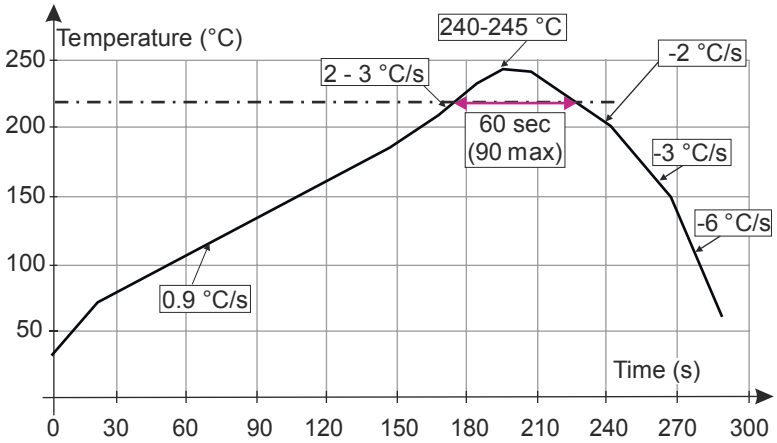
Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package

Table 4. **Tape dimension values**

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
D0	1.50	1.55	1.60
D1	1.00		
F	3.45	3.50	3.55
K0	1.12	1.22	1.32
P0	3.90	4.00	4.10
P1	3.90	4.00	4.10
P2	1.95	2.00	2.05
W	7.90	8.00	8.30

2.3 Reflow profile

Figure 23. **ST ECOPACK recommended soldering reflow profile for PCB mounting**



Note: Minimize air convection currents in the reflow oven to avoid component movement. Maximum soldering profile corresponds to the latest IPC/JEDEC J-STD-020.

2.4 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
ESDA051-1JY	B5	SOD323	5.3 mg	3000	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Revision	Changes
05-Nov-2019	1	Initial release.
16-Jun-2026	2	Updated Section Features, Section Application, Table 2, and Section 2: Package information.

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