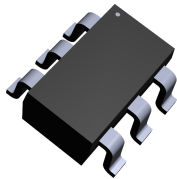
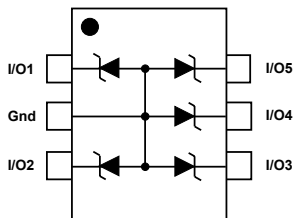



## Automotive 5 lines TVS for ESD protection



SOT23-6L



### Features

- AEC-Q101 qualified 
- 5 unidirectional TVS functions
- UL 94, V0
- J-STD-020 MSL level 1
- Benefit:
  - Suitable for high density boards
- Complies with the standard ISO 10605 / IEC 61000-4-2: C = 150 pF, R = 330 Ω
  - ±30 kV (air discharge)
  - ±18 kV (contact discharge)
- Complies with the standard ISO 10605: C = 330 pF, R = 330 Ω
  - ±20 kV (air discharge)
  - ±13 kV (contact discharge)
- Complies with the standard ISO 7637-3
  - Pulse 3a: VS = -150 V
  - Pulse 3b: VS = +100 V

### Applications

Where ESD and EOS transient overvoltage protection in susceptible equipment is required, such as:

- Information - entertainment
- Signal communications
- Connectivity
- Comfort and convenience

### Description

The **ESDA6V1-5SC6Y** is a monolithic voltage suppressor designed to protect components which are connected to data and transmission lines against ESD.

It clamps the voltage just above the logic level supply for positive transients, and to a diode drop below ground for negative transient.

#### Product status link

[ESDA6V1-5SC6Y](#)

#### Product summary

<b>Order code</b>	ESDA6V1-5SC6Y
<b>Package</b>	SOT23-6L
<b>Packing</b>	Tape and reel

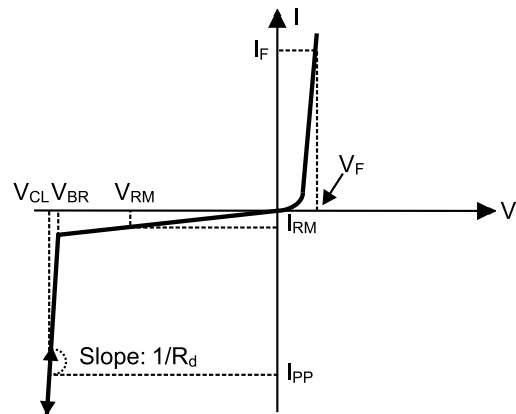
# 1 Characteristics

**Table 1. Absolute ratings ( $T_{amb} = 25\text{ °C}$ )**

Symbol	Parameter	Value	Unit	
$V_{PP}$	Peak pulse voltage	ISO 10605 / IEC 61000-4-2 (C = 150 pF, R = 330 $\Omega$ )	18	kV
		Contact discharge		
	Air discharge	30		
	ISO 10605 (C = 330 pF, R = 330 $\Omega$ )	13		
Contact discharge				
	Air discharge	20		
$P_{PP}$	Peak pulse power dissipation (8/20 $\mu$ s), $T_j$ initial = $T_{amb}$	80	W	
$I_{PP}$	Peak pulse current (8/20 $\mu$ s)	7	A	
$T_{sig}$	Storage temperature range	-65 to +150	$^{\circ}\text{C}$	
$T_j$	Operating junction temperature range	-40 to +150	$^{\circ}\text{C}$	
$T_L$	Maximum temperature for soldering during 10 s	260	$^{\circ}\text{C}$	

**Figure 1. Electrical characteristics (definitions)**

Symbol	Parameter
$V_{BR}$	Breakdown voltage
$I_{RM}$	Leakage current @ $V_{RM}$
$V_{RM}$	Stand-off voltage
$V_{CL}$	Clamping voltage
$I_{PP}$	Peak pulse current
$I_F$	Forward current
$V_F$	Forward voltage
$R_d$	Dynamic impedance
$C_{LINE}$	Line capacitance

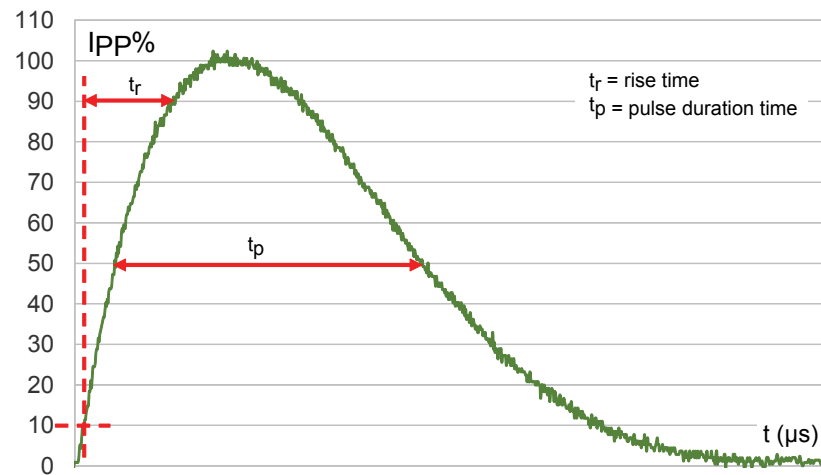

**Table 2. Electrical characteristics - values ( $T_{amb} = 25\text{ °C}$ )**

Order code	$V_{BR}$ at $I_R$			$I_{RM}$ at $V_{RM}$		$V_{CL}$ at $I_{pp}^{(1)}$		$V_F$ at $I_F$		$\alpha T^{(2)}$	$C_{line}$
	Min.	Max.		Max.		Max.		Max.		Max.	Typ.
	V	V	mA	$\mu$ A	V	V	A	V	mA	$10^{-4}/\text{C}$	pF
ESDA6V1-5SC6Y	6.1	7.2	1	1	5.2	11.4	7	1.25	200	6	50

 1. 8/20  $\mu$ s waveform

 2.  $V_{BR}$  at  $T_j = V_{BR}$  at  $25\text{ °C} \times (1 + \alpha T \times (T_j - 25))$

Figure 2. Pulse definition for electrical characteristics



## 1.1 Characteristics (curves)

Figure 3. Pulse power versus junction temperature

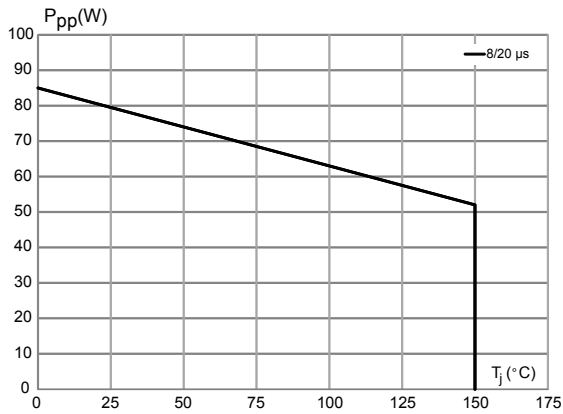


Figure 4. Peak pulse power versus exponential pulse duration

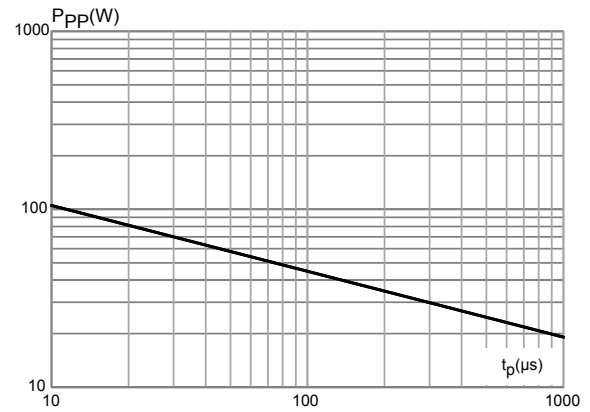


Figure 5. Clamping voltage versus peak pulse current

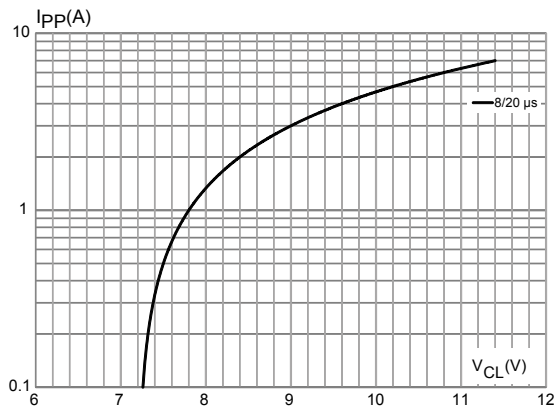
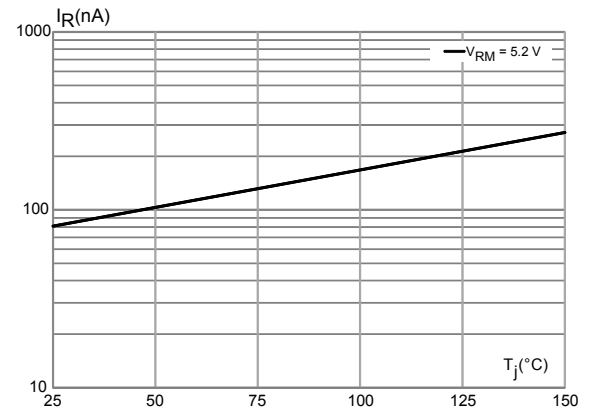
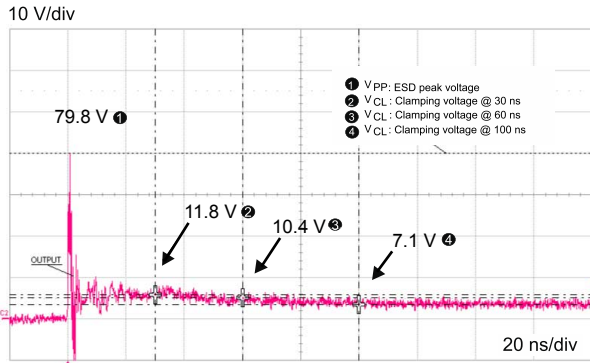
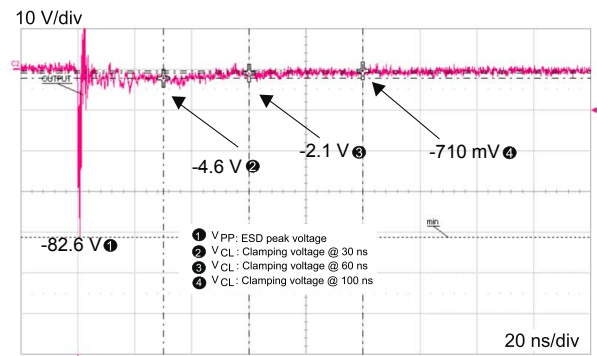
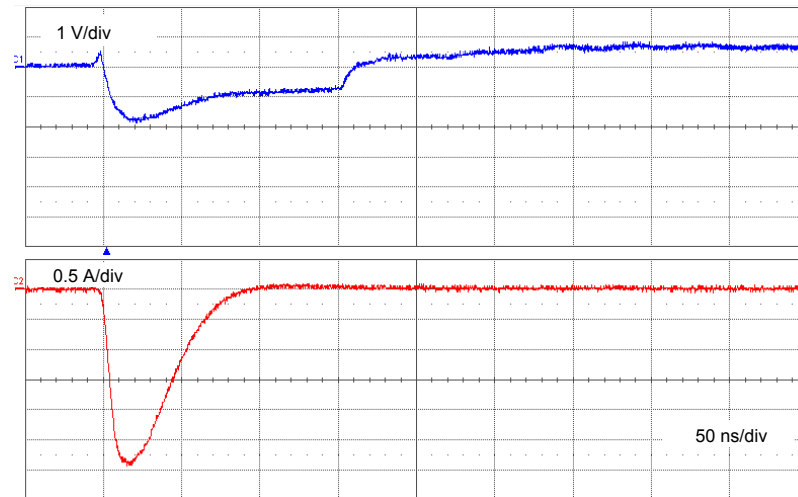
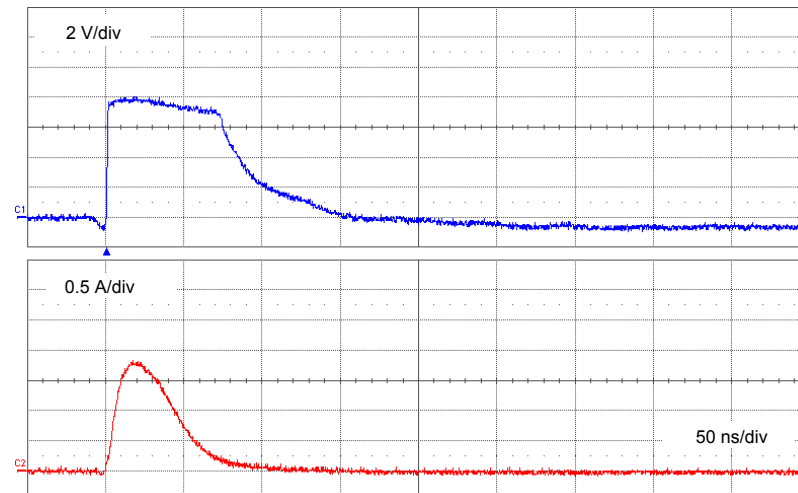


Figure 6. Leakage current versus junction temperature



**Figure 7. ESD response to IEC 61000-4-2 (+8 kV contact discharge)**

**Figure 8. ESD response to IEC 61000-4-2 (-8 kV contact discharge)**

**Figure 9. ISO7637-3 pulse 3a response ( $V_S = -150$  V)**

**Figure 10. ISO7637-3 pulse 3b response ( $V_S = 100$  V)**


## **2 Application and design guidelines**

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Further information can be found in AN2689 titled: "Protection of automotive electronics from electrical hazards, guidelines for design and component selection".

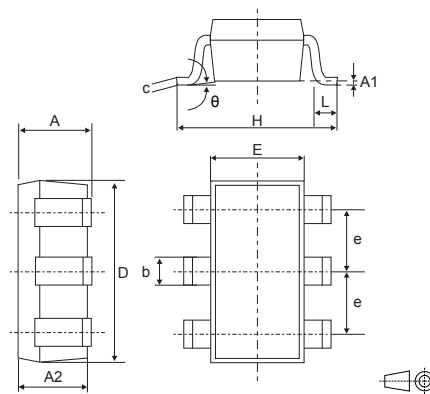
### 3 Package information

In order 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](http://www.st.com). ECOPACK® is an ST trademark.

#### 3.1 SOT23-6L package information

- Epoxy meets UL 94,V0
- Lead-free package

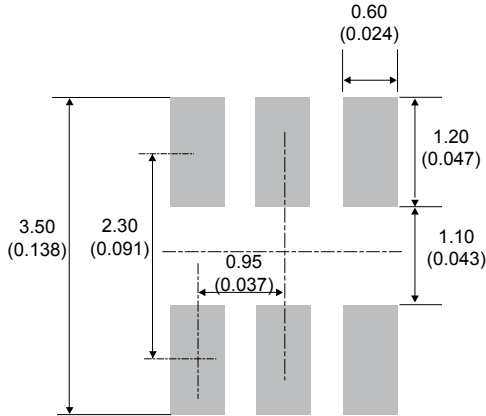
**Figure 11. SOT23-6L package outline**



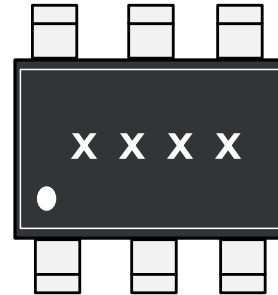
**Table 3. SOT23-6L package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.9		1.45	0.0354		0.0571
A1	0		0.15	0		0.0059
A2	0.9		1.3	0.0354		0.0512
b	0.30		0.5	0.0118		0.0197
c	0.09		0.2	0.0035		0.0079
D	2.8		3.05	0.1102		0.1201
E	1.5		1.75	0.0591		0.0689
e		0.95			0.0374	
H	2.6		3	0.1024		0.1181
L	0.3		0.6	0.0118		0.0236
θ	0		10	0		0.3937

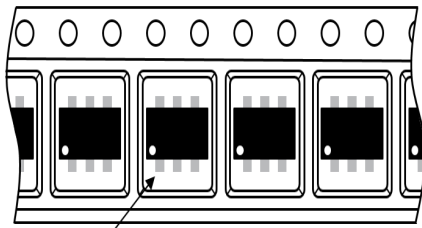
**Figure 12. Footprint recommendations, dimensions in mm (inches)**



**Figure 13. Marking layout (refer to ordering information table for marking)**



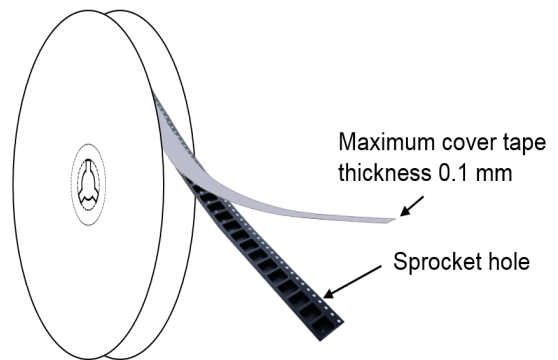
**Figure 14. Package orientation in reel**



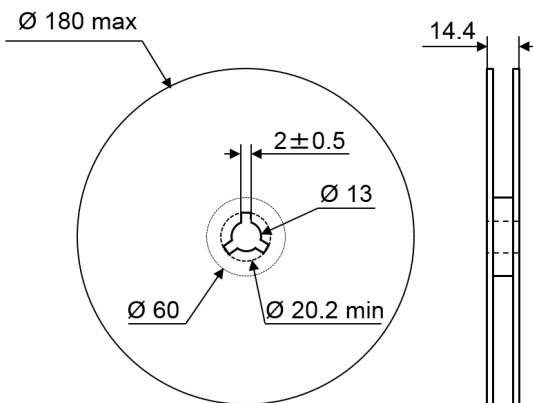
Pin 1 located according to EIA-481

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

**Figure 15. Tape and reel orientation**



**Figure 16. Reel dimensions (mm)**



**Figure 17. Inner box dimensions (mm)**

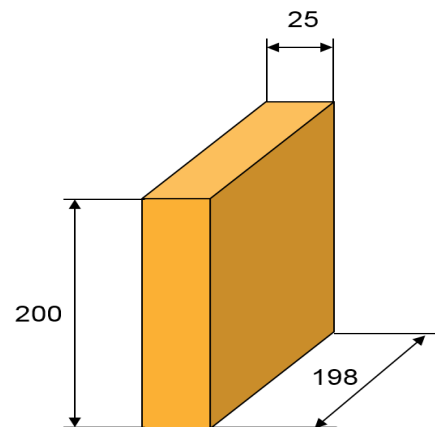
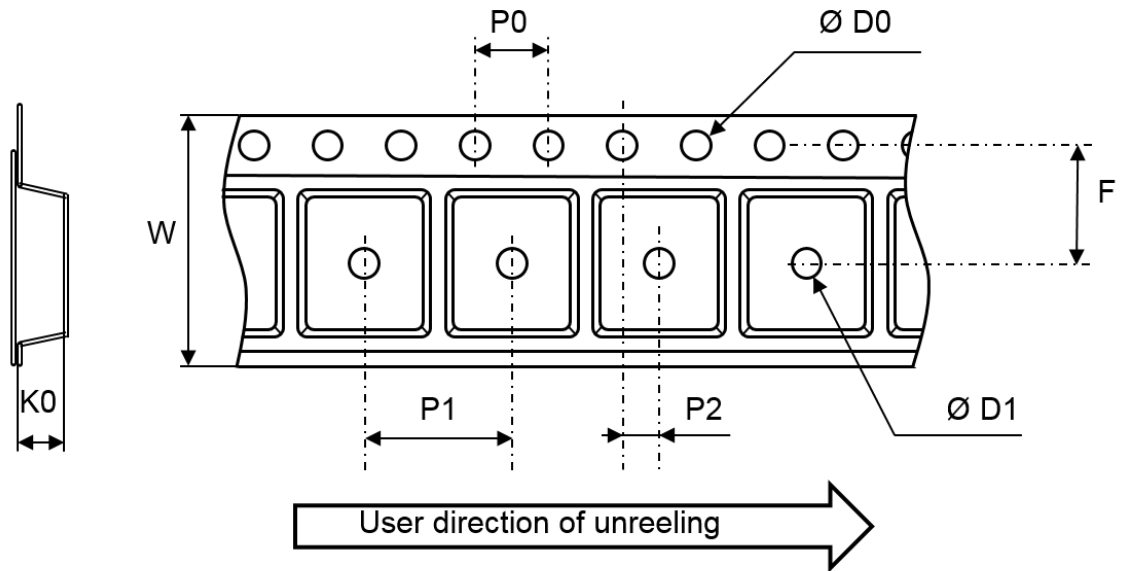




Figure 18. Tape and reel outline



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

Table 4. Tape and reel mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
P1	3.9	4	4.1
P0	3.9	4	4.1
D0	1.45	1.5	1.6
D1	1		
F	3.45	3.5	3.55
K0	1.3	1.4	1.6
P2	1.95	2	2.05
W	7.9	8	8.3

## 4 Ordering information

Figure 19. Ordering information scheme

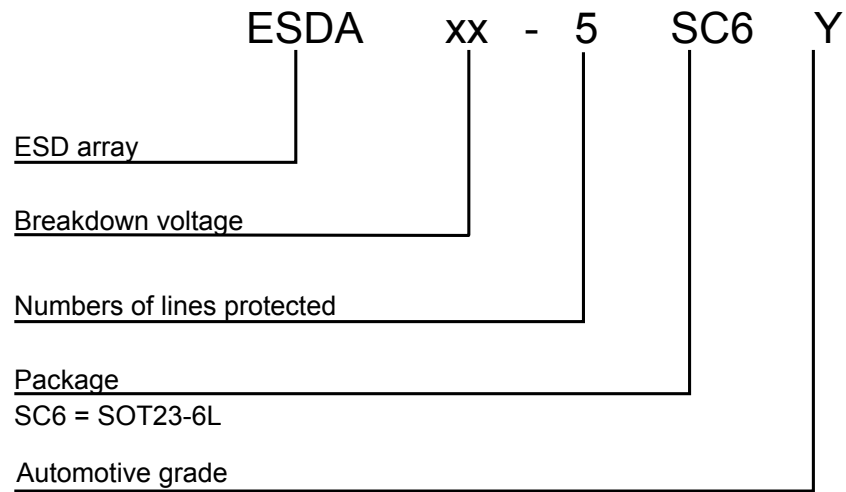


Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
ESDA6V1-5SC6Y	EC6Y	SOT23-6L	14 mg	3000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
08-Nov-2016	1	Initial release.
15-Mar-2017	2	Updated title and description in cover page. Minor text changes to improve readability.
03-May-2017	3	Formatting improvement, no content changes.
08-Jan-2019	4	Updated <a href="#">Table 1</a> .

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