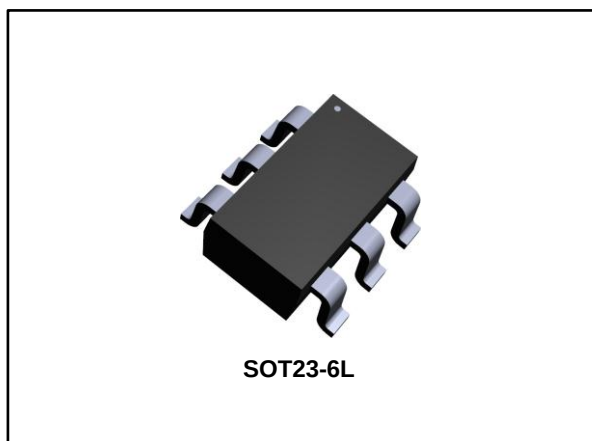


Automotive-grade 5-line transient voltage suppressor (TVS) for ESD protection

Datasheet - production data



Applications

This device is used to protect equipment in which ESD and EOS transient overvoltage may damage electronic circuits.

Description

This device is a monolithic voltage suppressor designed to protect components 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 transients.

Features

- AEC-Q101 qualified
- 5 unidirectional TVS functions
- UL 94 V-0
- J-STD-020 MSL level 1



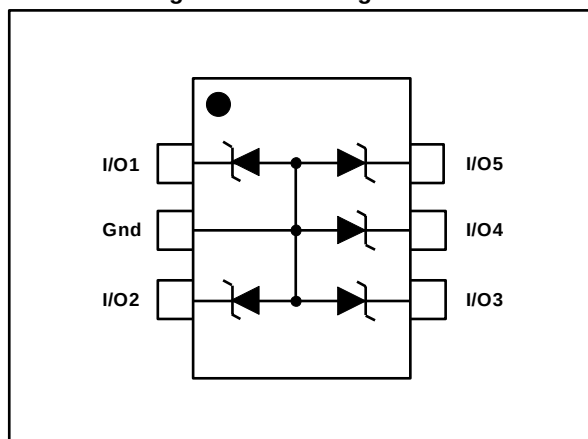
Benefits

- Suitable for high density boards

Complies with the following standards

- ISO 10605 / IEC 61000-4-2: C = 150 pF, R = 330 Ω
 - 30 kV (air discharge)
 - 18 kV (contact discharge)
- ISO 10605: C = 330 pF, R = 330 Ω
 - 20 kV (air discharge)
 - 13 kV (contact discharge)
- ISO 7637-3
 - Pulse 3a: $V_S = -150$ V
 - Pulse 3b: $V_S = +100$ V

Figure 1: Pin configuration



1 Characteristics

Table 1: Absolute ratings (Tamb = 25 °C)

Symbol	Parameter		Value	Unit
V _{pp}	Peak pulse voltage	ISO 10605 / IEC 61000-4-2 (C = 150 pF, R = 330 Ω)	30	kV
		Contact discharge	18	
		Air discharge		
		ISO10605 (C = 330 pF, R = 330 Ω)	20	
		Contact discharge	13	
		Air discharge		
I _{pp}	Peak pulse current	8/20μs	7	A
P _{pp}	Peak pulse power		80	W
T _{stg}	Storage temperature range		-65 to +150	°C
T _j	Operating junction temperature range		-40 to +150	
T _L	Maximum temperature for soldering during 10 s		260	°C

Figure 2: Electrical characteristics (definitions)

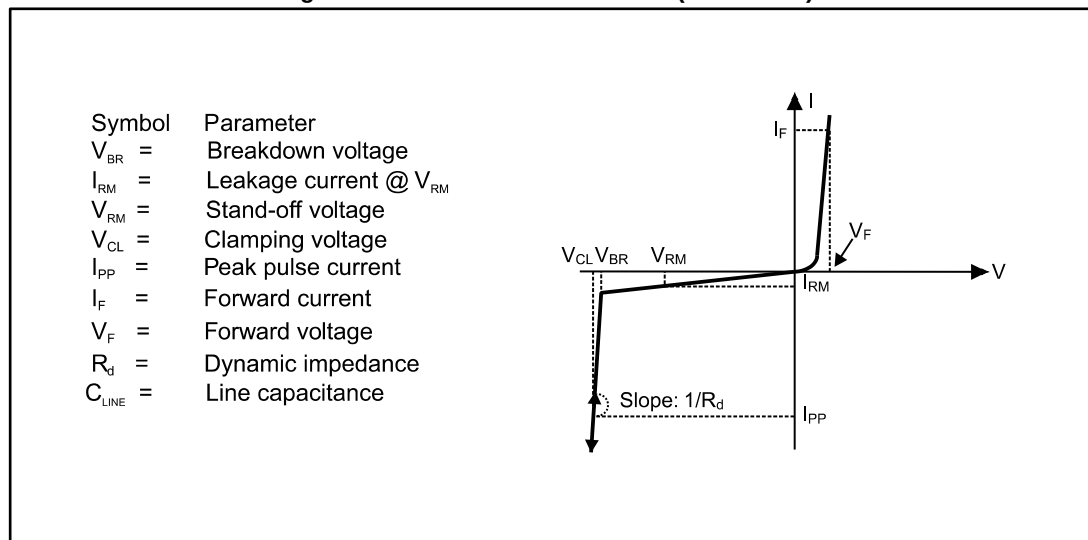


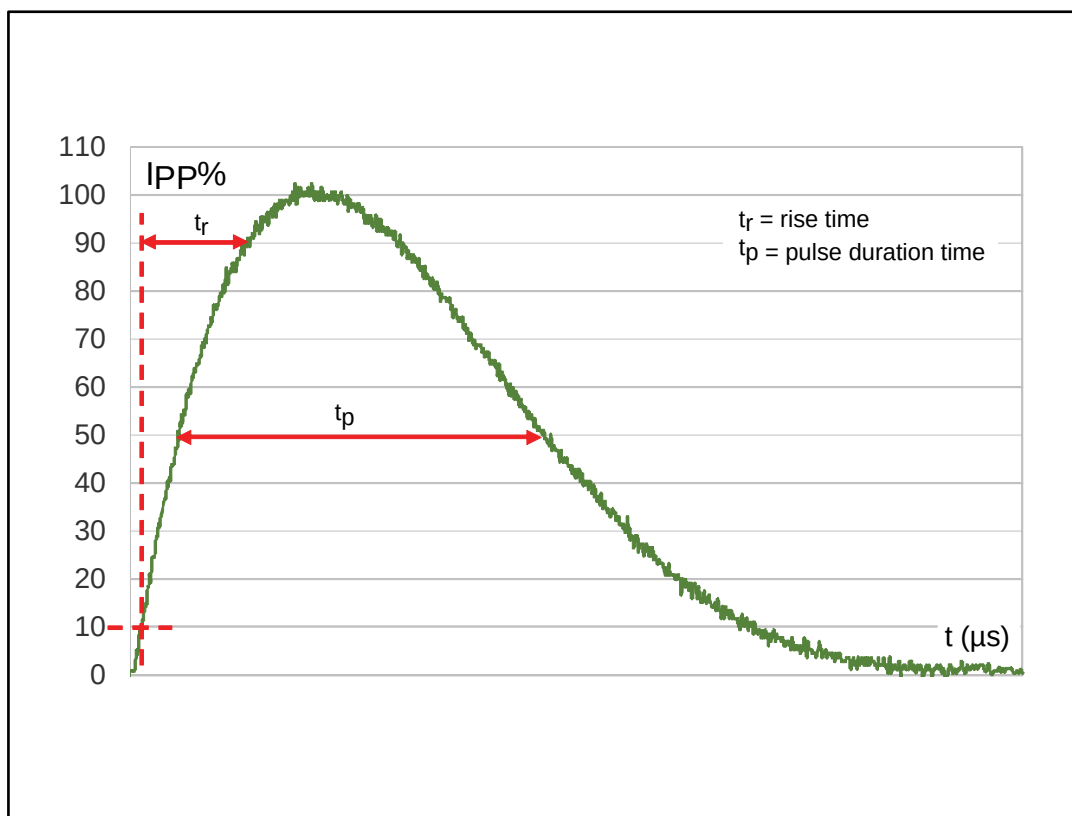
Table 2: Electrical characteristics - values (Tamb = 25 °C)

Order code	V _{BR} at I _R			I _{RM} at V _{RM}		V _{CL} at I _{pp} ⁽¹⁾		V _F at I _F		αT ⁽²⁾	C _{line}
	Min.	Max.		Max.		Max.		Max.		Max.	Typ.
	V	V	mA	μA	V	V	A	V	mA	10 ⁻⁴ /°C	pF
ESDA6V1-5SC6Y	6.1	7.2	1	1	5.2	11.4	7	1.25	200	6	50

Notes:

⁽¹⁾8/20 μs waveform⁽²⁾V_{BR} at T_j = V_{BR} at 25 °C x (1 + αT x (T_j - 25))

Figure 3: Pulse definition for electrical characteristics



1.1 Characteristics (curves)

Figure 4: Pulse power versus junction temperature

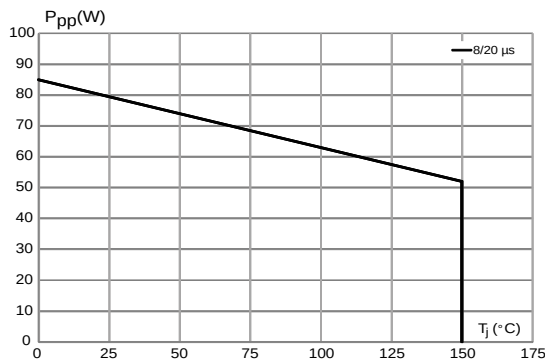


Figure 5: Peak pulse power versus exponential pulse duration

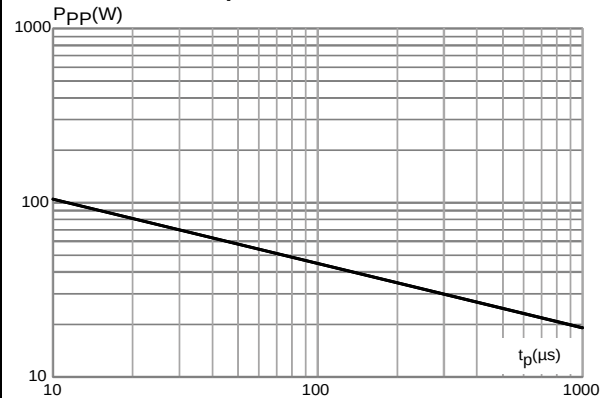


Figure 6: Clamping voltage versus peak pulse current

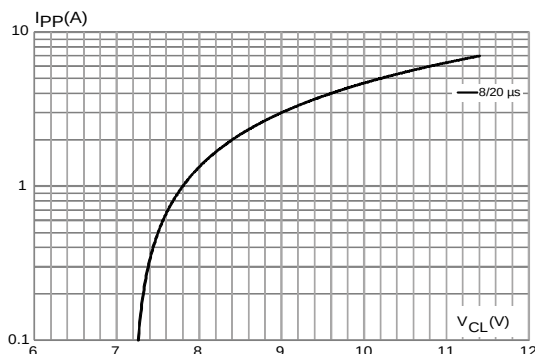


Figure 7: Leakage current versus junction temperature

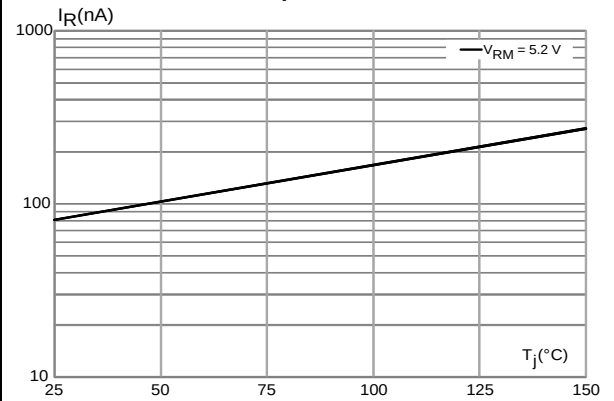


Figure 8: ESD response to IEC 61000-4-2 (+8 kV contact discharge)

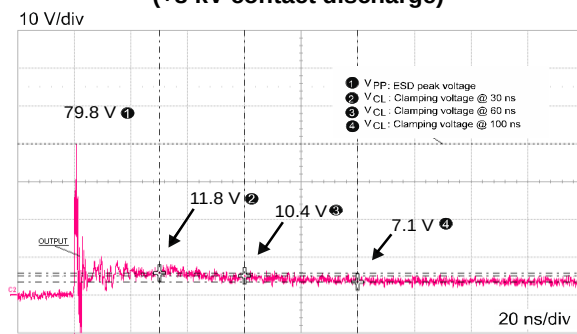


Figure 9: ESD response to IEC 61000-4-2 (-8 kV contact discharge)

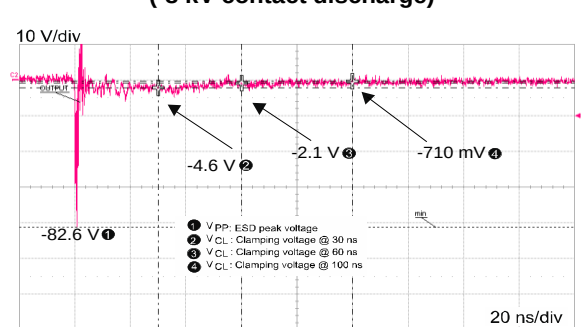
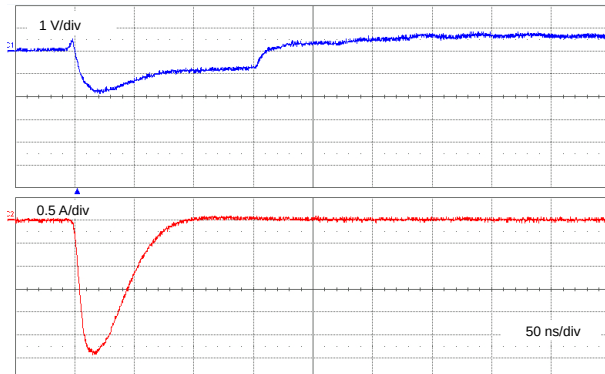
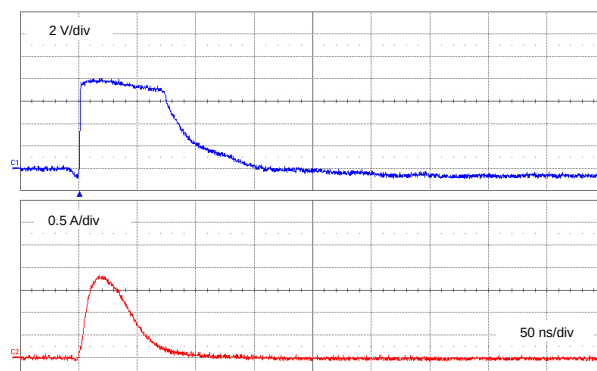


Figure 10: ISO7637-3 pulse 3a response ($V_S = -150\text{ V}$)**Figure 11: ISO7637-3 pulse 3b response ($V_S = 100\text{ V}$)**

2 Application and design guidelines

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. ECOPACK® is an ST trademark.

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

3.1 SOT23-6L package information

Figure 12: SOT23-6L package outline

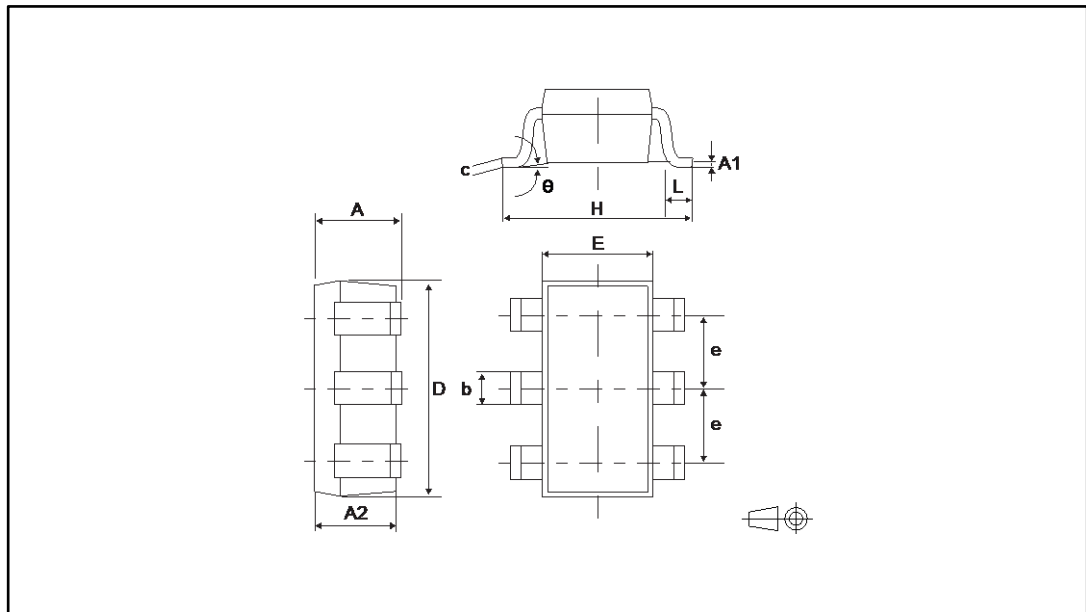
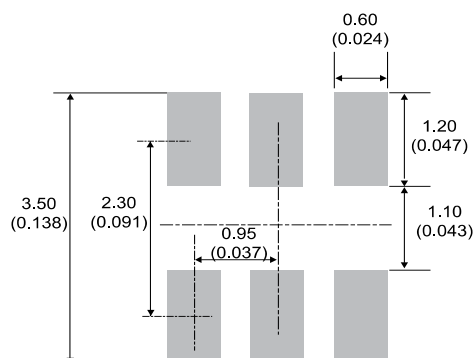
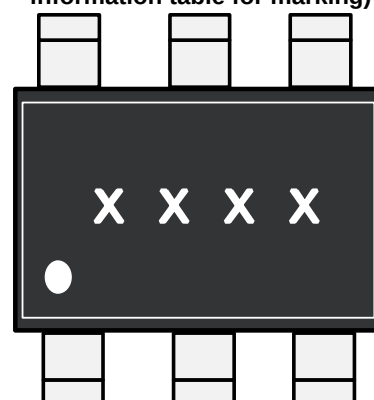
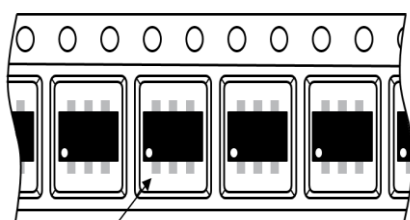


Table 3: SOT23-6L package mechanical data

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 13: Footprint recommendations, dimensions in mm (inches)**Figure 14: Marking layout (refer to ordering information table for marking)****Figure 15: 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

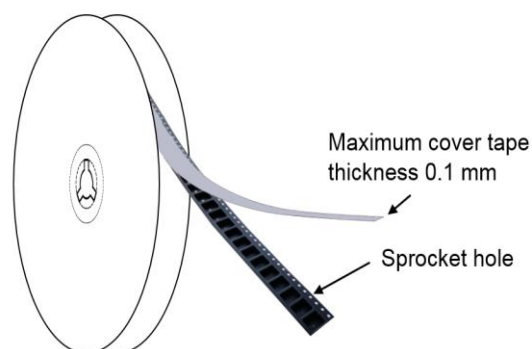
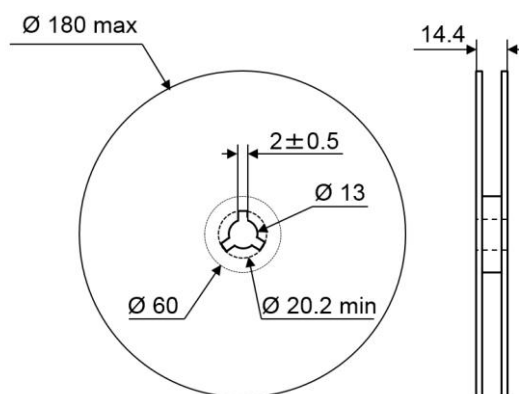
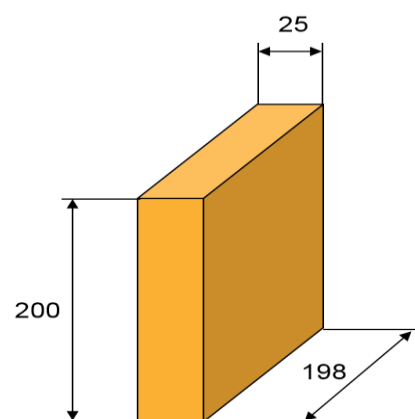
Figure 16: Tape and reel orientation**Figure 17: Reel dimensions (mm)****Figure 18: Inner box dimensions (mm)**

Figure 19: Tape and reel outline

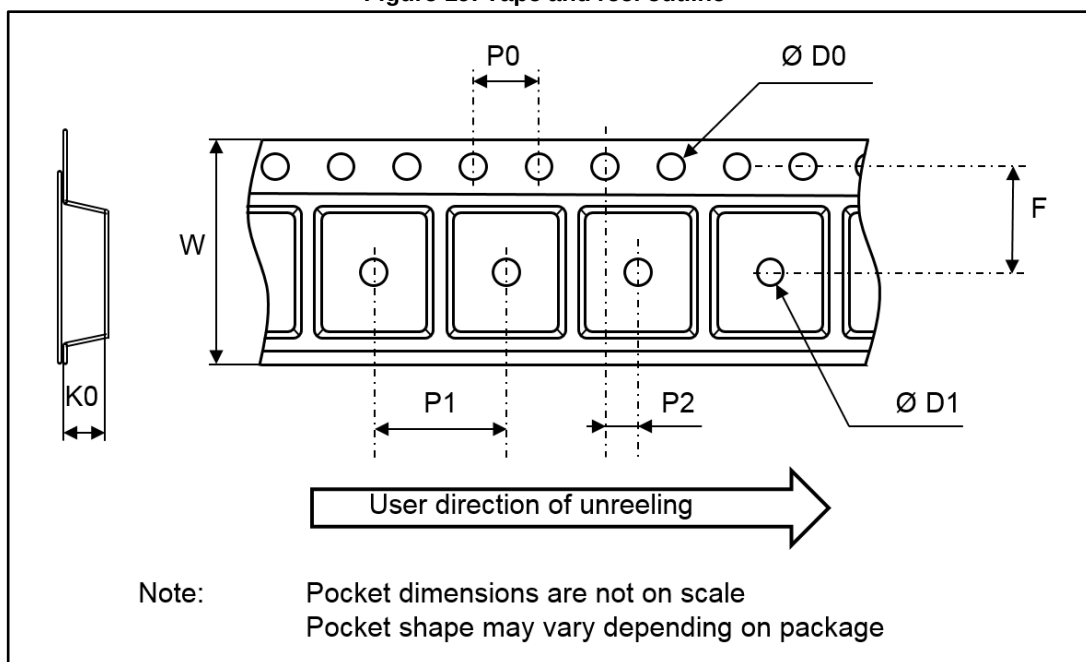


Table 4: Tape and reel mechanical data

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 20: Ordering information scheme

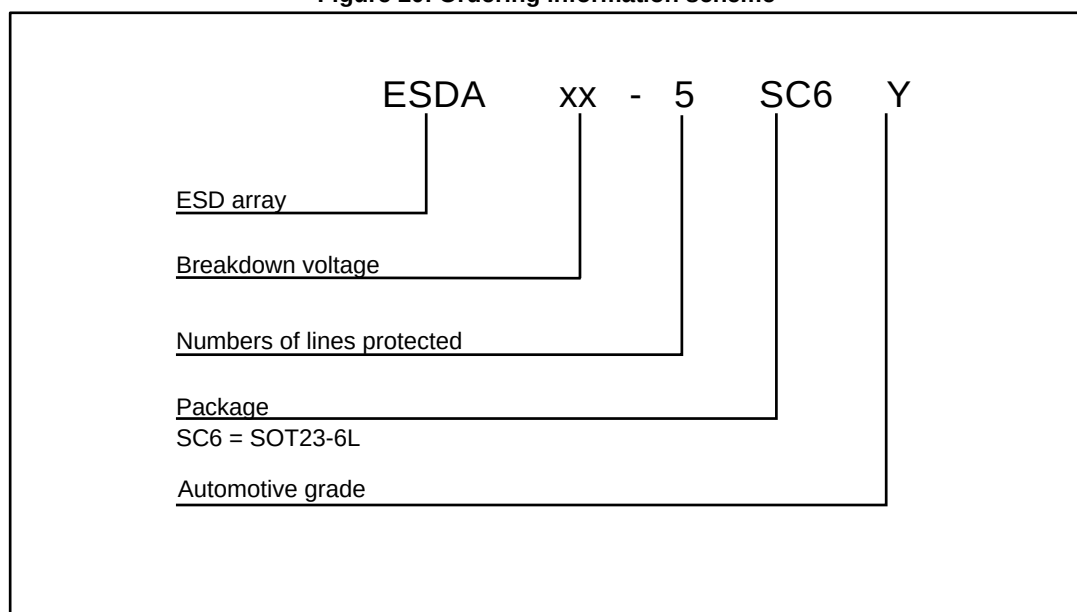


Table 5: Ordering information

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

5 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.

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