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ESDAxxxP6

ASD

Transil™ array for ESD protection

Main applications

Where transient overvoltage protection in ESD sensitive equipment is required, such as:

- Computers
- Servers
- Printers
- Communication systems and cellular phones
- Video equipment

These devices are particularly adapted to the protection of symmetrical signals.

Features

- 4 / 5 Unidirectional (ESDA6V1P6 and ESDA6V1-5P6) and Bidirectional (ESDA14V2BP6 and ESDA25-4BP6) Transil functions
- Breakdown voltage: V_{BR} = 6.1 V min., 14.2 V min. and 25 V min.
- Low leakage current: < 500 nA (ESDA6V1P6 / ESDA6V1-5P6) < 1 µA (ESDA14V2BP6 and ESDA25-4BP6)
- Very small PCB area < 2.6 mm^2

Description

The ESDAxxxP6 are monolithic arrays designed to protect up to 5 lines against ESD transients.

These devices are ideal where board space saving and reduced line capacitance are required.

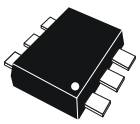
Benefits

- High ESD protection level
- High integration
- Suitable for high density boards

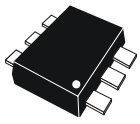
Complies with the following standards:

IEC61000-4-2 level 4: 15 kV (air discharge)
8 kV (contact discharge)

MIL STD 883E-Method 3015-7: class3
25 kV (Human Body Model)



SOT-666IP
(Internal pad)
ESDA6V1P6
ESDA6V1-5P6



SOT-666
ESDA14V2BP6
ESDA25-4BP6

Order codes

Part Number	Marking
ESDA6V1P6	B
ESDA6V1-5P6	C
ESDA14V2BP6	A
ESDA25-4BP6	V

Figure 1. ESDA6V1P6 functional diagram

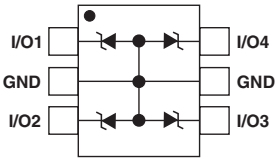


Figure 2. ESDA6V1-5P6 functional diagram

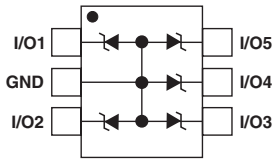
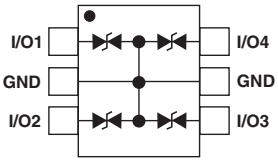


Figure 3. ESDA14V2BP6 and ESDA25-4BP6 functional diagram



TM: Transil is a trademark of STMicroelectronics

1 Characteristics

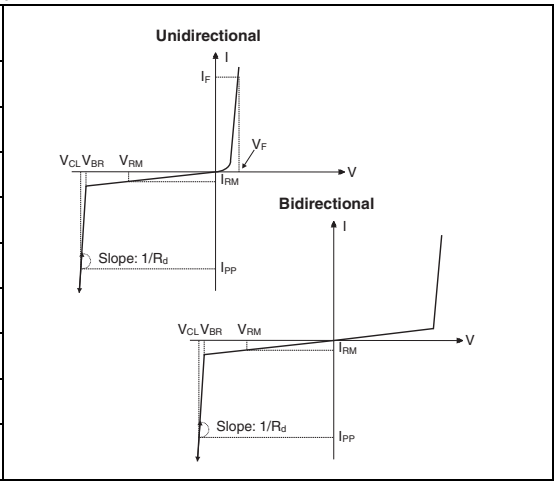
Table 1. Absolute Maximum Ratings (T_{amb} = 25° C)

Symbol	Parameter		Value	Unit
V_{PP}	IEC 61000-4-2 level 4 standard	air discharge contact discharge	±15 ±8	kV
P_{PP}	Peak pulse power (8/20 µs) (1) T_j initial = T_{amb}	ESDA6V1P6 / ESDA6V1-5P6	150	W
		ESDA14V2BP6 / ESDA25-4BP6	50	
T_j	Junction temperature		150	°C
T_{stg}	Storage temperature range		-55 to +150	°C
T_L	Maximum lead temperature for soldering during 10 s at 5 mm for case		260	°C
T_{op}	Operating temperature range		-40 to +150	°C

1. for a surge greater than the maximum values, the diode will fail in short-circuit.

Table 2. Electrical Characteristics (T_{amb} = 25° C)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop
C	Capacitance
R_d	Dynamic resistance



Part Numbers	V_{BR} min.	V_{BR} max. @ I_R		I_{RM} @ V_{RM} max.		R_d max.	αT typ.	C typ. @ 0V
	V	V	mA	µA	V	Ω	10^{-4}/°C	pF
ESDA6V1P6	6.1	7.2	1	0.5	3	1.5	4	70
ESDA6V1-5P6								
ESDA14V2BP6	14.2	18	1	1	12	1.5	5.8	25
				0.1	3			
ESDA25-4BP6	25	30	1	1	24	1.7	7.3	22

Figure 4. Peak power dissipation versus initial junction temperature

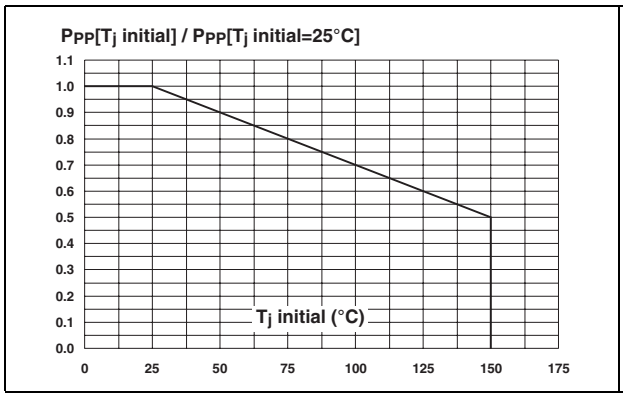


Figure 5. Peak pulse power versus exponential pulse duration (T_j initial = 25° C)

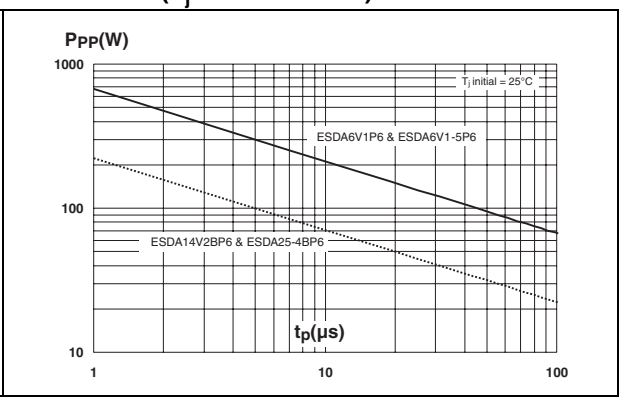


Figure 6. Clamping voltage versus peak pulse current (T_j initial = 25° C, rectangular waveform, t_p = 2.5 µs)

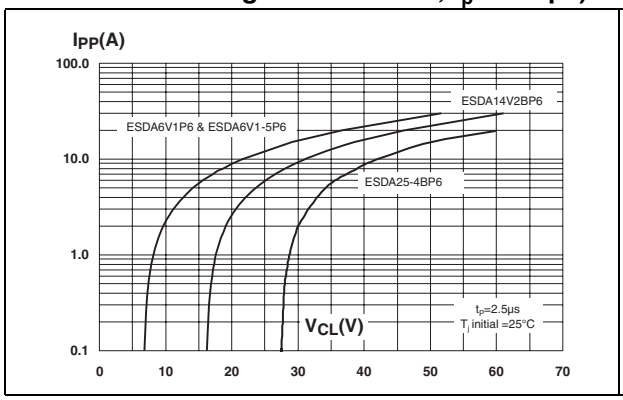


Figure 7. Junction capacitance versus reverse applied voltage (typical values)

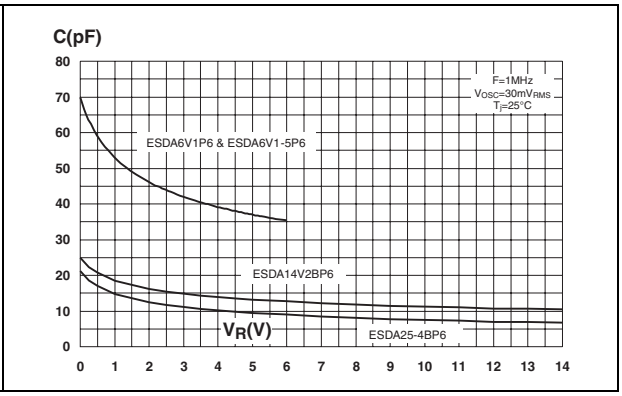


Figure 8. Relative variation of leakage current versus junction temperature (typical values)

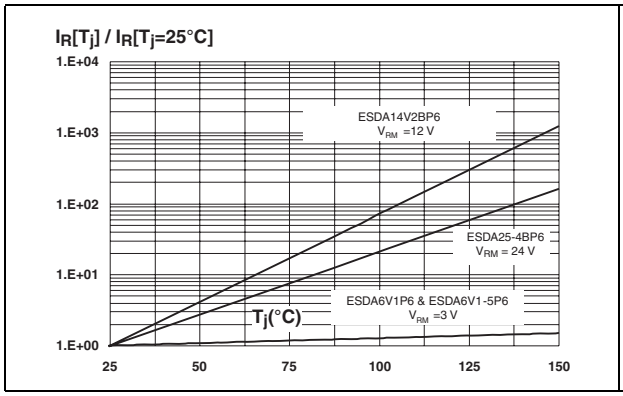


Figure 9. Peak forward voltage drop versus peak forward current (typical values)

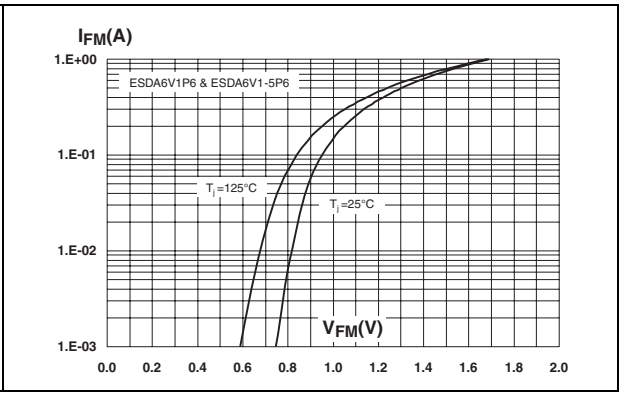


Figure 10. ESD response @ V_{PP} = 15 kV air discharge (ESDA6V1-5P6)

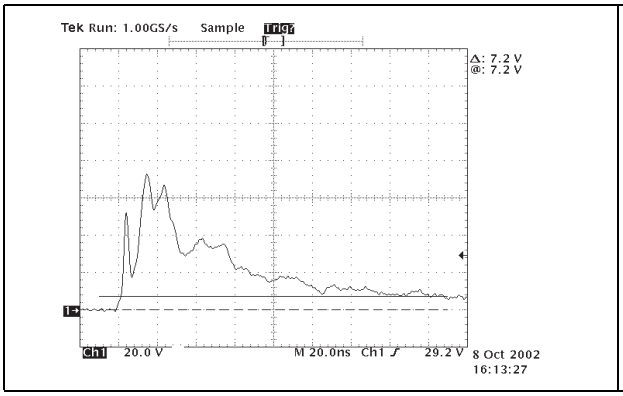
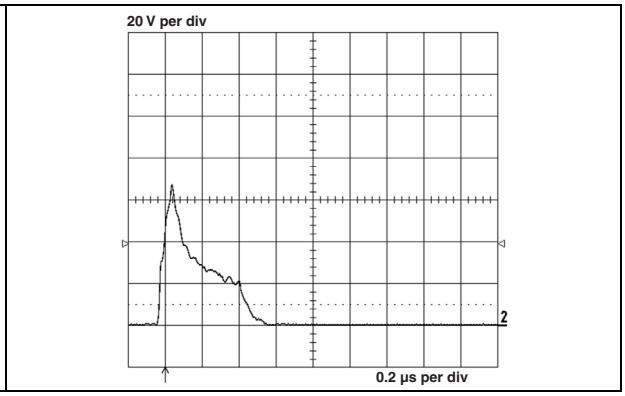


Figure 11. ESD response @ V_{PP} = 15 kV air discharge (ESDA25-4BP6)



2 Ordering information scheme

ESDA 6V1 - x B Px

ESD Array

Breakdown Voltage
6V1 = 6.1 Volts min.
14V2 = 14.2 Volts min.
25 = 25 Volts min.

Number of lines protected (optional)
5 = 5 lines
4 = 4 lines

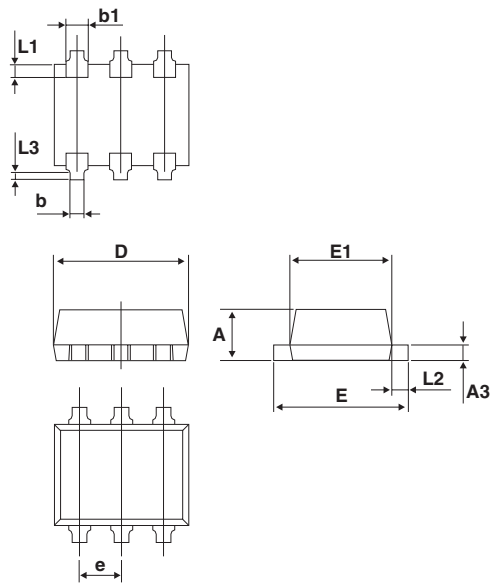
Type
Blank = Unidirectional
B = Bidirectional

Packages
P6 = SOT-666 for ESDA14V2BP6 and ESDA25-4BP6
SOT-666IP for ESDA6V1P6 and ESDA6V1-5P6

3 Package information

- Epoxy meets UL94, V0

Table 3. SOT-666 Dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45		0.60	0.018		0.024
A3	0.08		0.18	0.003		0.007
b	0.17		0.34	0.007		0.013
b1	0.19	0.27	0.34	0.007	0.011	0.013
D	1.50		1.70	0.059		0.067
E	1.50		1.70	0.059		0.067
E1	1.10		1.30	0.043		0.051
e		0.50			0.020	
L1		0.19			0.007	
L2	0.10		0.30	0.004		0.012
L3		0.10			0.004	

Figure 12. SOT-666 Footprint (dimensions in mm)

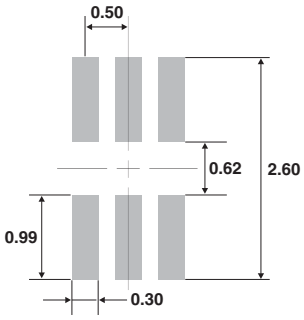
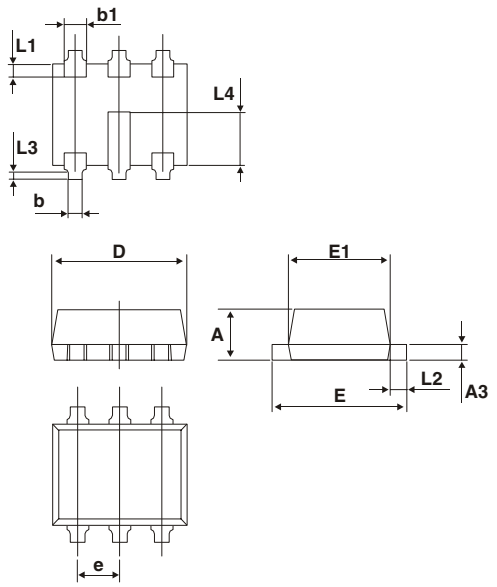
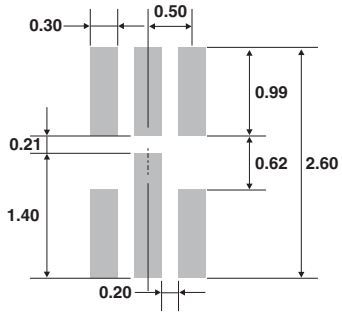


Table 4. SOT-666IP Dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45		0.60	0.018		0.024
A3	0.08		0.18	0.003		0.007
b	0.17		0.34	0.007		0.013
b1	0.19	0.27	0.34	0.007	0.011	0.013
D	1.50		1.70	0.059		0.067
E	1.50		1.70	0.059		0.067
E1	1.10		1.30	0.043		0.051
e		0.50			0.020	
L1		0.19			0.007	
L2	0.10		0.30	0.004		0.012
L3		0.10			0.004	
L4		0.60			0.024	

Figure 13. SOT-666IP Footprint (dimensions in mm)



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
ESDA6V1P6	B	SOT-666IP	2.9 mg	3000	Tape and reel
ESDA6V1-5P6	C				
ESDA14V2BP6	A	SOT-666			
ESDA25-4BP6	V				

5 Revision history

Date	Revision	Changes
07-Feb-2006	1	ESDA6V1P6, ESDA6V1-5P6 and ESDA14V2BP6: datasheets merged. ECOPACK statement added. Some curves combined.
26-Jun-2006	2	Reformatted to current standards. Modified package information to show both SOT-666 and SOT-666IP.
22-May-2007	3	Added product ESDA25-4BP6

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