

### ESDAxxxP6

### 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<sub>BR</sub> = 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<sup>2</sup>

#### **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	В
ESDA6V1-5P6	С
ESDA14V2BP6	Α
ESDA25-4BP6	V

Figure 1. ESDA6V1P6 functional diagram

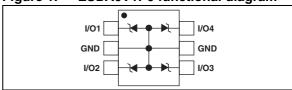


Figure 2. ESDA6V1-5P6 functional diagram

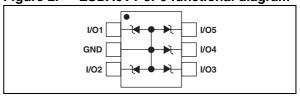
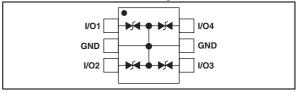


Figure 3. ESDA14V2BP6 and ESDA25-4BP6 functional diagram



TM: Transil is a trademark of STMicroelectronics

Characteristics ESDAxxxP6

## 1 Characteristics

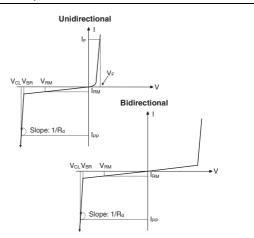
**Table 1.** Absolute Maximum Ratings  $(T_{amb} = 25^{\circ} C)$ 

Symbol	Param	Value	Unit	
V <sub>PP</sub>	IEC 61000-4-2 level 4 standard	air discharge contact discharge	±15 ±8	kV
Ь	Peak pulse power (8/20 µs) (1)	wer (8/20 µs) (1) ESDA6V1P6 / ESDA6V1-5P6		W
$P_{PP} \mid T_j$	$T_j$ initial = $T_{amb}$	ESDA14V2BP6 / ESDA25-4BP6	50	"
T <sub>j</sub>	Junction temperature	150	Ô	
T <sub>stg</sub>	Storage temperature range	-55 to +150	°C	
T <sub>L</sub>	Maximum lead temperature for sold	260	°C	
T <sub>op</sub>	Operating temperature range	-40 to +150	ç	

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

**Table 2.** Electrical Characteristics  $(T_{amb} = 25^{\circ} C)$ 

Symbol	Parameter	
V <sub>RM</sub>	Stand-off voltage	
$V_{BR}$	Breakdown voltage	
V <sub>CL</sub>	Clamping voltage	
I <sub>RM</sub>	Leakage current	
I <sub>PP</sub>	Peak pulse current	
αΤ	Voltage temperature coefficient	
V <sub>F</sub>	Forward voltage drop	
С	Capacitance	
R <sub>d</sub>	Dynamic resistance	

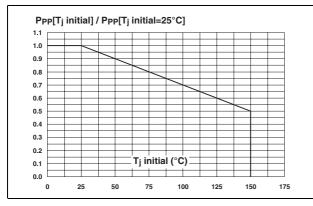


	V	3R		I <sub>RM</sub> @	V <sub>RM</sub>	R <sub>d</sub>	α <b>T</b>	С		
Part Numbers	min.	max.	@ I <sub>R</sub>	may		max.	typ.	typ.		
Fait Numbers	111111.	IIIax.		max.				@ 0V		
	V	V	mA	μΑ	V	Ω	10 <sup>-4</sup> /°C	pF		
ESDA6V1P6	6.1	7.2	1	0.5	3	1.5	4	70		
ESDA6V1-5P6	0.1	1.2	'	0.5	3	1.5	4	70		
ESDA14V2BP6	14.0	14.0	14.2	14.2 10	18 1	1	12	1.5	5.8	25
E3DA14V2BF0	14.2	10	'	0.1	3	1.5	5.6	23		
ESDA25-4BP6	25	30	1	1	24	1.7	7.3	22		

ESDAxxxP6 Characteristics

Figure 4. Peak power dissipation versus initial junction temperature

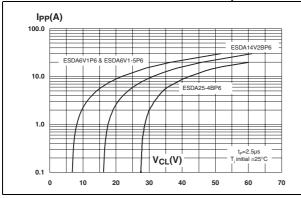
Figure 5. Peak pulse power versus exponential pulse duration (T<sub>i</sub> initial = 25° C)



Ppp(W)
1000
ESDA6V1P6 & ESDA6V1-5P6
ESDA14V2BP6 & ESDA25-4BP6
100
1 100
100
100
100

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

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



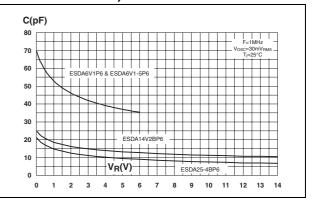
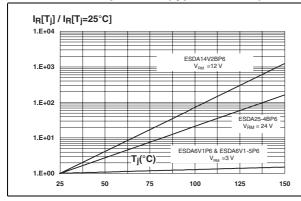


Figure 8. Relative variation of leakage current versus junction temperature (typical values)

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



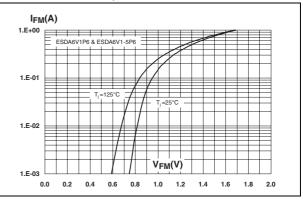
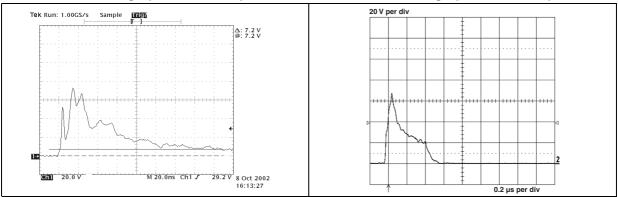
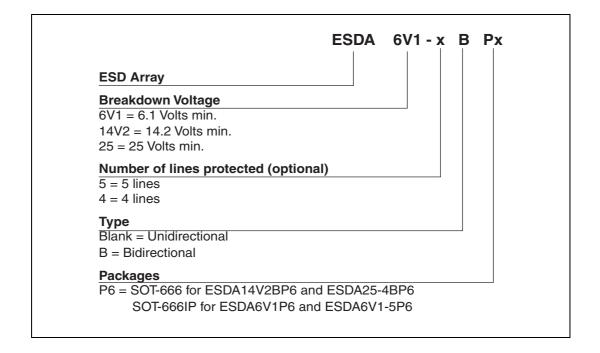


Figure 10. ESD response @ V<sub>PP</sub> = 15 kV air discharge (ESDA6V1-5P6)

Figure 11. ESD response @ V<sub>PP</sub> = 15 kV air discharge (ESDA25-4BP6)



## 2 Ordering information scheme

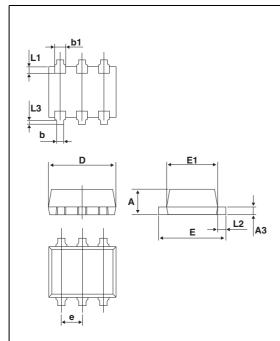


ESDAxxxP6 Package information

# 3 Package information

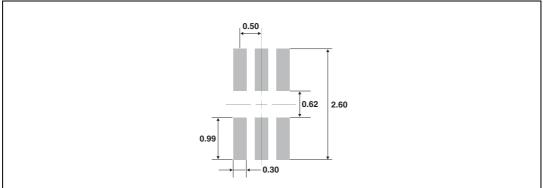
Epoxy meets UL94, V0

Table 3. SOT-666 Dimensions



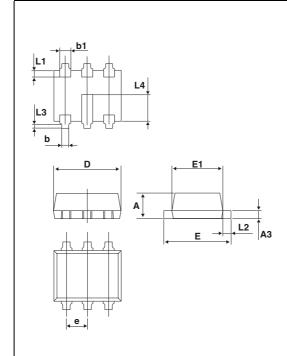
	Dimensions					
Ref.	Millimeter		rs		Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	0.45		0.60	0.018		0.024
А3	0.08		0.18	0.003		0.007
b	0.17		0.34	0.007		0.013
b1	0.19	0.27	0.34	0.007	0.011	0.013
D	1.50		1.70	0.059		0.067
Е	1.50		1.70	0.059		0.067
E1	1.10		1.30	0.043		0.051
е		0.50			0.020	
L1		0.19			0.007	
L2	0.10		0.30	0.004		0.012
L3	_	0.10			0.004	

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



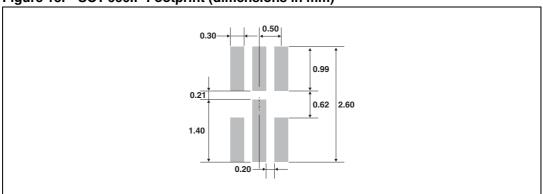
Package information ESDAxxxP6

Table 4. SOT-666IP Dimensions



	Dimensions						
Ref.	f. Millimete		ers		Inches		
	Min.	Тур.	Max.	Min.	Тур.	Max.	
Α	0.45		0.60	0.018		0.024	
А3	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	
Е	1.50		1.70	0.059		0.067	
E1	1.10		1.30	0.043		0.051	
е		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.

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# 4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
ESDA6V1P6	В	SOT-666IP			
ESDA6V1-5P6	С	301-0001	2.9 mg	3000	Tana and roal
ESDA14V2BP6	Α	SOT-666	2.9 mg	3000	Tape and reel
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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