

## Quad bidirectional Transil™ array for ESD protection

### Features

- 4 bidirectional Transil functions
- ESD Protection: IEC 61000-4-2 level 4
- Stand-off voltage: 12 V min.
- Low leakage current < 0.5  $\mu$ A
- 50 W Peak pulse power (8/20  $\mu$ s)

### Benefits

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

### Complies with the following standards:

- IEC 61000-4-2
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G-Method 3015-7: class3
  - 25 kV (human body model)

### Applications

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

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

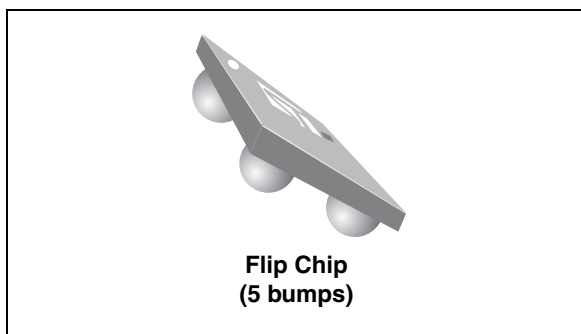


Figure 1. Pin layout (bump side)

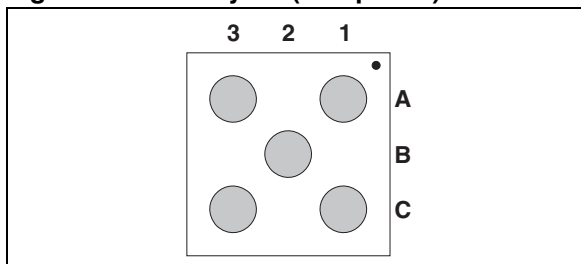
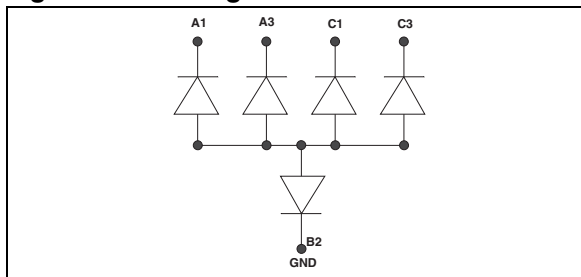


Figure 2. Configuration



### Description

The ESDA14V2-4BF3 is a monolithic array designed to protect up to 4 lines bidirectionally against ESD transients. The device is ideal for situations where board space saving is required.

This device is particularly adapted to the protection of symmetrical signals.

**TM:** Transil is ASD a trademark of STMicroelectronics.

# 1 Characteristics

**Table 1. Absolute ratings (limiting values)**

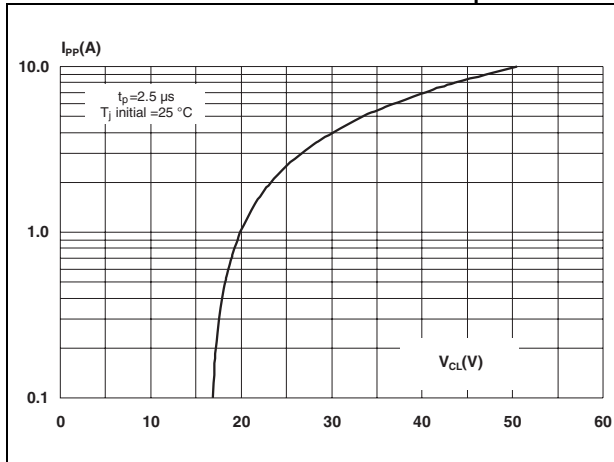
Symbol	Parameter	Value	Unit
V <sub>PP</sub>	MIL STD 883G-Method 3015-7	± 25	kV
	ESD discharge IEC 61000-4-2 air discharge	± 15	
	IEC 61000-4-2 contact discharge	± 8	
P <sub>PP</sub>	Peak pulse power (8/20µs)	50	W
T <sub>j</sub>	Junction temperature	125	°C
T <sub>stg</sub>	Storage temperature range	-55 to +150	°C
T <sub>L</sub>	Lead solder temperature (10 seconds duration)	260	°C
T <sub>op</sub>	Operating temperature range	-40 to +125	°C

**Table 2. Electrical characteristics (T<sub>amb</sub> = 25 °C)**

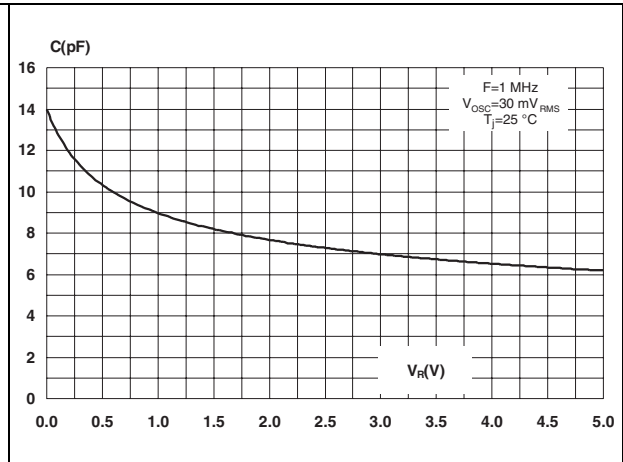
Symbol	Parameter							
V <sub>BR</sub>	Breakdown voltage							
I <sub>RM</sub>	Leakage current @ V <sub>RM</sub>							
V <sub>RM</sub>	Stand-off voltage							
V <sub>CL</sub>	Clamping voltage							
R <sub>d</sub>	Dynamic impedance							
I <sub>PP</sub>	Peak pulse current							
C	Capacitance							
Order code	V <sub>BR</sub> @ I <sub>R</sub>			I <sub>RM</sub> @ V <sub>RM</sub>		R <sub>d</sub>	αT	C
	min.	max.		max.		typ. <sup>(1)</sup>	max. <sup>(2)</sup>	max. 0 V bias
	V	V	mA	µA	V	W	10 <sup>-4</sup> /C	pF
ESDA14V2-4BF3	14.2	18	1	0.5 0.1	12 3	3.2	10	15

1. Square pulse, I<sub>pp</sub> = 3 A, t<sub>p</sub> = 2.5 µs.
2. Δ V<sub>BR</sub> = α·T\* (T<sub>amb</sub> -25 °C) \* V<sub>BR</sub> (25 °C)

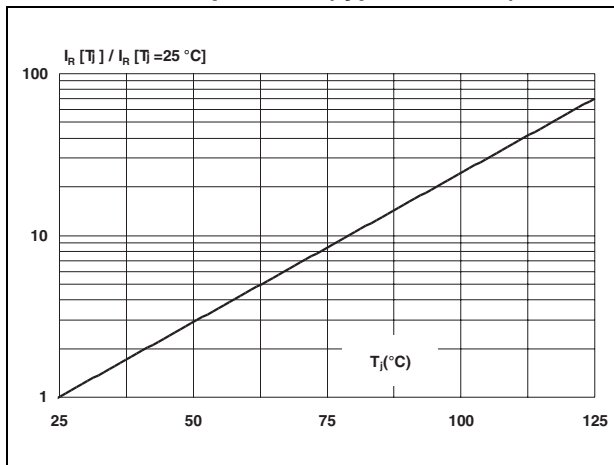
**Figure 3. Clamping voltage versus peak pulse current ( $T_j$  initial = 25 °C) (rectangular waveform,  $t_p = 2.5 \mu s$ )**



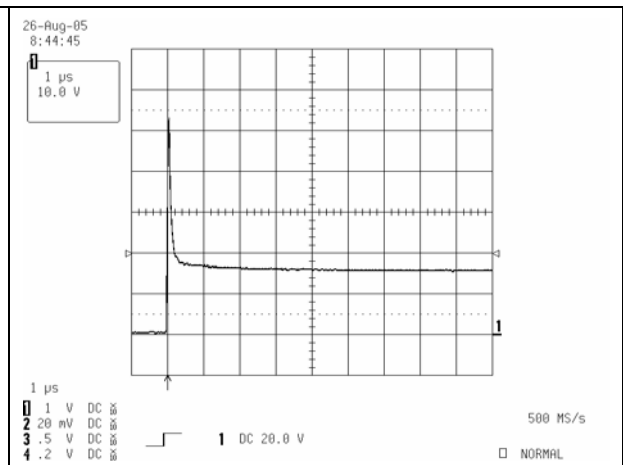
**Figure 4. Junction capacitance versus reverse applied voltage (typical values)**



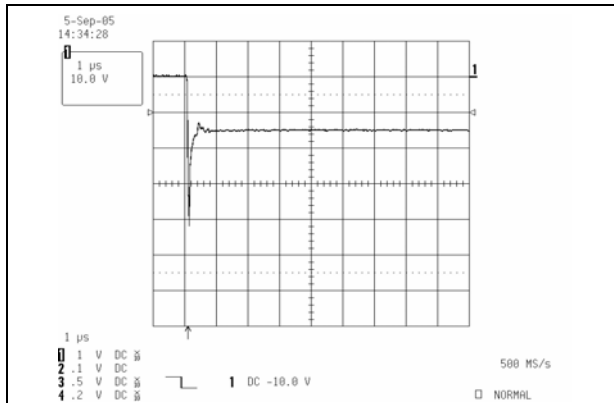
**Figure 5. Relative variation of leakage current versus junction temperature (typical values)**



**Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge)**



**Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge)**



**Figure 8. Analog crosstalk measurements**

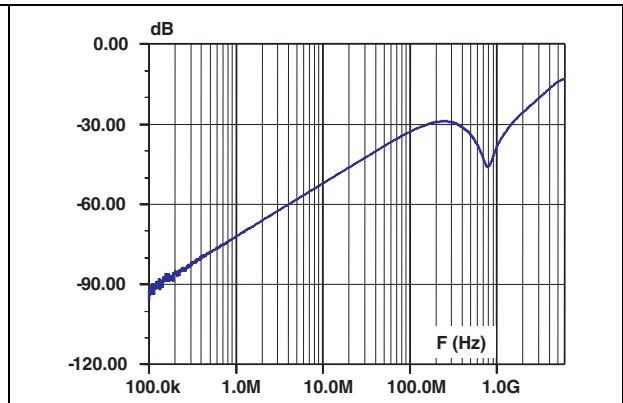
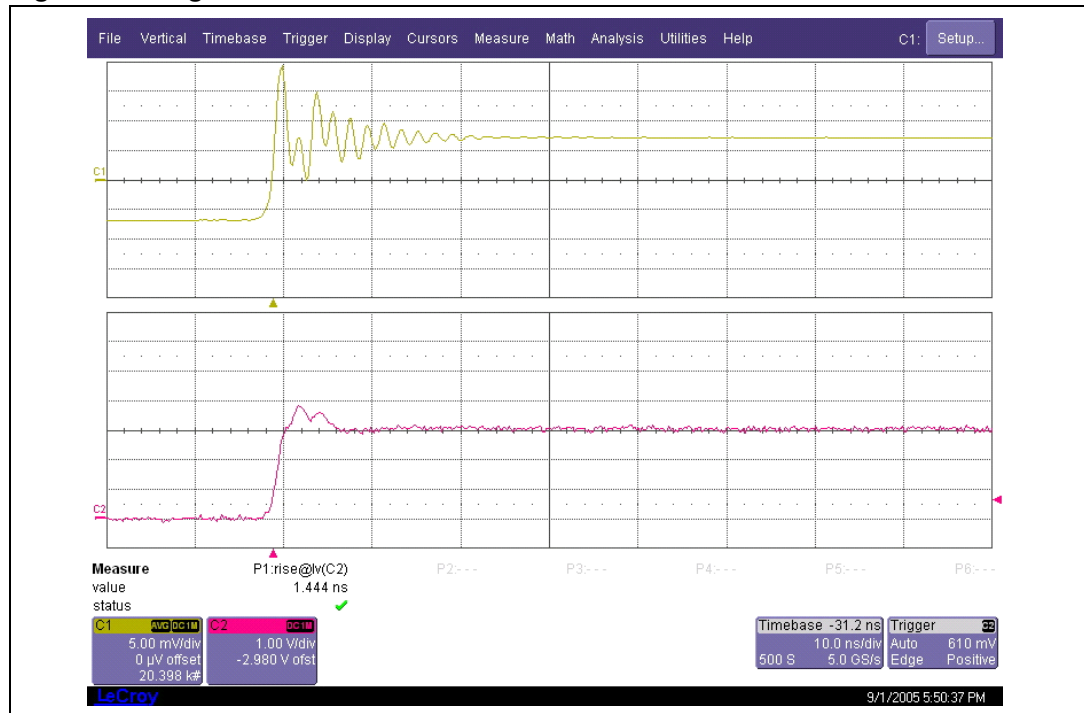
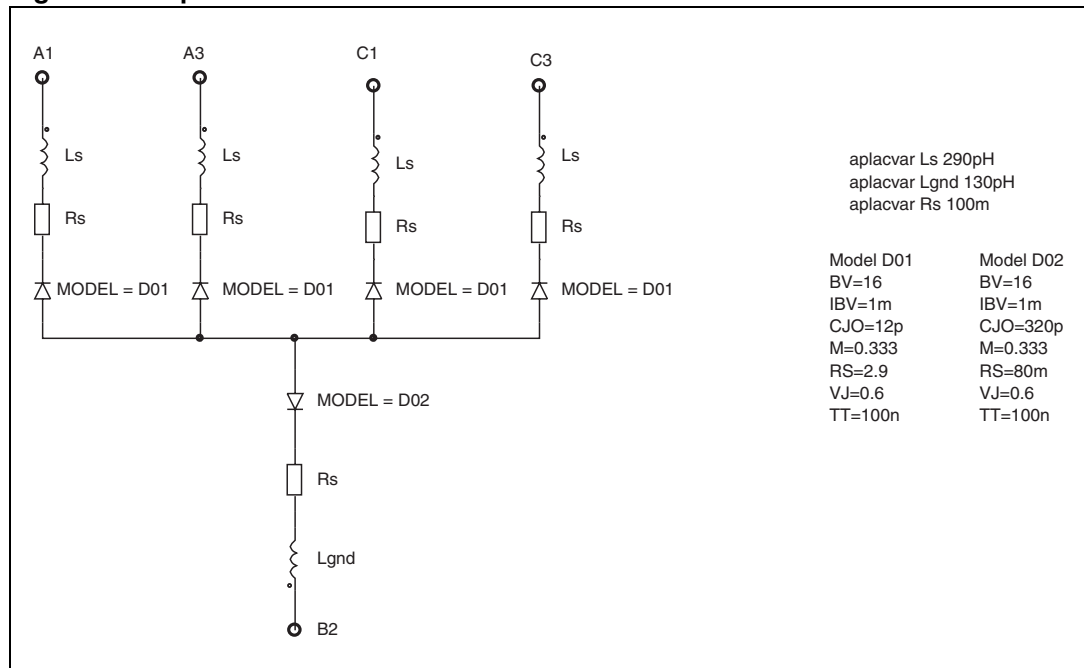


Figure 9. Digital crosstalk measurements



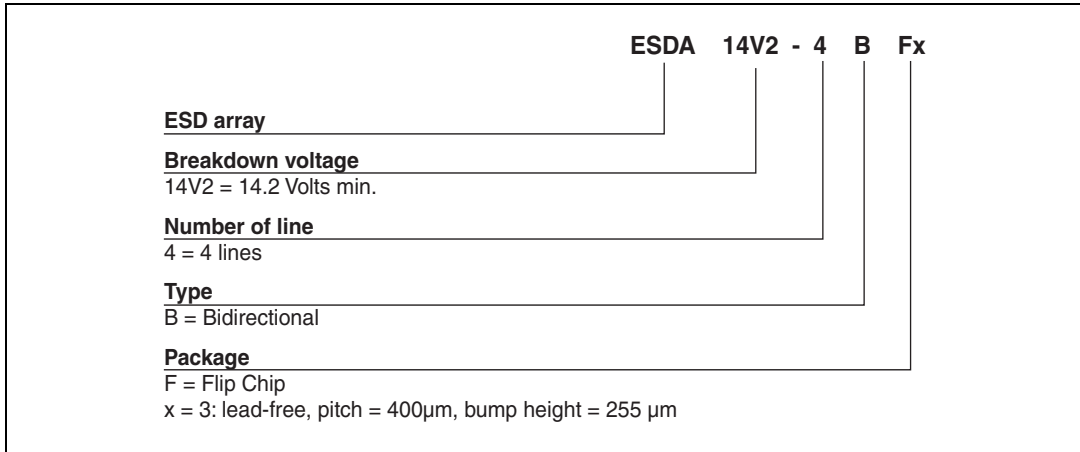
## 2 Application information

Figure 10. Aplac model



### 3 Ordering information scheme

Figure 11. Ordering information scheme



### 4 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.

Figure 12. Package dimensions

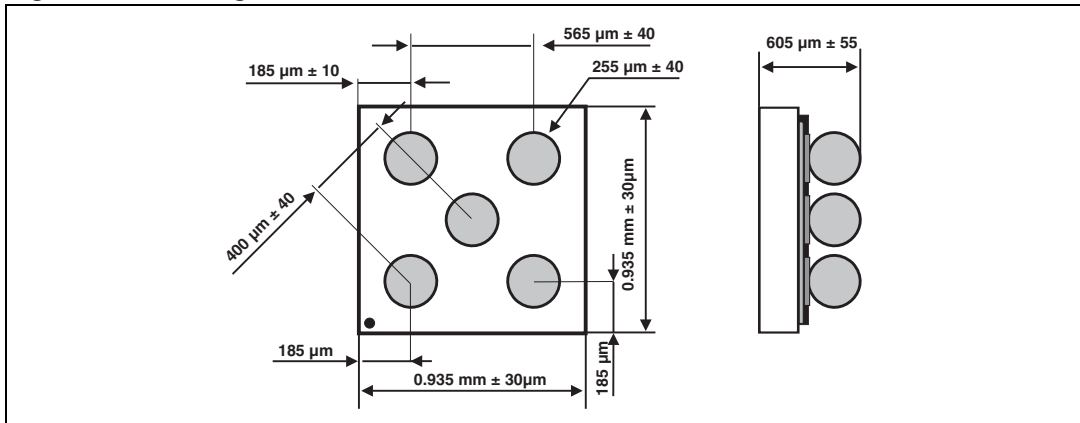


Figure 13. Footprint

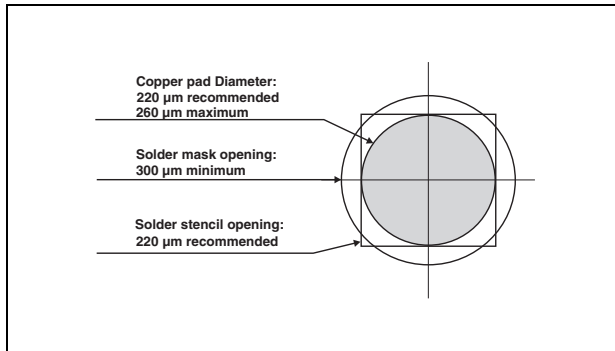


Figure 14. Marking

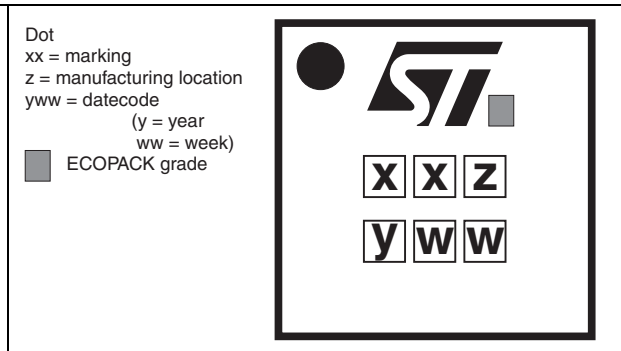
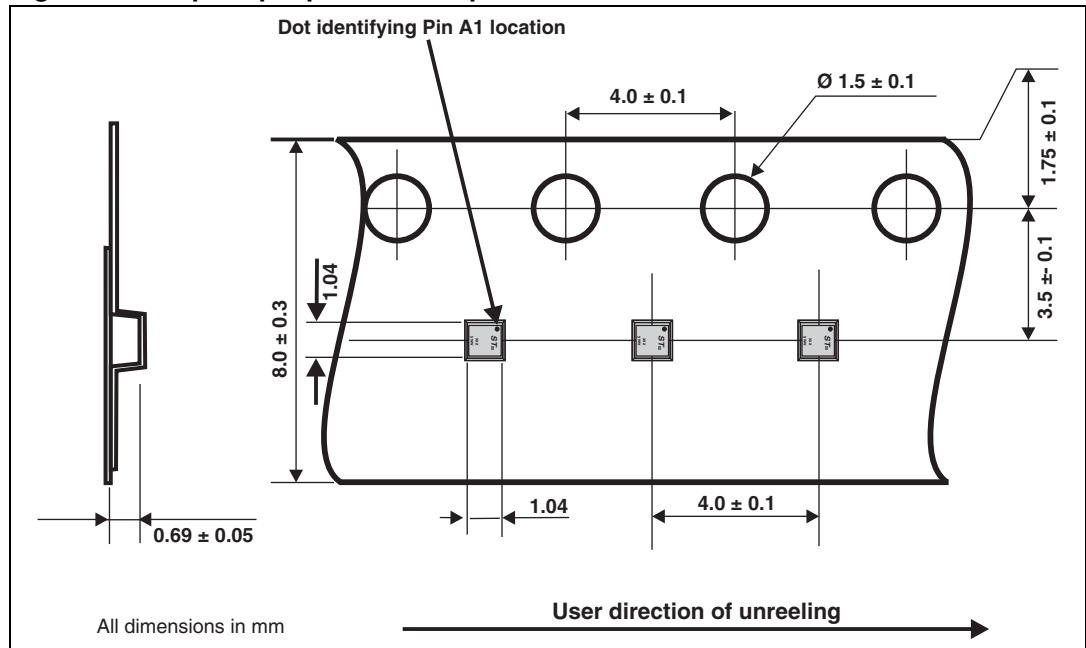


Figure 15. Flip Chip tape and reel specifications



Note: More information is available in the application notes:  
 AN2348: "400  $\mu\text{m}$  Flip Chip: Package description and recommendations for use"  
 AN1751: EMI Filters: Recommendations and measurements

## 5 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
ESDA14V2-4BF3	EF	Flip Chip	1.10 mg	5000	Tape and reel 7"

## 6 Revision history

Table 4. Document revision history

Date	Revision	Changes
19-Sep-2005	1	Initial release.
15-Dec-2005	2	Dimension from center bump to corner bump changed in Figure 9 to indicate diagonal instead of perpendicular measurement. No values changed. ECOPACK statement added. Updated ordering information.
18-Apr-2008	3	Updated ECOPACK statement. Updated <a href="#">Figure 11</a> , <a href="#">Figure 12</a> and <a href="#">Figure 15</a> . Reformatted to current standards.
28-Jan-2010	4	Added ST logo and ECOPACK grade to package and marking illustrations.

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