

#### **ESDA14V2-4BF3**

### 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 µA
- 50 W Peak pulse power (8/20 µs)

#### **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

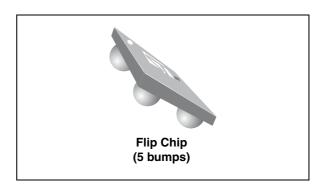


Figure 1. Pin layout (bump side)

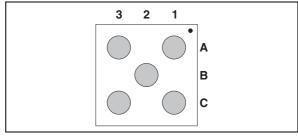
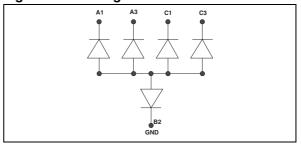


Figure 2. Configuration



#### **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.

Characteristics ESDA14V2-4BF3

### 1 Characteristics

Table 1. Absolute ratings (limiting values)

| Symbol           | Para  | Value                       | Unit        |    |  |
|------------------|---|-----------------------------|-------------|----|--|
|                  | MIL S   | STD 883G-Method 3015-7      | ± 25        |    |  |
| V <sub>PP</sub>  | ESD discharge IEC 6                           | 61000-4-2 air discharge     | ± 15        | kV |  |
|                  | IEC 6   | 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  $(T_{amb} = 25 \, ^{\circ}C)$ 

| Table 2. Electrical characteristics (Tamb = 20 °C) |                                   |      |          |                           |                 |                     |                     |                  |
|--|-----------------------------------|------|----------|---------------------------|-----------------|---------------------|---------------------|------------------|
| Symbol   | Parameter                         |      |          | 1                         |                 |                     |                     |                  |
| V <sub>BR</sub>                                    | Breakdown voltage                 |      |          |                           |                 |                     |                     |                  |
| I <sub>RM</sub>                                    | Leakage current @ V <sub>RM</sub> |      | $V_{RM}$ |                           |                 |                     |                     |                  |
| V <sub>RM</sub>                                    | Stand-off voltage                 |      |          | VCL VBR VRM               |                 |                     | ∨                   |                  |
| V <sub>CL</sub>                                    | V <sub>CL</sub> Clamping voltage  |      |          | T                         |                 |                     |                     | → v              |
| R <sub>d</sub>                                     | Dynamic impedance                 |      | е        |                           |                 |                     |                     |                  |
| I <sub>PP</sub>                                    | Peak pulse current                |      |          | Slope: 1 / R <sub>d</sub> |                 |                     |                     |                  |
| С  | Capacitance                       |      |          | IPP                       |                 |                     |                     |                  |
|  | V <sub>BR</sub> @ I <sub>R</sub>  |      |          | I <sub>RM</sub> @         | V <sub>RM</sub> | R <sub>d</sub>      | α <b>T</b>          | С                |
| Order code   | min.                              | max. |          | max.                      |                 | typ. <sup>(1)</sup> | max. <sup>(2)</sup> | max.<br>0 V bias |
|  | ٧                                 | V    | mA       | μΑ                        | V               | W                   | 10 <sup>-4</sup> /C | pF               |
| ESDA14V2-4BF3                                      | 14.2                              | 18   | 1        | 0.5<br>0.1                | 12<br>3         | 3.2                 | 10                  | 15               |

<sup>1.</sup> Square pulse,  $I_{pp} = 3 \text{ A}$ ,  $t_p = 2.5 \mu \text{s}$ .

<sup>2.</sup>  $\Delta V_{BR} = \alpha T^* (T_{amb} -25 \,^{\circ}C) \,^* V_{BR} (25 \,^{\circ}C)$ 

ESDA14V2-4BF3 Characteristics

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)

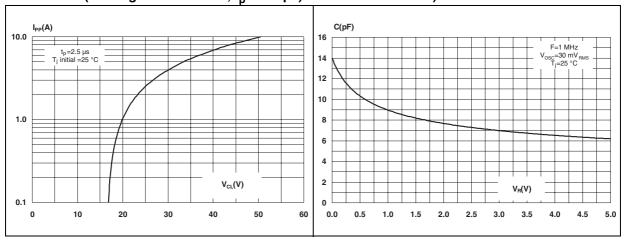


Figure 5. Relative variation of leakage current versus junction temperature (typical values)

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

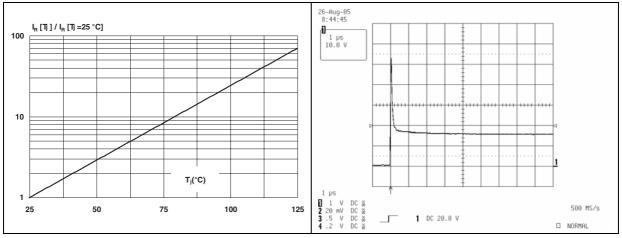
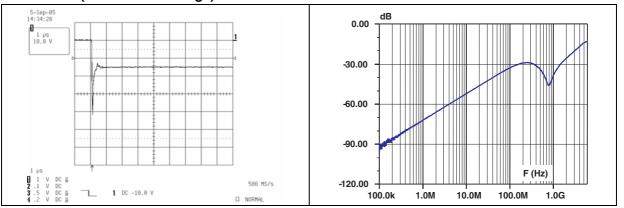


Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge)

Figure 8. Analog crosstalk measurements



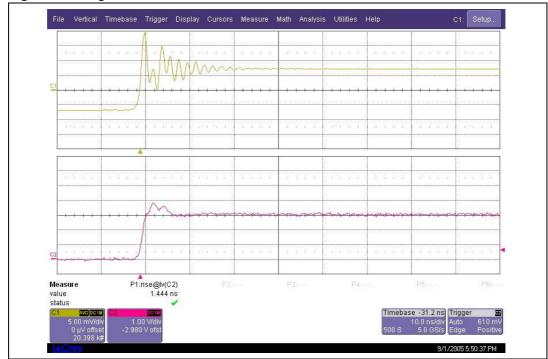
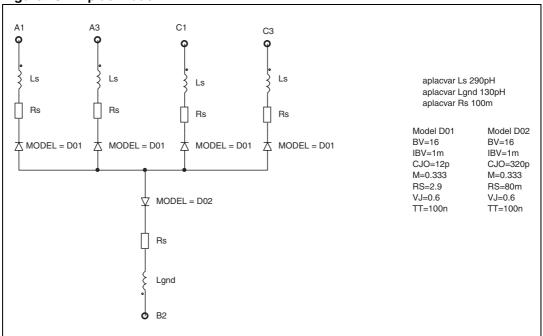


Figure 9. Digital crosstalk measurements

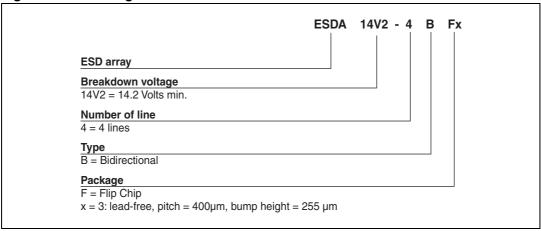
# 2 Application information





### 3 Ordering information scheme

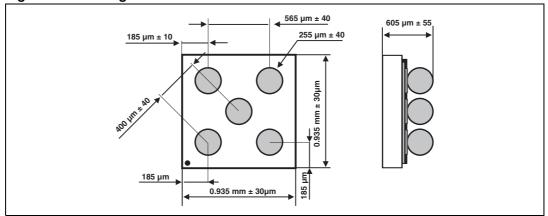
Figure 11. Ordering information scheme



### 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: <a href="www.st.com">www.st.com</a>. ECOPACK® is an ST trademark.

Figure 12. Package dimensions



Package information ESDA14V2-4BF3

Figure 13. Footprint

Figure 14. Marking

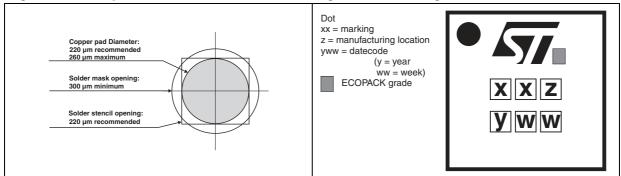
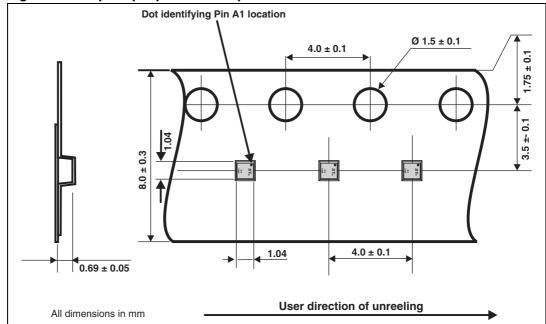


Figure 15. Flip Chip tape and reel specifications



Note:

More information is available in the application notes:

AN2348:"400 µm 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 <i>Figure 11</i> , <i>Figure 12</i> and <i>Figure 15</i> . Reformatted to current standards.  |
| 28-Jan-2010 | 4        | Added ST logo and ECOPACK grade to package and marking illustrations.  |

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