

## Quad bidirectional Transil™ array for ESD protection

### Features

- 2 bidirectional Transil functions
- ESD protection: IEC 61000-4-2 level 4
- Stand off voltage: 12 V Min.
- Low leakage current
- Very small PCB area < 1.5 mm<sup>2</sup>
- 400 microns pitch

### Complies with the following standards

- IEC 61000-4-2
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883E- Method 3015-7: class 3
  - 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

### Description

The ESDA14V2-2BF3 is a monolithic array designed to protect 2 lines against ESD transients. The device is ideal for applications where both reduced line capacitance and board space saving are required.

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

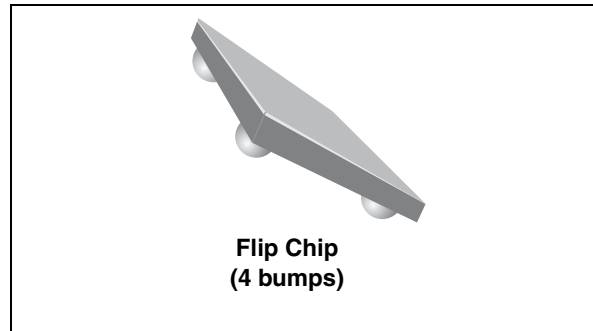


Figure 1. Pin layout (bump side)

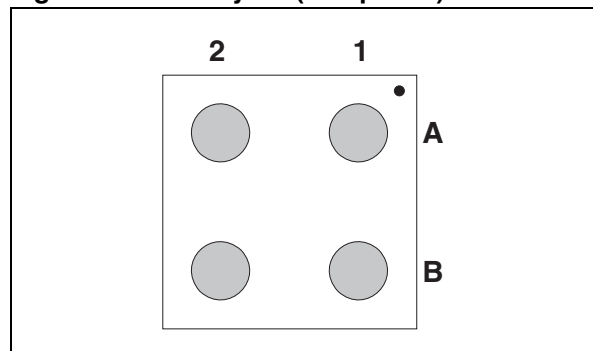
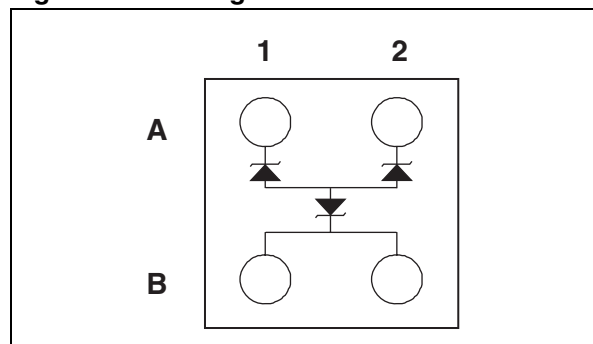


Figure 2. Configuration



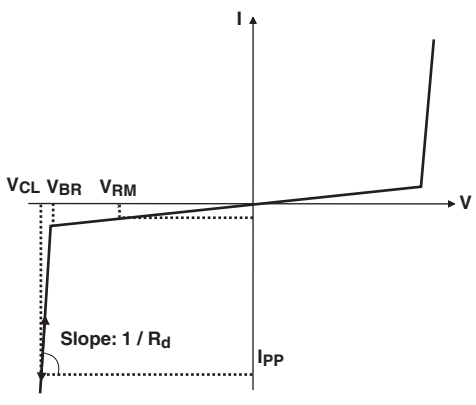
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# 1 Characteristics

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

| Symbol    | Parameter                                     | Value       | Unit |
|-----------|---|-------------|------|
| $V_{PP}$  | MIL STD 883E - Method 3015-7                  | $\pm 25$    | kV   |
|           | ESD discharge IEC 61000-4-2 air discharge     | $\pm 15$    |      |
|           | IEC 61000-4-2 contact discharge               | $\pm 8$     |      |
| $P_{PP}$  | Peak pulse power (8/20 $\mu$ s)               | 50          | W    |
| $T_j$     | Junction temperature                          | 125         | °C   |
| $T_{stg}$ | Storage temperature range                     | -55 to +150 | °C   |
| $T_L$     | Lead solder temperature (10 seconds duration) | 260         | °C   |
| $T_{op}$  | Operating temperature range                   | -40 to +125 | °C   |

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

| 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                |     |   |                                   |         |                     |                     |                  |
| αT              | Voltage temperature coefficient   |     |   |                                   |         |                     |                     |                  |
| 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.<br>0 V bias |
|                 | V                                 | V   | mA  | μA                                | V       | Ω                   | 10 <sup>-4</sup> /C | pF               |
| ESDA14V2-2BF3   | 14.2                              | 18  | 1   | 0.5<br>0.1                        | 12<br>3 | 3.2                 | 6.5                 | 12               |

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

2.  $\Delta V_{BR} = \alpha T^* (T_{amb} - 25\text{ }^{\circ}\text{C}) * V_{BR} (25\text{ }^{\circ}\text{C})$

Figure 3. Relative variation of peak pulse power versus initial junction temperature

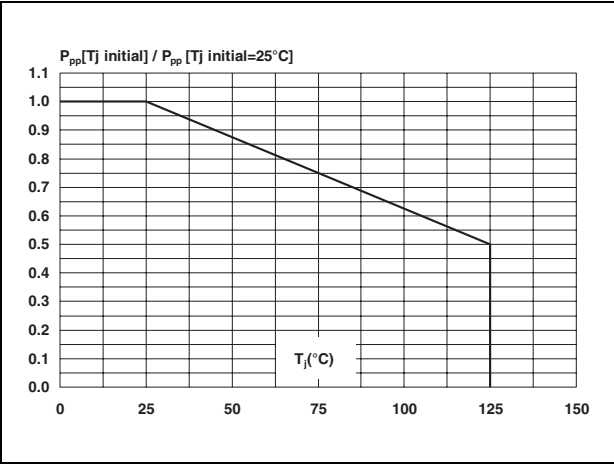


Figure 4. Peak pulse power versus exponential pulse duration

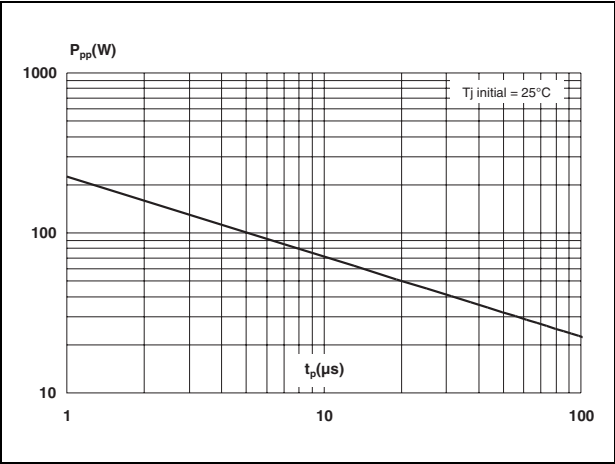


Figure 5. Clamping voltage versus peak pulse current (typical values, rectangular waveform)

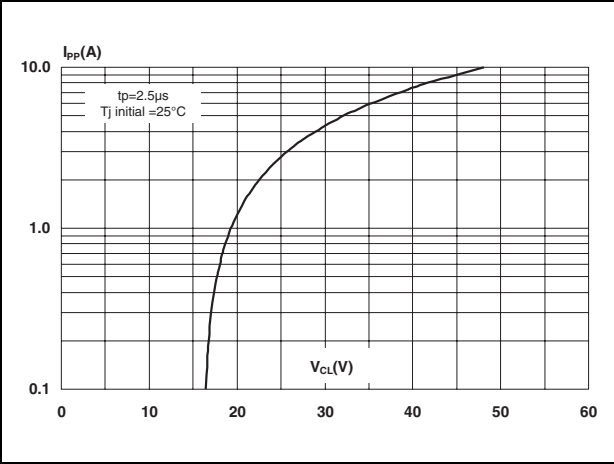


Figure 6. Junction capacitance versus reverse applied voltage (typical values)

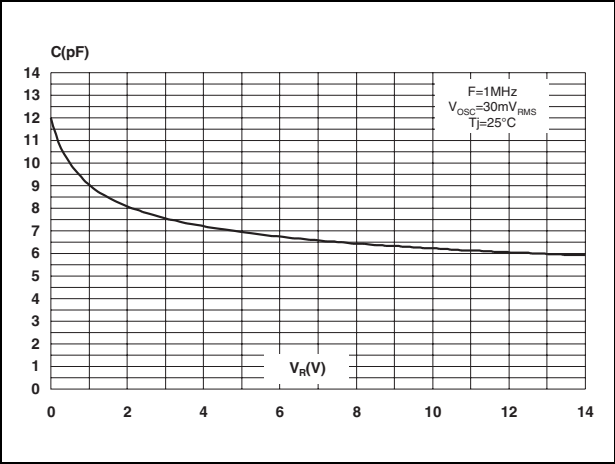


Figure 7. Relative variation of leakage current versus junction temperature (typical values)

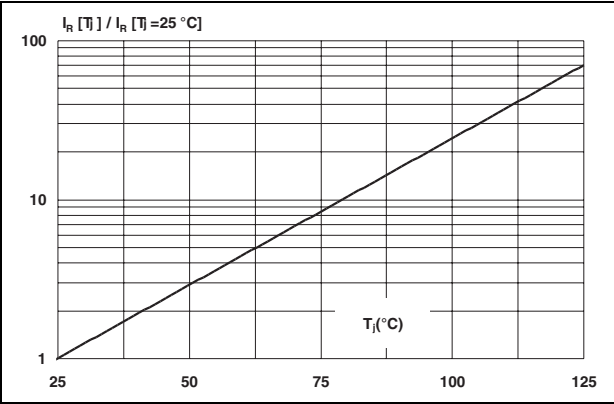


Figure 8. Analog crosstalk measurement

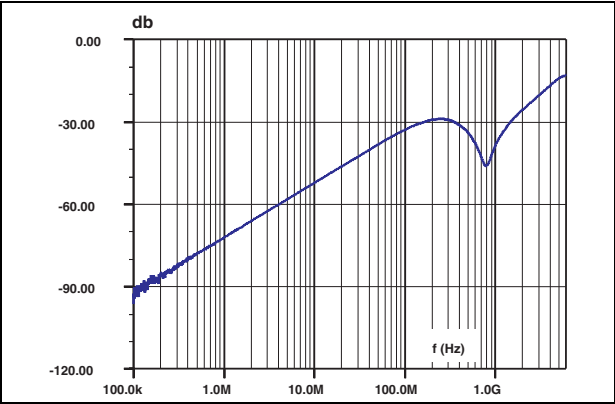


Figure 9. ESD response to IEC 61000-4-2 (+15 kV air discharge)

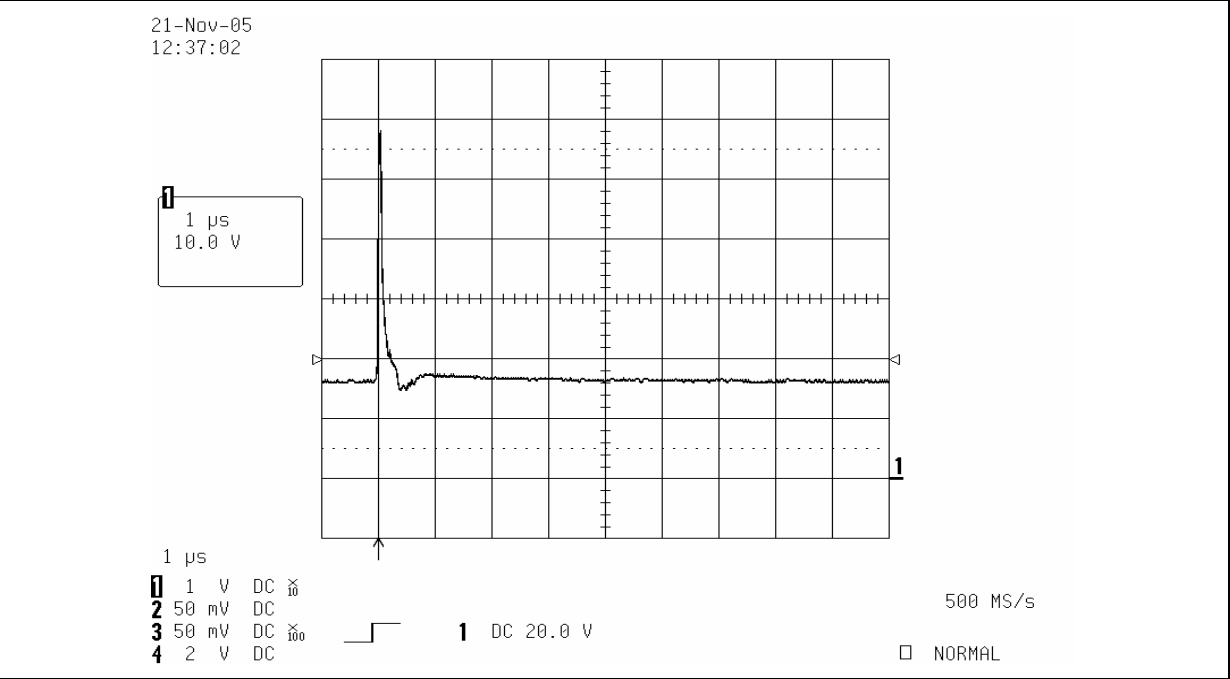


Figure 10. ESD response to IEC 61000-4-2 (-15 kV air discharge)

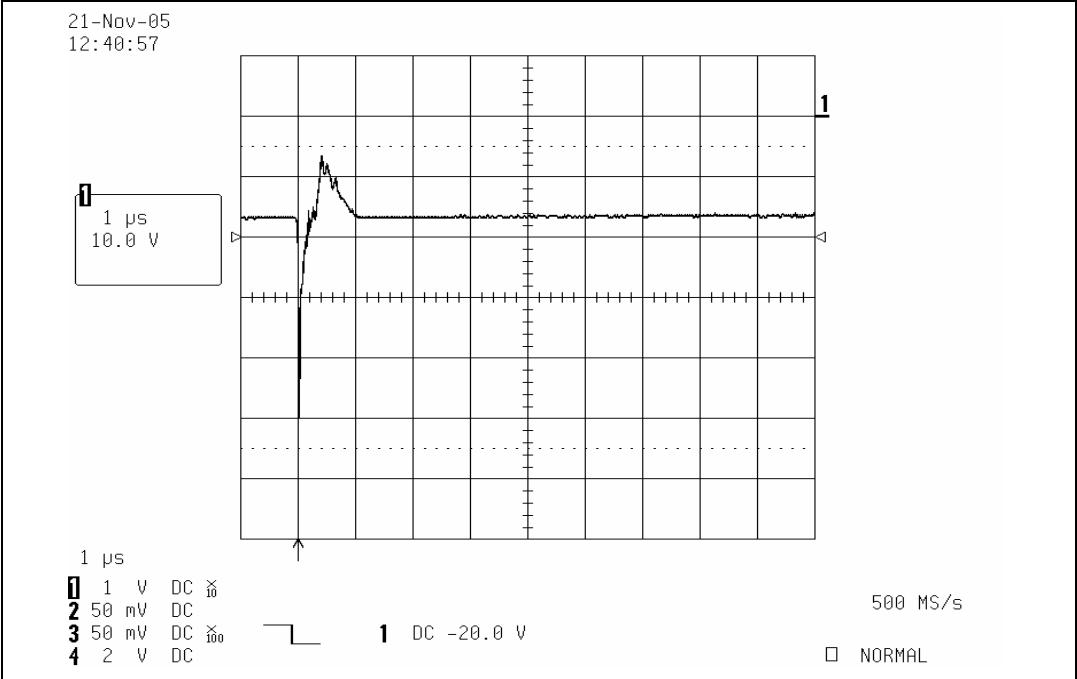
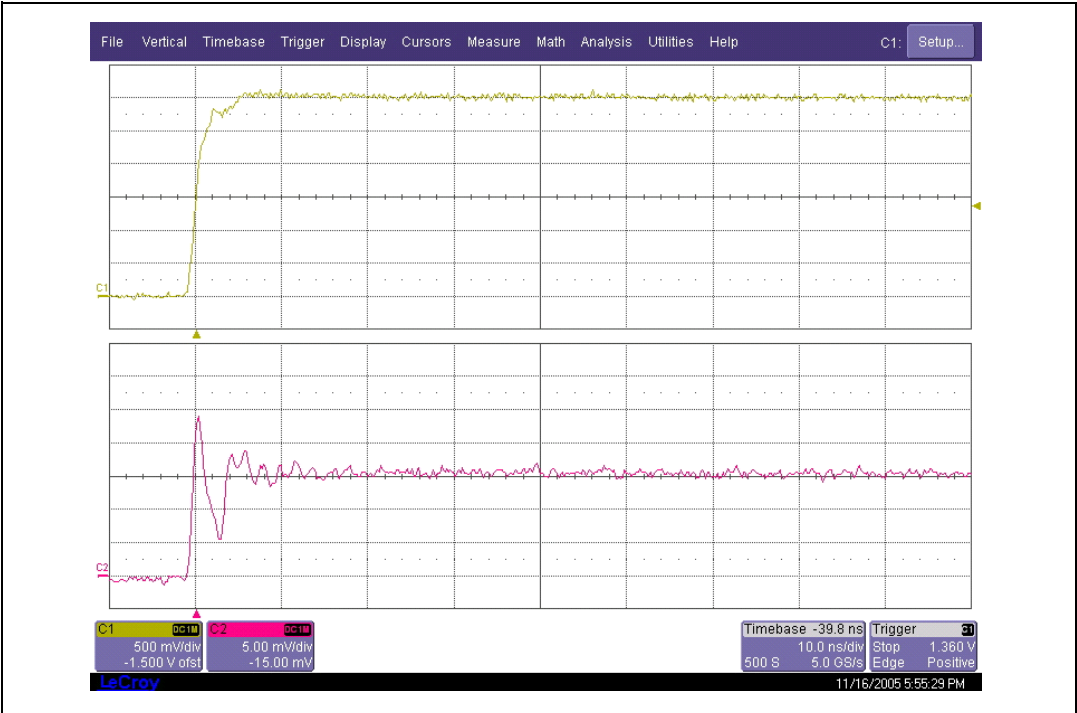
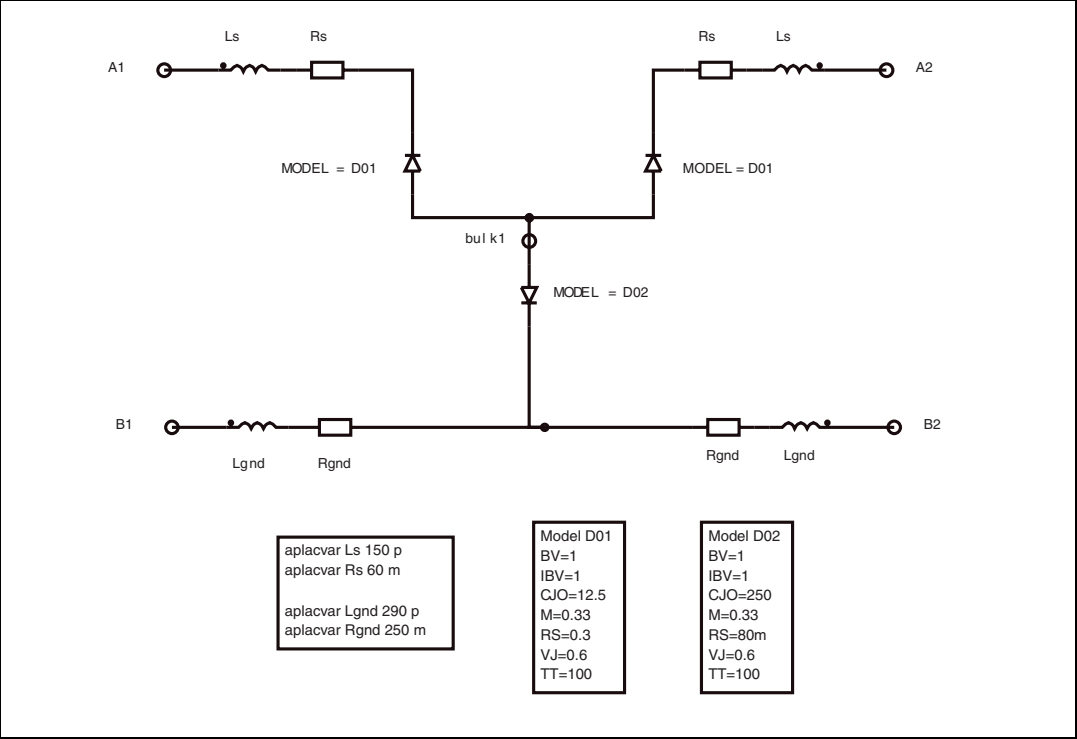


Figure 11. Digital crosstalk measurement



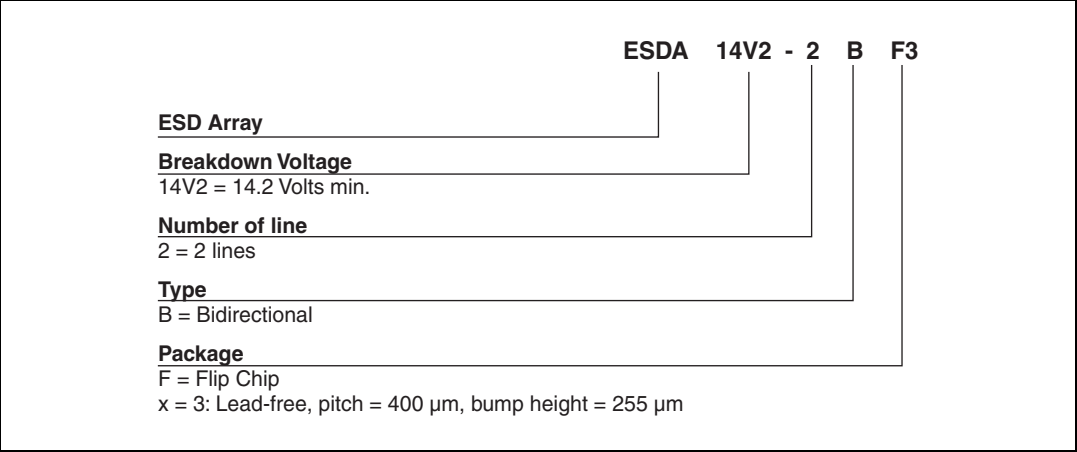
## 2 Application information

Figure 12. Aplac model



## 3 Ordering information scheme

Figure 13. Ordering information scheme



# 4 Package information

In order to meet environmental requirements, ST offers these devices in ECOPACK<sup>®</sup> packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked 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](http://www.st.com).

Figure 14. Package dimensions

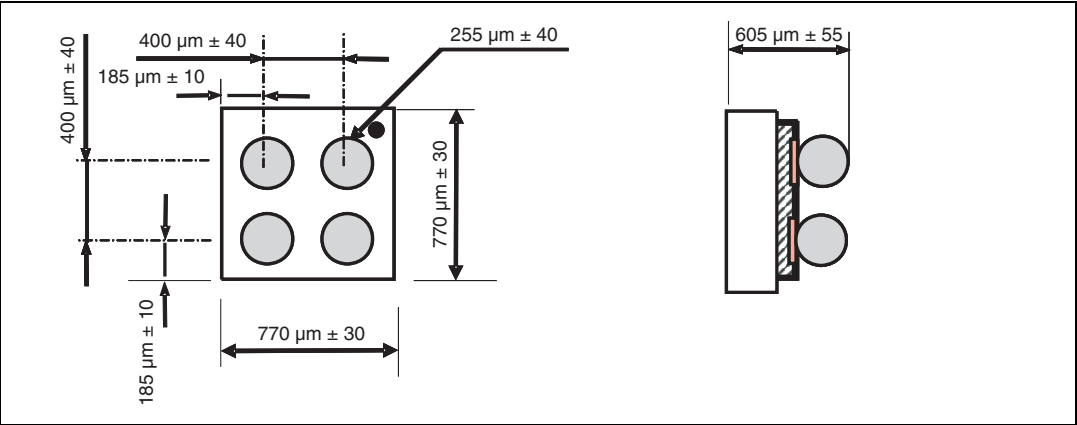


Figure 15. Footprint

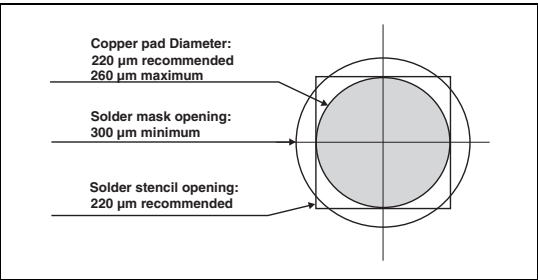
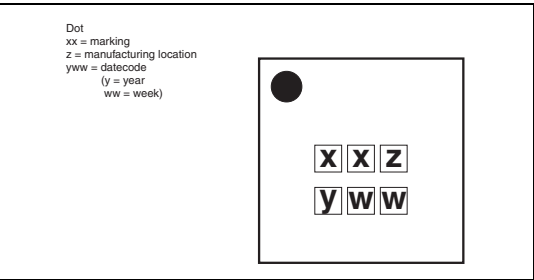


Figure 16. Marking



Dot identifying Pin A1 location

$4 \pm 0.1$

$\varnothing 1.5 \pm 0.1$

$1.75 \pm 0.1$

$3.5 \pm 0.1$

$8 \pm 0.3$

$0.71 \pm 0.05$

$0.87$

$0.87$

$4 \pm 0.1$

User direction of unreeing

All dimensions in mm

## 5 Ordering information

| Order code    | Marking | Package   | Weight  | Base qty | Delivery mode    |
|---------------|---------|-----------|---------|----------|------------------|
| ESDA14V2-2BF3 | EG      | Flip Chip | 0.79 mg | 5000     | Tape and reel 7" |

## 6 Revision history

| Date        | Revision | Changes  |
|-------------|----------|--|
| 02-Dec-2005 | 1        | Initial release.   |
| 15-Dec-2005 | 2        | Ordering information changed.  |
| 29-Apr-2008 | 3        | Updated ECOPACK statement. Updated <i>Figure 13</i> and <i>Figure 17</i> . Reformatted to current standards. |



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