ESDA18-1F2

Transil™, transient voltage suppressor

Features

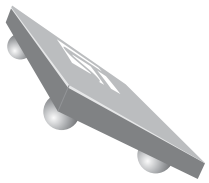
- Stand-off voltage 16V
- Unidirectional device
- Low clamping factor V_{CL}/V_{BR}
- Fast response time
- Very thin package: 0.65 mm

Complies with the following standards

- IEC 61000-4-2 Level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)

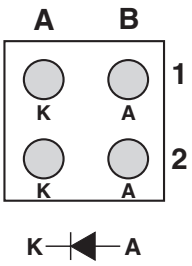
Description

The ESDA18-1F2 is a single line Transil diode designed specifically for the protection of integrated circuits into portable equipment and miniaturized electronics devices subject to ESD and EOS transient overvoltages.



Flip Chip
(4 bumps)

Figure 1. Pin configuration (bump side)



TM: Transil is a trademark of STMicroelectronics.

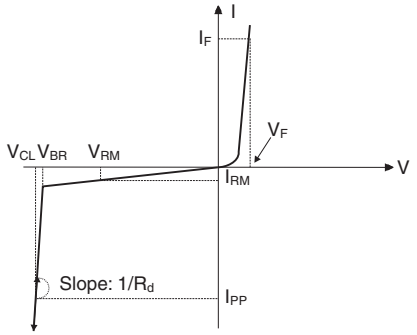
1 Characteristics

Table 1. Absolute ratings (limiting value, per diode)

Symbol	Parameter and test conditions		Value	Unit
P_{PP}	Peak pulse power dissipation 10 / 1000 µs pulse	T_j initial = T_{amb}	100	W
	Peak pulse power dissipation 8 / 20 µs pulse		700	
I_{FSM}	Non repetitive surge peak forward current	t_p=10 ms T_j initial = T_{amb}	8	A
T_j	Maximum operating junction temperature		125	°C
T_{stg}	Storage temperature range		- 65 to + 175	°C

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

Symbol	Parameter
V_{BR}	Breakdown voltage
I_{RM}	Leakage current
V_{RM}	Stand-off voltage
V_{CL}	Clamping voltage
R_d	Dynamic impedance
I_{PP}	Peak pulse current
C	Capacitance



Order number	V_{BR} min.	V_{BR} max.	I_R	I_{RM} max.	V_{RM}	V_{CL} max.	I_{PP} (1)	V_F (2) max. I_F = 850 mA	αT max.	C typ. V_R=0 V
	V	V	mA	µA	V	V	A	V	10^{-4}/°C	pF
ESDA18-1F2	16	18	1	0.5	10	20	1	1.3	8.5	230

1. 8 / 20 µs pulse waveform.
2. A DC current is not recommended for more than 5 sec. Even if Transil failure mode is short circuit the bumps could exceed melting temperature and the component disassembled from the board.

Figure 2. Relative variation of peak pulse power versus initial junction temperature

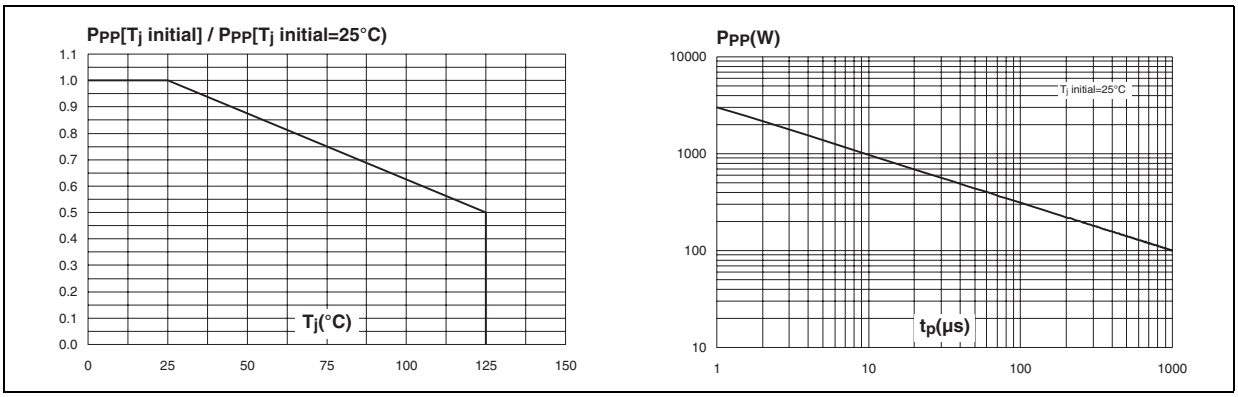


Figure 3. Peak pulse power versus exponential pulse duration

Figure 4. Clamping voltage versus peak pulse current (typical values, exponential waveform)

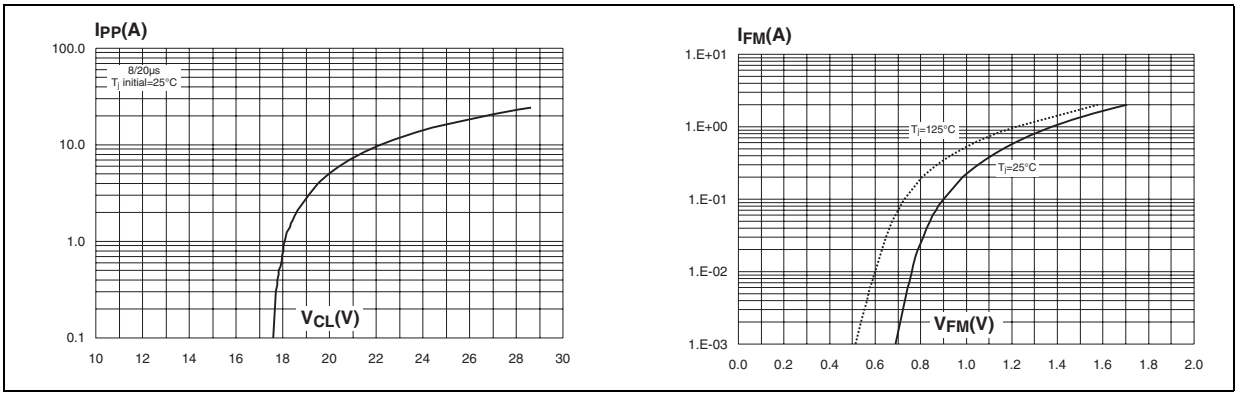


Figure 5. Forward voltage drop versus peak forward current (typical values)

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

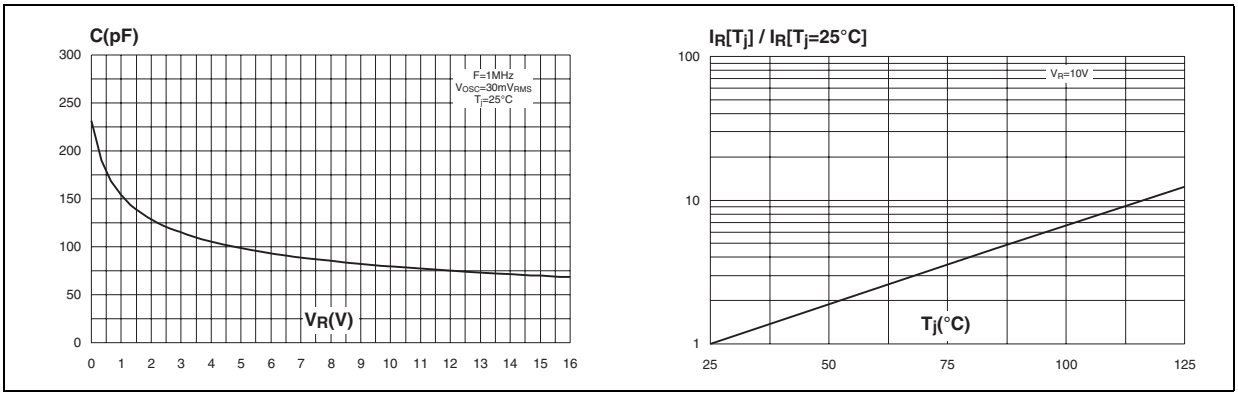


Figure 7. Relative variation of leakage current versus junction temperature (typical values)

2 Application information

One major point is that the ESDA18-1F2 has to ensure the safety during reverse battery operation. Indeed, during this operation the device must clamp the DC reverse voltage below 1.3 V @ 0.85 A (max current). Thus reverse battery operation has been simulated by inverting the polatrity of the Transil (please see figures 8 and 9)

Figure 8. Reverse battery operation setup

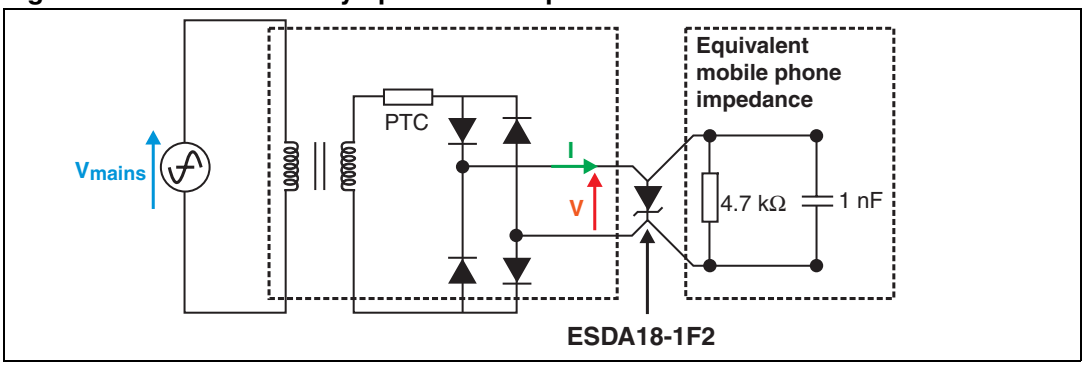
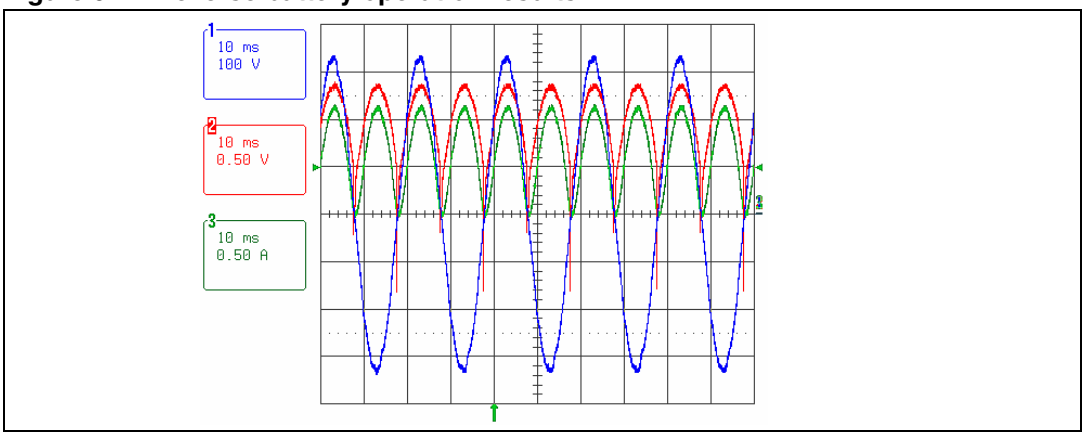


Figure 9. Reverse battery operation results



A short calculation based on Reverse battery operation results figures clearly show that in such real phone application the ESDA18-1F2 clamp the DC voltage below 1.3 V.

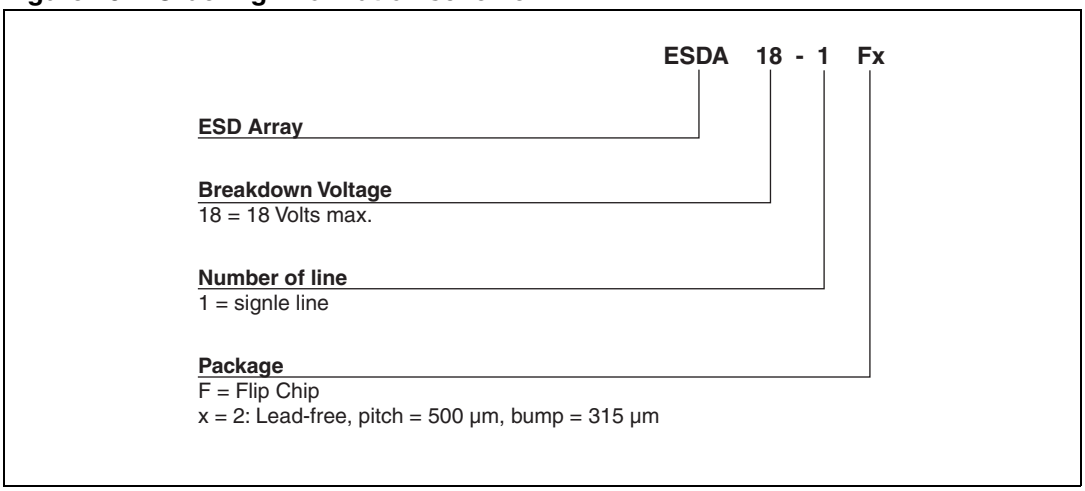
Typically the ESDA18-1F2 can clamp the DC voltage @ 0.9 V @ 0.76 A DC current:

$$V_{DC} = \frac{2 \times V_{max}}{\Pi} \approx \frac{2 \times 1.4}{3.14} \approx 0.9V$$

$$I_{DC} = \frac{2 \times I_{max}}{\Pi} \approx \frac{2 \times 1.2}{3.14} \approx 0.76A$$

3 Ordering information scheme

Figure 10. Ordering information scheme



4 Packing information

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 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*.

Figure 11. Flip Chip package dimensions

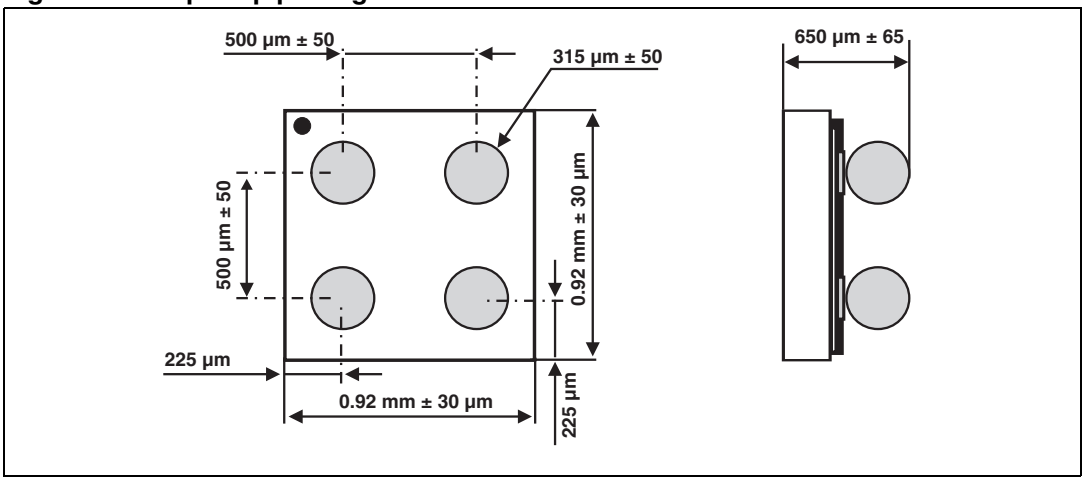


Figure 12. Footprint recommendations **Figure 13. Marking**

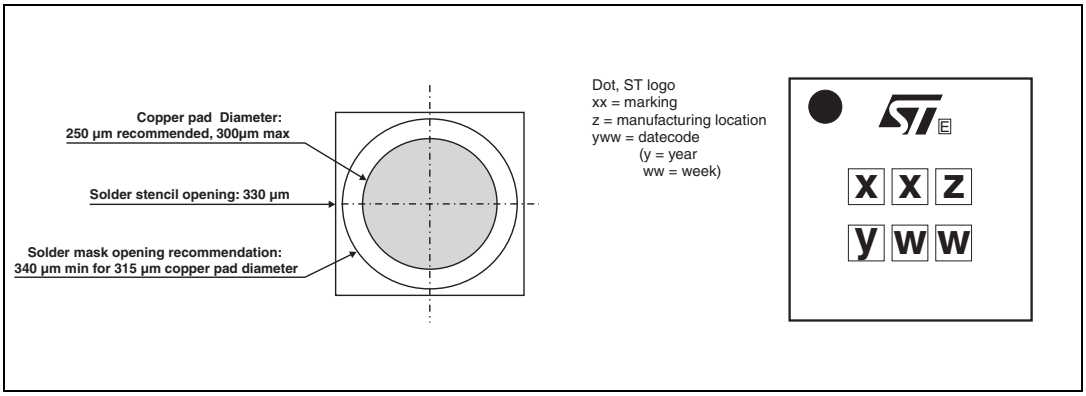
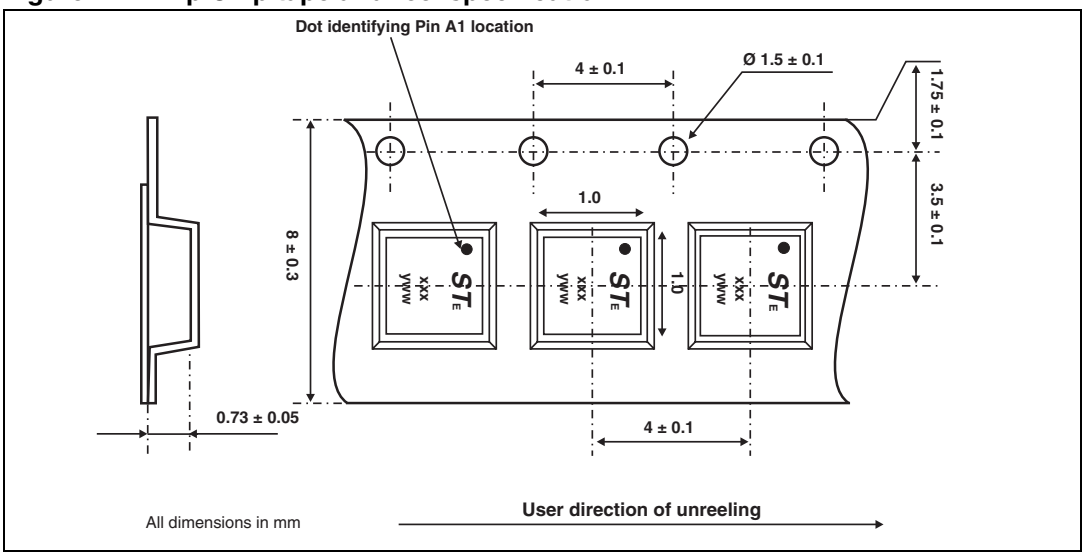


Figure 14. Flip Chip tape and reel specification



Note: More packing information is available in the application notes:

AN1235: "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
ESDA18-1F2	EE	Flip Chip	1.25 mg	5000	Tape and reel 7”

6 Revision history

Table 4. Document revision history

Date	Revision	Changes
09-May-2005	1	First issue.
18-Apr-2008	2	Updated ECOPACK statement. Updated *Figure 11*, *Figure 13*, and *Figure 14*. Reformatted to current standards.

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