

## Low forward voltage Transil™, transient voltage suppressor

### Features

- Low forward voltage: 1.05 V @ 850 mA
- Peak pulse power (8/20 μs): 350 W
- Very low clamping factor  $V_{CL}/V_{BR}$
- Unidirectional device
- Fast response time
- Very thin package: 0.605 mm
- RoHS compliant

### Complies with the following standards:

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

### Description

The LFTVS7-1F3 is a single line diode designed specifically for the protection of integrated circuits in portable equipment and miniaturized electronics devices subject to ESD and EOS transient overvoltages.

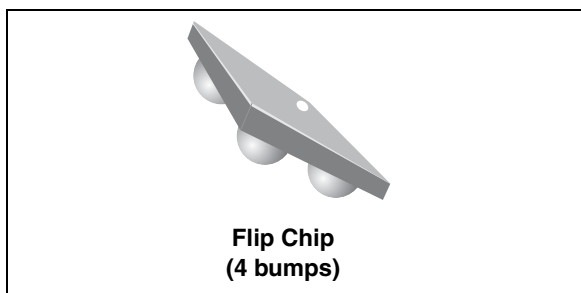


Figure 1. Pin configuration (bump side)

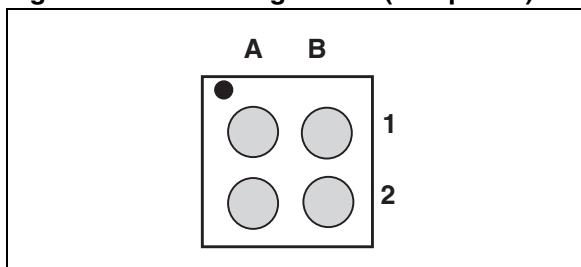
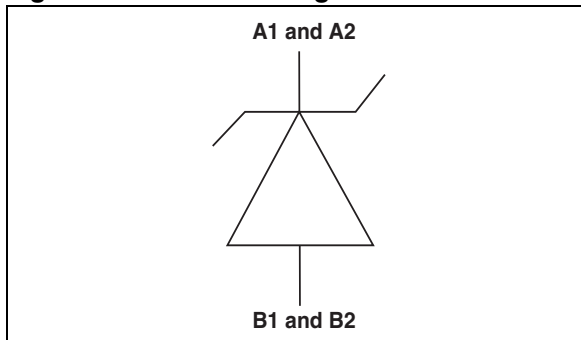


Figure 2. Device configuration



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# 1 Characteristics

**Table 1. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

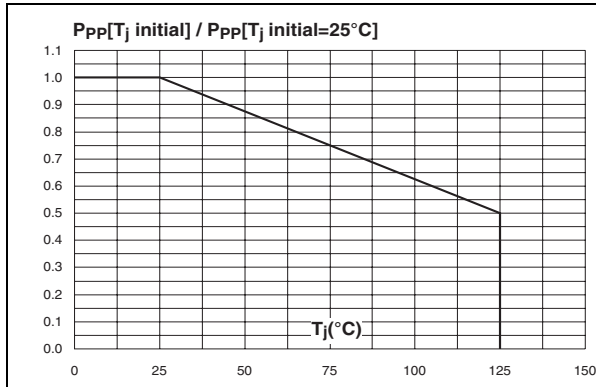
| Symbol    | Parameter  | Test condition  | Value       | Unit               |
|-----------|--|---|-------------|--------------------|
| $P_{PP}$  | Peak pulse power dissipation (10/1000 $\mu\text{s}$ pulse) | $T_j \text{ initial} = T_{amb}$                         | 75          | W                  |
|           | Peak pulse power dissipation (8/20 $\mu\text{s}$ pulse)    |   | 350         |                    |
| $I_{FSM}$ | Non repetitive surge peak forward current                  | $t_p = 10\text{ ms}$<br>$T_j \text{ initial} = T_{amb}$ | 11          | A                  |
| $T_j$     | Maximum operating junction temperature                     |   | 125         | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage temperature range                                  |   | -55 to +150 | $^{\circ}\text{C}$ |

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

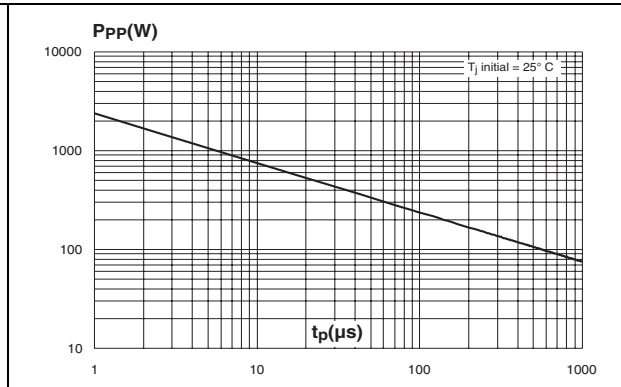
| Symbol     | Parameter  |   |     |      |                            |
|------------|--|---|-----|------|----------------------------|
| $V_{BR}$   | Breakdown voltage  |   |     |      |                            |
| $I_{RM}$   | Leakage current @ $V_{RM}$                                   |   |     |      |                            |
| $V_{RM}$   | Stand-off voltage  |   |     |      |                            |
| $V_{CL}$   | Clamping voltage   |   |     |      |                            |
| $R_d$      | Dynamic impedance  |   |     |      |                            |
| $I_{PP}$   | Peak pulse current   |   |     |      |                            |
| $\alpha T$ | Voltage temperature coefficient                              |   |     |      |                            |
| $V_F$      | Forward voltage drop   |   |     |      |                            |
| Symbol     | Test conditions  |   |     |      |                            |
| $V_{BR}$   | $I_R = 15\text{ mA}$   | 7 |     |      | V                          |
| $I_{RM}$   | $V_{RM} = 5.5\text{ V}$                                      |   |     | 500  | nA                         |
| $V_{CL}$   | $I_{PP} = 1\text{ A}^{(1)}$                                  |   |     | 10   | V                          |
| $V_F$      | $I_F = 850\text{ mA}$  |   |     | 1.05 | V                          |
| $\alpha T$ |  |   |     | 6    | $10^{-4}/^{\circ}\text{C}$ |
| $C_{line}$ | $V_R = 0\text{ V}, V_{OSC} = 30\text{ mV}, F = 1\text{ MHz}$ |   | 320 |      | pF                         |

1. 8 / 20  $\mu\text{s}$  pulse waveform

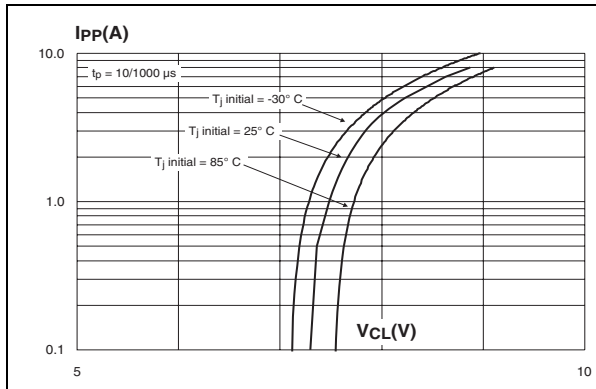
**Figure 3. Relative variation of peak pulse power versus initial junction temperature**



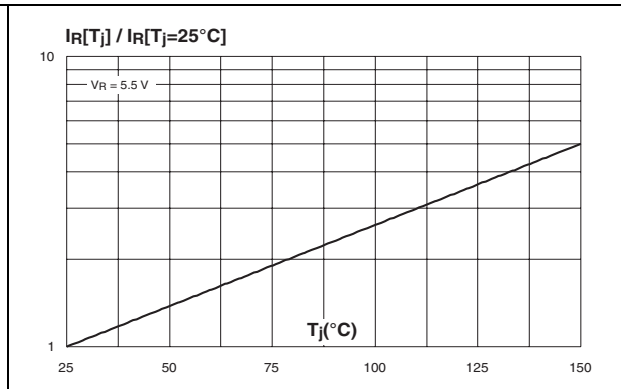
**Figure 4. Peak pulse power versus exponential pulse duration (typical value)**



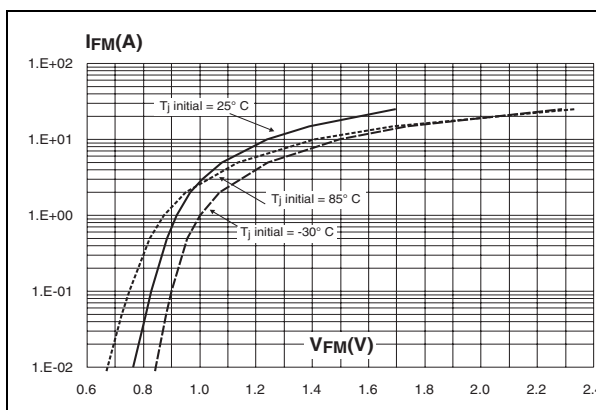
**Figure 5. Clamping voltage versus peak pulse current (typical values)**



**Figure 6. Relative variation of leakage current versus junction temperature (typical values)**



**Figure 7. Forward voltage drop versus peak forward current (typical values)**



**Figure 8. Junction capacitance versus reverse voltage applied (typical values)**

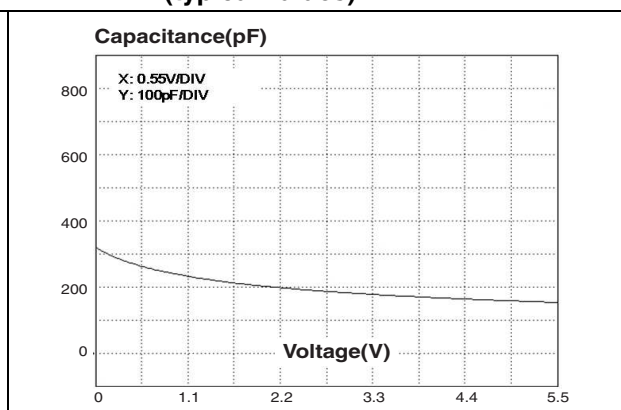


Figure 9. Breakdown voltage versus initial junction temperature (typical value)

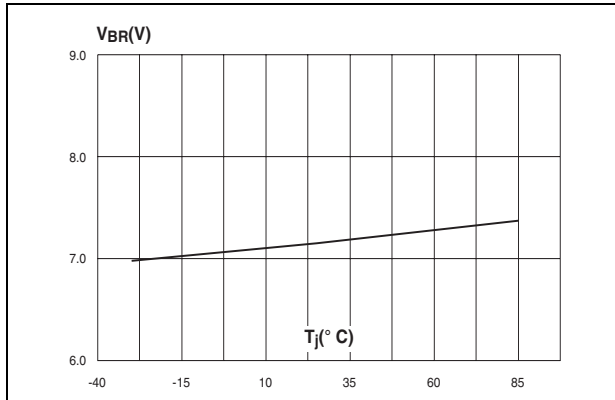


Figure 10. Frequency response

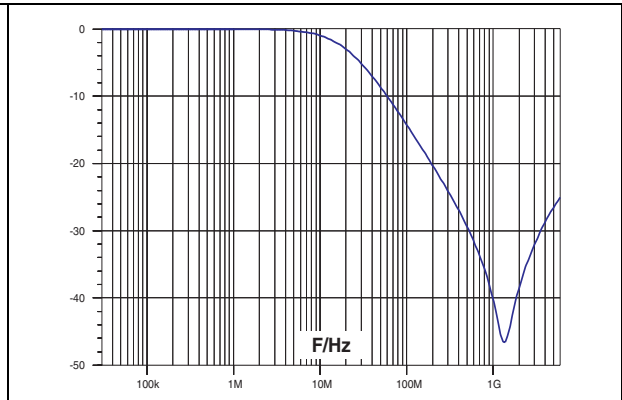


Figure 11. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

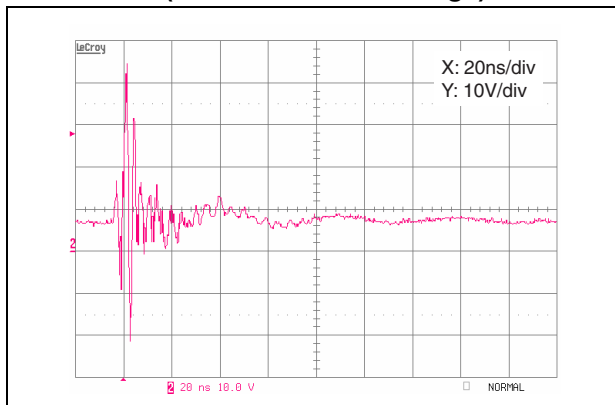
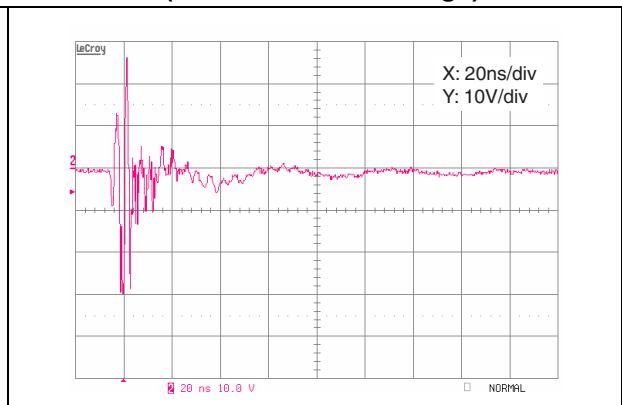
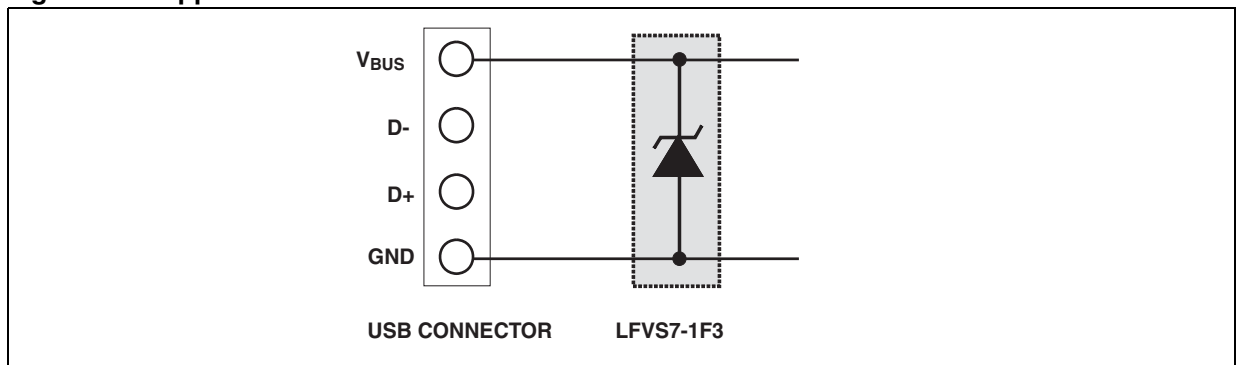


Figure 12. ESD response to IEC 61000-4-2 (-8 kV contact discharge)



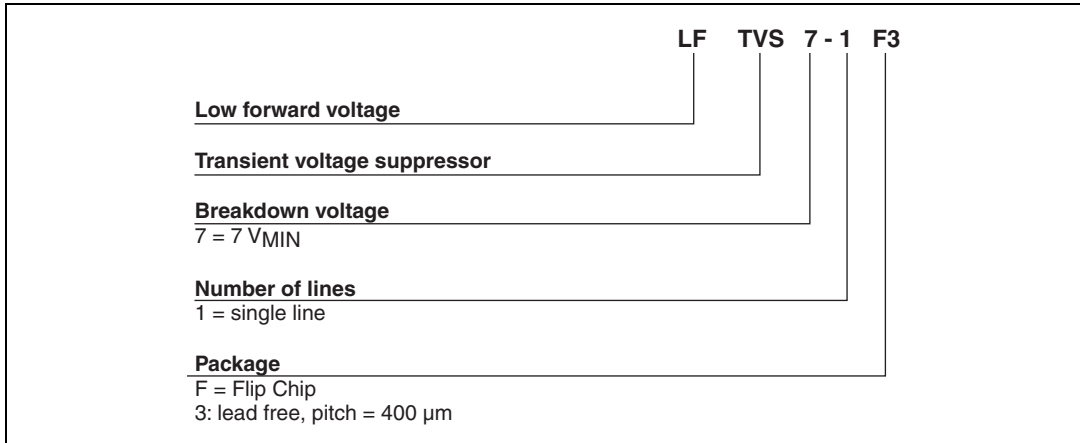
## 2 Application information

Figure 13. Application schematic



### 3 Ordering information scheme

Figure 14. 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 15. Flip Chip dimensions

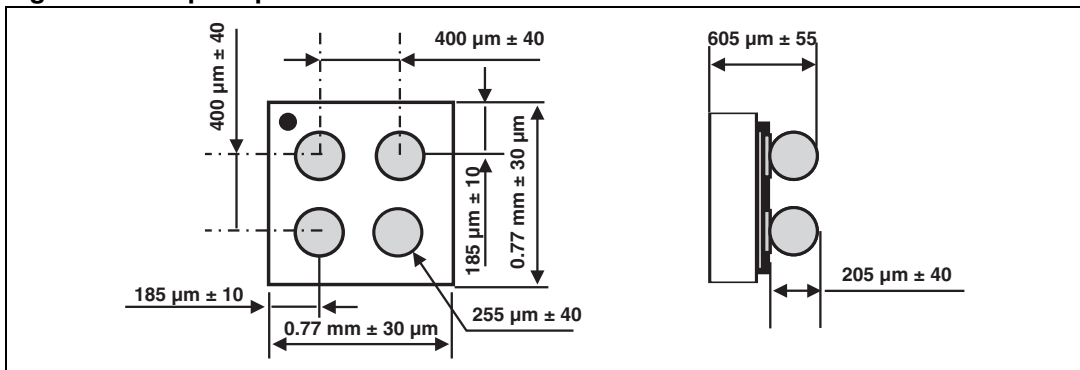


Figure 16. Foot print recommendations Figure 17. Marking

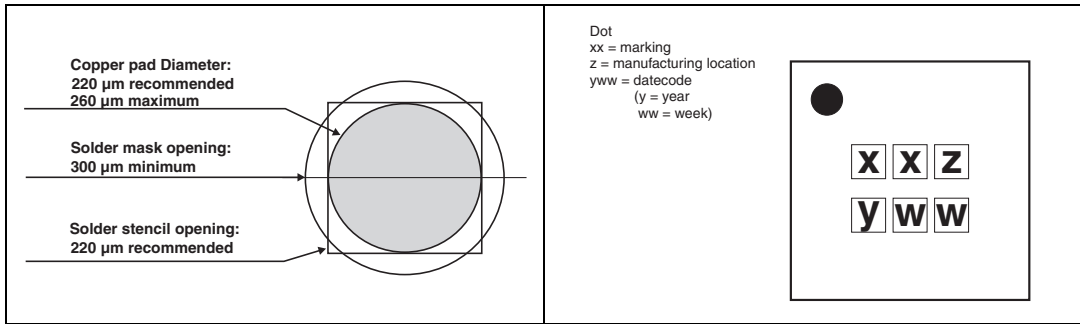
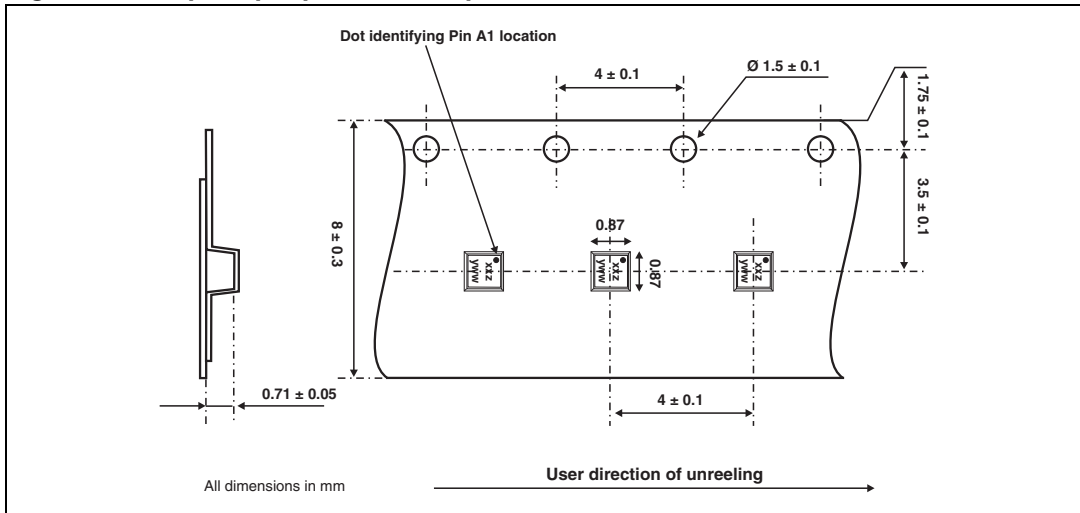


Figure 18. Flip Chip tape and reel specifications



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      |
|------------|---------|-----------|---------|----------|--------------------|
| LFTVS7-1F3 | EJ      | Flip Chip | 0.86 mg | 5000     | Tape and reel (7") |

## 6 Revision history

Table 4. Document revision history

| Date        | Revision | Changes  |
|-------------|----------|--|
| 01-Mar-2007 | 1        | Initial release.   |
| 16-Apr-2008 | 2        | Updated ECOPACK statement. Updated <a href="#">Figure 14</a> , and <a href="#">Figure 15</a> . Reformatted to current standards. Changed $V_F$ from 1.2 to 1.05 V. |

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