

Features

- Packaged in lead-free Flip Chip
- Very low resistance: 0.35 Ω
- High attenuation: -45 dB at 900 MHz
- Very low PCB space consumption: 0.89 mm x 1.26 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression IEC6 1000-4-2 level 4
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging

Complies with the following standards

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

Application

- Mobile phones

Description

The EMIF02-SPK02F2 chip is a highly integrated device designed to suppress EMI/RFI noise for interface line filtering.

The EMIF02-SPK02F2 flip-chip packaging means the package size is equal to the die size. That's why the EMIF02-SPK02F2 is a very small device.

Additionally, this filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 30 kV.

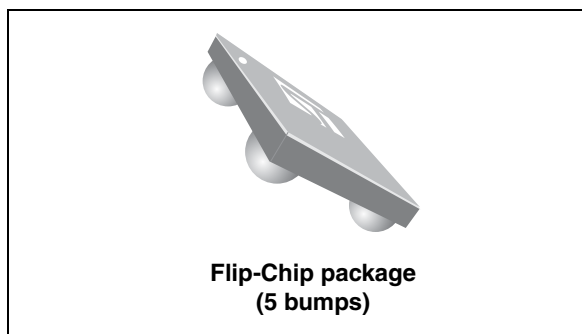


Figure 1. Pin configuration (bump side)

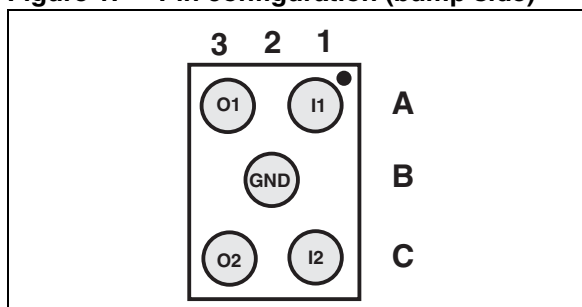
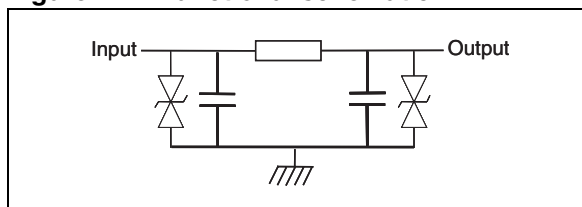


Figure 2. Functional schematic



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1 Characteristics

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

| Symbol | Parameter | Value | Unit |
|-----------|---------------------------------|--------------|------|
| V_{PP} | ESD discharge IEC 61000-4-2 | | |
| | Air discharge | 30 | kV |
| | Contact discharge | 30 | |
| I_{SPK} | Maximum rms current per channel | 350 | mA |
| T_j | Junction temperature range | -30 to 125 | °C |
| T_{stg} | Storage temperature range | -55 to + 150 | °C |

Figure 3. Electrical characteristics - definitions

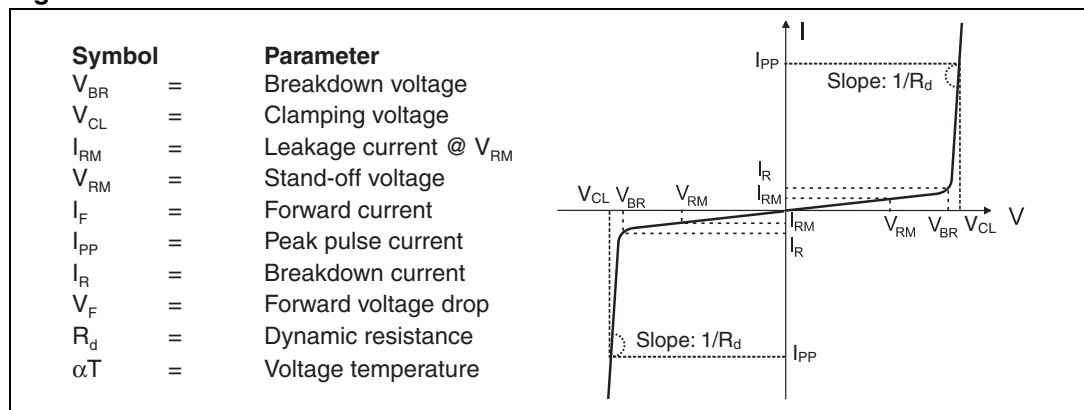


Table 2. Electrical characteristics - values ($T_{amb} = 25\text{ °C}$)

| Symbol | Test conditions | Min | Typ | Max | Unit |
|------------|---|-----|------|-----|----------|
| V_{BR} | $I_R = 1\text{ mA}$ | 6 | | | V |
| I_{RM} | $V_{RM} = 3\text{ V}$ | | | 400 | nA |
| $R_{I/O}$ | | | 0.35 | 0.8 | Ω |
| C_{LINE} | $V_R = 0\text{ V DC}, 1\text{ MHz}$ | 185 | 250 | 315 | pF |
| F_c | Cut-off frequency: $Z_{SOURCE} = Z_{LOAD} = 50\ \Omega$ | | 20 | | MHz |

Figure 4. Attenuation measurements versus frequency

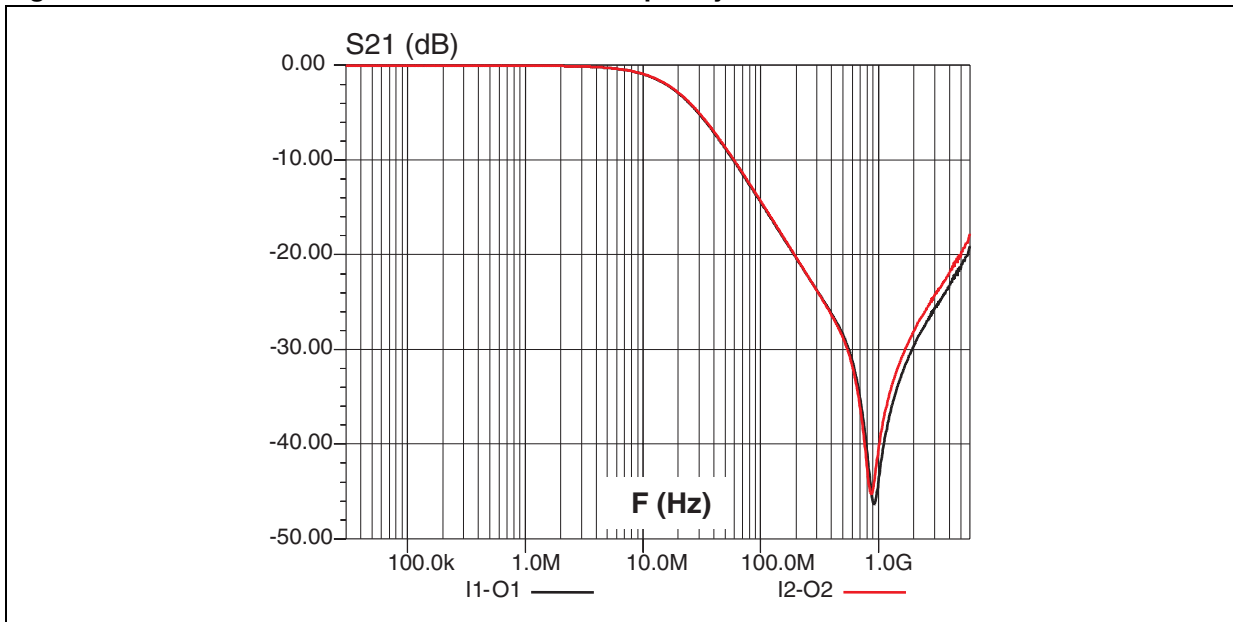


Figure 5. Crosstalk measurements versus frequency

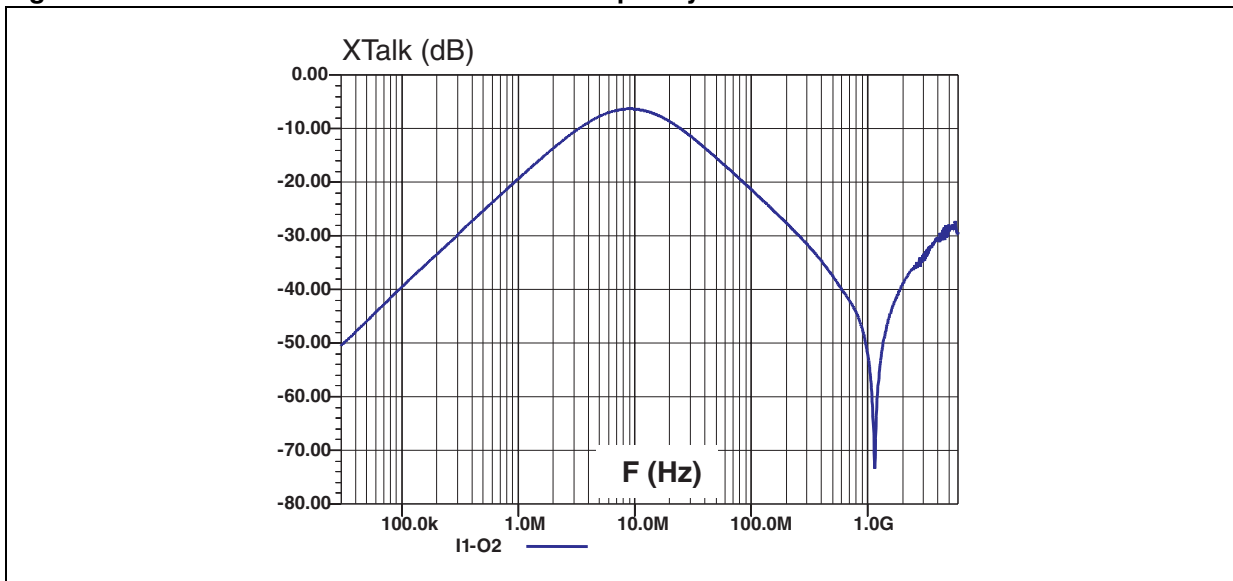


Figure 6. ESD test conditions

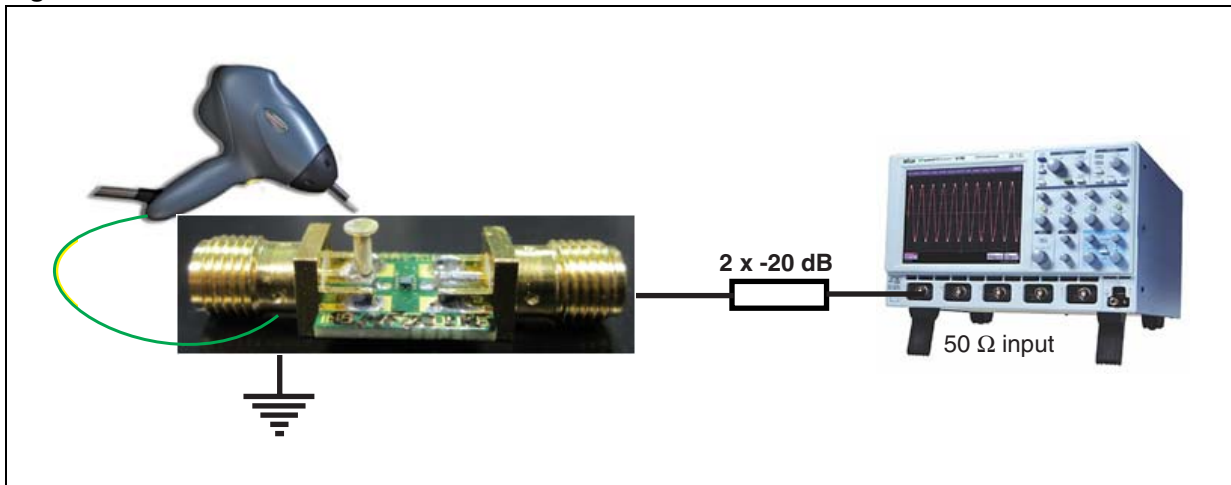
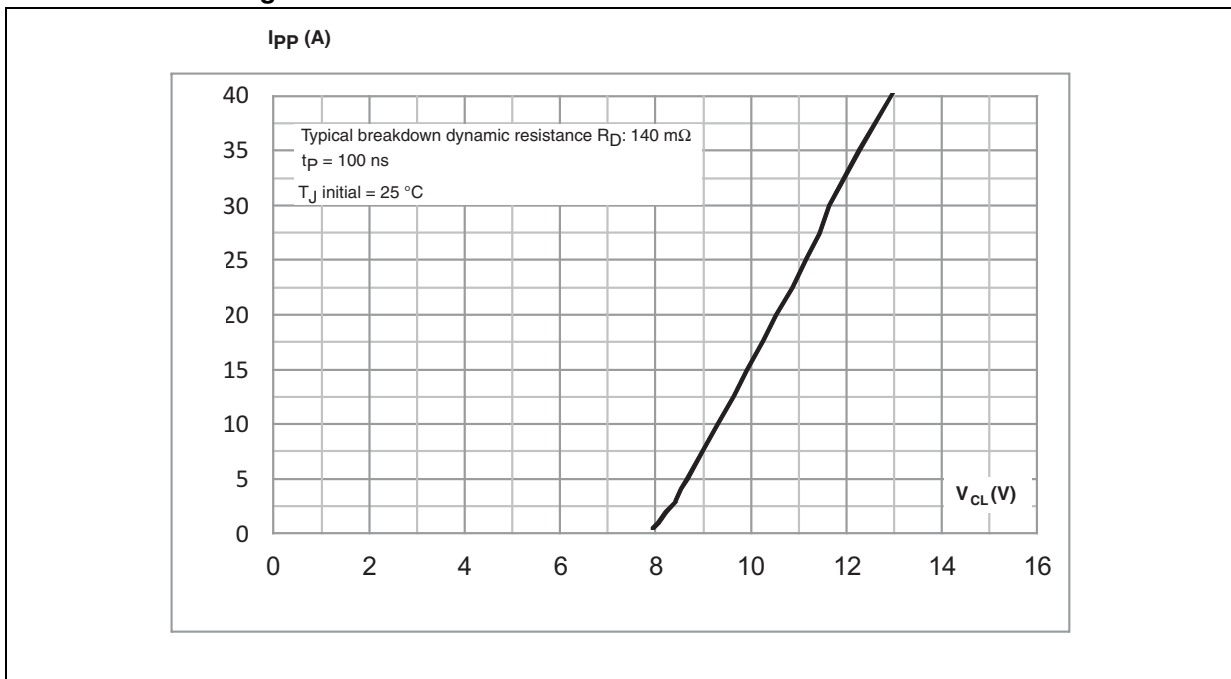


Figure 7. Clamping voltage V_{CL} versus peak pulse current I_{PP} for short pulse duration such as ESD surges



Note: For further information on the dynamic characteristic see the STMicroelectronics' application note AN4022, "TVS short pulse R_D measurement and correlation with TVS clamping voltage during ESD".

Figure 8. Output filter ESD response to IEC 61000-4-2 (+8 kV contact discharge) I1 to O1

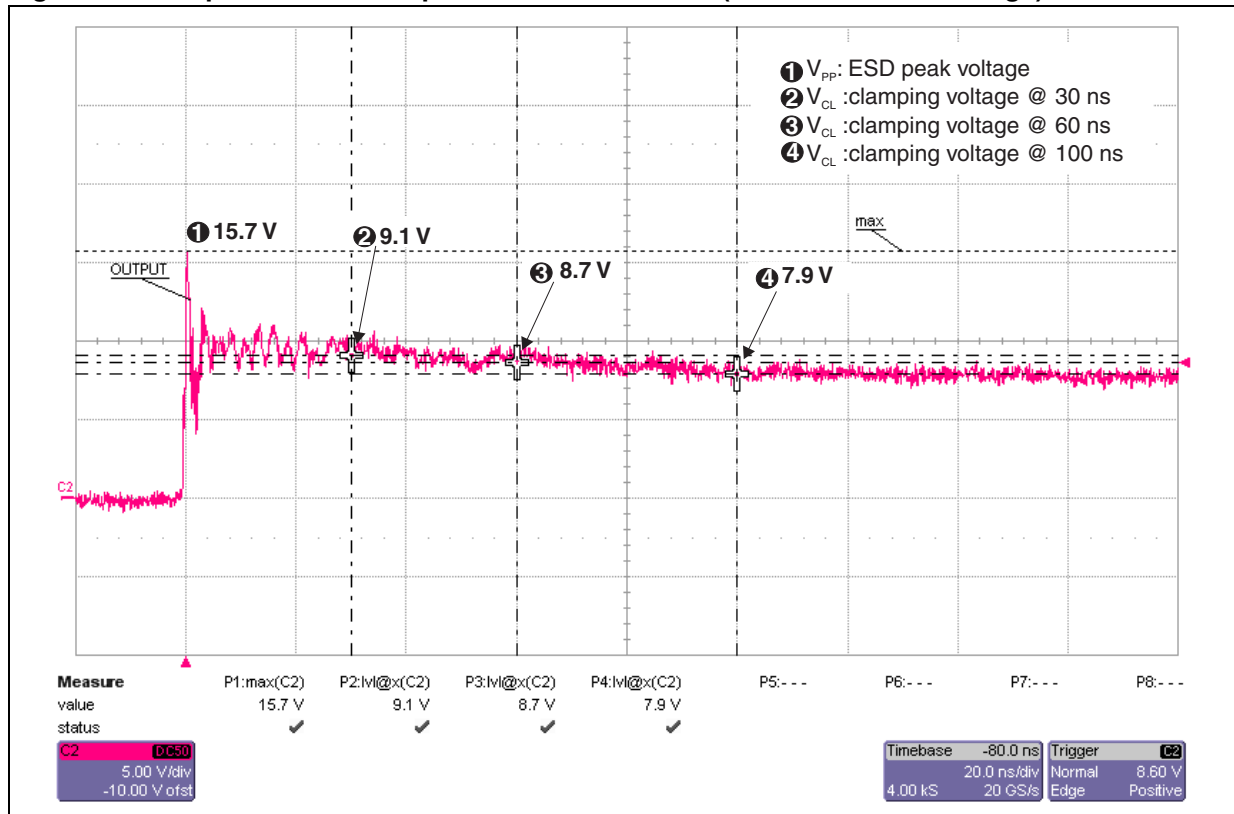


Figure 9. Output filter ESD response to IEC 61000-4-2 (-8 kV contact discharge) I1 to O1

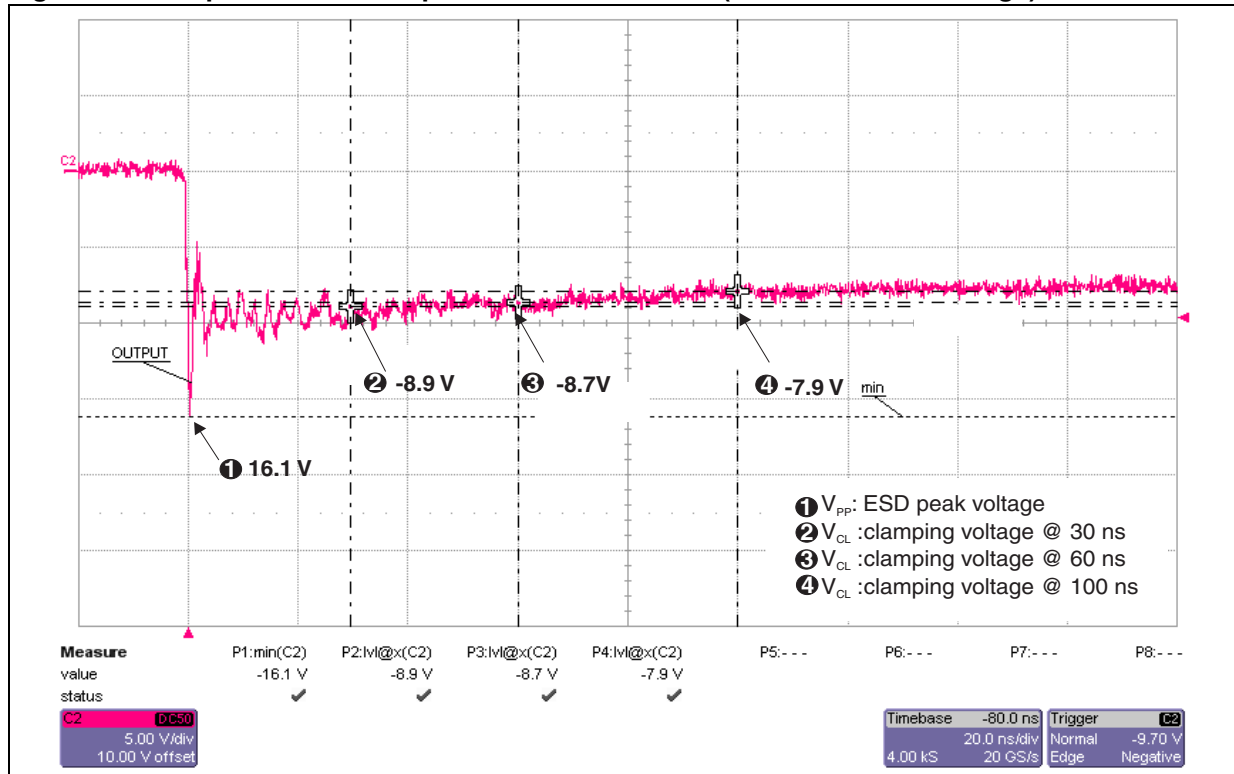


Figure 10. Output filter ESD response to IEC 61000-4-2 (+15 kV contact discharge) I1 to O1

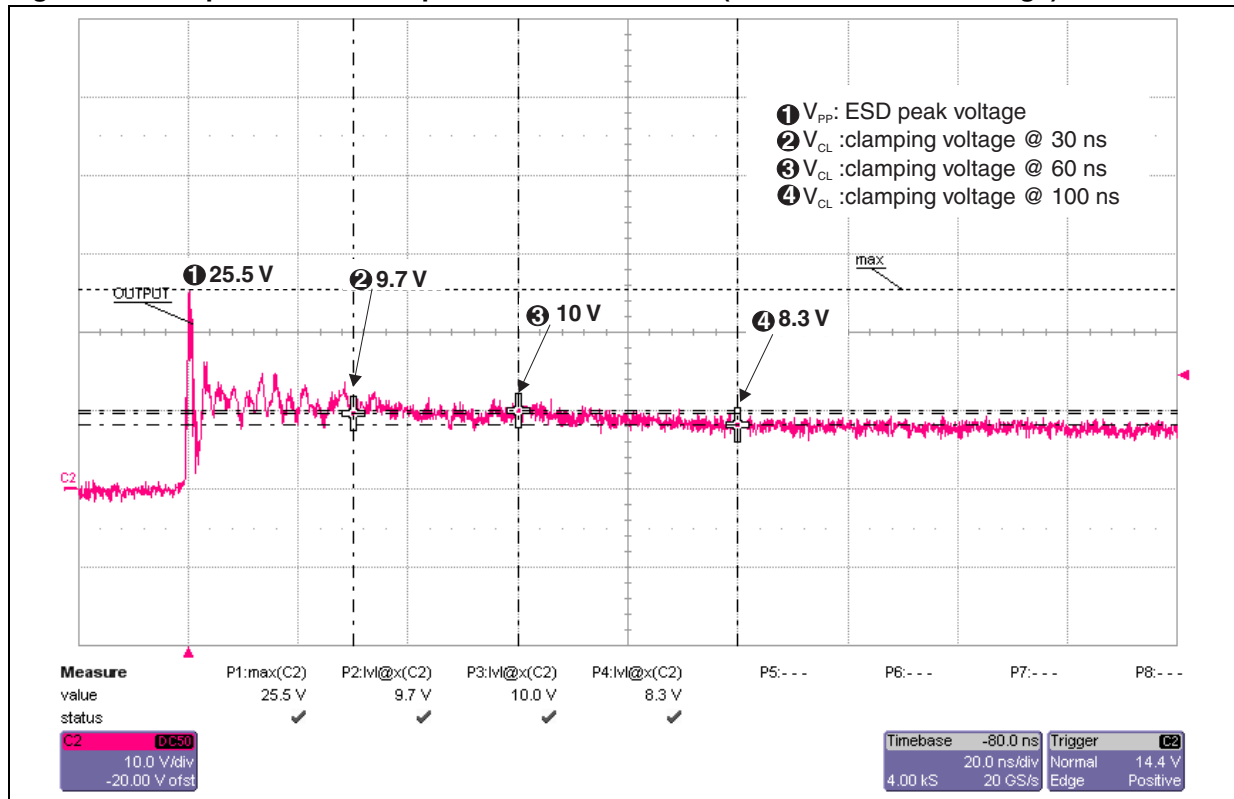


Figure 11. Output filter ESD response to IEC 61000-4-2 (-15 kV contact discharge) I1 to O1

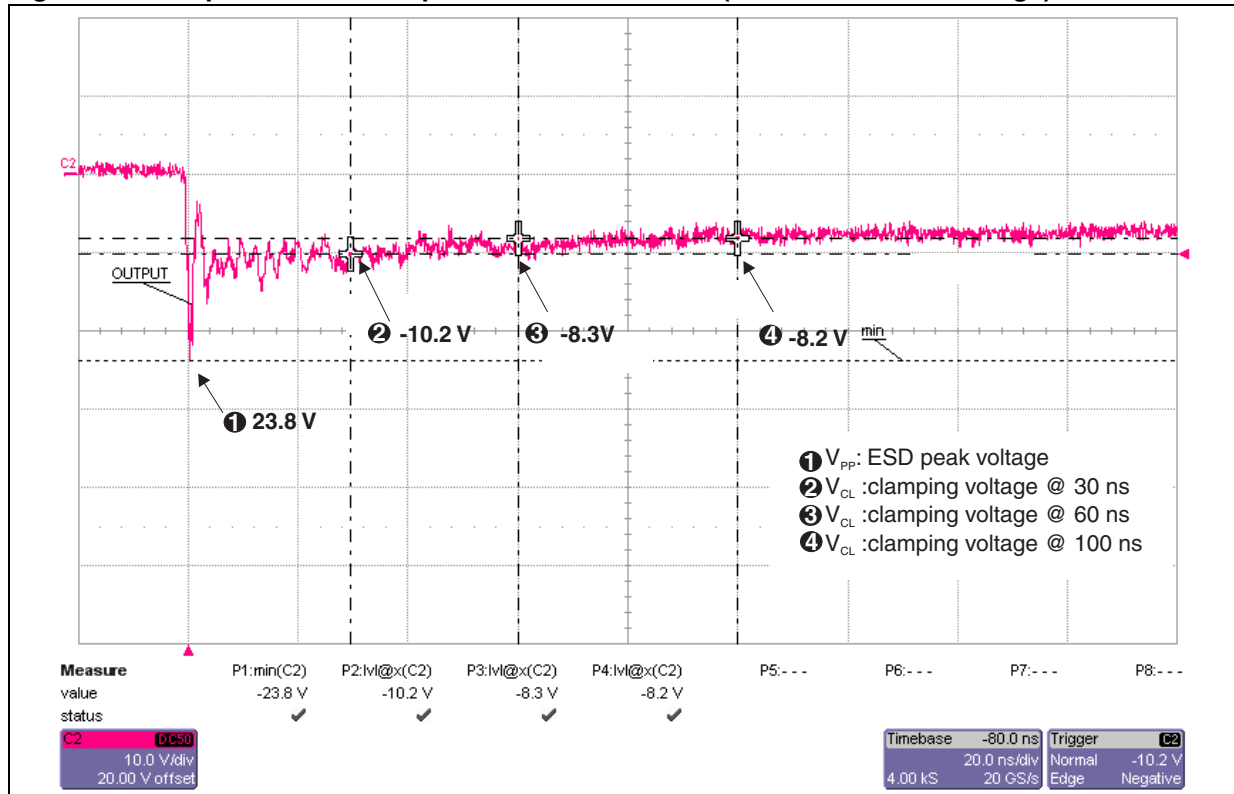


Figure 12. Output filter ESD response to IEC 61000-4-2 (+30 kV contact discharge) I1 to O1

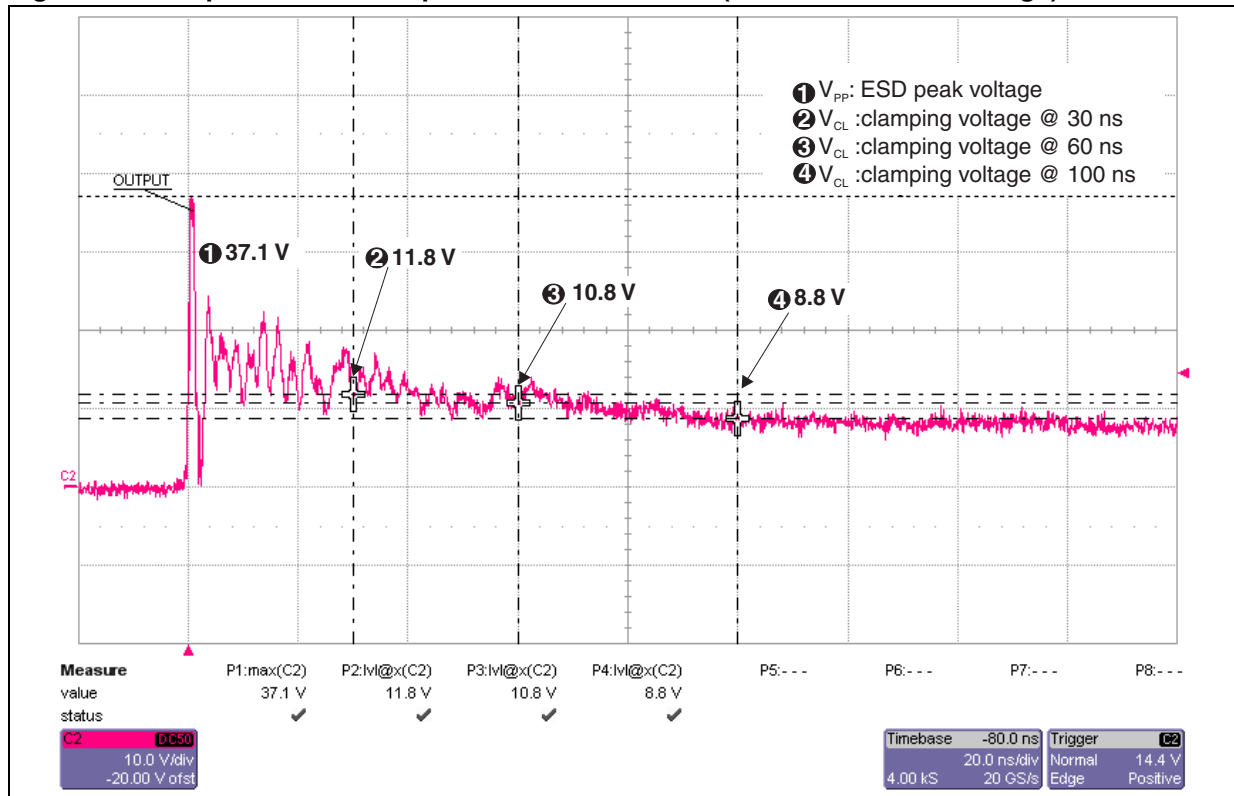
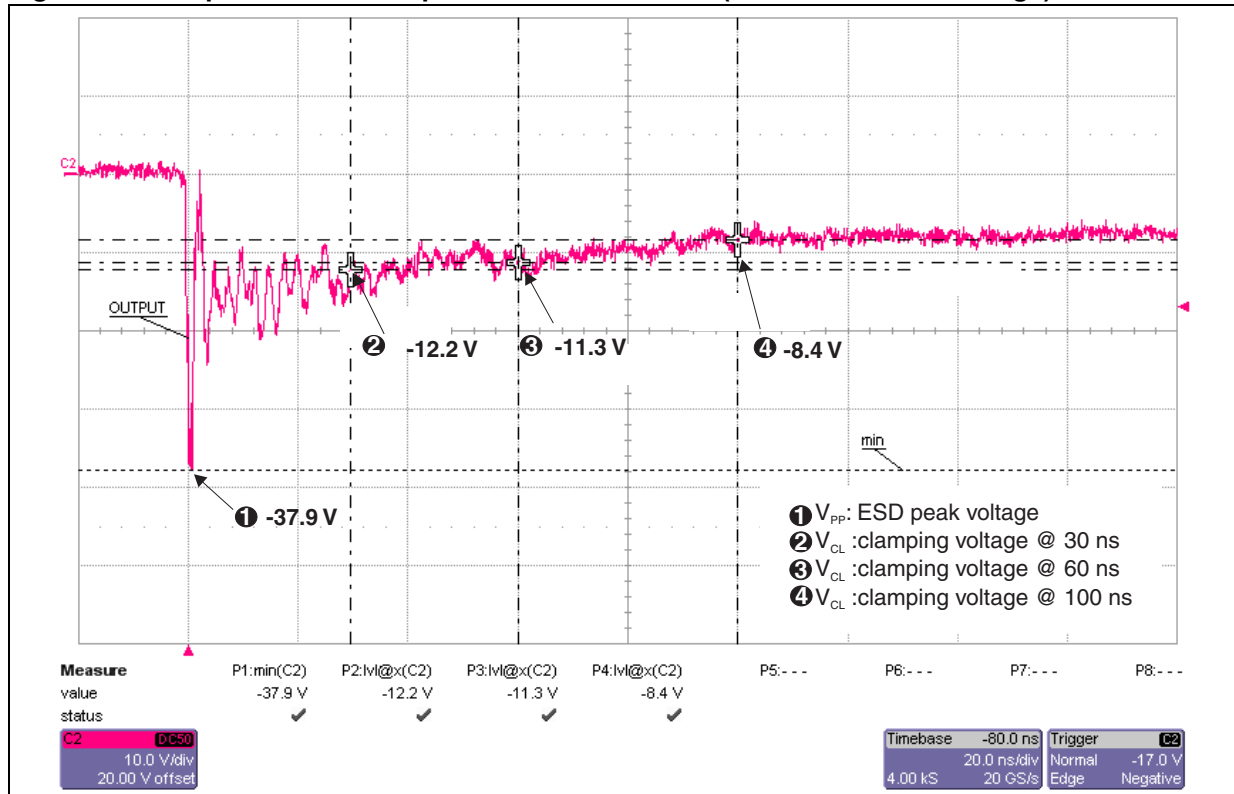
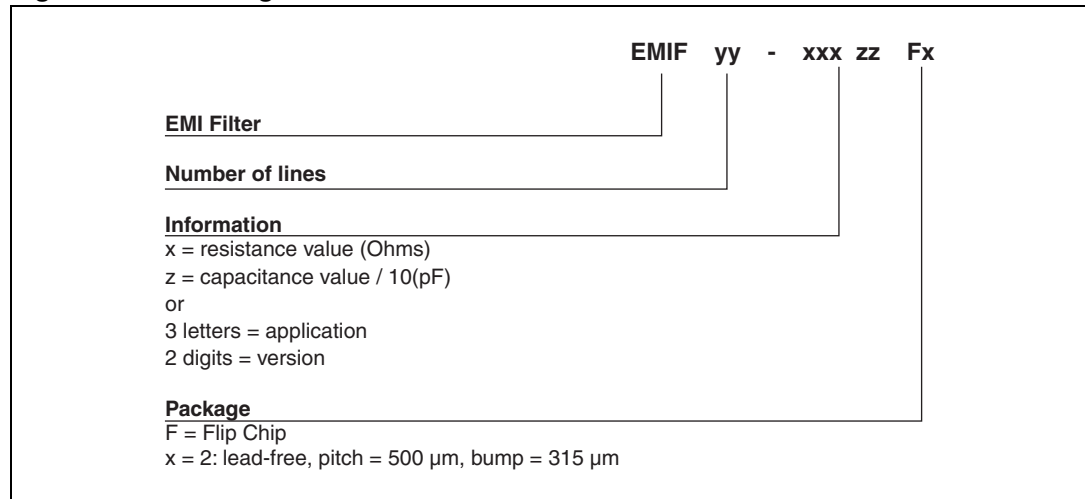


Figure 13. Output filter ESD response to IEC 61000-4-2 (-30 kV contact discharge) I1 to O1



2 Ordering information scheme

Figure 14. Ordering information scheme



3 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. ECOPACK[®] is an ST trademark.

Figure 15. Package dimensions

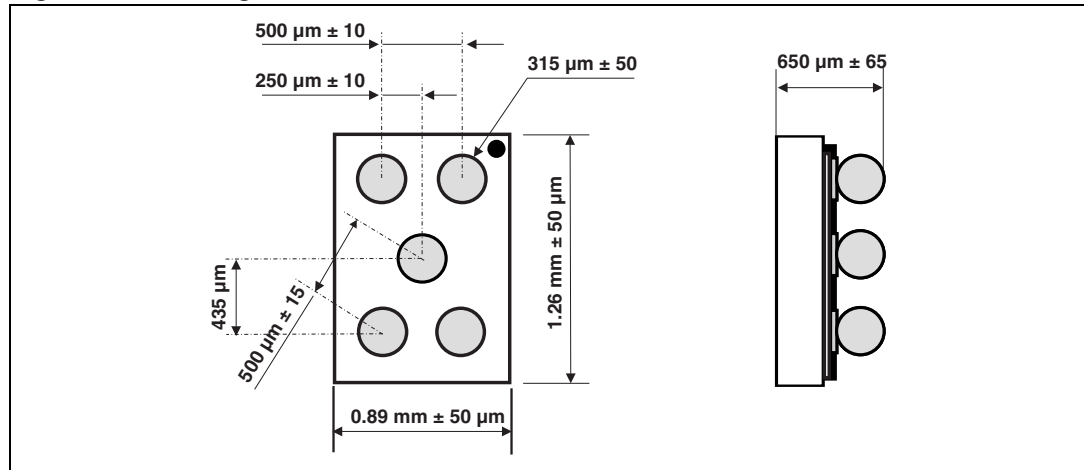


Figure 16. Footprint

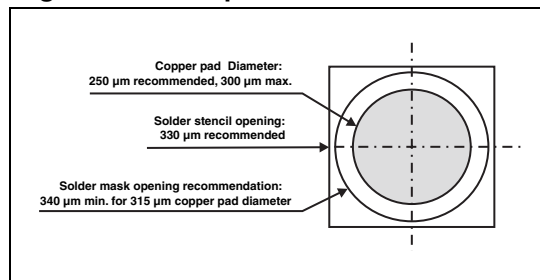


Figure 17. Marking

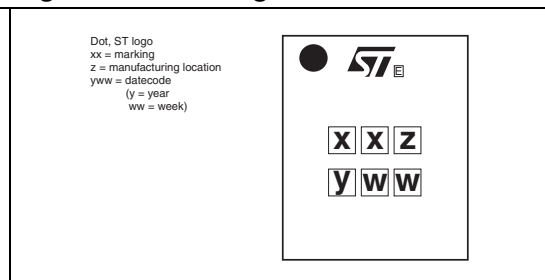
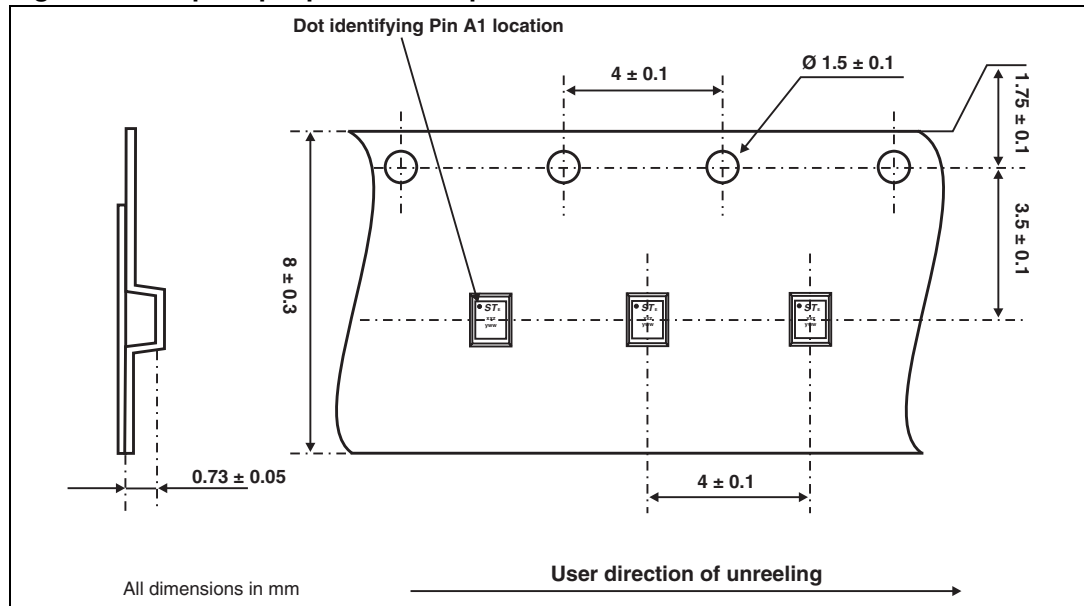


Figure 18. Flip Chip tape and reel specification



Note: More information is available in the application notes:
 AN1235: "Flip Chip: Package description and recommendations for use"
 AN1751: "EMI filters: Recommendations and measurements"

4 Ordering information

Table 3. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|---------|-----------|--------|----------|------------------|
| EMIF02-SPK02F2 | JD | Flip Chip | 1.8 mg | 5000 | Tape and reel 7" |

5 Revision history

Table 4. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 17-Sep-2008 | 1 | Initial release. |
| 12-Sep-2011 | 2 | Updated Figure 15 and Figure 16 . |
| 3-Apr-2012 | 3 | Updated cover page features and description. Inserted Figure 6 to Figure 13 . |

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