



EMIF06-MSD04F3

6-line low capacitance IPAD™ for micro-SD card
with EMI filtering and ESD protection

Features

- EMI low-pass filter
- Integrated pull up resistors to prevent bus floating when no card is connected
- 208 MHz clock frequency compatible with SDR104 mode (SD3.0)
- Lead-free package

Benefits

- Low power consumption
- Easy layout thanks to smart pin-out configuration
- Very low PCB space consumption
- High reliability offered by monolithic integration
- Reduction of parasitic elements thanks to CSP integration

Complies with the following standards:

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

Application

Micro (T-Flash) secure digital memory card in:

- Mobile phones
- Communication systems

Description

The EMIF06-MSD04F3 is a highly integrated device based on IPAD technology offering two functions: ESD protection to comply with IEC standard, and EMI filtering to reject mobile phone frequencies.

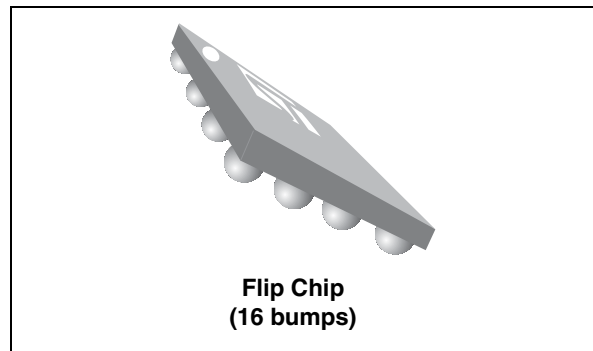
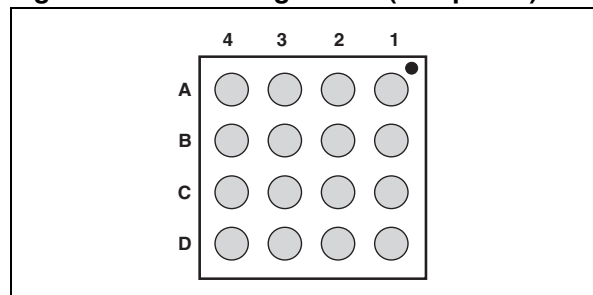


Figure 1. Pin configuration (bump side)



TM: IPAD is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute ratings (limiting values)

| Symbol | Parameter | Value | Unit |
|----------------------------|--------------------------------------|---------------|------|
| V _{PP} | ESD discharge IEC 61000-4-2, level 4 | | |
| | Air discharge, card side | 15 | kV |
| | Contact discharge, card side | 8 | |
| | Air discharge, IC side | 2 | |
| Contact discharge, IC side | 2 | | |
| T _j | Maximum junction temperature | 125 | °C |
| T _{op} | Operating temperature range | - 40 to + 85 | °C |
| T _{stg} | Storage temperature range | - 55 to + 150 | °C |

Figure 2. EMIF06-MSD04F3 configuration

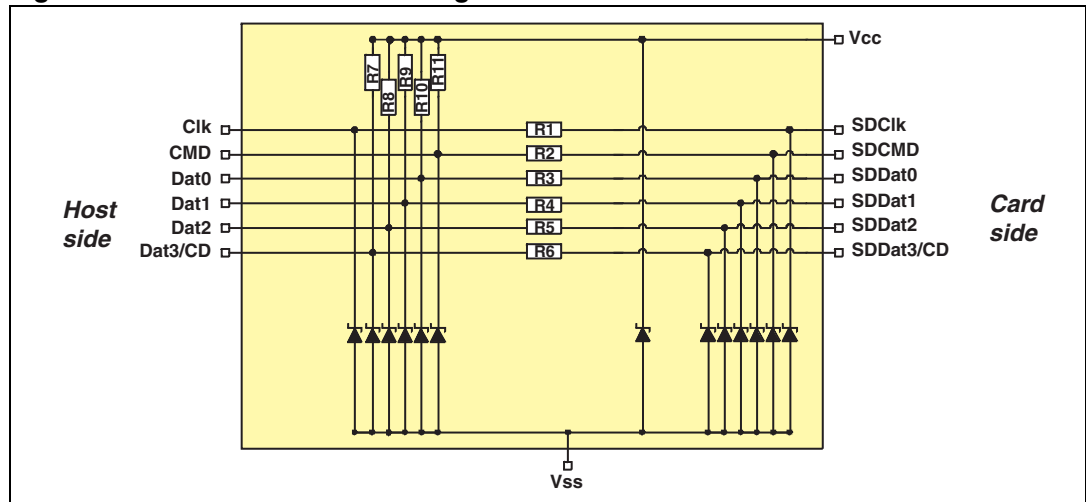


Table 2. Pin configuration

| Pin | Signal | Pin | Signal |
|-----|-----------------|-----|-----------------|
| A1 | Dat0 | C1 | CMD |
| A2 | Dat1 | C2 | V _{ss} |
| A3 | SDDat1 | C3 | V _{ss} |
| A4 | SDDa0 | C4 | SDCMD |
| B1 | Clk | D1 | Dat3/CD |
| B2 | V _{cc} | D2 | Dat2 |
| B3 | V _{ss} | D3 | SDDat2 |
| B4 | SDCIk | D4 | SDDat3/CD |

Table 3. Electrical characteristic

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|------------------------|-----------------------------|--|------|------|------|------------------|
| V_{BR} | Breakdown voltage | $I_R = 1 \text{ mA}$ | 14 | 16 | | V |
| I_{RM} | Leakage current at V_{RM} | $V_{RM} = 3 \text{ V}$ | | | 0.1 | μA |
| R1, R2, R3, R4, R5, R6 | Serial resistance | Tolerance $\pm 10 \%$, matching $\pm 2 \%$ | 36 | 40 | 44 | Ω |
| R7, R8, R9, R10, R11 | Pull-up resistance | Tolerance $\pm 20 \%$, matching $\pm 2 \%$ | 20 | 25 | 30 | $\text{k}\Omega$ |
| C_{line} | Data line capacitance | $V = 1.8 \text{ V}$, $F = 10 \text{ MHz}$, $V_{OSC} = 30 \text{ mV}$ | | 7.5 | 10 | pF |
| | | $V = 2.9 \text{ V}$, $F = 10 \text{ MHz}$, $V_{OSC} = 30 \text{ mV}$ | | | 9 | |
| F_0 | Cut-off frequency | $S_{21} = -3 \text{ dB}$ | | 550 | | MHz |
| t_R, t_F | Rise and fall time | $C_{load} = 10 \text{ pF}$, low-ref = 0.58 V, high-ref = 1.27 V | | 0.98 | | ns |

Figure 3. S21 attenuation measurements

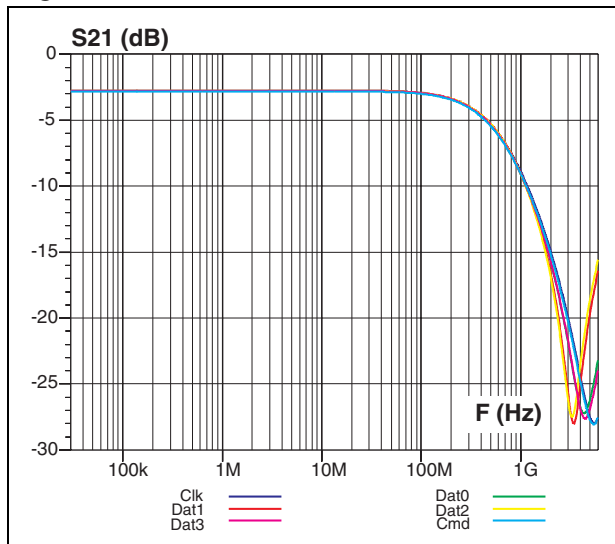


Figure 4. Analog crosstalk measurements

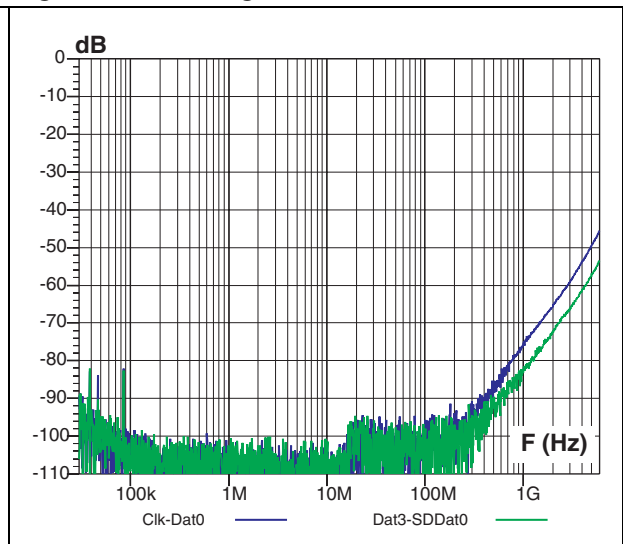


Figure 5. Line capacitance versus applied voltage (typical values)

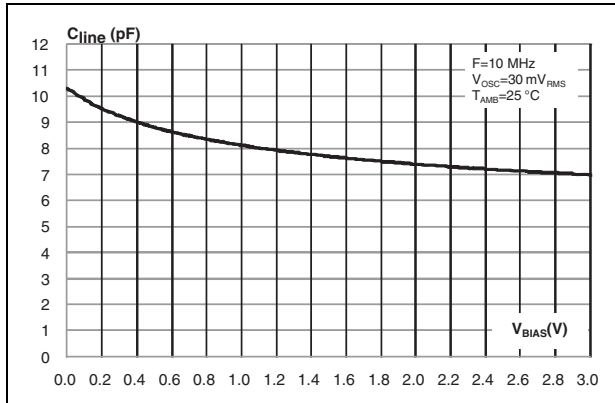


Figure 6. Line capacitance versus frequency (typical values)

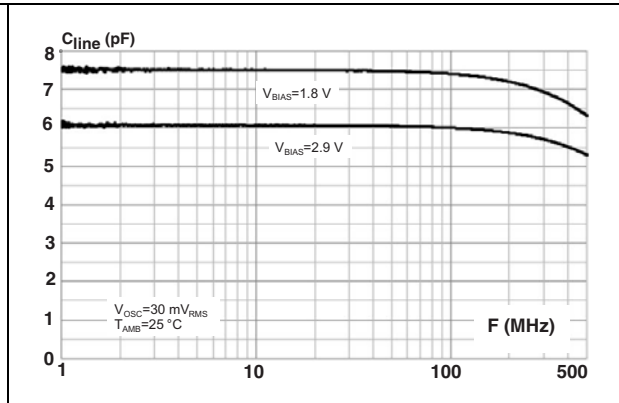


Figure 7. Digital crosstalk measurements

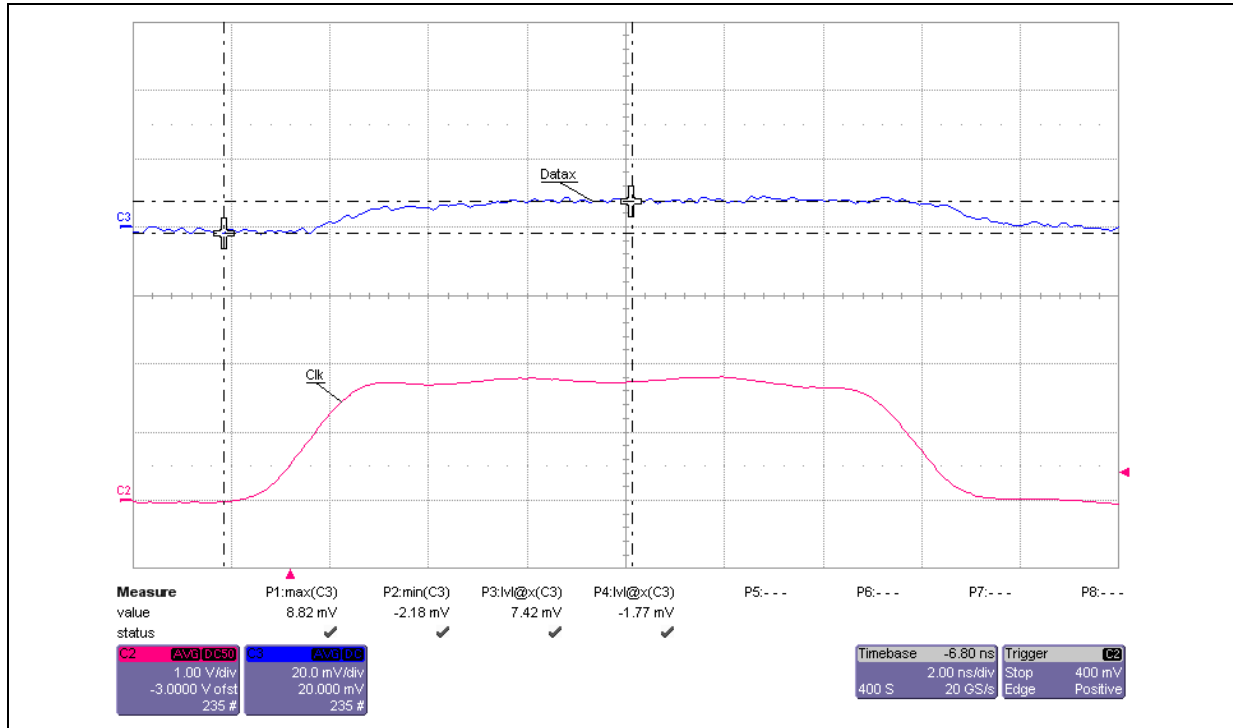


Figure 8. Host side response to IEC 61000-4-2 (+8 kV contact discharge) on card side

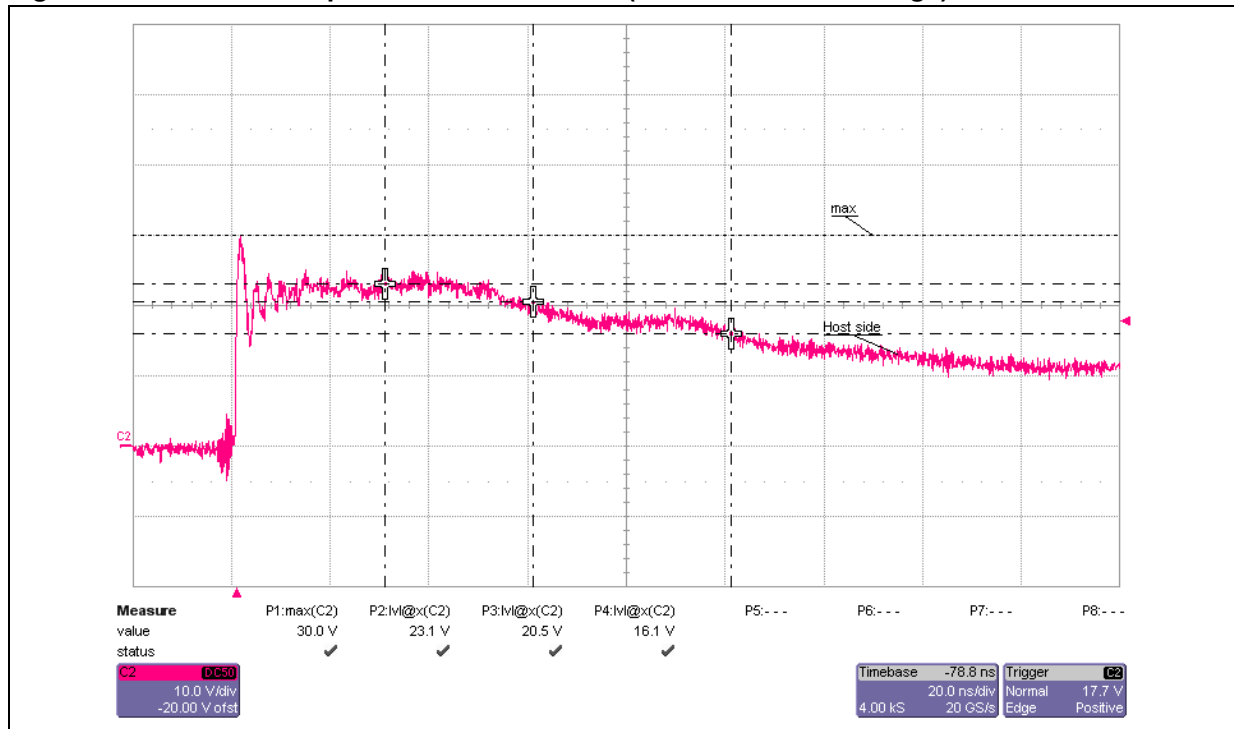
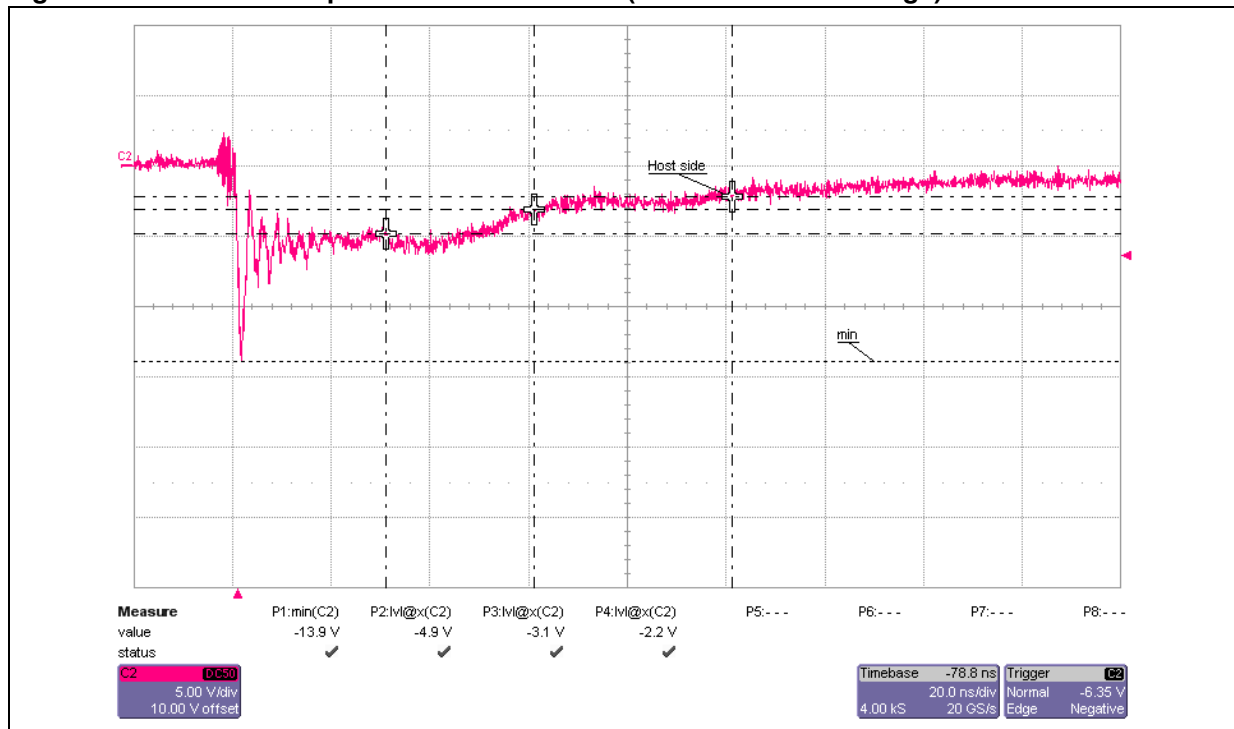
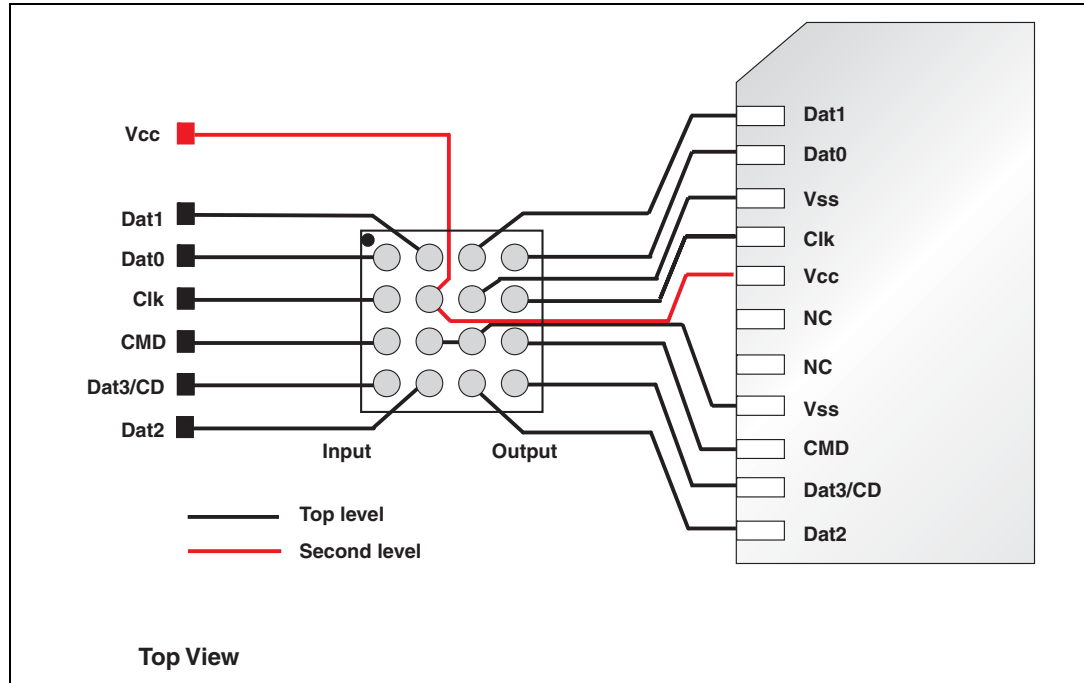


Figure 9. Host side response to IEC 61000-4-2 (-8 kV contact discharge) on card side



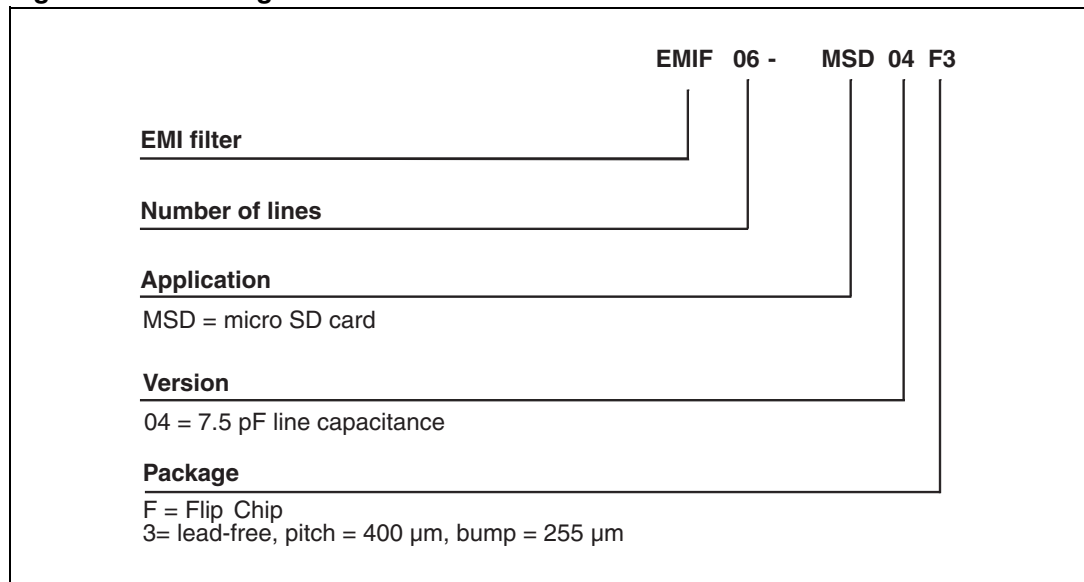
2 Layout recommendations

Figure 10. Layout recommendations



3 Ordering information scheme

Figure 11. Ordering information scheme



4 Package information

- Epoxy meets UL94, V0
- Lead-free package

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 12. Package dimensions

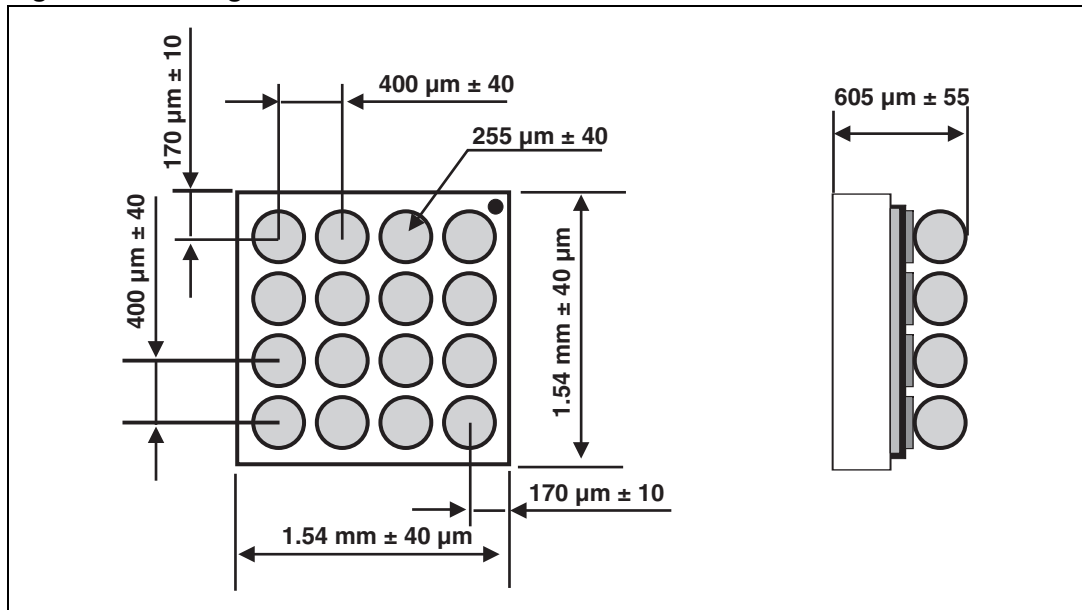


Figure 13. Footprint

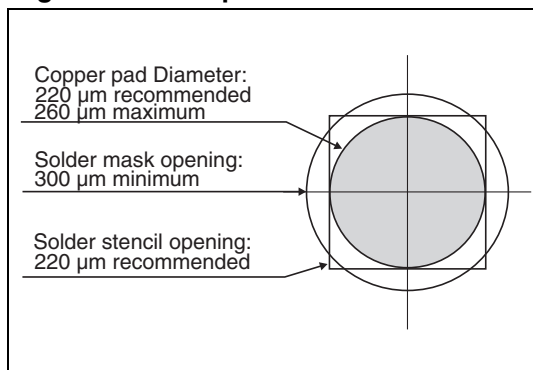


Figure 14. Marking

Dot, ST logo
 □ ECOPACK status
 xx = marking
 z = manufacturing location
 yww = datecode
 y = year,
 ww = week

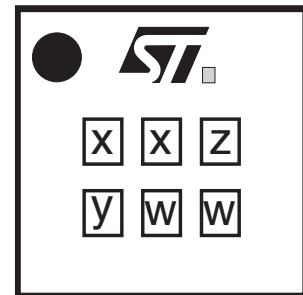
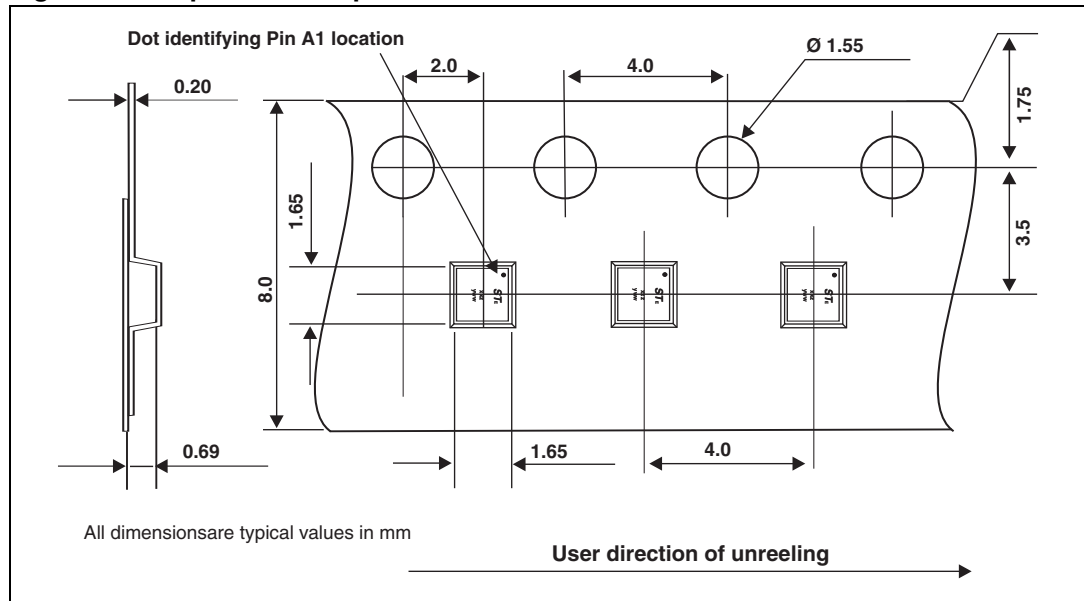


Figure 15. Tape and reel specification



5 Ordering information

Table 4. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|---------|-----------|--------|----------|------------------|
| EMIF06-MSD04F3 | JW | Flip Chip | 3.2 mg | 5000 | Tape and reel 7" |

Note: More information is available in the application notes:
 AN2348: "Flip Chip: Package description and recommendations for use"
 AN1751: "EMI Filters: Recommendations and measurements"

6 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|--------------|----------|--------------|
| 12-July-2011 | 1 | First issue. |

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