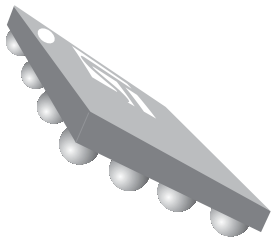
# EMIF06-USD04F3

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

**Datasheet – production data**



**Flip Chip**
**(15 bumps)**

## Features

- EMI low-pass filter
- ESD protection ±8 kV (IEC 61000-4-2)
- 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

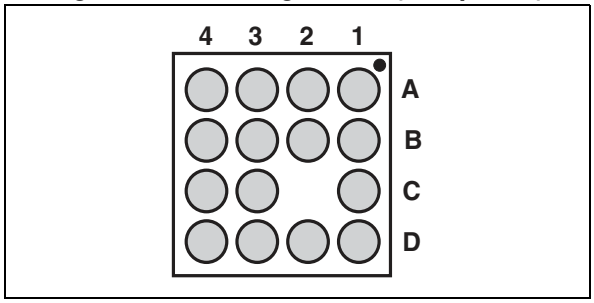
### Complies with the following standards:

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

## Description

The EMIF06-USD04F3 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 maximum ratings ($T_{amb}$ = 25 °C)**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{PP}$ | ESD discharge IEC 61000-4-2, level 4<br>(on pins Vcc, SDclk, SDcmd, SDdat0, SDdat1, SDdat2, SDdat3<br>Air discharge, external pins<br>Contact discharge, external pins<br>ESD discharge IEC 61000-4-2, level 1<br>(on pins dat0, dat1, clk, cmd,dat3, dat2)<br>Air discharge, internal pins<br>Contact discharge, internal pins | <br><br>15<br>8<br><br><br>2<br>2 | kV |
| $T_j$ | Maximum junction temperature | 125 | °C |
| $T_{op}$ | Operating temperature range | - 30 to + 85 | °C |
| $T_{stg}$ | Storage temperature range | - 55 to + 150 | °C |

**Figure 2. EMIF06-USD04F3 Schematic**

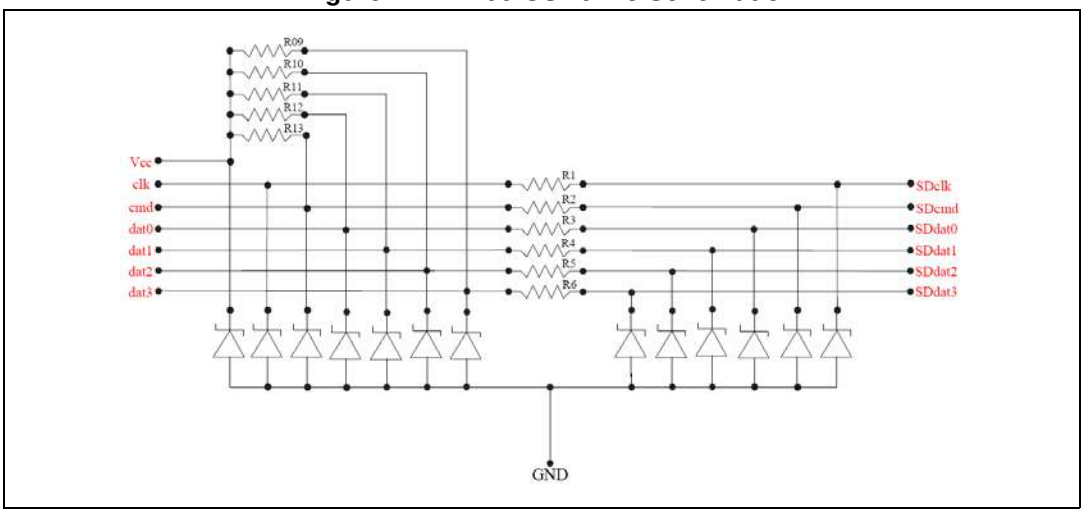



**Table 2. Pin configuration**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| A1 | dat0 | C1 | Cmd |
| A2 | dat1 | | |
| A3 | SDdat1 | C3 | GND |
| A4 | SDdat0 | C4 | SDcmd |
| B1 | clk | D1 | dat3 |
| B2 | $V_{cc}$ | D2 | dat2 |
| B3 | GND | D3 | SDdat2 |
| B4 | SDclk | D4 | SDdat3 |

**Table 3. Electrical characteristics (values, $T_{amb}$ = 25 °C)**

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{BR}$ | Breakdown voltage | $I_R$ = 1 mA | 14 | | 20 | V |
| $I_{RM}$ | Leakage current at $V_{RM}$ | $V_{RM}$ = 3 V | | | 100 | nA |
| R1, R2, R3, R4, R5, R6 | Serial resistance | Tolerance ±10%, matching ±2% | | 40 | | Ω |
| R9, R10, R11, R12 | Pull-up resistance | Tolerance ±10%, matching ±2% | | 50 | | kΩ |
| R13 | Pull-up resistance on cmd | Tolerance ±10% | | 15 | | kΩ |
| $C_{line}$ | Data line capacitance | V = 0 V, F = 10 MHz, $V_{OSC}$ = 30 mV | | 10 | 12 | pF |
| | | V = 1.8 V, F = 10 MHz, $V_{OSC}$ = 30 mV | | 7.5 | 10 | |
| | | V = 2.9 V, F = 10 MHz, $V_{OSC}$ = 30 mV | | | 9 | |

**Figure 3. Electrical characteristics (definitions)**

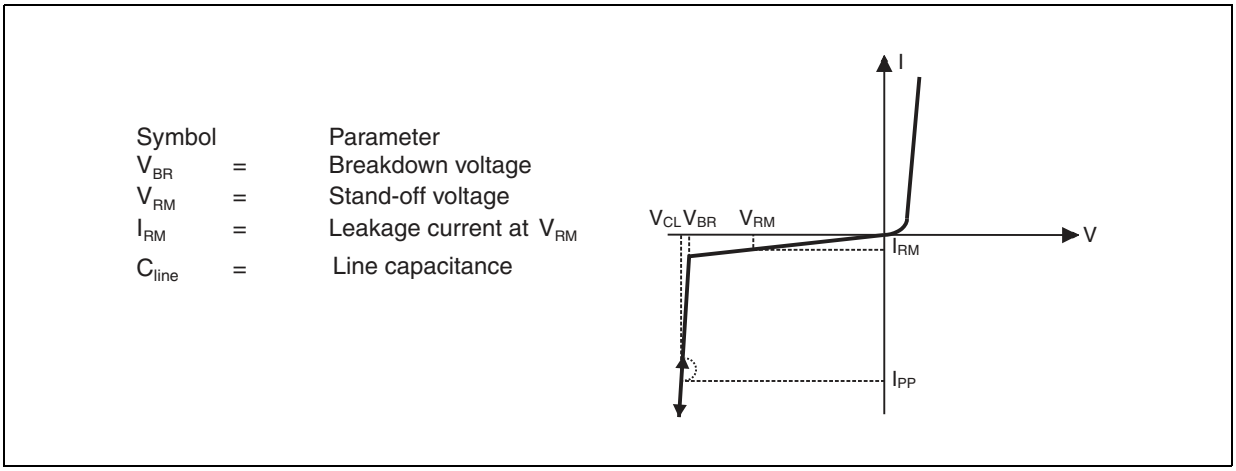



**Figure 4. Attenuation versus frequency**

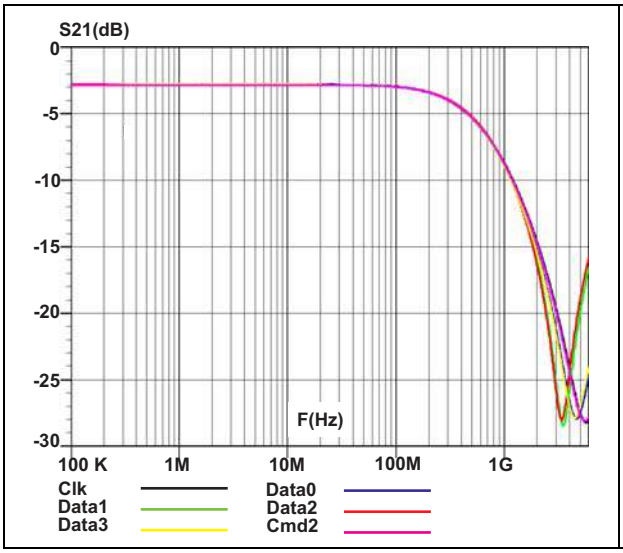



**Figure 5. Analog crosstalk versus frequency**

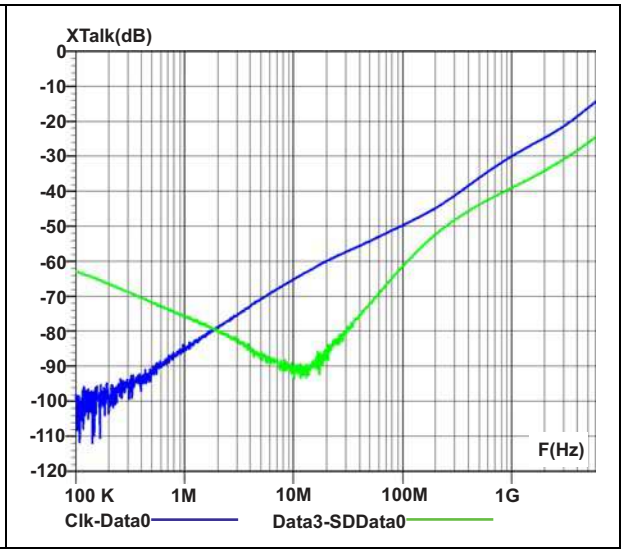


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

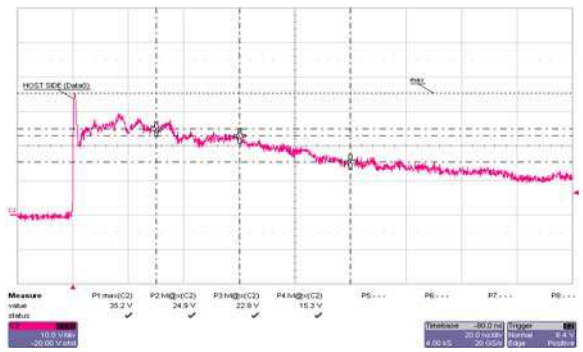


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

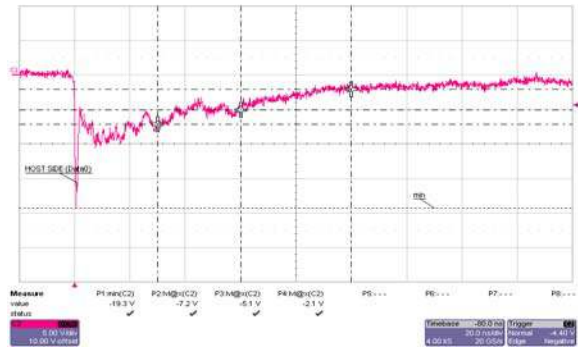
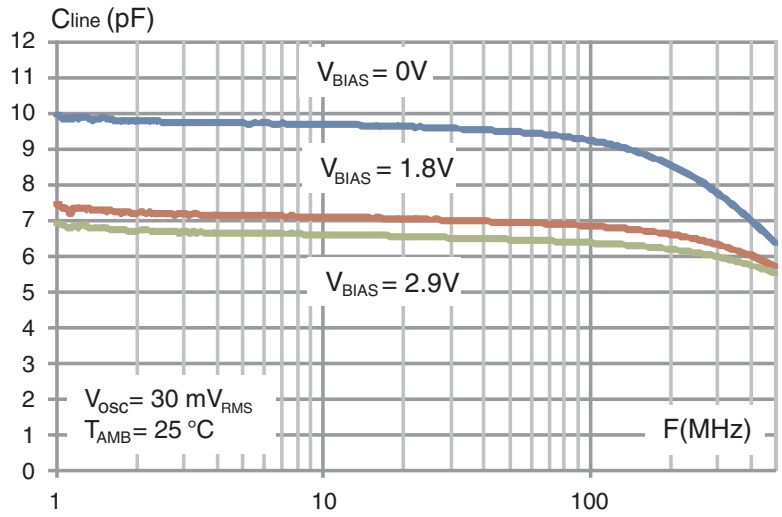


Figure 8. Line capacitance versus frequency and bias voltage (typical values)



# 2 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 9. Package dimensions**

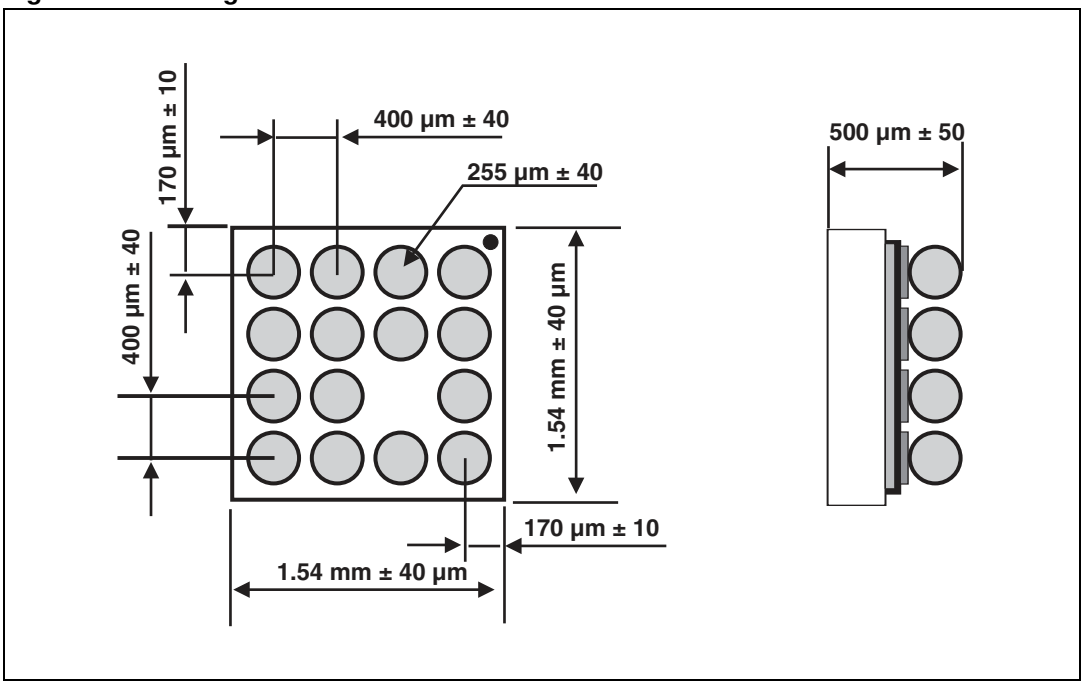



**Figure 10. Footprint**

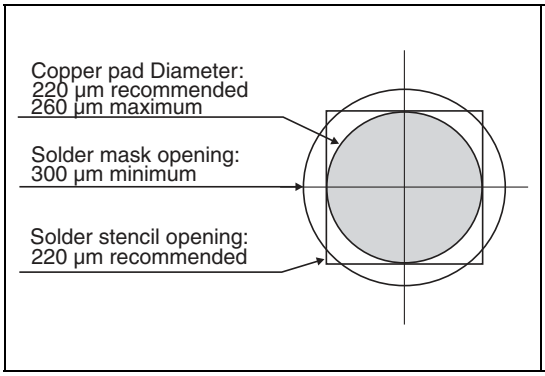



**Figure 11. Marking**

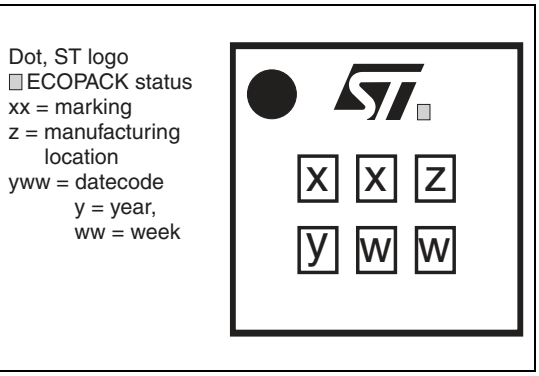
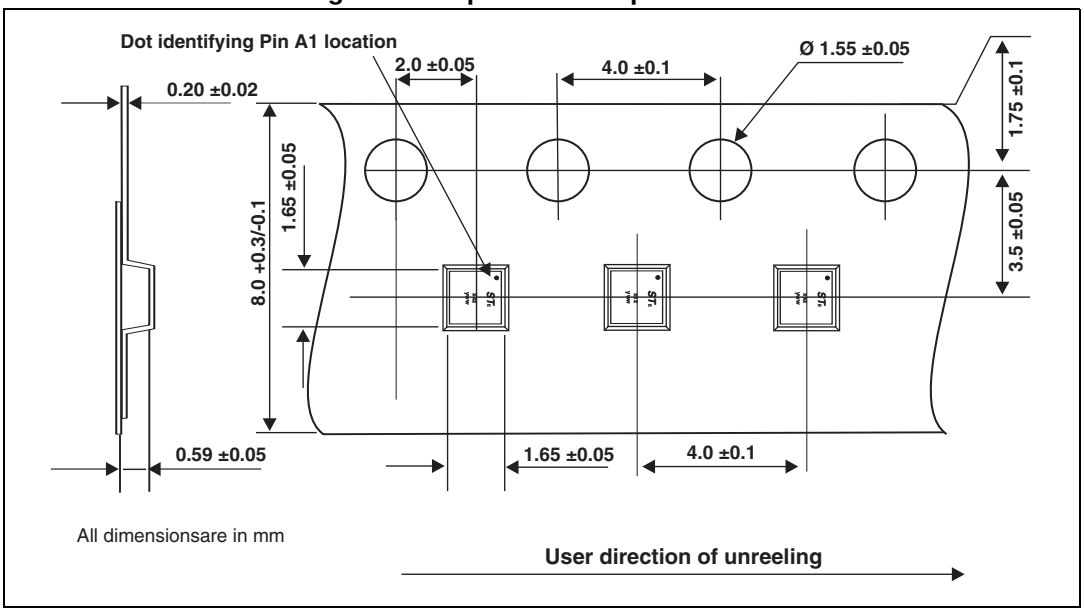


**Figure 12. Tape and reel specification**



# 3 Ordering information

**Figure 13. Ordering information scheme**

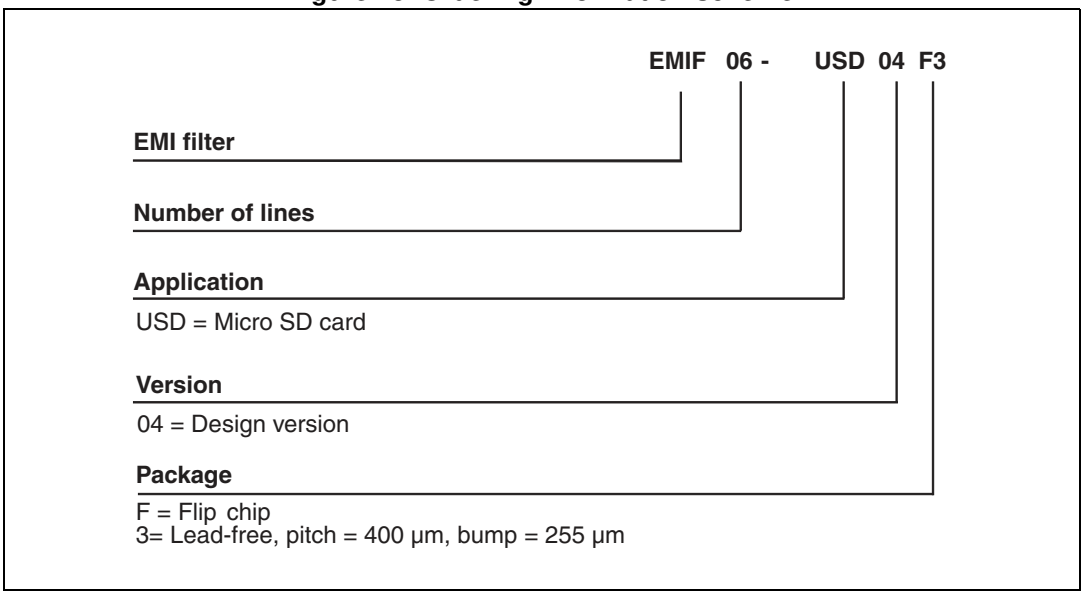



**Table 4. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| EMIF06-USD04F3 | JZ | Flip Chip | 2.6 mg | 5000 | Tape and reel 7” |

*Note: More information is available in the STmicroelectronics Application notes:*
*AN2348: “Flip Chip: Package description and recommendations for use”*
*AN1751: “EMI Filters: Recommendations and measurements”*

# 4 Revision history

**Table 5. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 09-May-2012 | 1 | First issue. |
| 27-Jun-2012 | 2 | Added tolerances in *Figure 12*. |
| 30-Jun-2014 | 3 | Updated *Figure 4*, *Figure 5* and breakdown voltage value in *Table 3*. |

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