# EMIF06-mSD01F2

## IPAD™

## Mini and micro SD Card - EMI filtering and 25 kV ESD protection

### Main application

Mini and micro (T-Flash) Secure Digital memory card in mobile phones and communication systems

### Description

The EMIF06-mSD01F2 is a highly integrated device based on IPAD technology with the following functions:

- ESD protection to comply with IEC standard
- EMI Filtering to reject mobile phone frequencies

### Benefits

- EMI Low-pass-filter
- ESD protection ±25 kV (IEC 61000-4-2)
- Integrated pull up resistors to prevent bus floating when no card is connected
- 50 Mhz clock frequency compatibility with $C_{line} < 20$ pF
- Low power consumption
- Easy Layout thanks to smart pin-out configuration
- Very low PCB space consuming
- High reliability offered by monolithic integration
- Reduction of parasitic elements thanks to CSP integration
- Lead free package
- Coated version option upon request

### Complies with the following standards:

IEC 61000-4-2

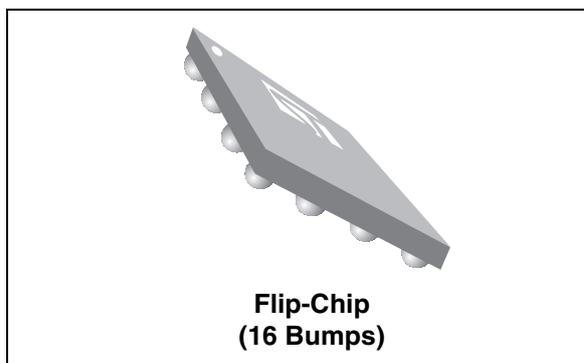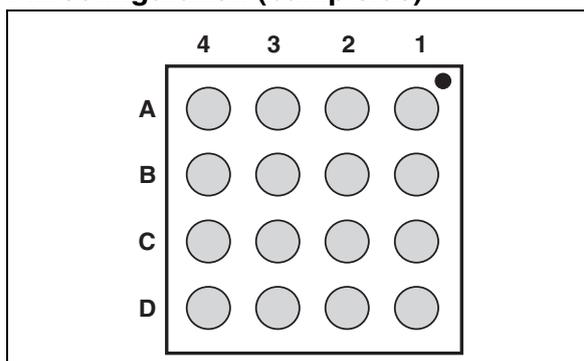| level 4 | 15 kV (air discharge) |
| | 8 kV (contact discharge) |

MIL STD 883G - Method 3015-7 Class 3A
SD Card Specification Ver. 1.01
MicroSD Card Specification Ver. 1.0
Physical layer specification, Part 1 vesion 1.1



**Flip-Chip
(16 Bumps)**

### Pin configuration (bump side)



| A1 | DATA0 | C1 | CMD |
| --- | --- | --- | --- |
| A2 | DATA1 | C2 | Vss |
| A3 | SDDATA1 | C3 | Vss |
| A4 | SDDATA0 | C4 | SDCMD |
| B1 | CLK | D1 | DATA3/CD |
| B2 | Vcc | D2 | DATA2 |
| B3 | Vss | D3 | SDDATA2 |
| B4 | SDCLK | D4 | SDDATA3/CD |

### Order code

| Part Number | Marking |
| --- | --- |
| EMIF06-mSD01F2 | HJ |

TM: IPAD is a trademeark of STMicroelectronics

# 1 Characteristics

**Table 1.    Absolute ratings (limiting values)**

| Symbol | Parameter and test conditions | Value | Unit |
|--------|-------------------------------|-------|------|
| $V_{PP}$ | ESD discharge IEC 61000-4-2, air discharge | 25 | kV |
| | ESD discharge IEC 61000-4-2, contact discharge | 25 | |
| $V_{in}$ | Maximum input voltage | 5.5 | V |
| $T_j$ | Maximum junction temperature | 125 | ° C |
| $T_{op}$ | Operating temperature range | - 40 to + 85 | ° C |
| $T_{stg}$ | Storage temperature range | 125 | ° C |

**Figure 1.    EMIF06-mSD01F2 configuration**
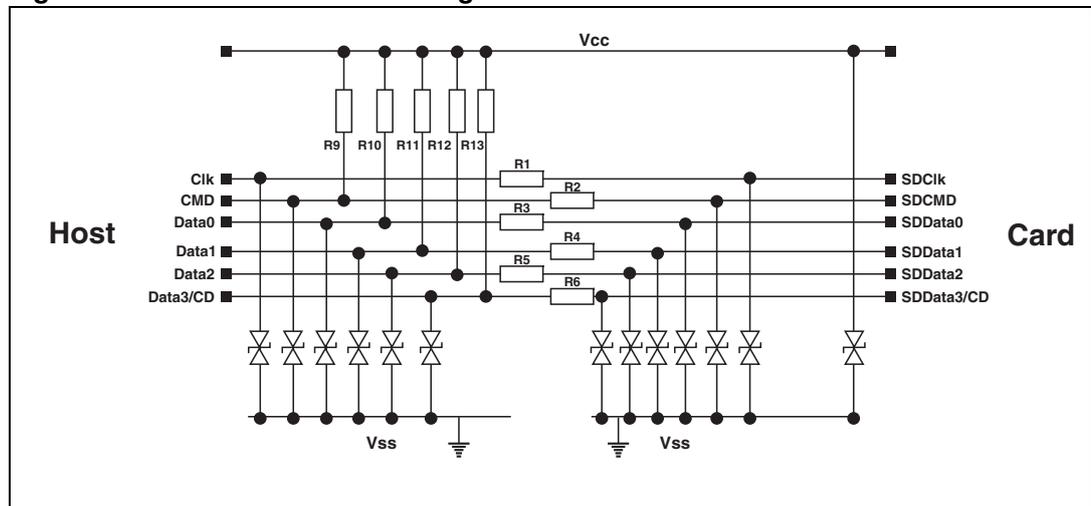


**Table 2.    Electrical characteristics**

| Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|--------|-----------------|------|------|------|------|
| $V_{BR}$ | $I_R$ = 1 mA | 14 | 16 | | V |
| $I_{RM}$ | $V_{RM}$ = 3 V | | | 0.1 | µA |
| R1, R2, R3, R4, R5, R6 | Tolerance ±20% | | 40 | | Ω |
| R9, R10, R11, R12, R13 | Tolerance ±30% | | 25 | | kΩ |
| $C_{line}$ | V = 0 V, F = 1 MHz $V_{osc}$ = 30 mV | | 17 | 20 | pF |

**Figure 2.    Frequency response for line D3/D2 - V$_{CC}$ not connected**
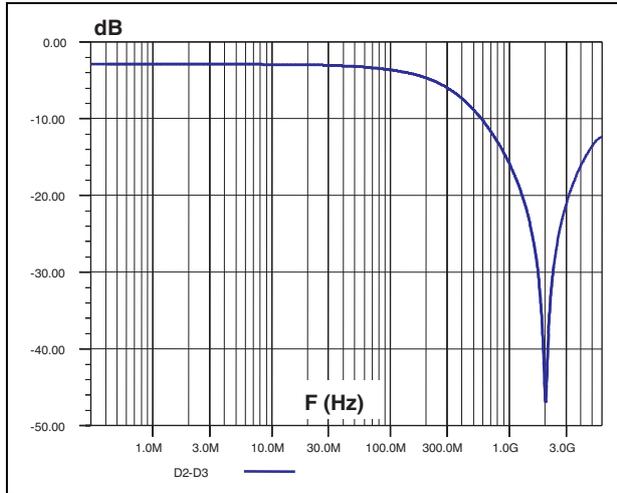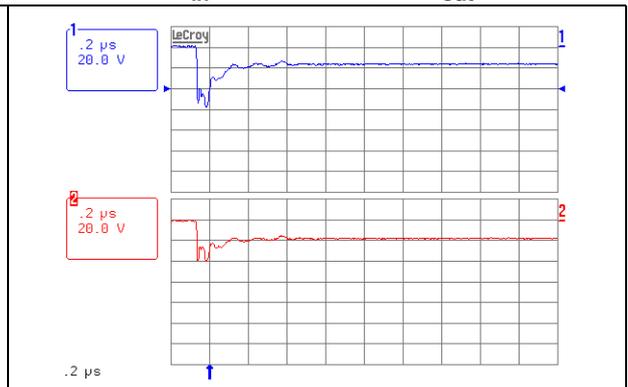


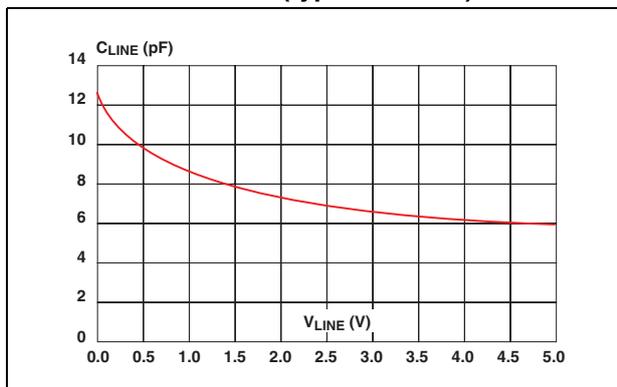**Figure 3.    Frequency response for line C1/B4 - V$_{CC}$ not connected**
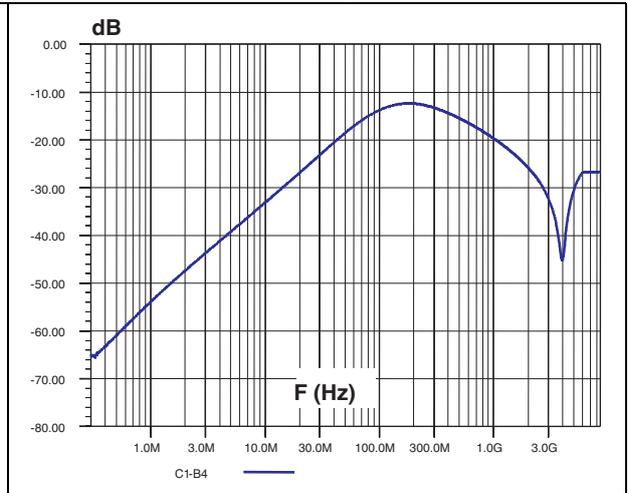


**Figure 4.    ESD response to IEC 61000-4-2 (+15 kV air discharge) on one imput (V$_{in}$) and one output (V$_{out}$)**
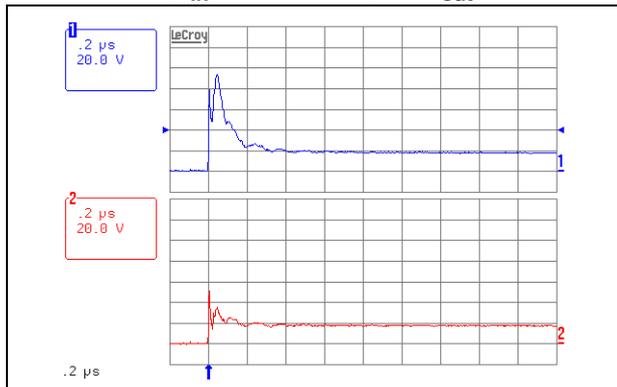


**Figure 5.    ESD response to IEC 61000-4-2 (-15 kV air discharge) on one imput (V$_{in}$) and one output (V$_{out}$)**
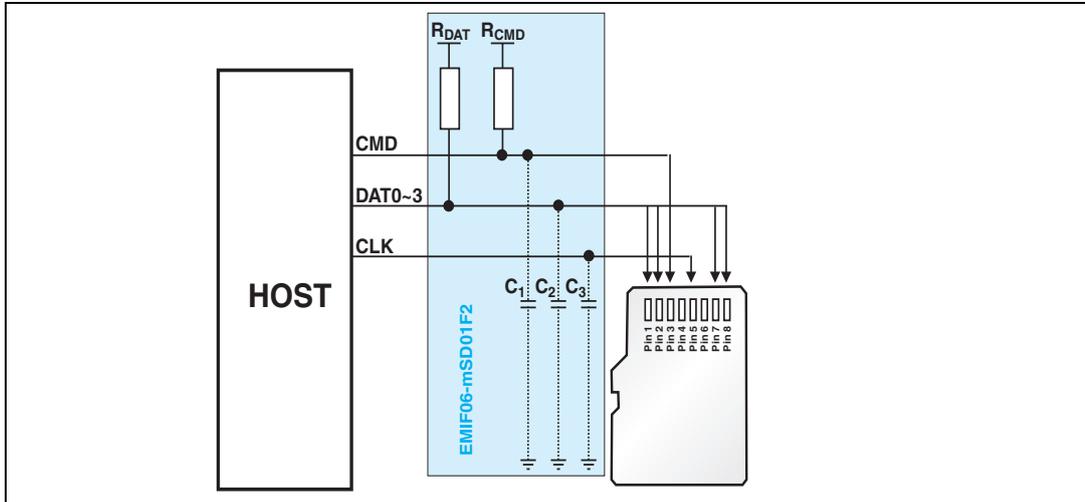


**Figure 6.    Junction capacitance versus reverse applied voltage CLK line (typical values)**
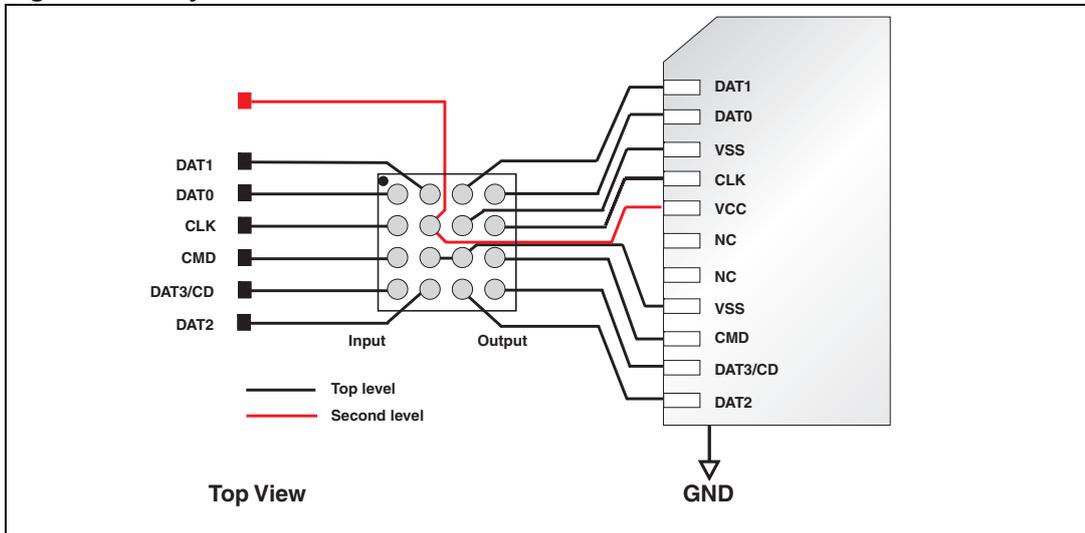
# 2    Technical information

**Figure 7.    T-Flash connection diagram recommendation (MicroSD Specification Ver 1.0)**



Pull-up resistance $R_{DAT}$ and $R_{CMD}$ are implemented to prevent bus floating when no card is inserted or when all card drivers are in high impedance mode. Resistance values should be set between 10 k$\Omega$ and 100 k$\Omega$ .

The pull-up resistors and capacitors described in the above recommendation are integrated in the EMIF06-mSD01F2. This makes the EMIF06-mSD01F2 an easy "plug and play" solution to implement secured T-flash, mini-SD card terminations.

**Figure 8.    Layout recommendation**

# 3      Ordering information scheme

EMIF   yy   -   xxx   zz   Fx

**EMI Filter**

**Number of lines**

**Information**
x = resistance value (Ohms)
z = capacitance value / 10(pF)
or
3 letters = application
2 digits = version

**Package**
F = Flip-Chip
x  = 2: Lead free Pitch = 500 μm, Bump = 315 μm
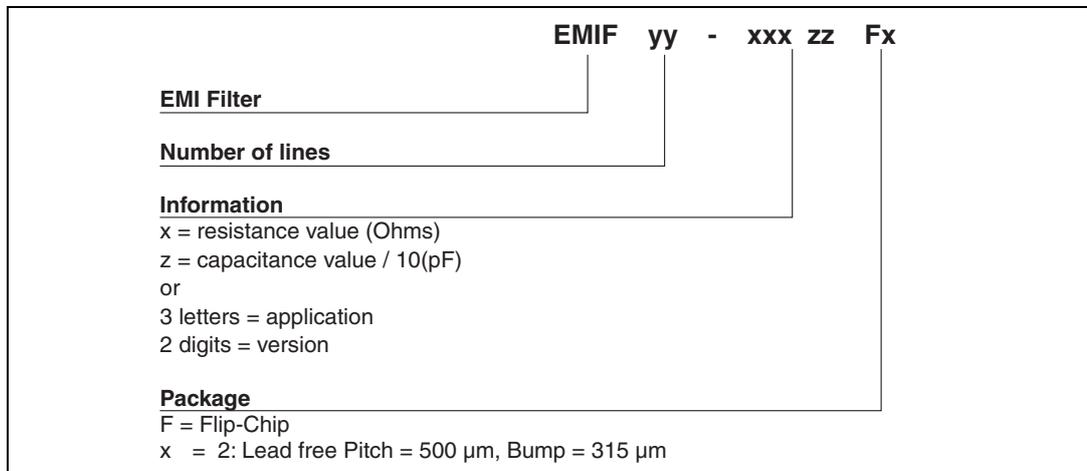
# 4      Package information

**Figure 9.      Flip-Chip Package dimensions**
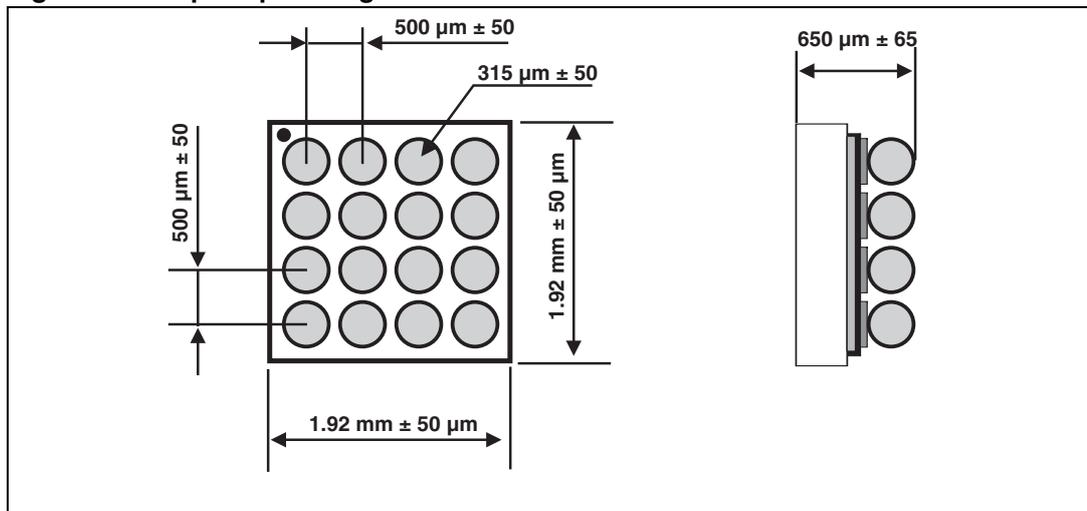


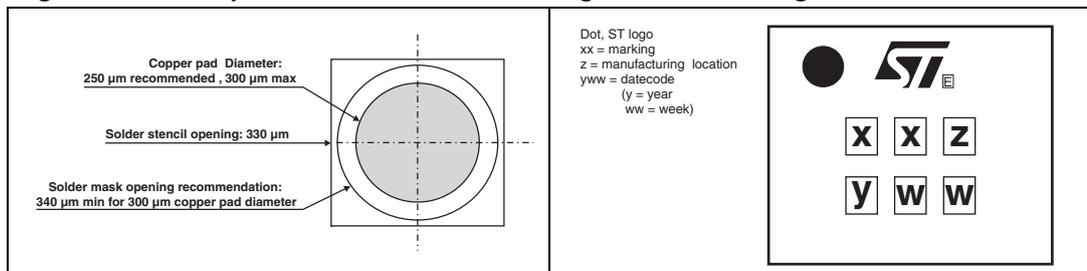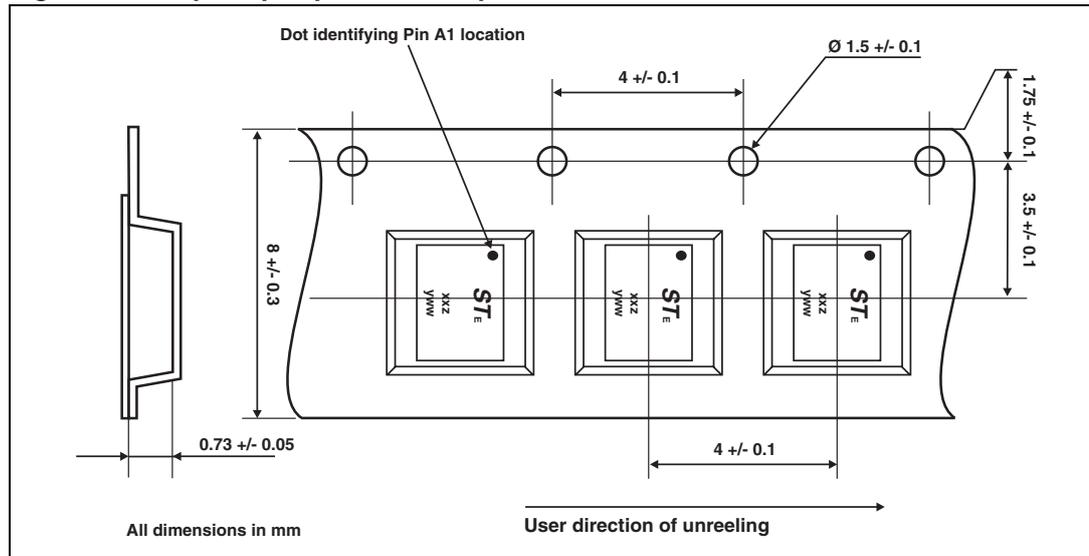**Figure 10.   Foot print recommendations**   **Figure 11.   Marking**

**Figure 12. Flip-Chip Tape and reel specification**



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 package and 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.

*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

| Ordering code | Marking | Package | Weight | Base qty | Delivery mode |
| --- | --- | --- | --- | --- | --- |
| EMIF06-mSD01F2 | HJ | Flip-Chip | 5.3 mg | 5000 | Tape and reel 7" |

# 6 Revision history

| Date | Revision | Description of Changes |
| --- | --- | --- |
| 02-Feb-2007 | 1 | First issue. |

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NFL21SP307X1C3D  NFL21SP506X1C3D  NFL21SP706X1C3D  NFW31SP207X1E4L