



## 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  $\pm 25$  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)

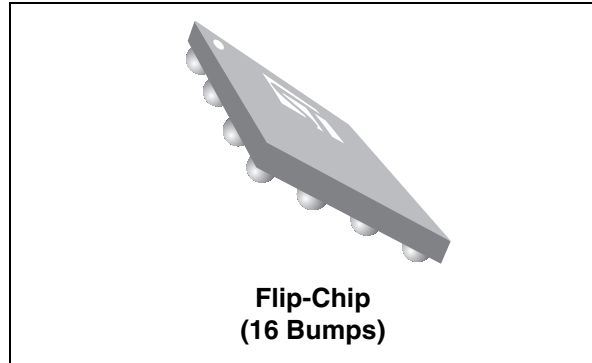
8 kV (contact discharge)

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 version 1.1



#### Pin configuration (bump side)

	4	3	2	1
A	○	○	○	○
B	○	○	○	○
C	○	○	○	○
D	○	○	○	○

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

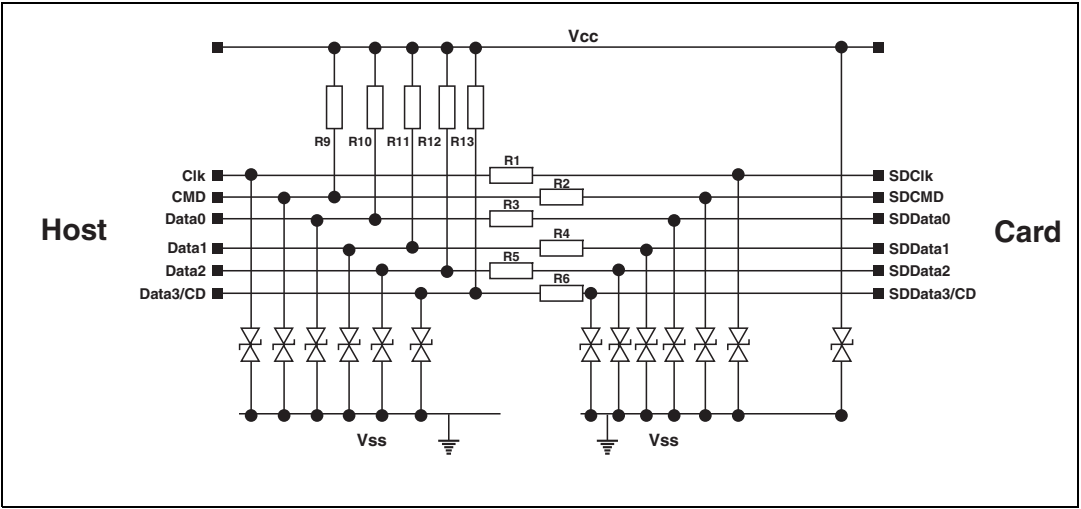
TM: IPAD is a trademark of STMicroelectronics

# 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

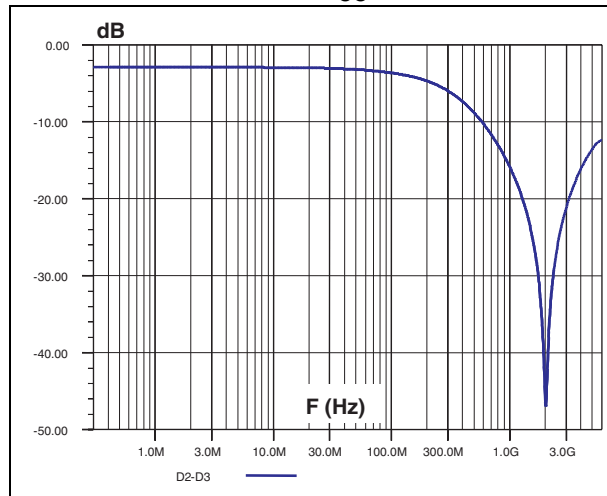
**Figure 1. EMIF06-mSD01F2 configuration**



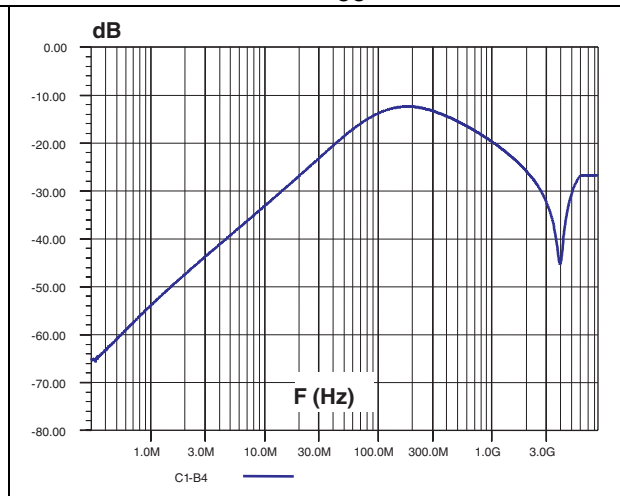
**Table 2. Electrical characteristics**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1 \text{ mA}$	14	16		V
$I_{RM}$	$V_{RM} = 3 \text{ V}$			0.1	$\mu\text{A}$
R1, R2, R3, R4, R5, R6	Tolerance $\pm 20\%$		40		$\Omega$
R9, R10, R11, R12, R13	Tolerance $\pm 30\%$		25		k $\Omega$
$C_{line}$	$V = 0 \text{ V}$ , $F = 1 \text{ MHz}$ $V_{osc} = 30 \text{ mV}$		17	20	pF

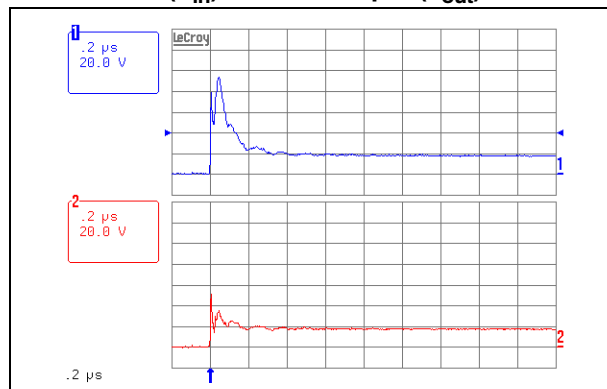
**Figure 2. Frequency response for line D3/D2 -  $V_{CC}$  not connected**



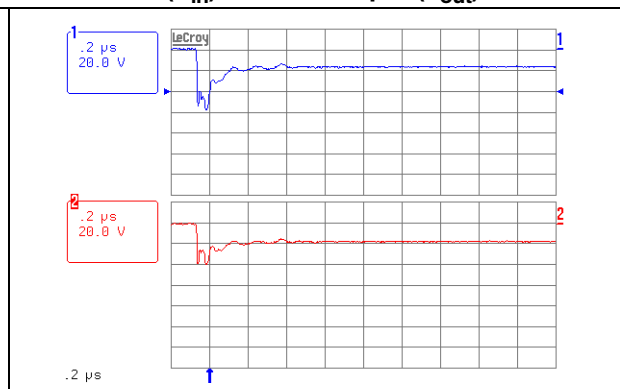
**Figure 3. Frequency response for line C1/B4 -  $V_{CC}$  not connected**



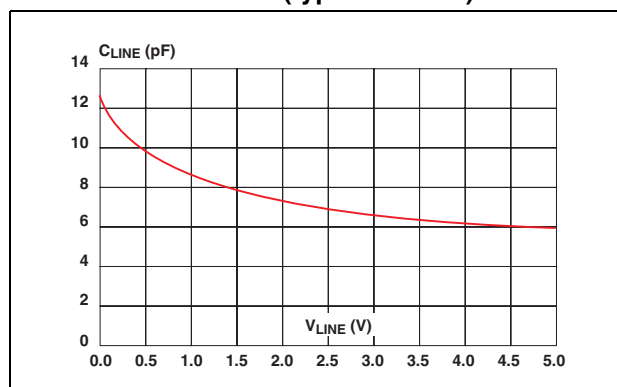
**Figure 4. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input ( $V_{in}$ ) and one output ( $V_{out}$ )**



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

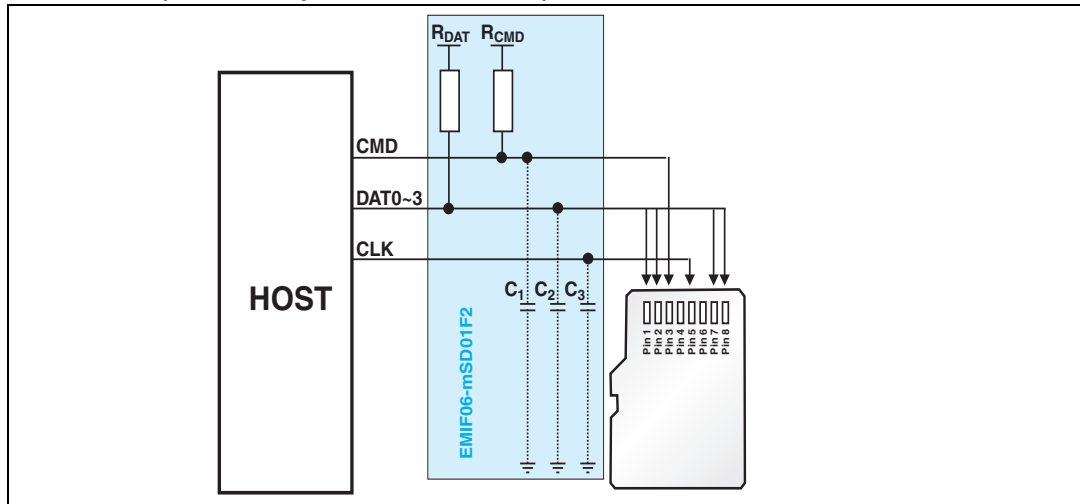


**Figure 6. Junction capacitance versus reverse applied voltage CLK line (typical values)**



## 2 Technical information

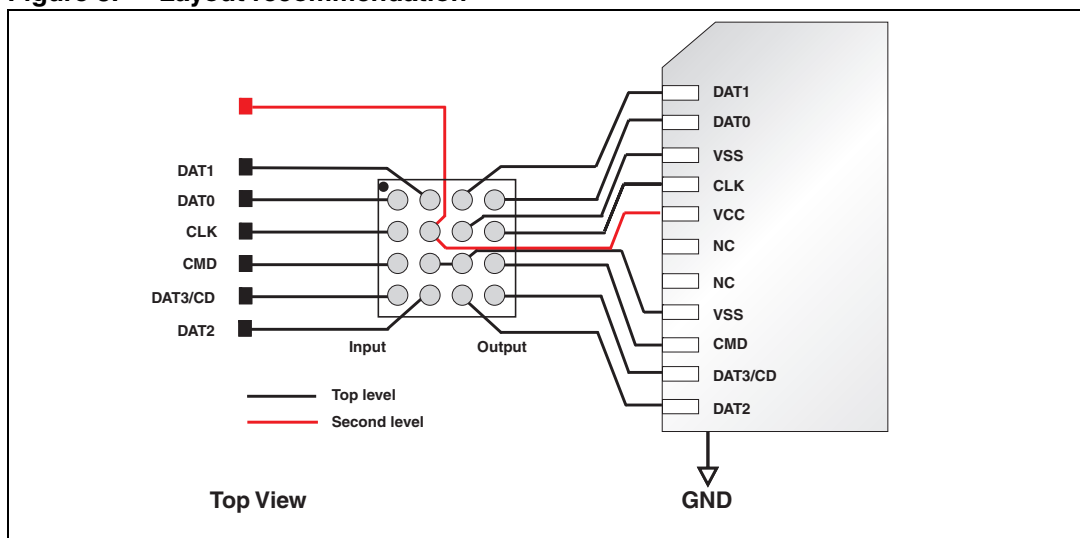
Figure 7. T-Flash connection diagram recommendation (MicroSD Specification Ver 1.0)



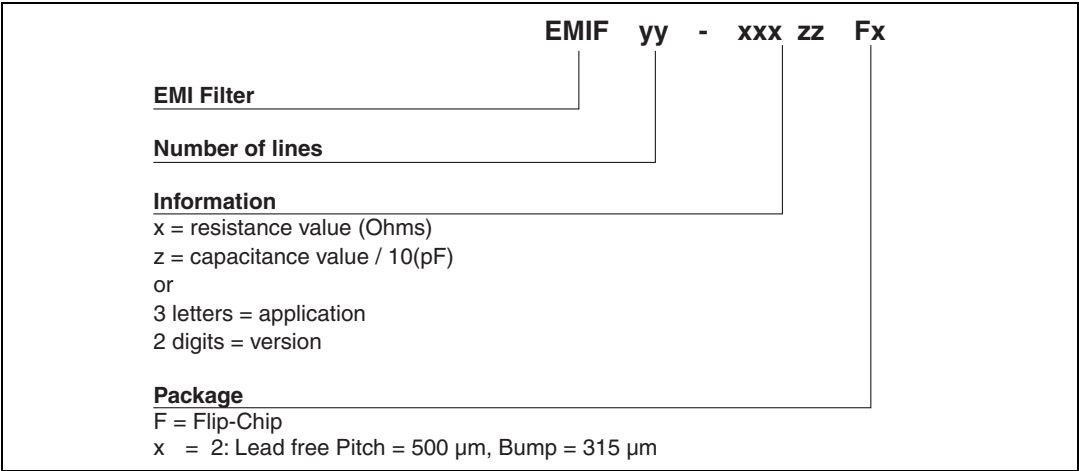
Pull-up resistance  $R_{DAT}$  and  $R_{CMD}$  are implemented to prevent bus floating when no card is inserted or when all card drivers are in high impedance mode. Resistance values should be set between 10 k $\Omega$  and 100 k $\Omega$ .

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



4 Package information

Figure 9. Flip-Chip Package dimensions

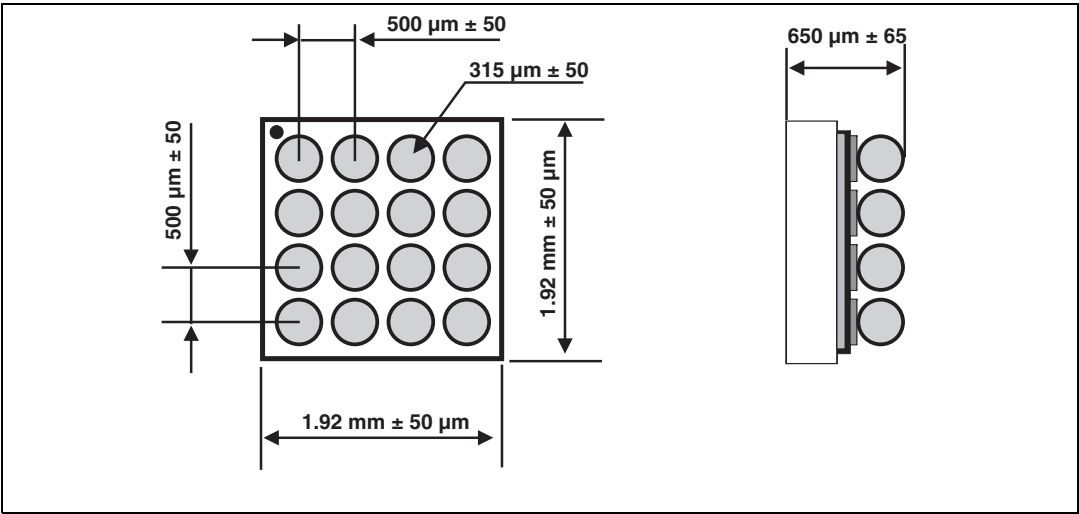


Figure 10. Foot print recommendations      Figure 11. Marking

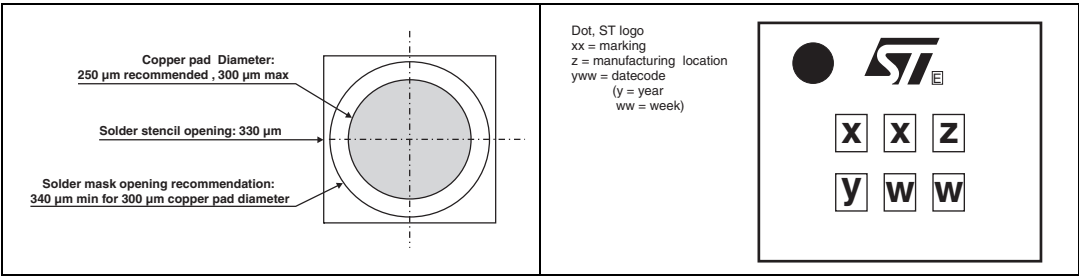
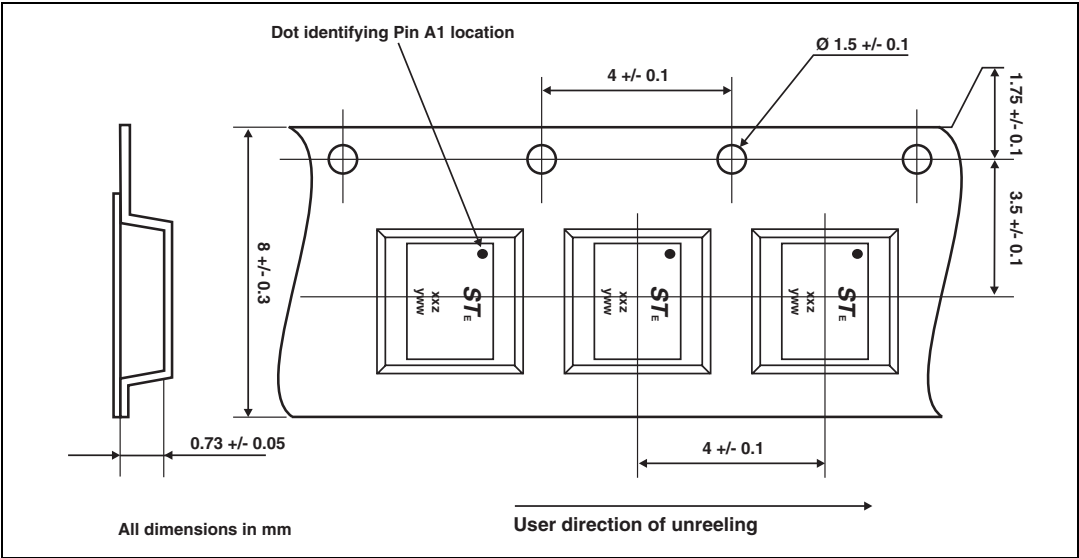


Figure 12. Flip-Chip Tape and reel specification



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](http://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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Email [mkt@ameya360.com](mailto:mkt@ameya360.com)