



## EMIF06-MSD03F3

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

### Features

- EMI low-pass filter
- ESD protection  $\pm 15$  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
- Coated version option on request
- Electrical card detect option

### 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-MSD03F3 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.

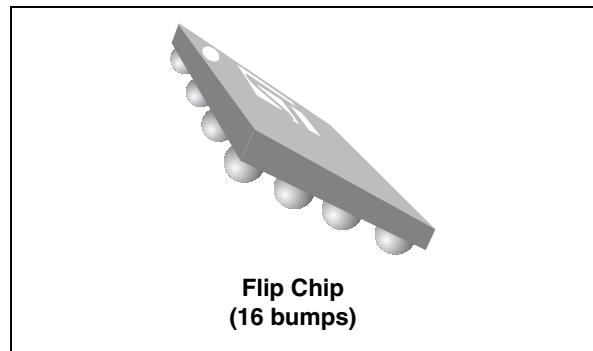
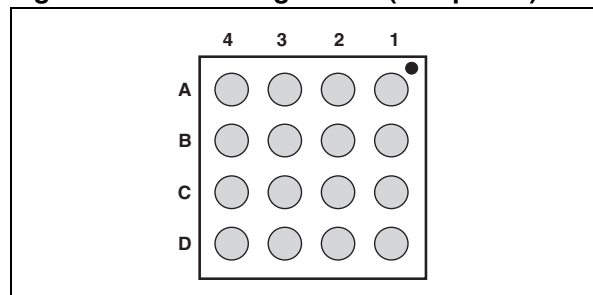


Figure 1. Pin configuration (bump side)



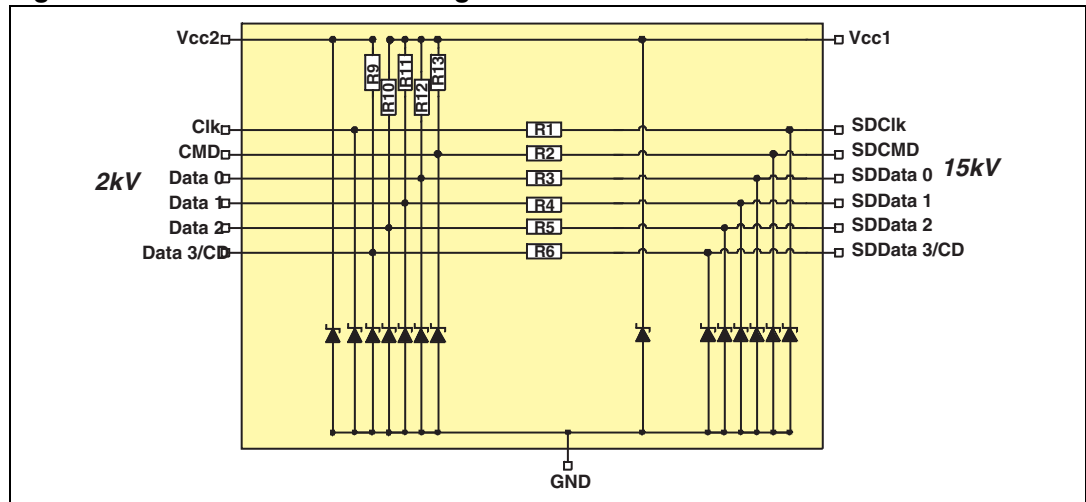
TM: IPAD is a trademark of STMicroelectronics

# 1 Characteristics

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

Symbol	Parameter	Value	Unit
V <sub>PP</sub>	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, ICside	2		
T <sub>j</sub>	Maximum junction temperature	125	°C
T <sub>op</sub>	Operating temperature range	- 40 to + 85	°C
T <sub>stg</sub>	Storage temperature range	- 55 to + 150	°C

**Figure 2. EMIF06-MSD03F3 configuration**



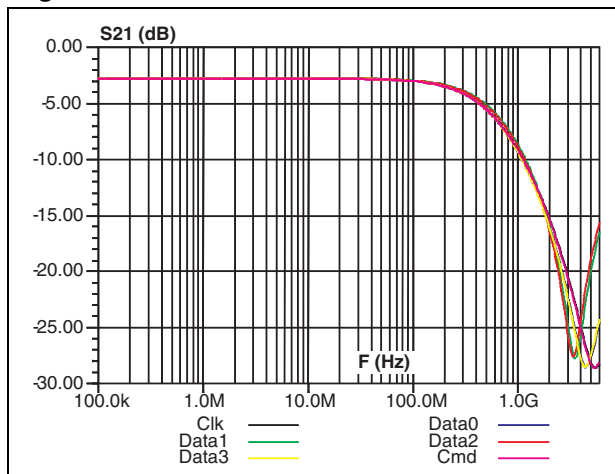
**Table 2. Pin configuration**

Pin	Signal	Pin	Signal
A1	DATA0	C1	CMD
A2	DATA1	C2	V <sub>cc2</sub>
A3	SDDATA1	C3	V <sub>ss</sub>
A4	SDDATA0	C4	SDCMD
B1	CLK	D1	DATA3/CD
B2	V <sub>cc1</sub>	D2	DATA2
B3	V <sub>ss</sub>	D3	SDDATA2
B4	SDCLK	D4	SDDATA3/CD

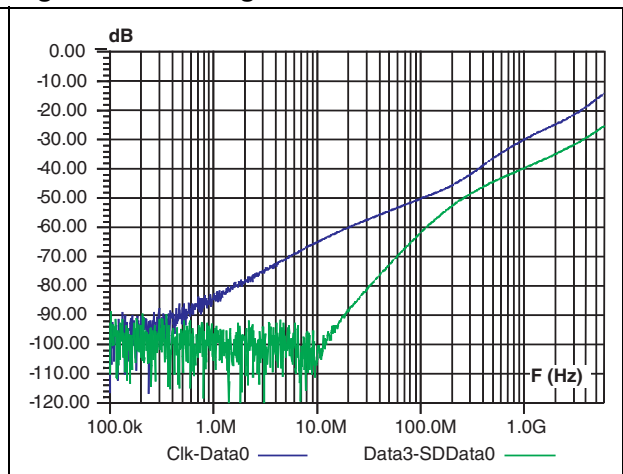
**Table 3. Electrical characteristic**

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	$\mu\text{A}$
R1, R2, R3, R4, R5, R6	Serial resistance	Tolerance $\pm 10 \%$ , matching $\pm 2 \%$		40		$\Omega$
R9, R10, R11, R12	Pull-up resistance	Tolerance $\pm 10 \%$ , matching $\pm 2 \%$		50		$\text{k}\Omega$
R13	Pull-up resistance on CMD	Tolerance $\pm 10 \%$		15		$\text{k}\Omega$
$C_{line}$	Data line capacitance	$V = 0 \text{ V}$ , $F = 10 \text{ MHz}$ , $V_{OSC} = 30 \text{ mV}$		10	12	pF
		$V = 1.8 \text{ V}$ , $F = 10 \text{ MHz}$ , $V_{OSC} = 30 \text{ mV}$		7.5	10	
		$V = 2.9 \text{ V}$ , $F = 10 \text{ MHz}$ , $V_{OSC} = 30 \text{ mV}$			9	
$F_0$	Cut-off frequency	S21 = -3 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, $V_{DDIO} = 1.8 \text{ V}$		0.98		ns

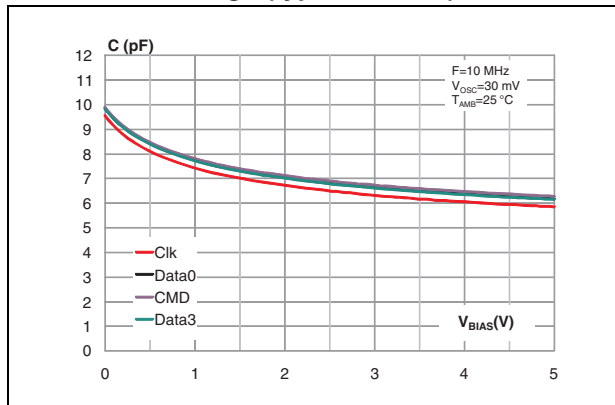
**Figure 3. S21 attenuation measurements**



**Figure 4. Analog crosstalk measurements**



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



**Figure 6. Line capacitance versus frequency (typical values)**

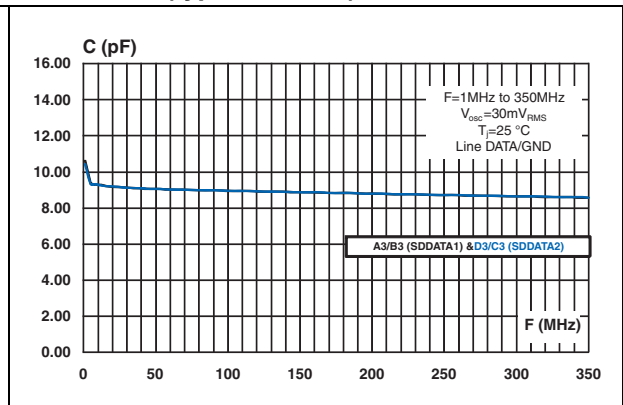


Figure 7. Digital crosstalk measurements

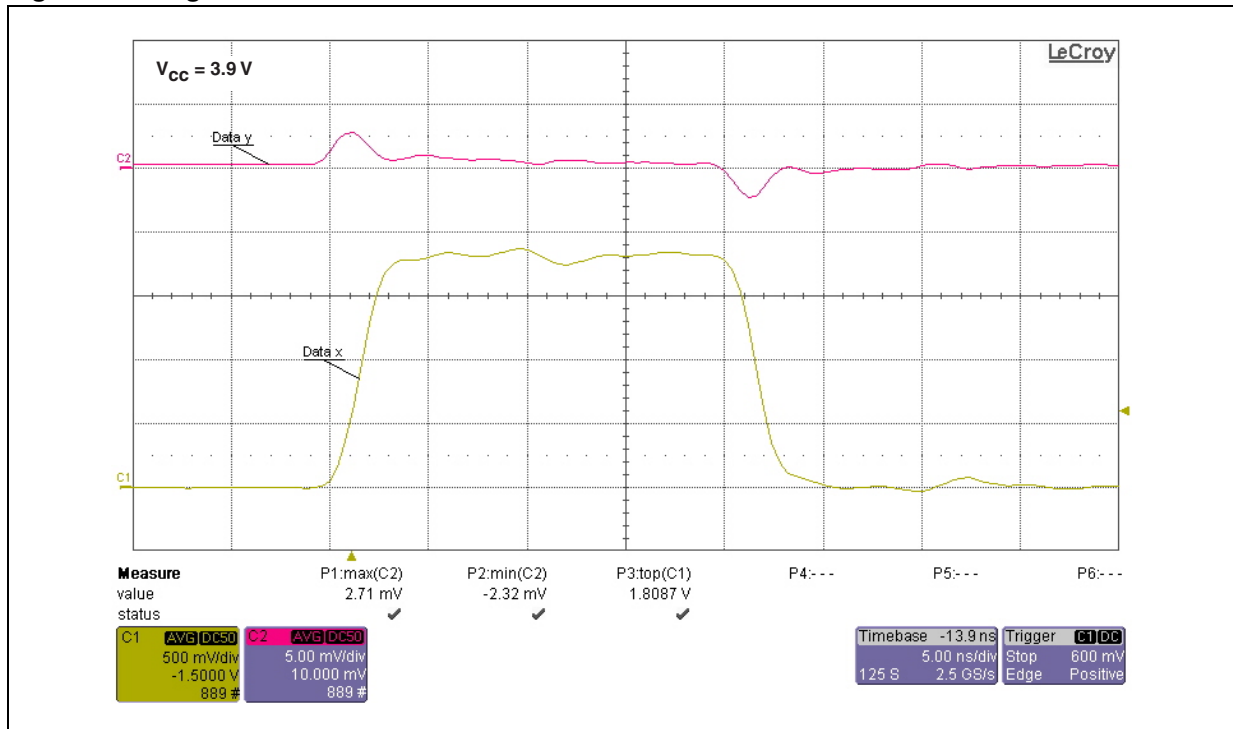


Figure 8. ESD response to IEC 61000-4-2 (+8 kV contact discharge) on one input and one output

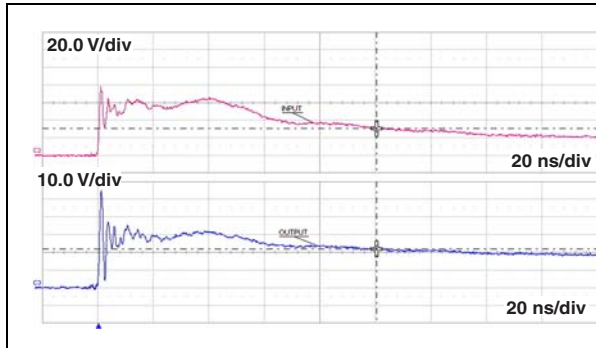
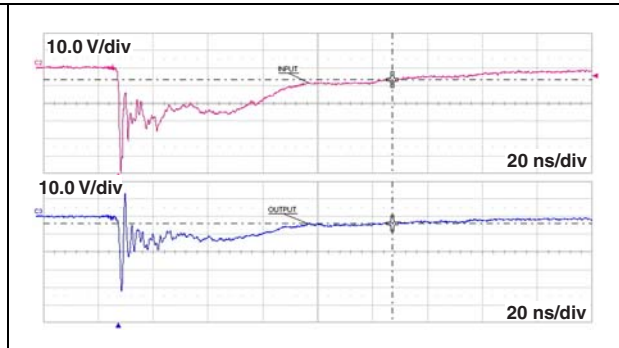
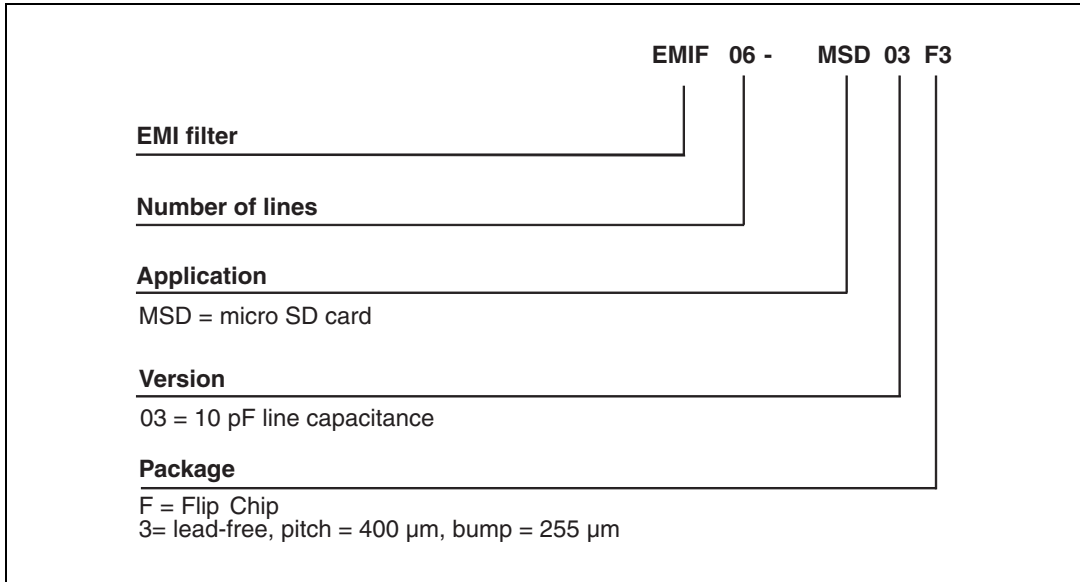


Figure 9. ESD response to IEC 61000-4-2 (-8 kV contact discharge) on one input and one output



## 2 Ordering information scheme

Figure 10. Ordering information scheme



### 3 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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 11. Package dimensions

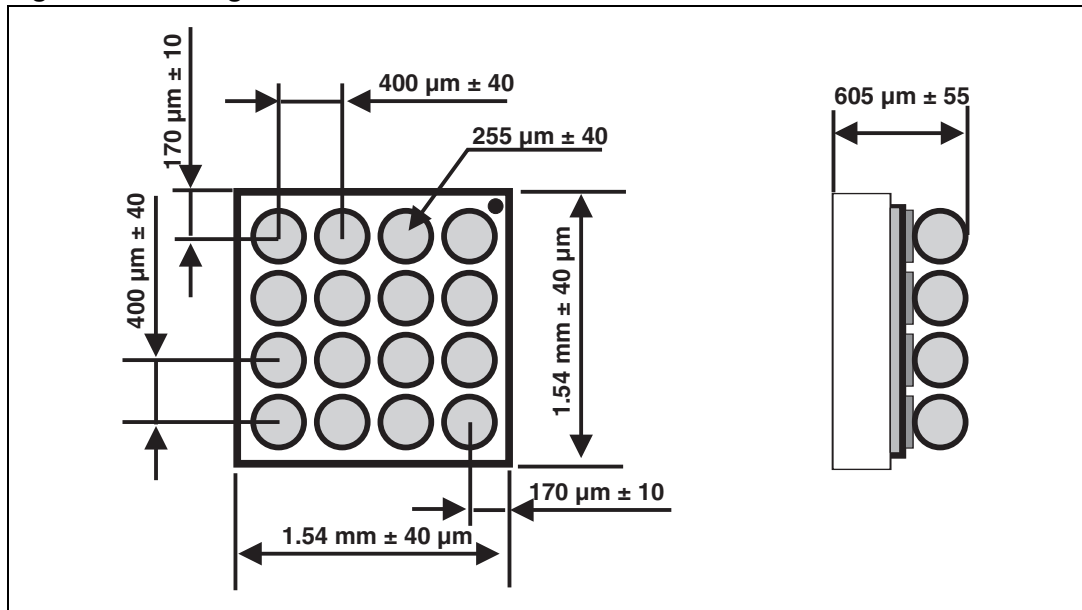


Figure 12. Footprint

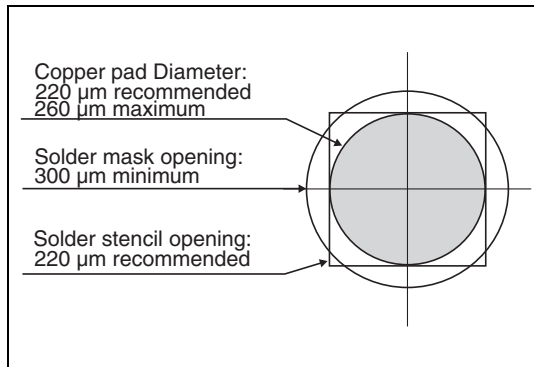


Figure 13. Marking

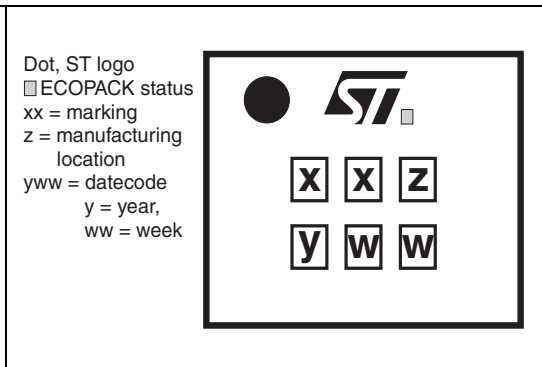
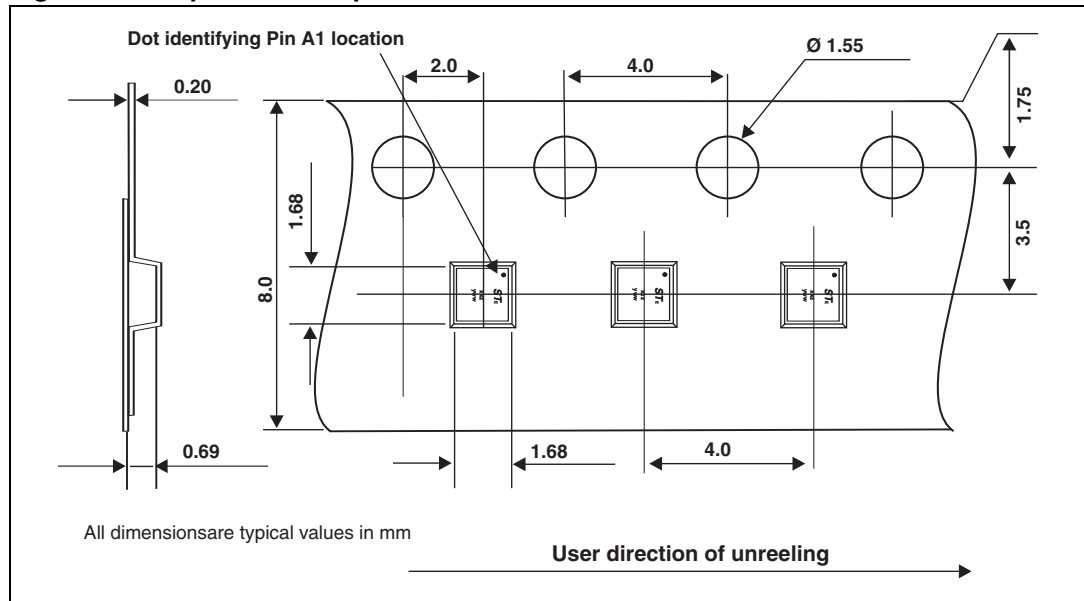


Figure 14. Tape and reel specification



## 4 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-MSD03F3	JV	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"

## 5 Revision history

Table 5. Document revision history

Date	Revision	Changes
11-Jul-2011	1	First issue.

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