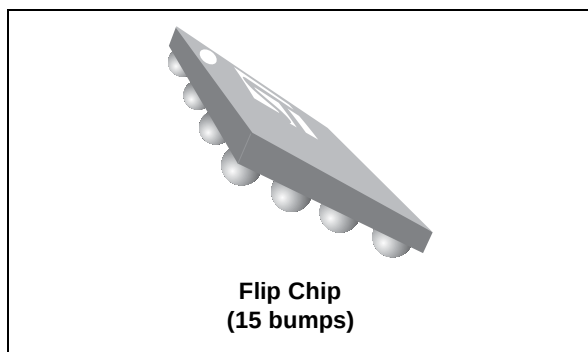


6-line low capacitance IPAD™ for micro-SD card with EMI filtering and ESD protection

Datasheet — production data



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

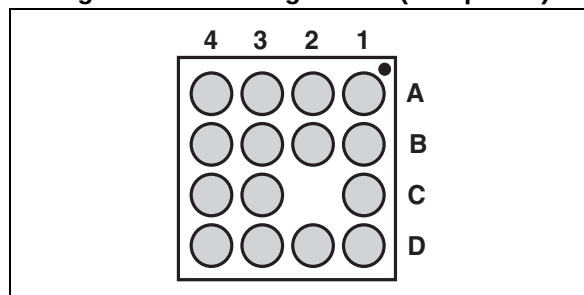
Complies with the following standards:

- 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

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

Figure 2. EMIF06-USD04F3 Schematic

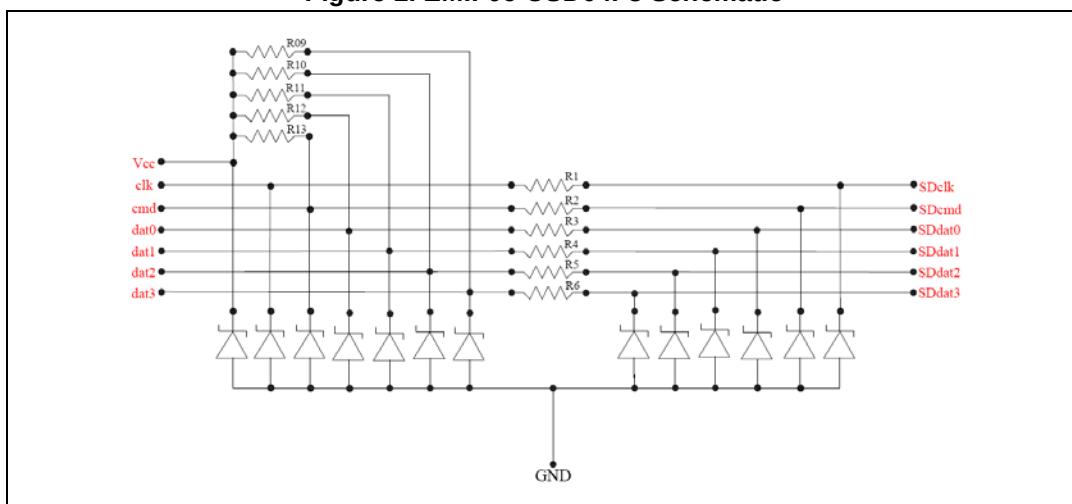


Table 2. Pin configuration

Pin	Signal	Pin	Signal
A1	dat0	C1	Cmd
A2	dat1		
A3	SDdat1	C3	GND
A4	SDdat0	C4	SDcmd
B1	clk	D1	dat3
B2	Vcc	D2	dat2
B3	GND	D3	SDdat2
B4	SDclk	D4	SDdat3

Table 3. Electrical characteristics (values, $T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage	$I_R = 1\text{ mA}$	14		20	V
I_{RM}	Leakage current at V_{RM}	$V_{RM} = 3\text{ V}$			100	nA
R1, R2, R3, R4, R5, R6	Serial resistance	Tolerance $\pm 10\%$, matching $\pm 2\%$		40		Ω
R9, R10, R11, R12	Pull-up resistance	Tolerance $\pm 10\%$, matching $\pm 2\%$		50		k Ω
R13	Pull-up resistance on cmd	Tolerance $\pm 10\%$		15		k Ω
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	

Figure 3. Electrical characteristics (definitions)

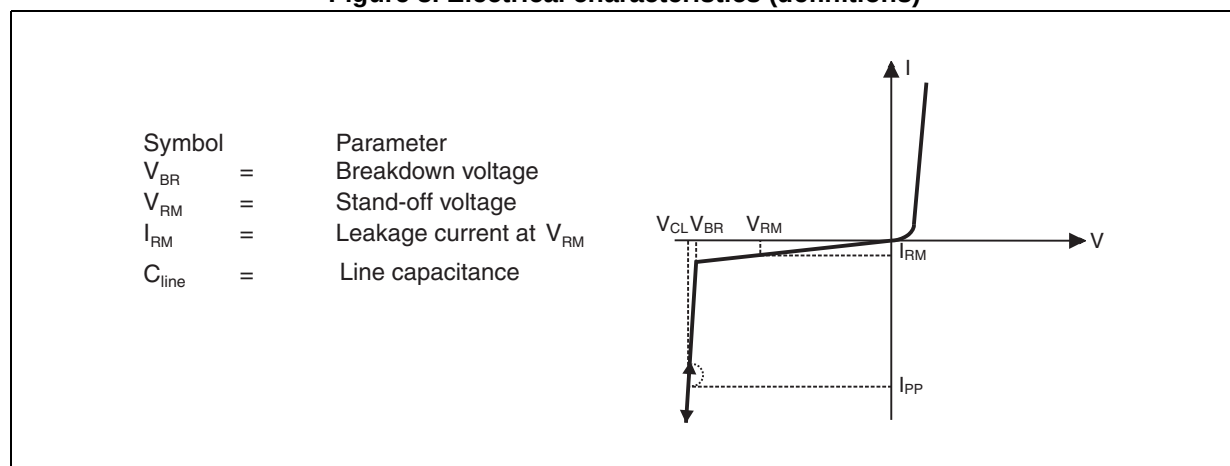


Figure 4. Attenuation versus frequency

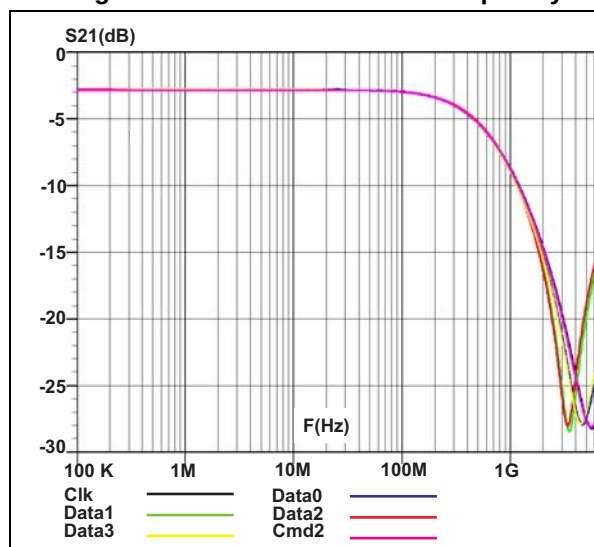


Figure 5. Analog crosstalk versus frequency

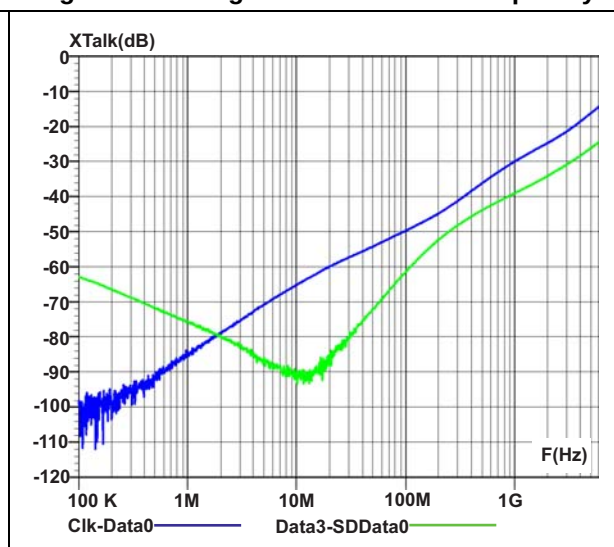


Figure 6. ESD response to IEC 61000-4-2
(+8 kV contact discharge)

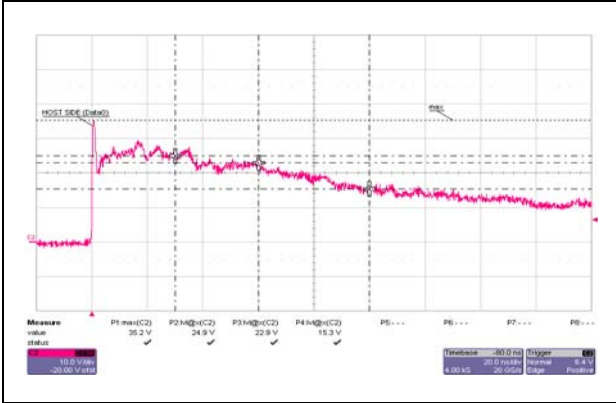


Figure 7. ESD response to IEC 61000-4-2
(-8 kV contact discharge)

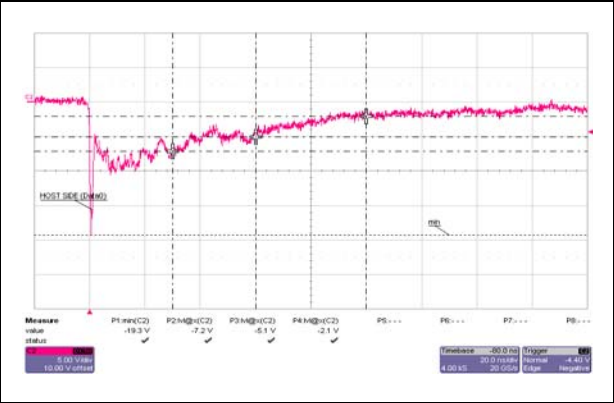
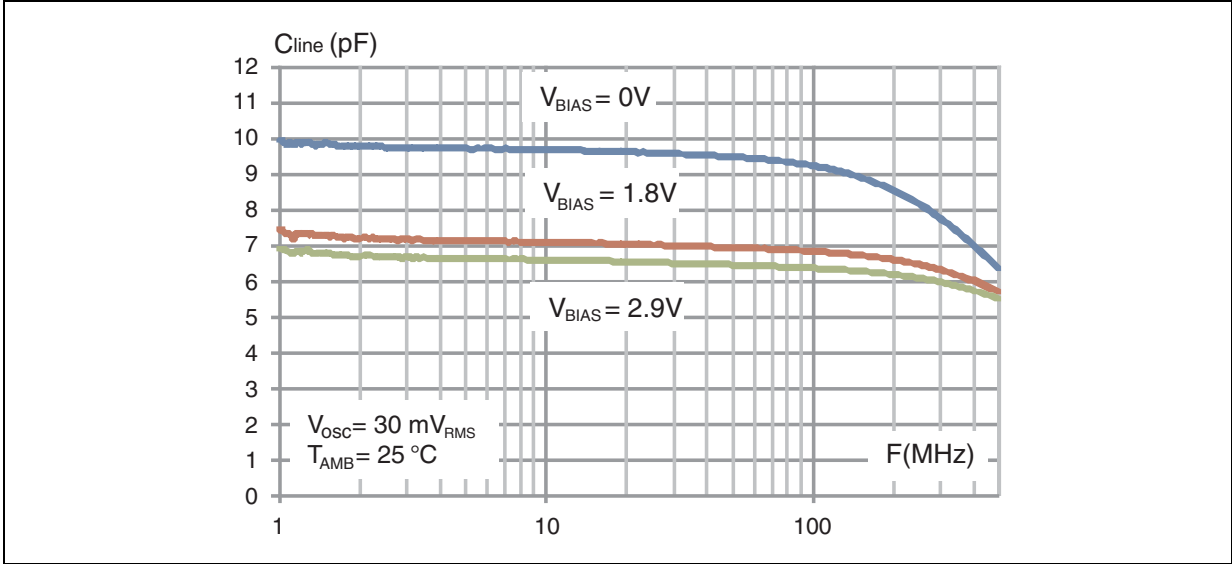


Figure 8. Line capacitance versus frequency and bias voltage (typical values)



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

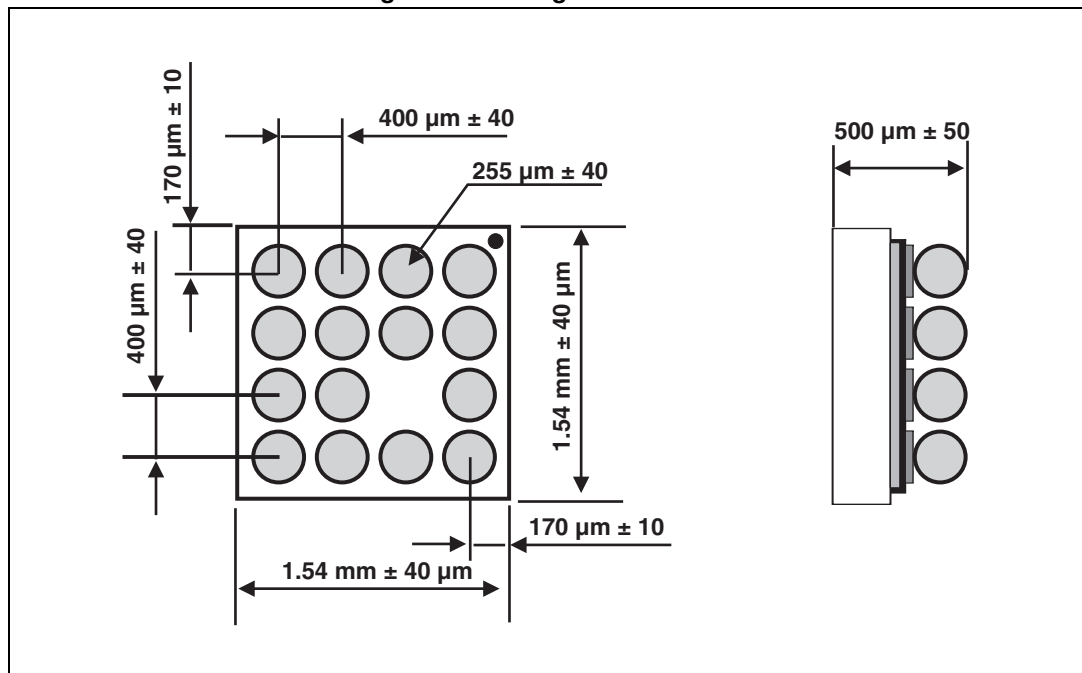


Figure 10. Footprint

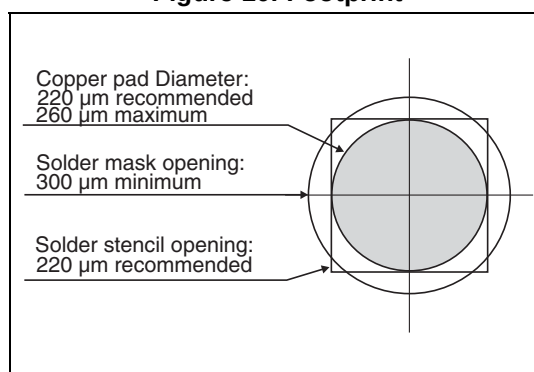


Figure 11. Marking

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

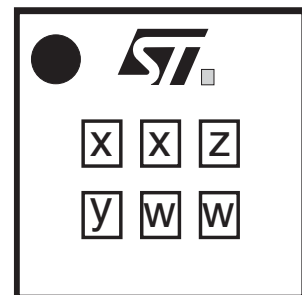
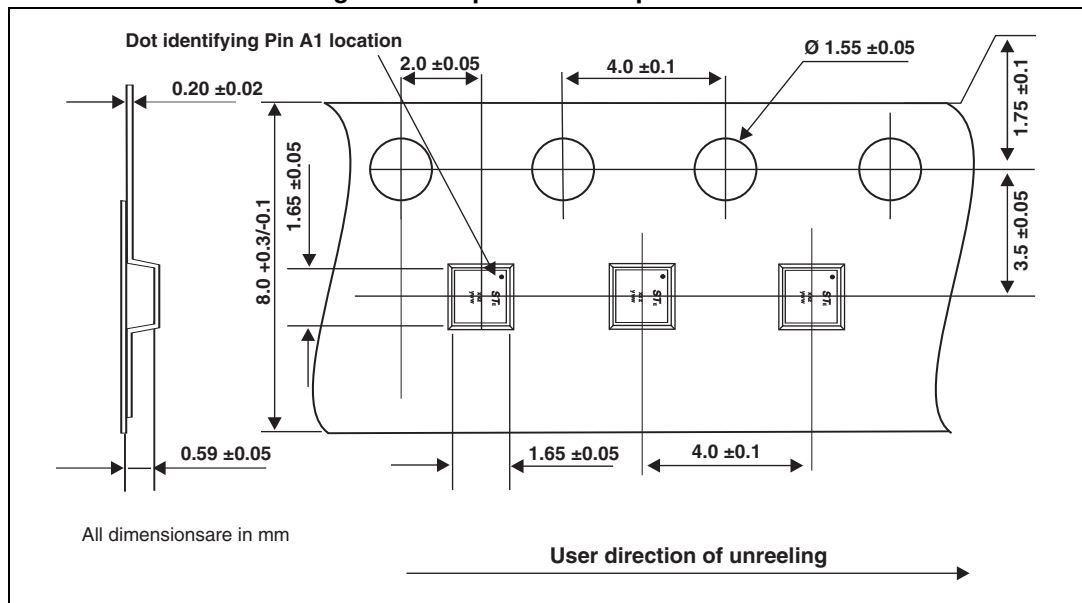


Figure 12. Tape and reel specification



3 Ordering information

Figure 13. Ordering information scheme

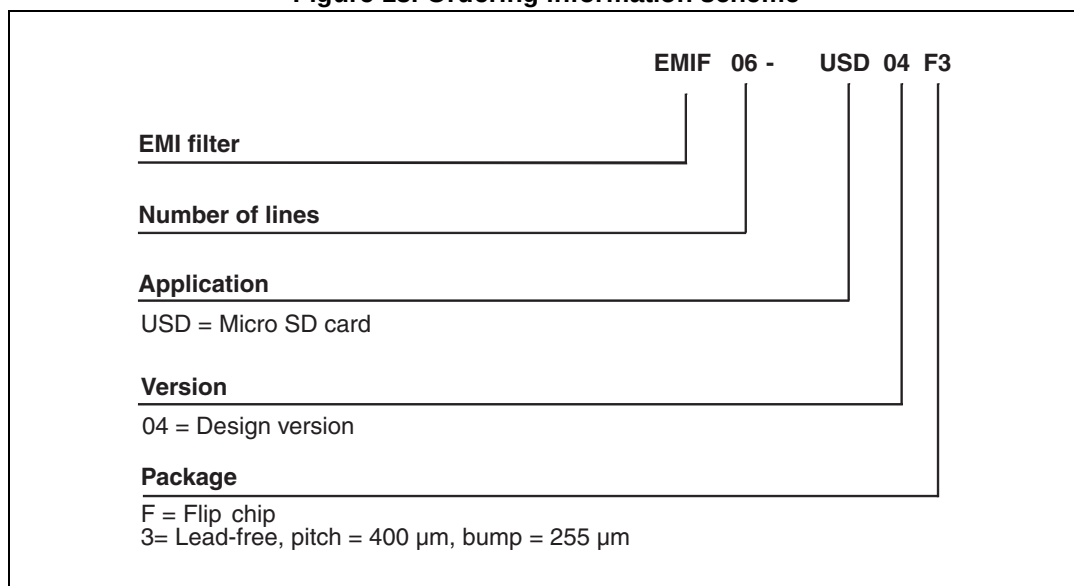


Table 4. Ordering information

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"
 AN4541: "EMI Filters for SD3.0 card: High speed SD card protection and filtering devices"

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 .
06-Jan-2015	4	Added mention for new AN4541.

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