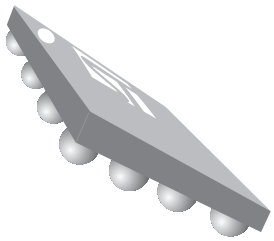
EMIF06-USD04F3

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

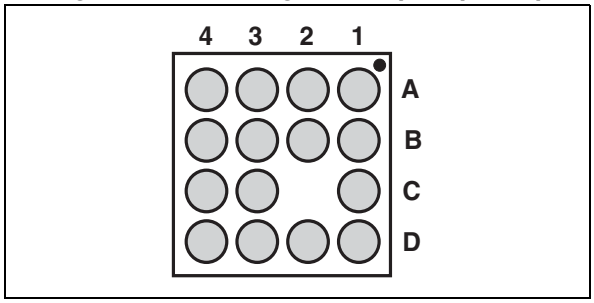
Complies with the following standards:

- 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 (on pins Vcc, SDclk, SDcmd, SDdat0, SDdat1, SDdat2, SDdat3 Air discharge, external pins Contact discharge, external pins ESD discharge IEC 61000-4-2, level 1 (on pins dat0, dat1, clk, cmd,dat3, dat2) Air discharge, internal pins Contact discharge, internal pins	 15 8 2 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

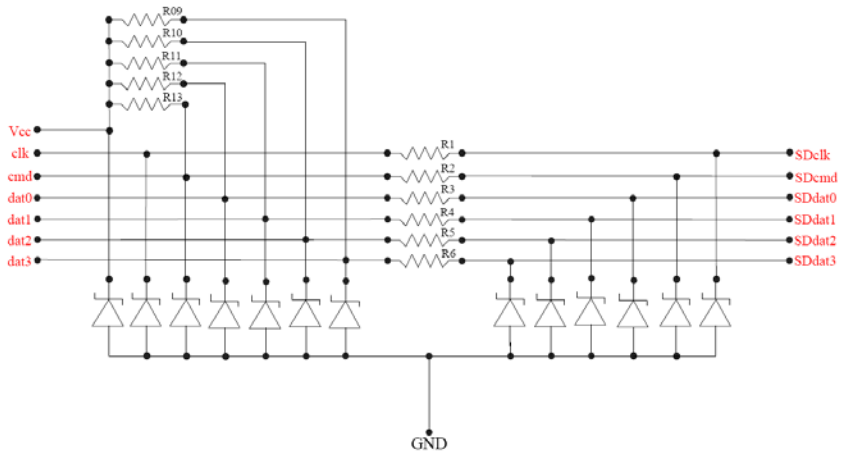


Table 2. Pin configuration

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)

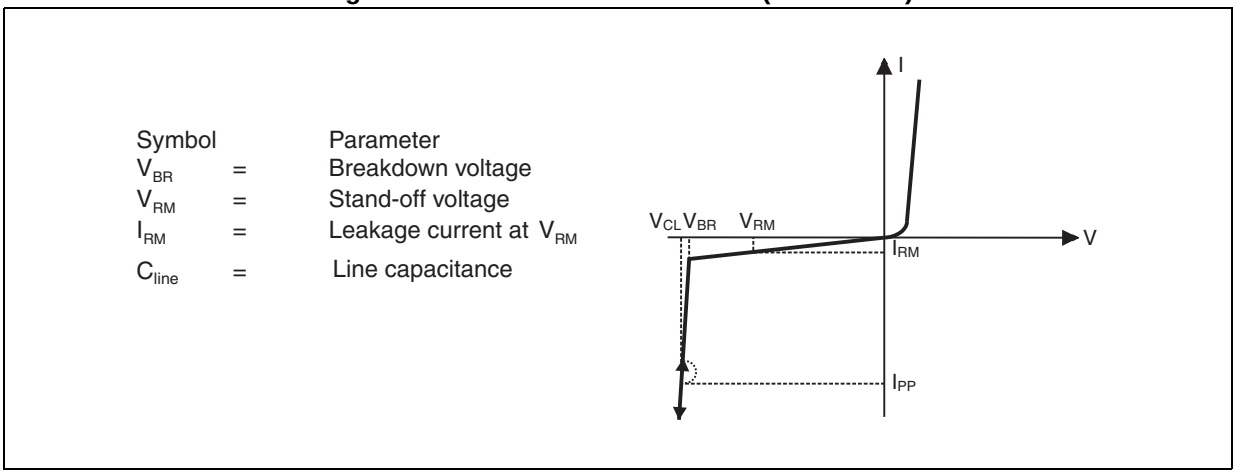


Figure 4. Attenuation versus frequency

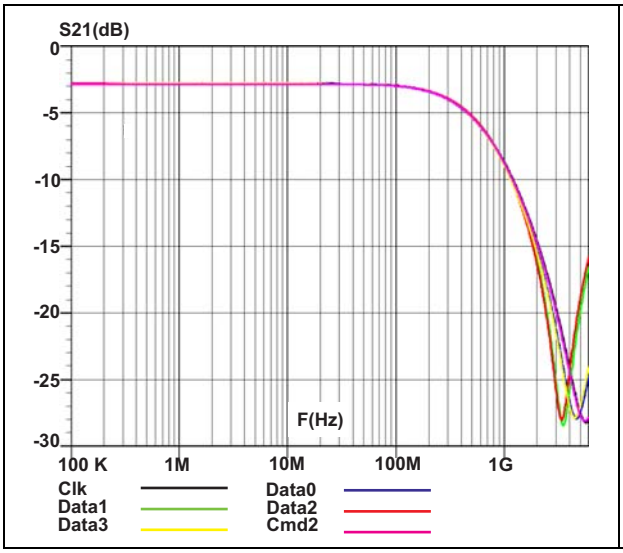


Figure 5. Analog crosstalk versus frequency

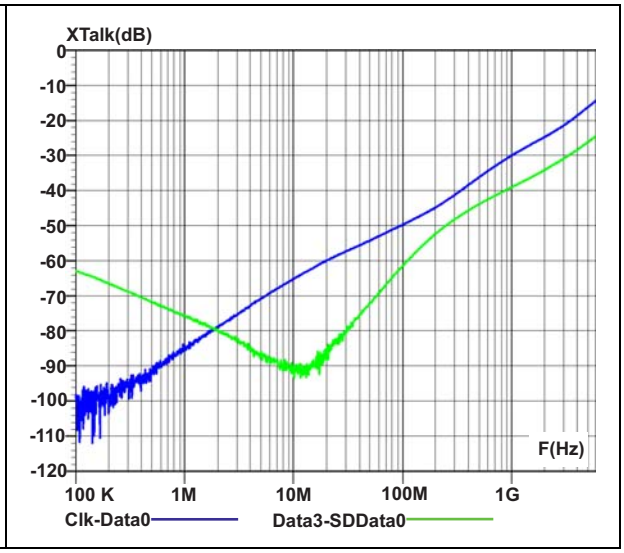


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

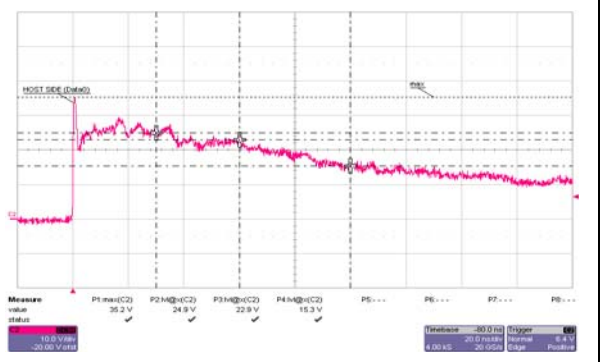


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

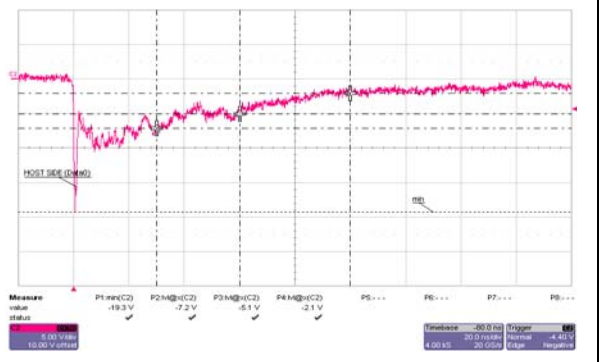
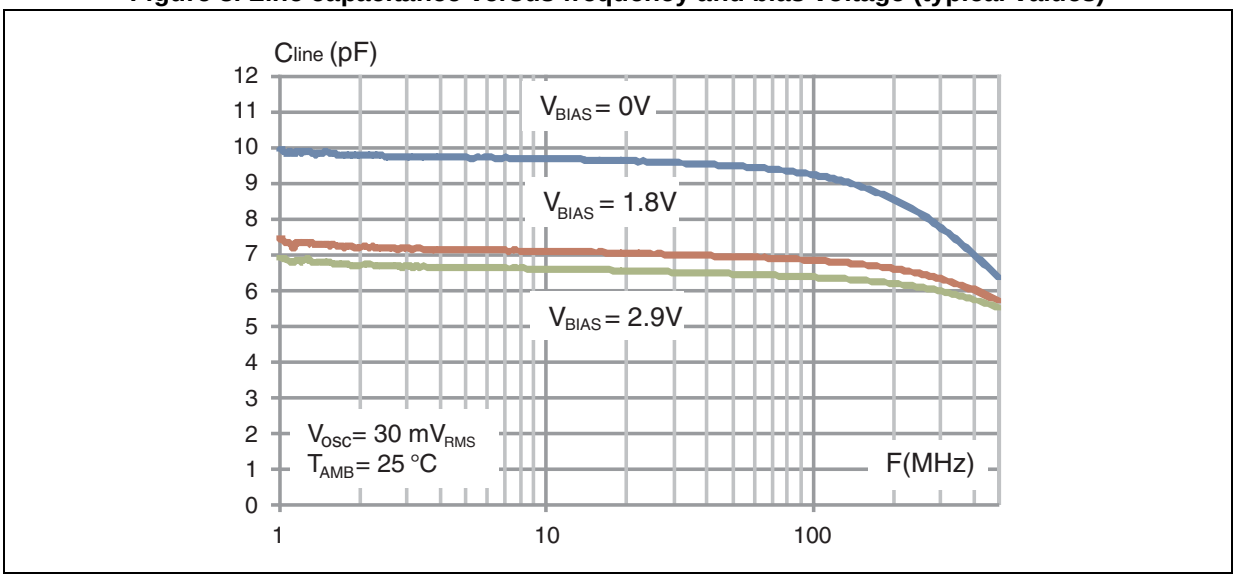


Figure 8. Line capacitance versus frequency and bias voltage (typical values)



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

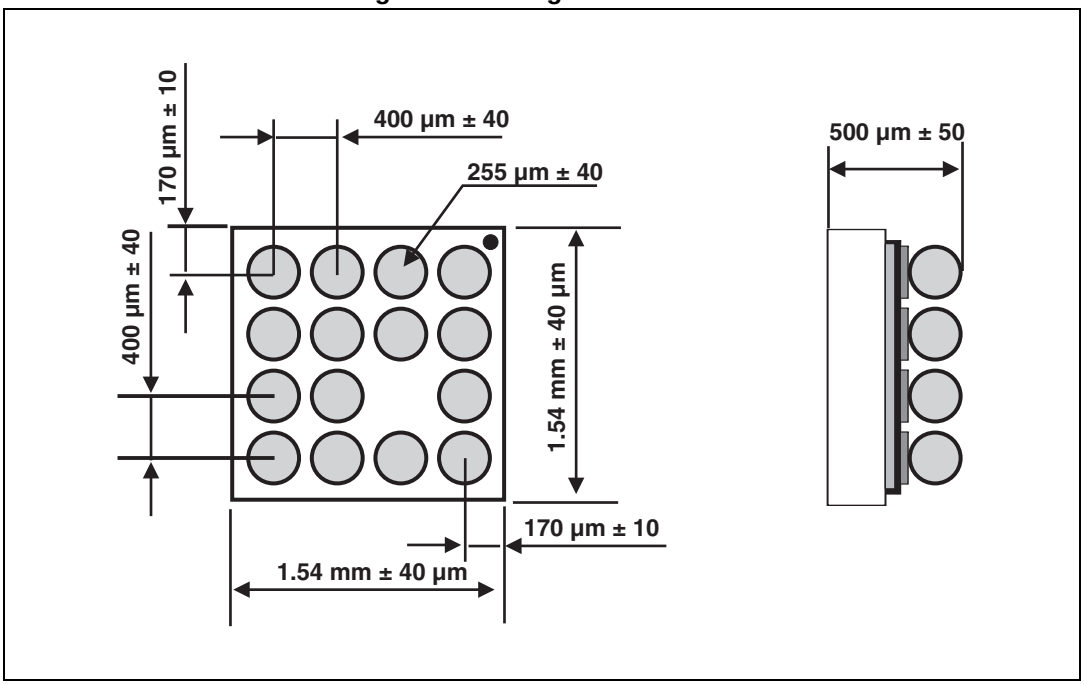


Figure 10. Footprint

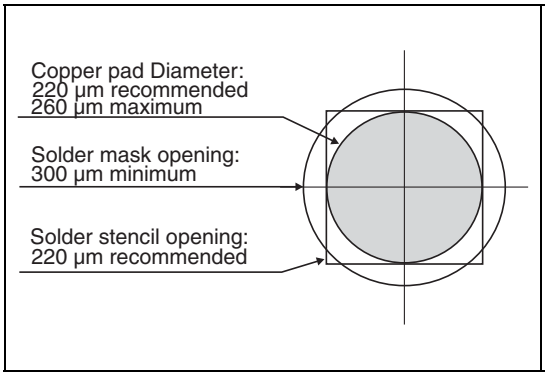


Figure 11. Marking

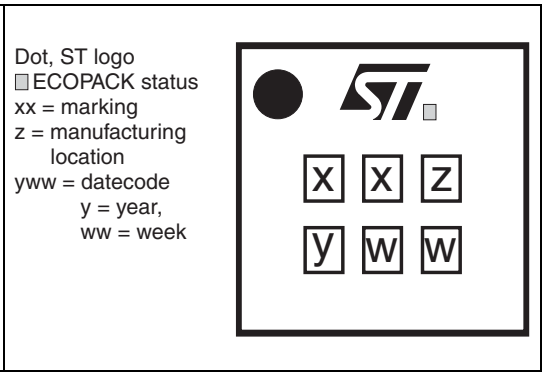
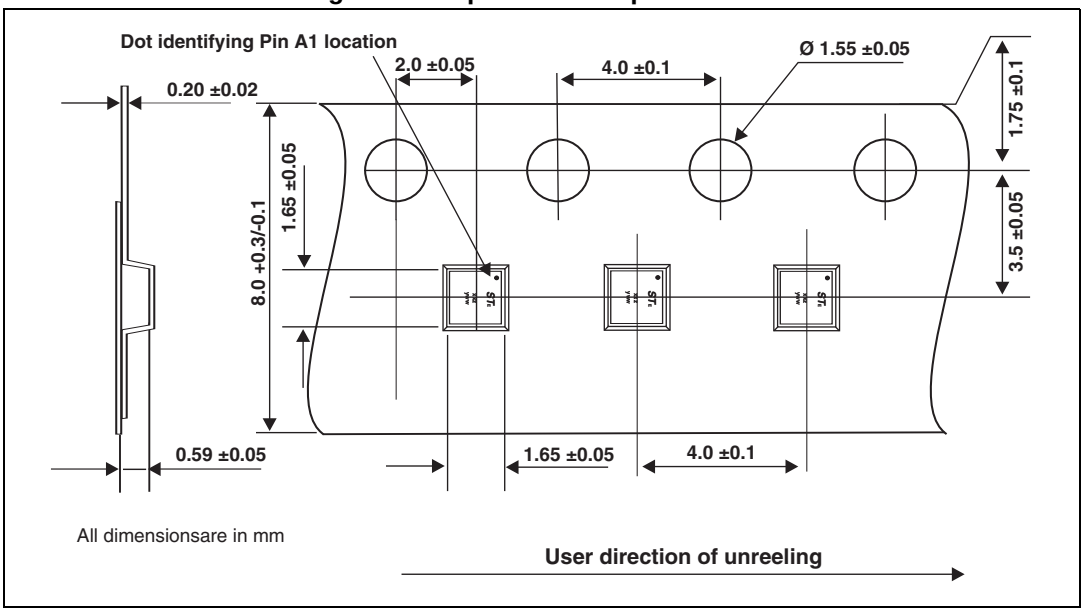


Figure 12. Tape and reel specification



3 Ordering information

Figure 13. Ordering information scheme

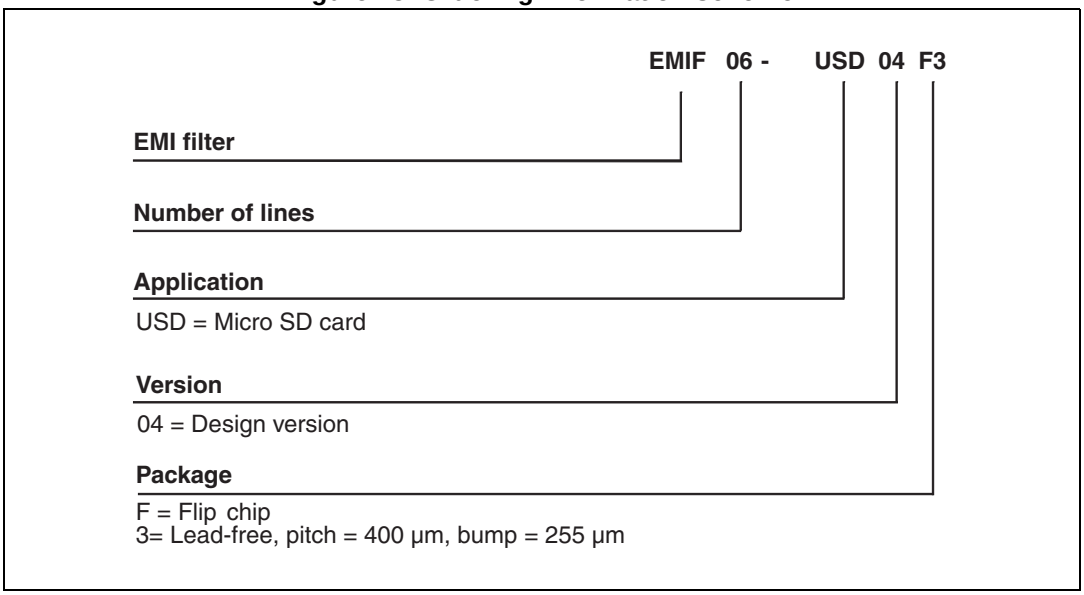


Table 4. Ordering information

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”
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.

Mouser Electronics

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