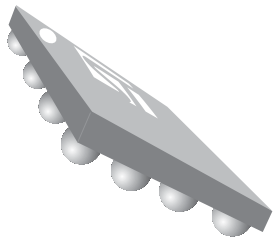
EMIF06-USD14F3

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)
- 208 MHz clock frequency compatible with SDR104 mode (SD3.0)
- Optimized PINOUT for easy PCB layout
- Lead-free package

Benefits

- Low power consumption
- Easy pins access (no tracks between bumps) for easy PCB layout
- 16 Bumps WLCSP package (with 400 µm pitch) featuring natural PCB routing, cost optimization and saving space on the board
- 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)

Applications

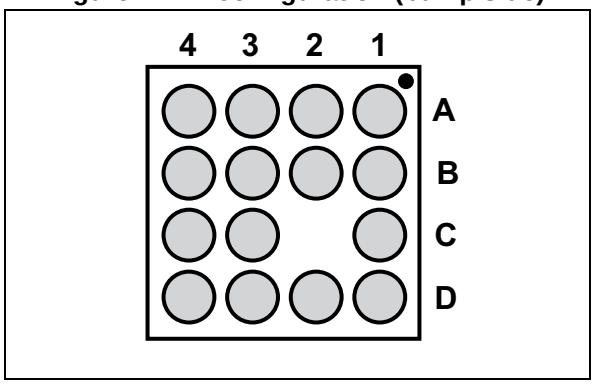
- Consumer and computer electronics with micro-SD card such as:
  - Tablet and smartphone
  - HD set-top boxes
  - Camera
  - Notebook
  - Game console
  - Mother boards

Description

The EMIF06-USD14F3 is a 6-line EMI filter dedicated to SD, mini-SD and micro-SD card applications.

This filter includes ESD protection circuitry, which prevents damage to the protected device when inserting the card. Pull-up resistors are not integrated inside the chip, hence the EMIF06-USD14F3 gives the flexibility to customers to use controllers with embedded resistance. This 6-line IPAD ™ is packaged into a flip-chip solution, saving PCB space.

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-USD14F3 schematic

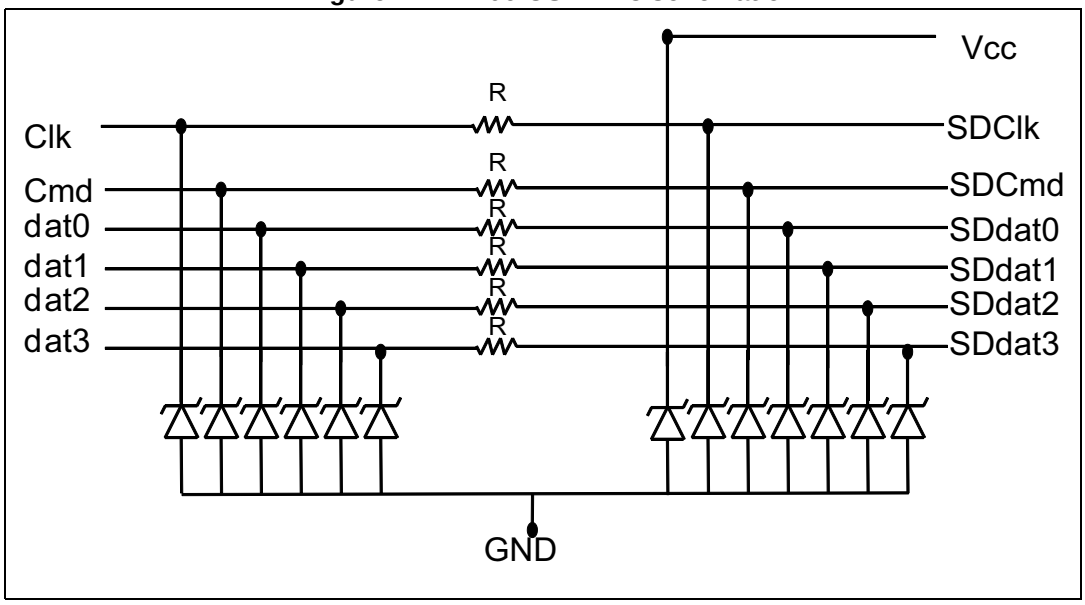


Table 2. Pin configuration

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	V_{RM} = 3 V			100	nA
R	Serial resistance	Tolerance ±10%, matching ±2%		40		Ω
C_{line}	Data line capacitance	V_{BIAS} = 0V, F = 10 MHz, V_{OSC} = 30mV_{RMS}		10	12	pF
		V_{BIAS} = 1.8V, F = 10 MHz, V_{OSC} = 30 mV_{RMS}		7.5	10	

Figure 3. Electrical characteristics (definitions)

Symbol Parameter
V_{BR} = Breakdown voltage
V_{RM} = Stand-off voltage
I_{RM} = Leakage current at V_{RM}
C_{line} = Line capacitance

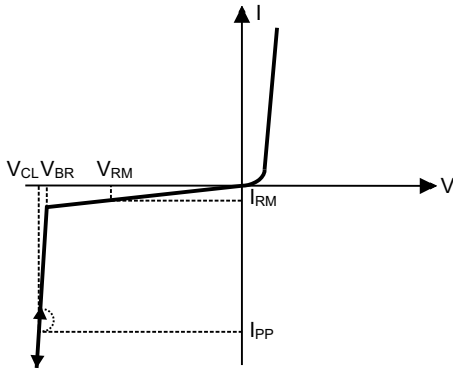


Figure 4. Attenuation versus frequency

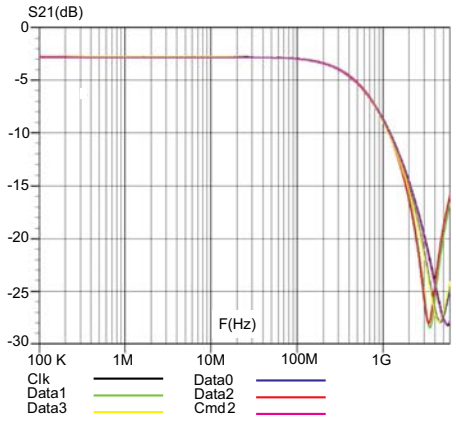


Figure 5. Analog crosstalk versus frequency

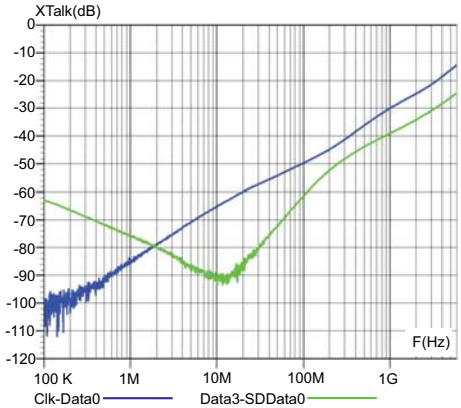


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

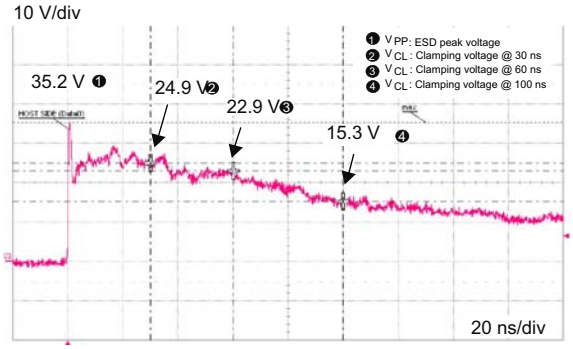


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

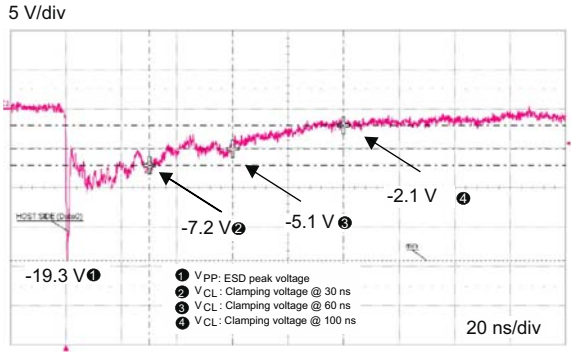
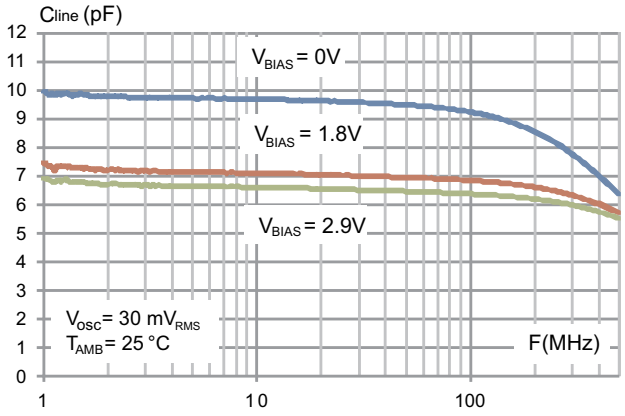


Figure 8. Line capacitance versus frequency and bias voltage (typical values)



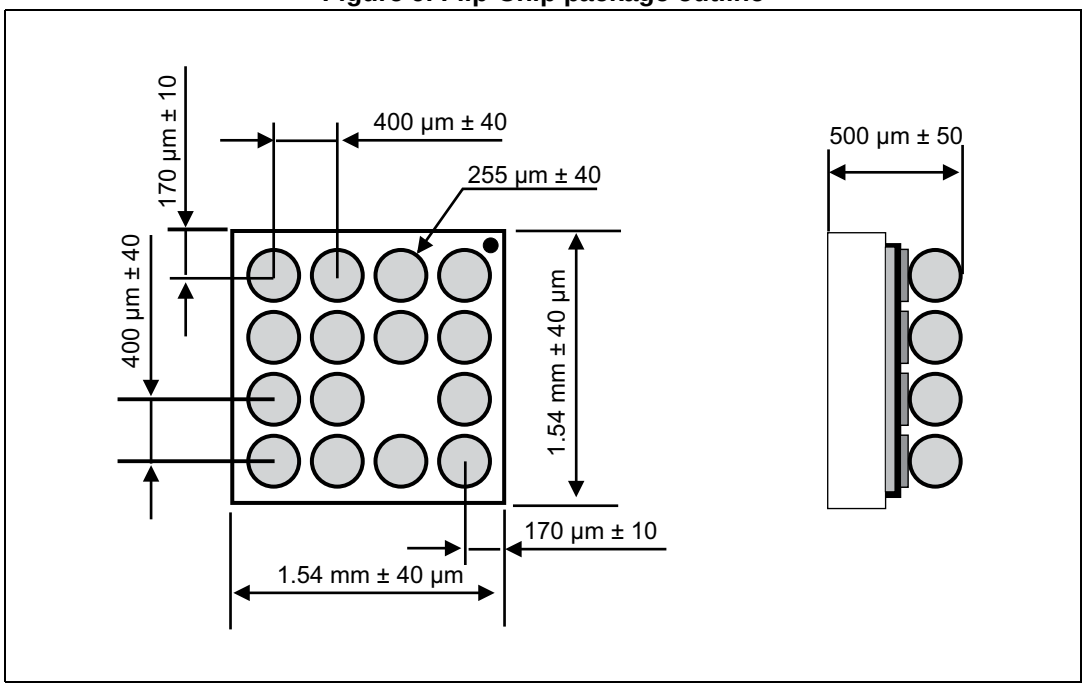
2 Package information

- 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.

2.1 Flip-Chip package information

Figure 9. Flip-Chip package outline



2.2 Packing information

Figure 10. Footprint

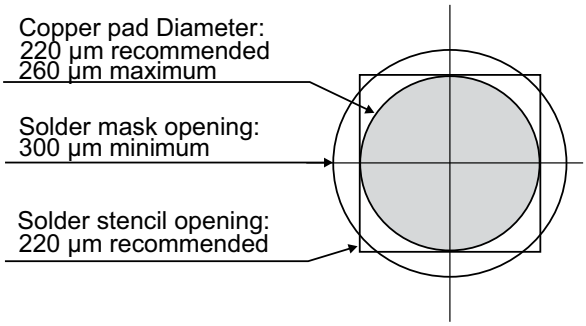


Figure 11. Marking

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

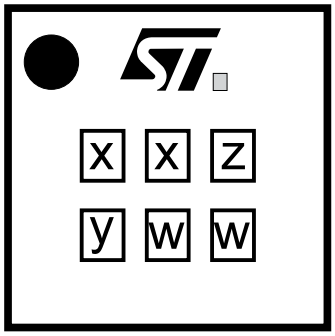
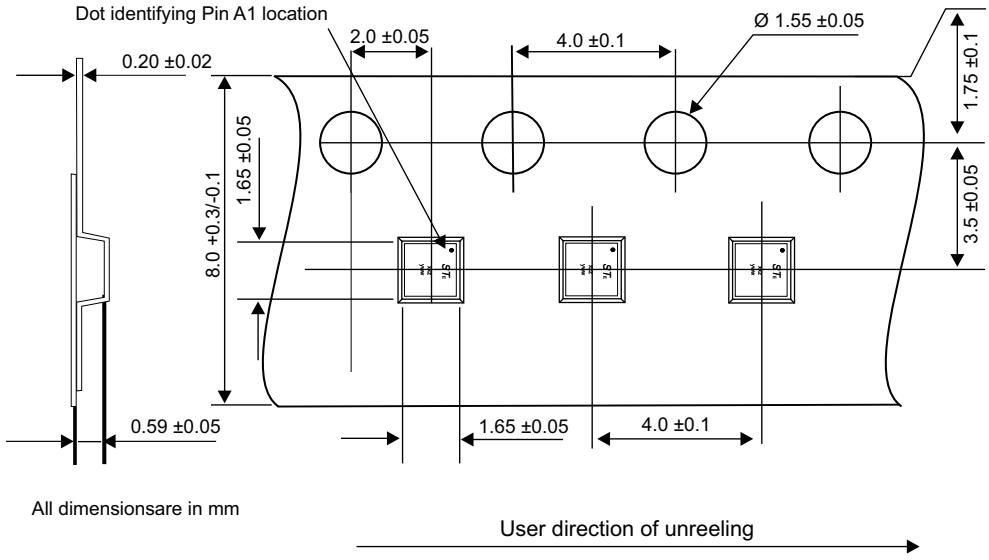


Figure 12. Tape and reel specification



3 Ordering information

Figure 13. Ordering information scheme

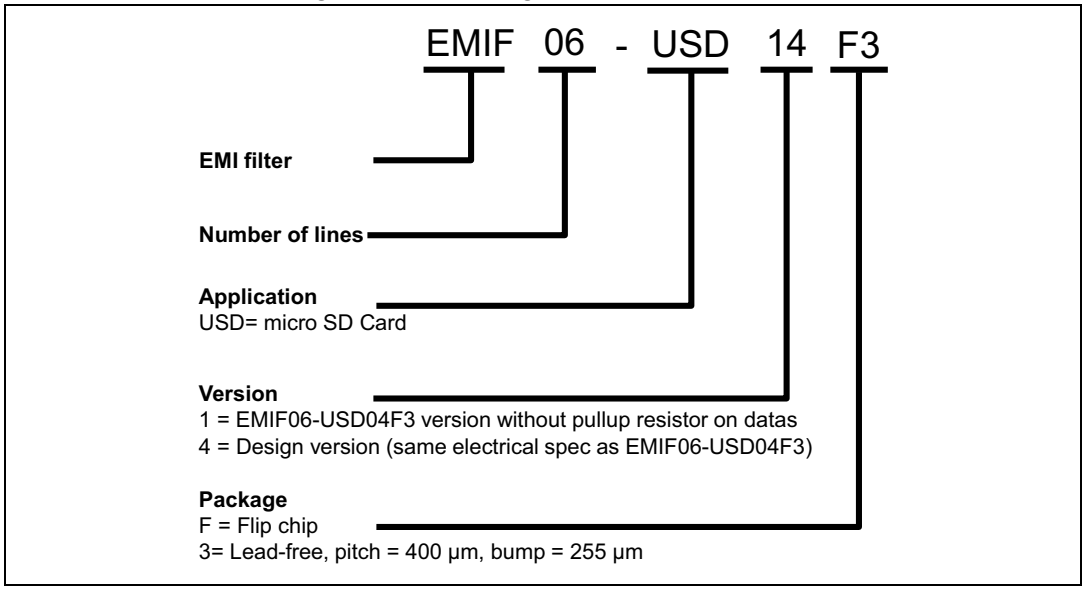


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
EMIF06-USD14F3	LH	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
17-Dec-2015	1	First issue.