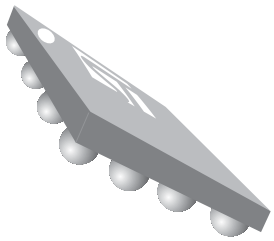
EMIF06-USD05F3

6-line EMI filter and ESD protection for SD card, mini-SD card and micro-SD card interfaces



Flip Chip
(15 bumps)

Datasheet – production data

Features

- EMI low-pass filter
- 104 MHz clock frequency compatible with SDR50 mode (SD3.0)
- High attenuation level of -30 dB at 900 MHz
- Lead-free package

Complies with the following standards:

- IEC 61000-4-2 level 4:
  - ±15 kV (air discharge)
  - ±8 kV (contact discharge)

Applications

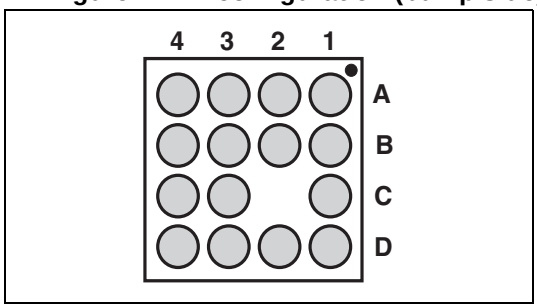
Where EMI filtering in ESD sensitive equipment is required:

- Features phones, smartphones, phablets and communication systems
- Tablets, multimedia players like MP3, camcorders

Description

The EMIF06-USD05F3 is a 6-line EMI filter dedicated to SD, mini-SD and micro-SD card applications. It provides an efficient attenuation at 900 MHz to reduce or suppress the antenna de-sense. 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-USD05F3 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 Air discharge card side Contact discharge card side Air discharge IC side Contact discharge IC side	 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. Electrical characteristics (definitions)

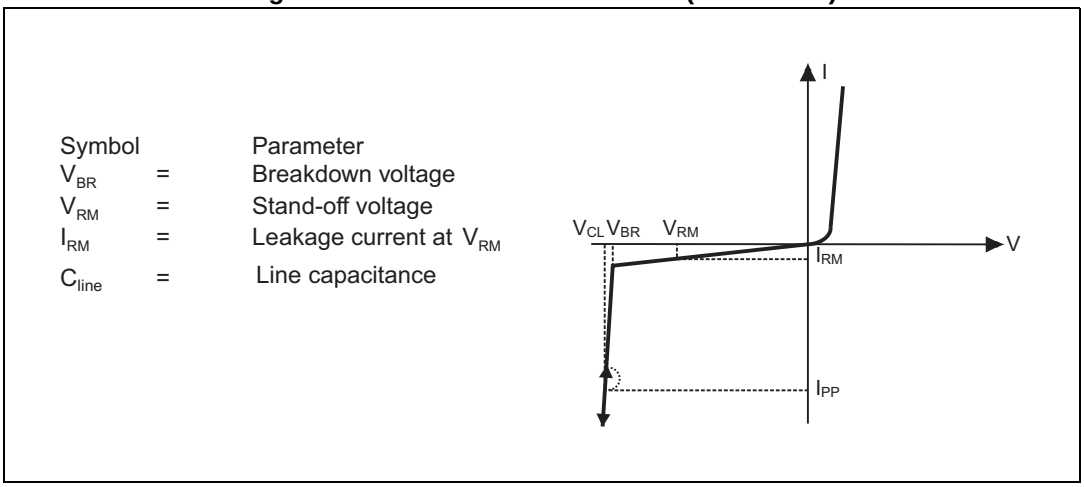


Table 2. Electrical characteristics (values, T_{amb} = 25 °C)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage	I_R = 1 mA	6			V
I_{RM}	Leakage current at V_{RM}	V_{RM} = 3 V			100	nA
R_{line}	Serial line resistor		32	40	48	Ω
C_{line}	Total line capacitance	V_{BIAS} = 2.4 V		11	14	pF
F_c	-3dB cut-off frequency	Z_{source} = Z_{load} = 50 Ω		300		MHz
S_{21}	Attenuation	F = 900 MHz	-25	-30		dB

Table 3. Pin configuration

Pin	Signal	Pin	Signal
A1	dat0	C1	cmd
A2	dat1	C2	
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

Figure 3. Functional schematic

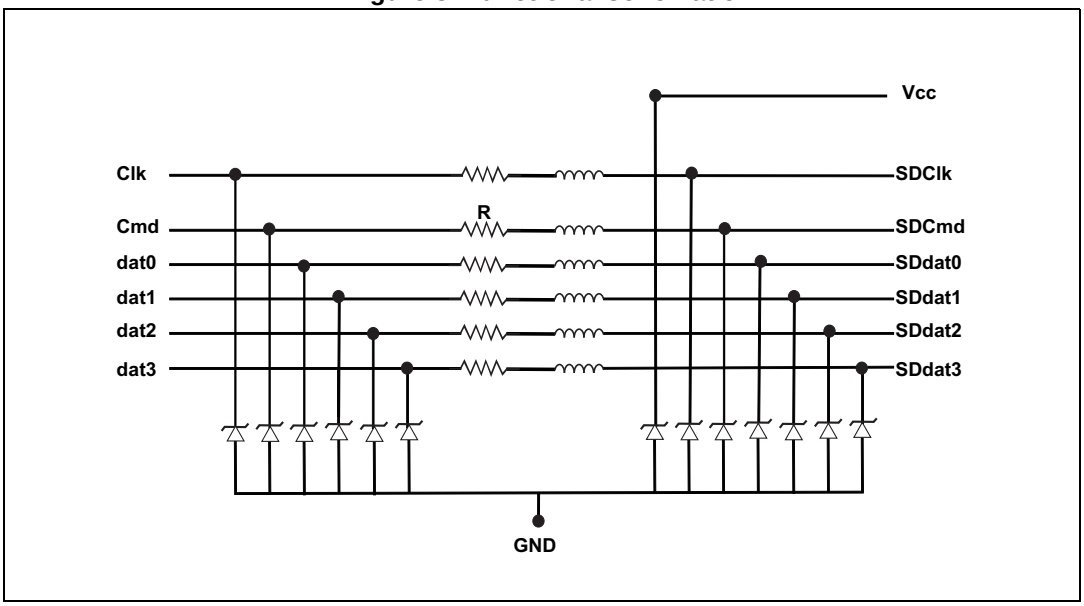


Figure 4. Attenuation versus frequency

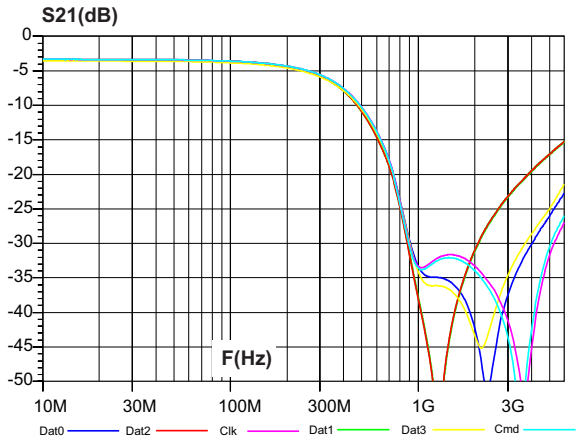


Figure 5. Line capacitance versus applied voltage

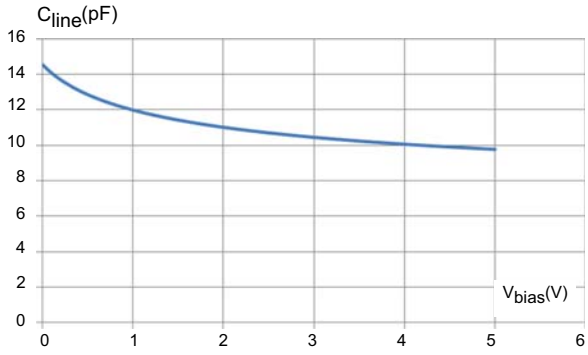


Figure 6. Analog crosstalk versus frequency

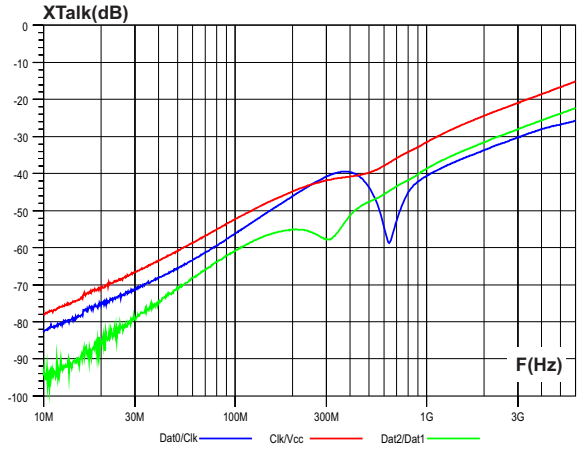


Figure 7. Digital crosstalk measurements

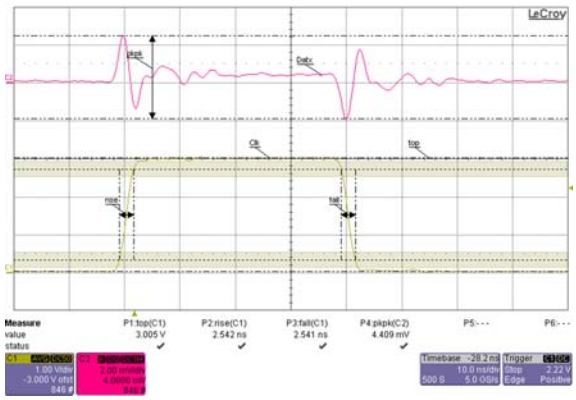


Figure 8. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

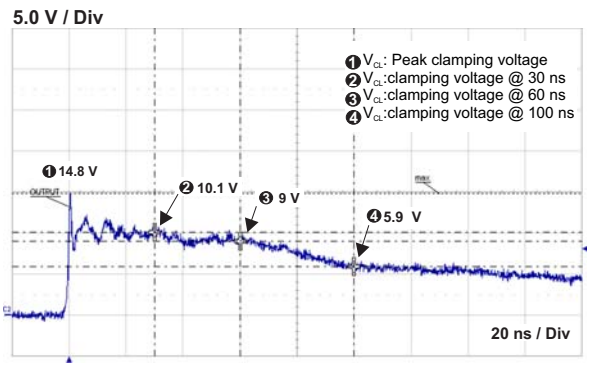
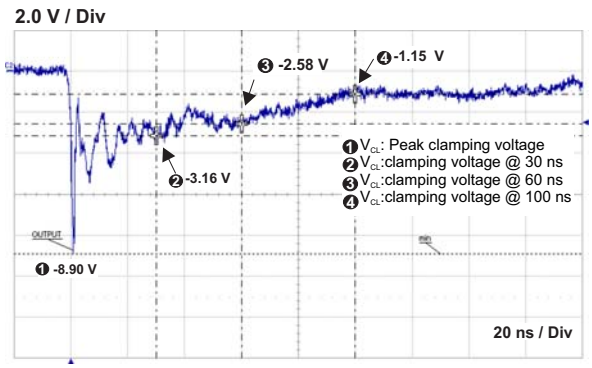


Figure 9. ESD response to IEC 61000-4-2 (-8 kV contact discharge)



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 10. Package dimensions

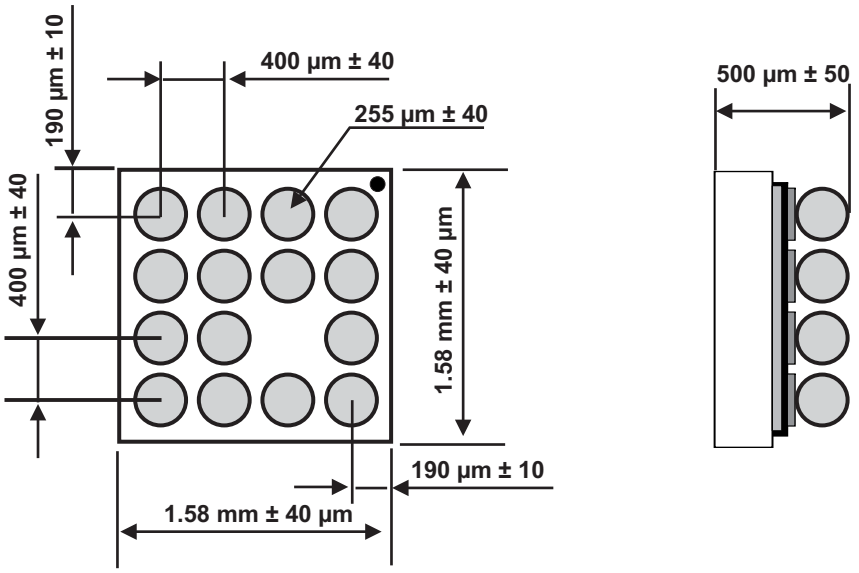


Figure 11. Footprint

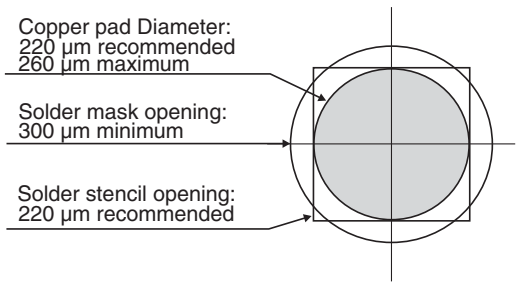


Figure 12. Marking

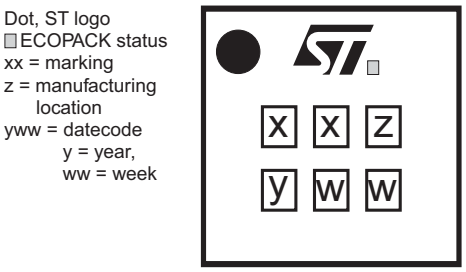
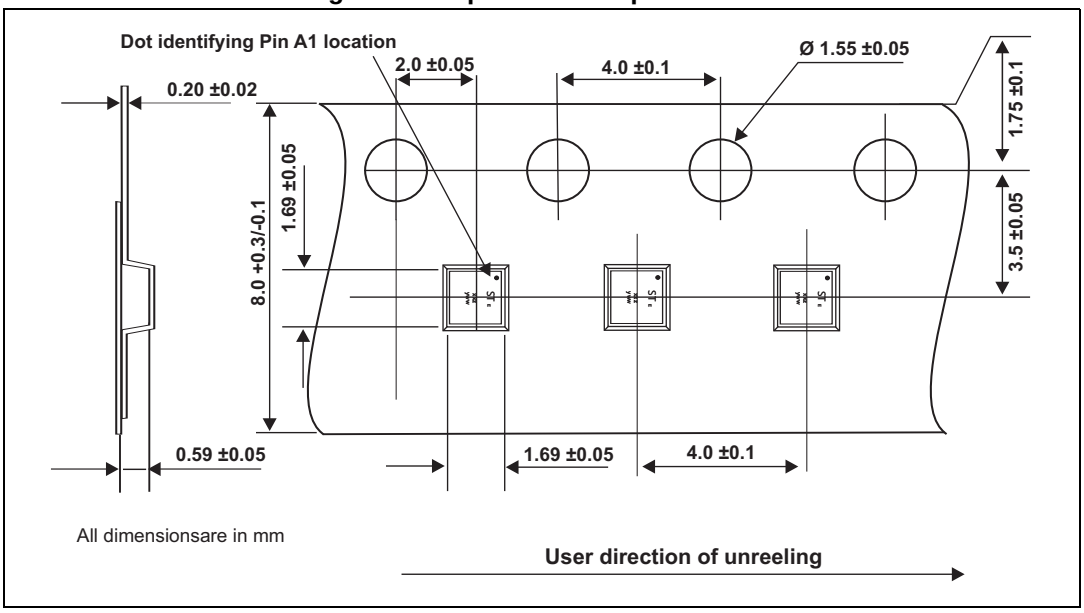


Figure 13. Tape and reel specification



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"

3 Ordering information

Figure 14. Ordering information scheme

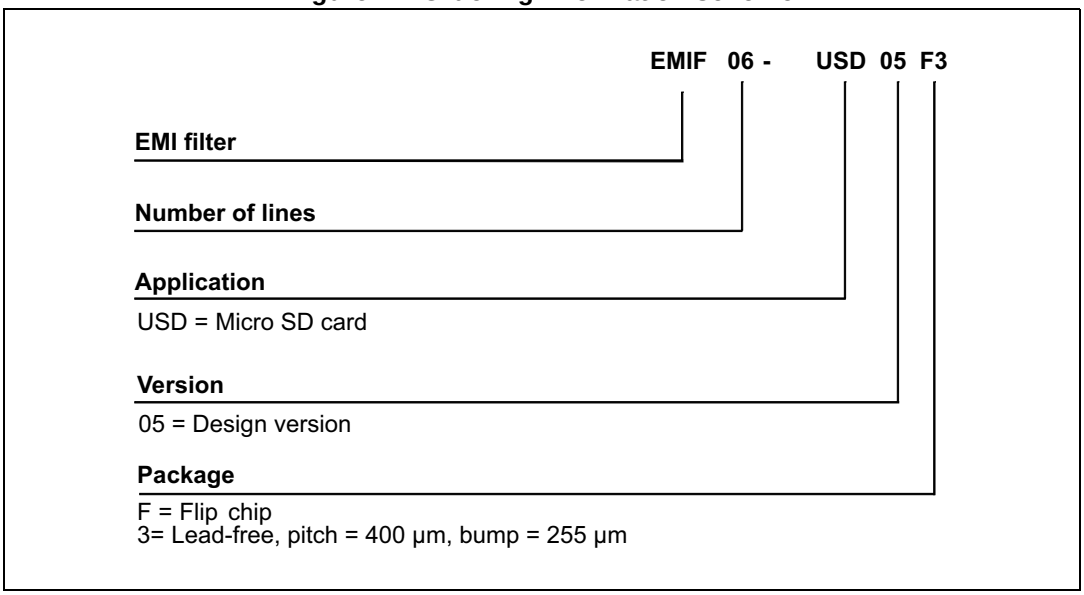


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-USD05F3	KT	Flip Chip	2.6 mg	5000	Tape and reel 7”

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
25-Apr-2014	1	First issue.

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