EMIF06-mSD02C3

Mini and micro-SD card IPAD™ EMI filtering and ESD protection

Features

- EMI low-pass filter
- ESD protection ±15 kV (IEC 61000-4-2)
- Integrated pull up resistors to prevent bus floating when no card is connected
- 50 MHz clock frequency compatibility with C_{line} < 20 pF
- Low power consumption
- Easy layout thanks to smart pin-out configuration
- Very low PCB space consuming
- High reliability offered by monolithic integration
- Reduction of parasitic elements thanks to CSP integration
- Lead-free package

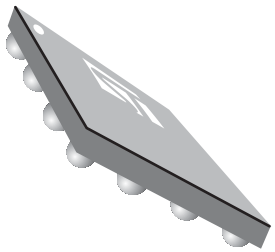
Complies with the following standards:

- IEC 61000-4-2 level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G - Method 3015-7 Class 3A
- SD Specification Part 1, Physical Layer Specification, Version 2.0

Application

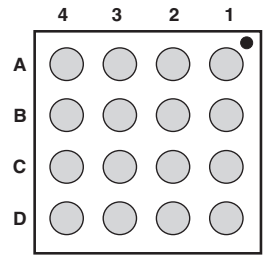
Mini and micro (T-Flash) secure digital memory card in:

- Mobile phones
- Communication systems



Flip Chip
(16 bumps)

Figure 1. Pin configuration (bump side)



Description

The EMIF06-mSD02C3 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.

TM: IPAD is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit
V_{PP}	ESD discharge IEC 61000-4-2, air discharge ESD discharge IEC 61000-4-2, contact discharge	15 15	kV
V_{in}	Maximum input voltage	5.5	V
T_j	Maximum junction temperature	125	°C
T_{op}	Operating temperature range	- 40 to + 85	°C
T_{stg}	Storage temperature range	- 55 to + 150	°C

Figure 2. EMIF06-mSD02C3 configuration

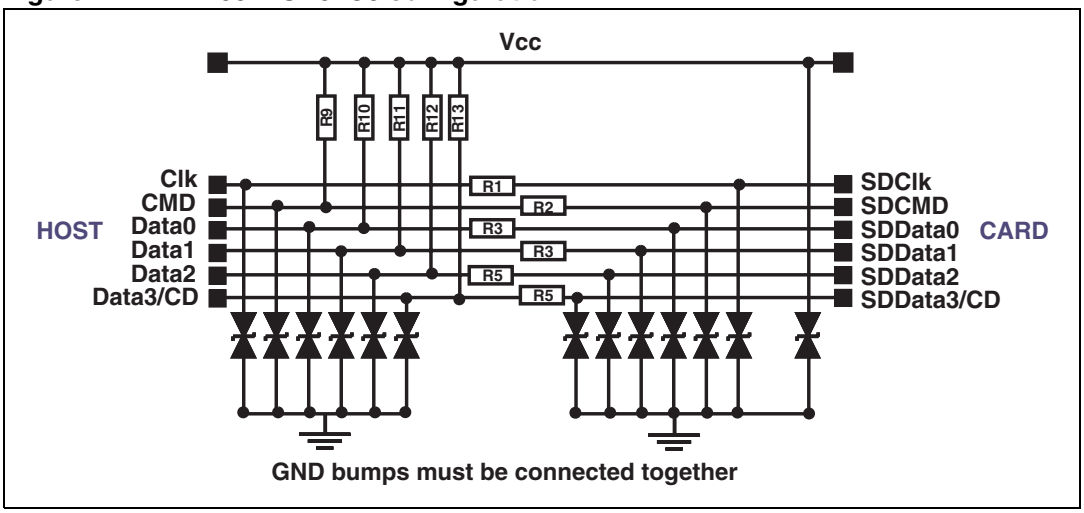


Table 2. Pin configuration

Pin	Signal	Pin	Signal
A1	DATA0	C1	CMD
A2	DATA1	C2	V_{ss}
A3	SDDATA1	C3	V_{ss}
A4	SDDATA0	C4	SDCMD
B1	CLK	D1	DATA3/CD
B2	V_{cc}	D2	DATA2
B3	V_{ss}	D3	SDDATA2
B4	SDCLK	D4	SDDATA3/CD

Table 3. Electrical characteristic

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	14	16		V
I_{RM}	V_{RM} = 3 V			0.1	µA
R1, R2, R3, R4, R5, R6	Tolerance ± 20 %		40		Ω
R10, R11, R12, R13	Tolerance ± 30 %		56		kΩ
R9	Tolerance ± 30 %		4.7		kΩ
C_{line}	V = 0 V, F = 1 MHz, V_{OSC} = 30 mV		15	20	pF

Figure 3. S21 attenuation measurements

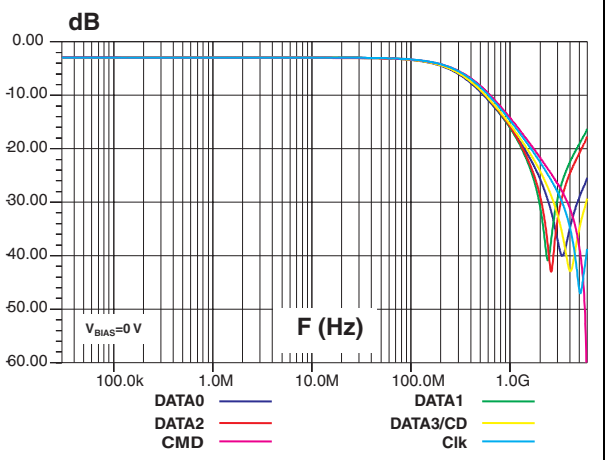


Figure 4. Analog crosstalk measurements

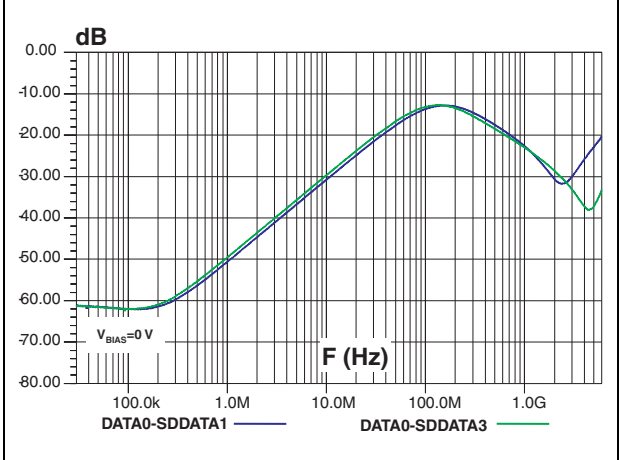


Figure 5. ESD response to IEC 61000-4-2 (+15 kV air discharge) on CLK and data lines

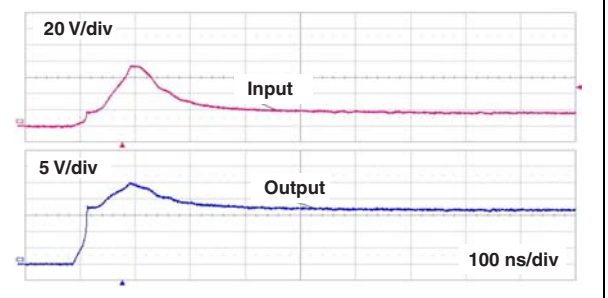


Figure 6. ESD response to IEC 61000-4-2 (-15 kV air discharge) on CLK and data lines

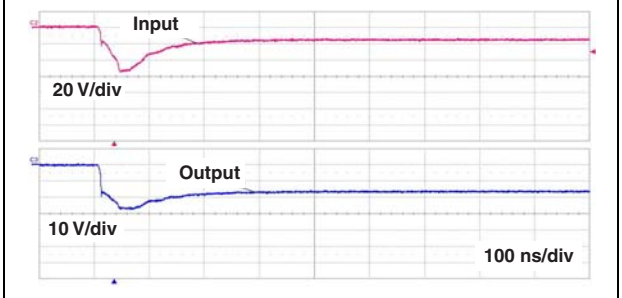


Figure 7. ESD response to IEC 61000-4-2 (+15 kV air discharge) on V_{CC} line

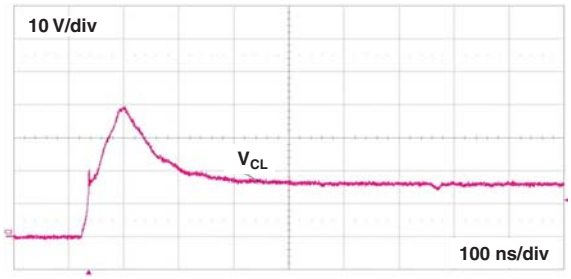


Figure 8. ESD response to IEC 61000-4-2 (-15 kV air discharge) on V_{CC} line

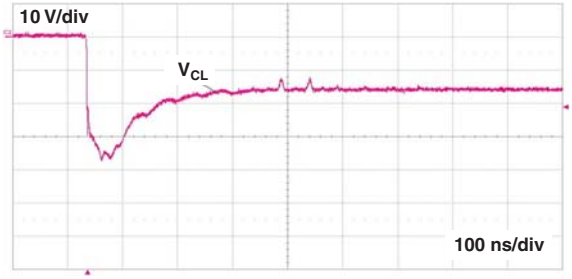


Figure 9. Digital crosstalk test setup

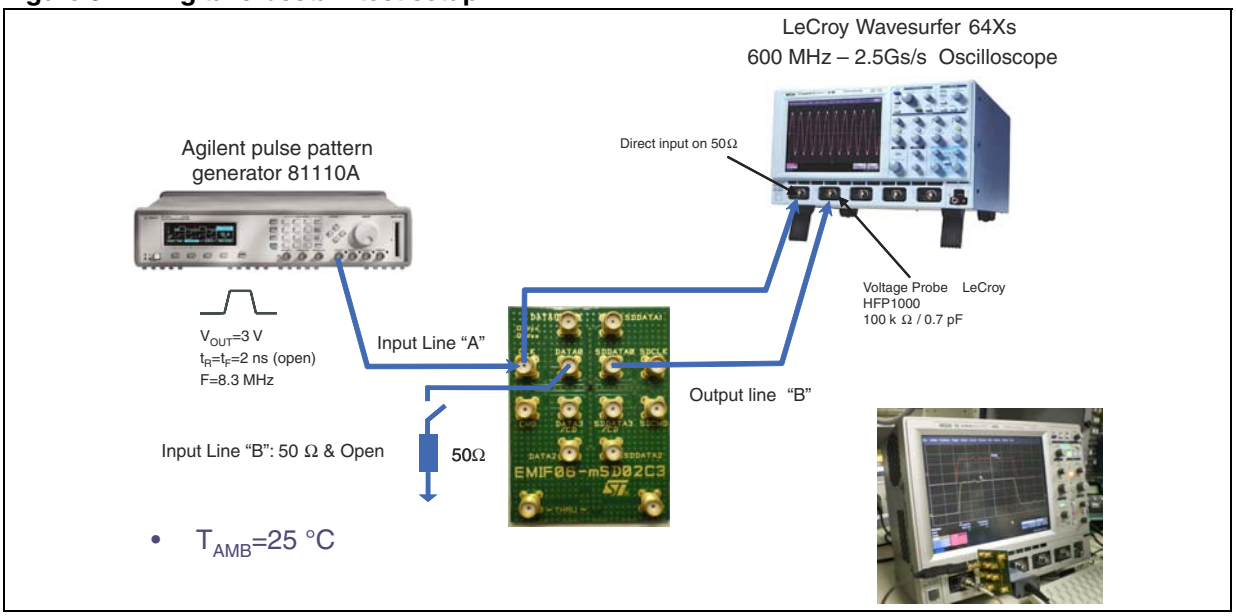


Figure 10. Digital crosstalk

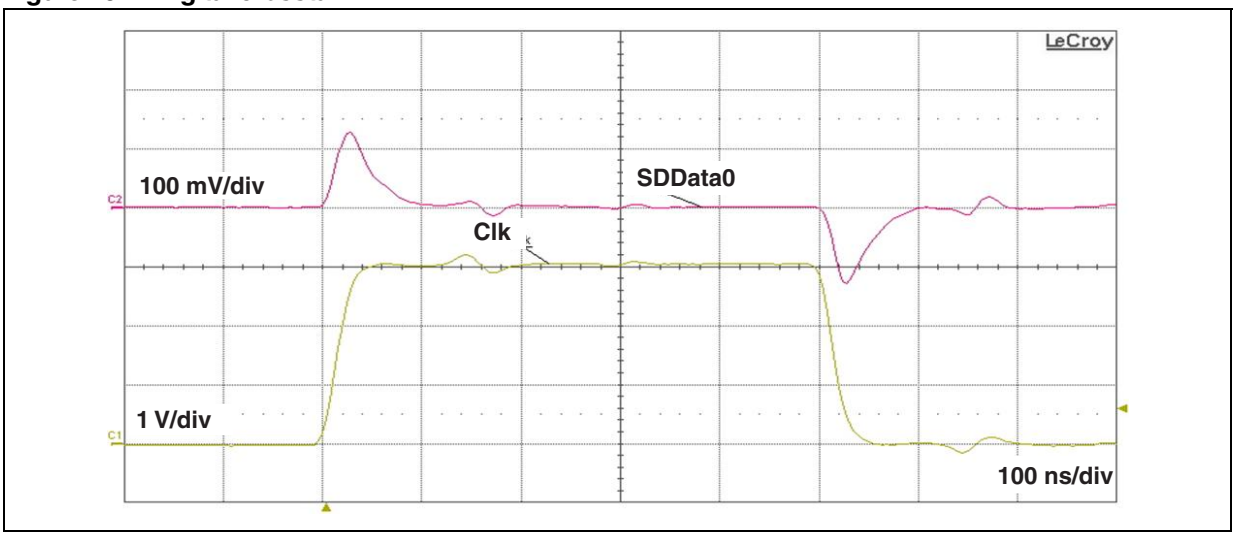


Figure 11. Step response test setup

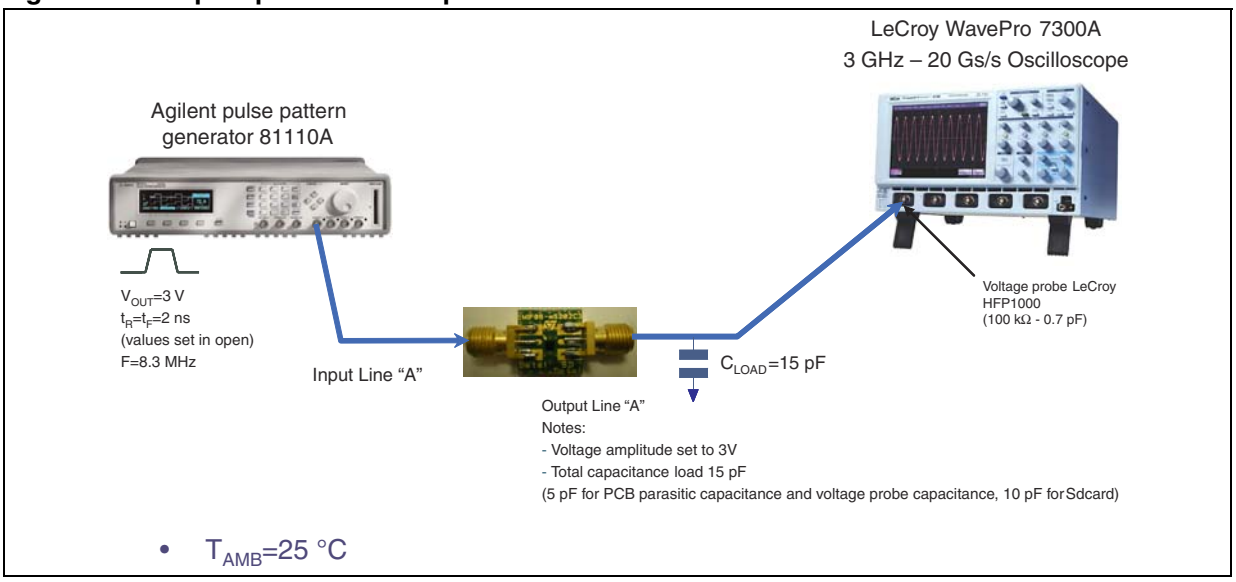


Figure 12. Step response without the filter

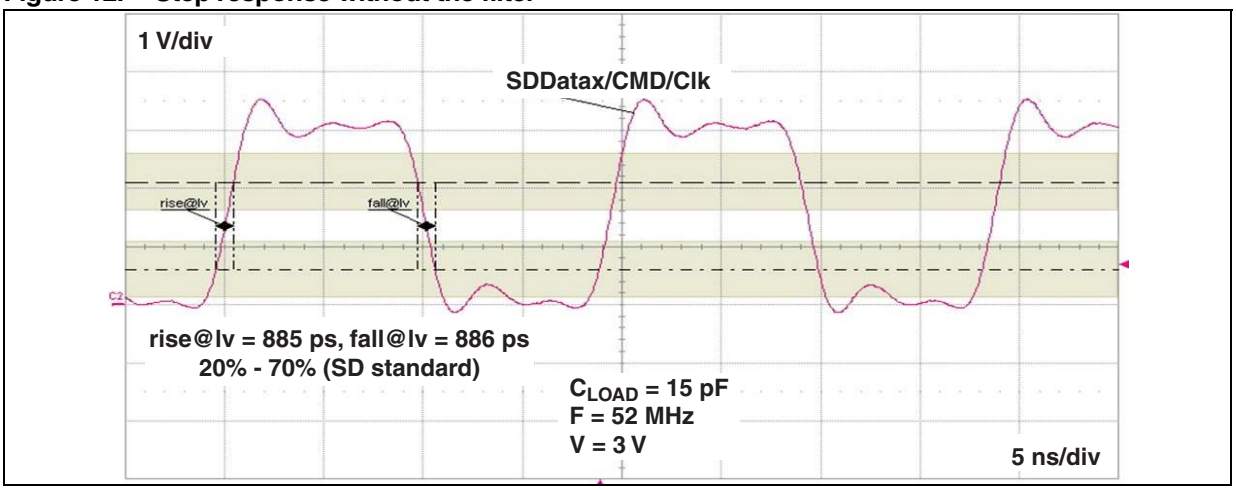


Figure 13. Step response with the filter

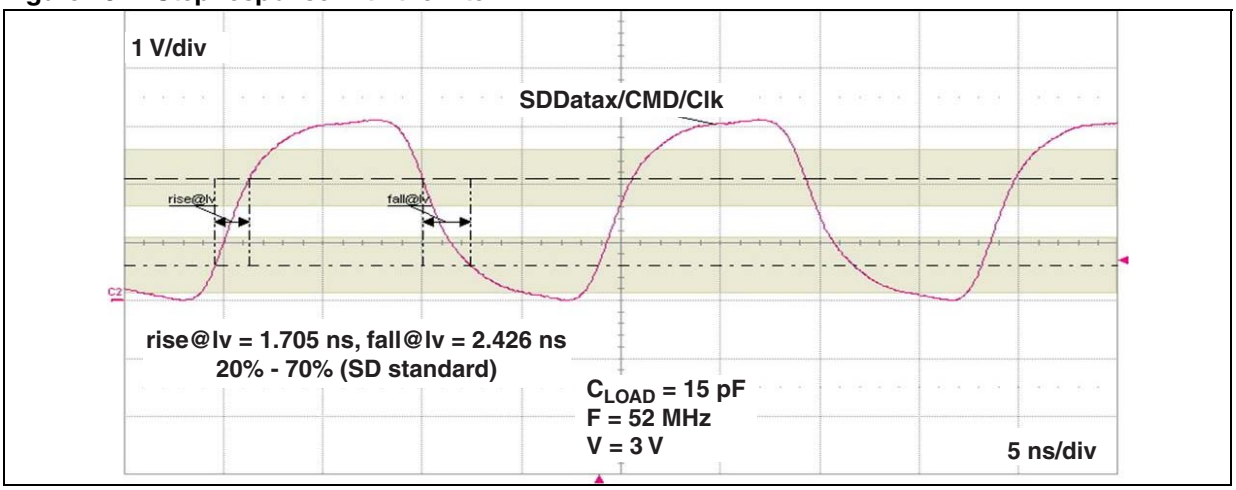
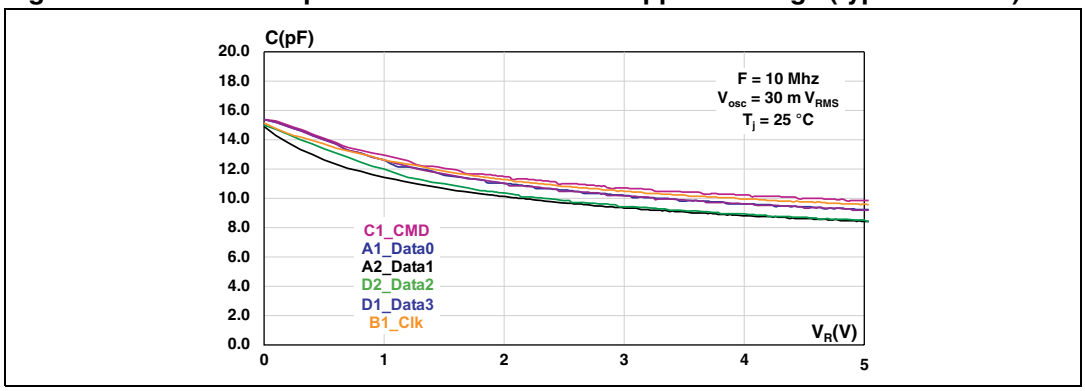
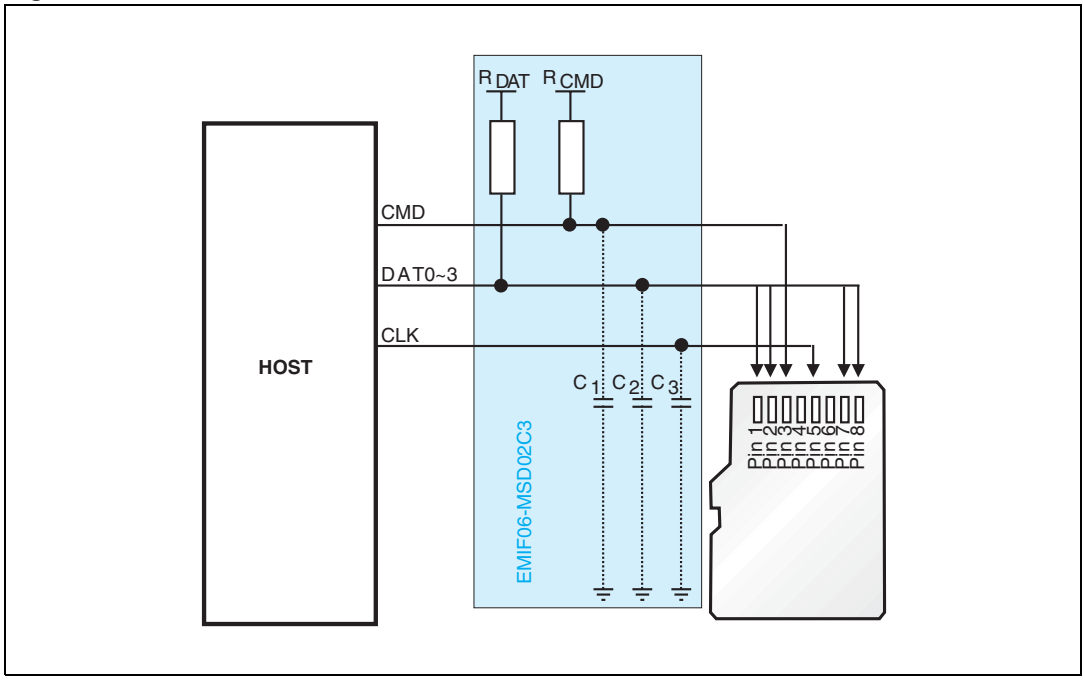


Figure 14. Junction capacitance versus reverse applied voltage (typical values)



2 Technical information

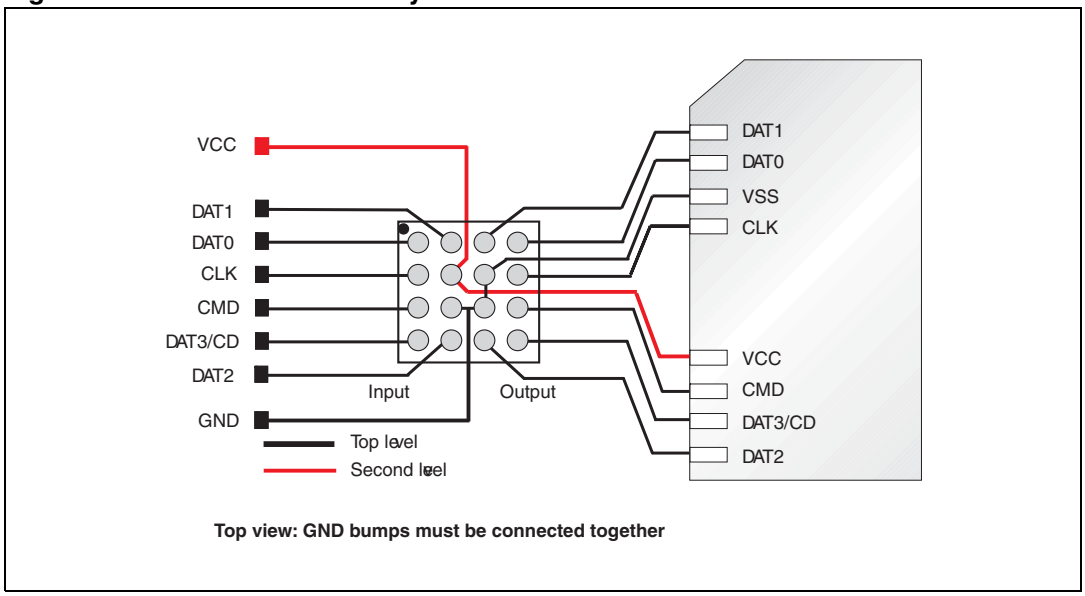
Figure 15. T-Flash recommended connection



Pull-up resistances R_{DAT} and R_{CMD} are included to prevent bus floating when no card is inserted or when all card drivers are in high impedance mode.

The pull-up resistors and capacitors described in the above recommendation are integrated in the EMIF06-mSD02C3. This makes the EMIF06-mSD02C3 an easy "plug and play" solution to implement secured T-Flash, mini-SD and micro-SD card terminations.

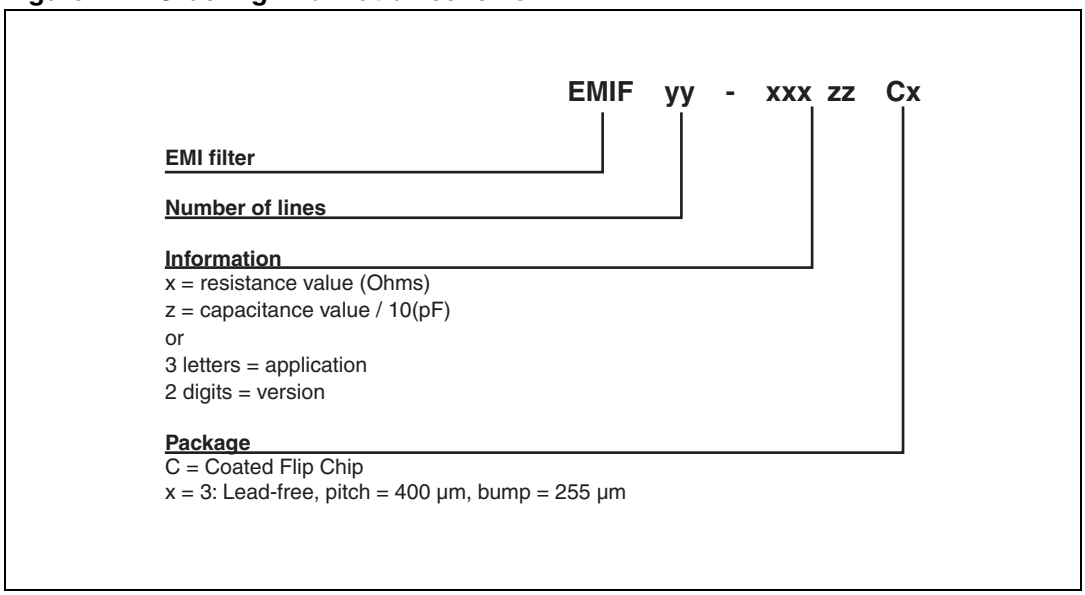
Figure 16. Recommendation layout



Top view: GND bumps must be connected together

3 Ordering information scheme

Figure 17. Ordering information scheme



4 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 18. Package dimensions

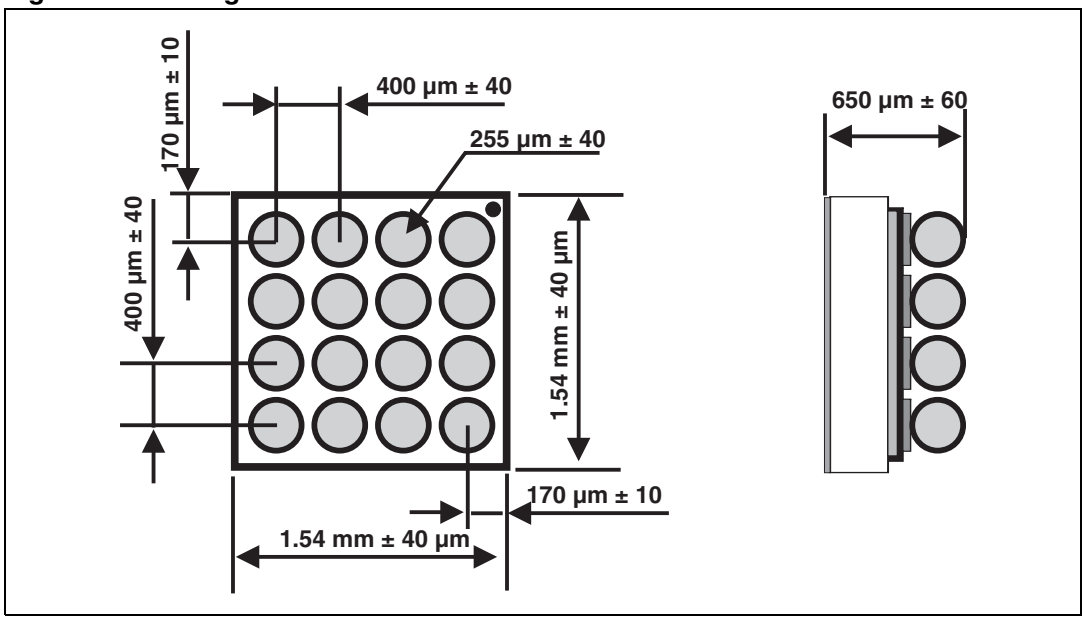


Figure 19. Footprint

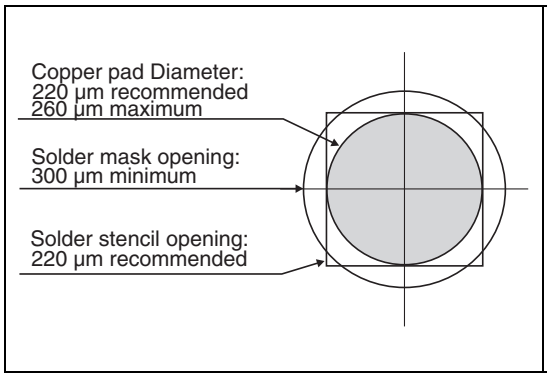


Figure 20. Marking

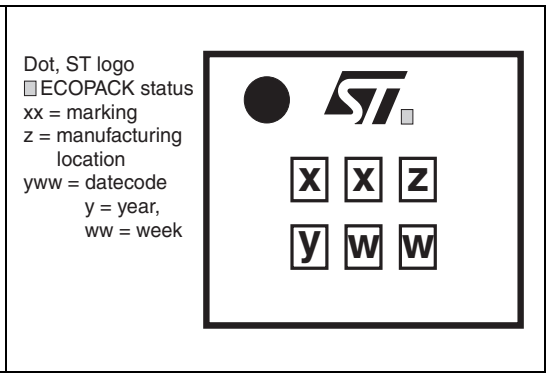
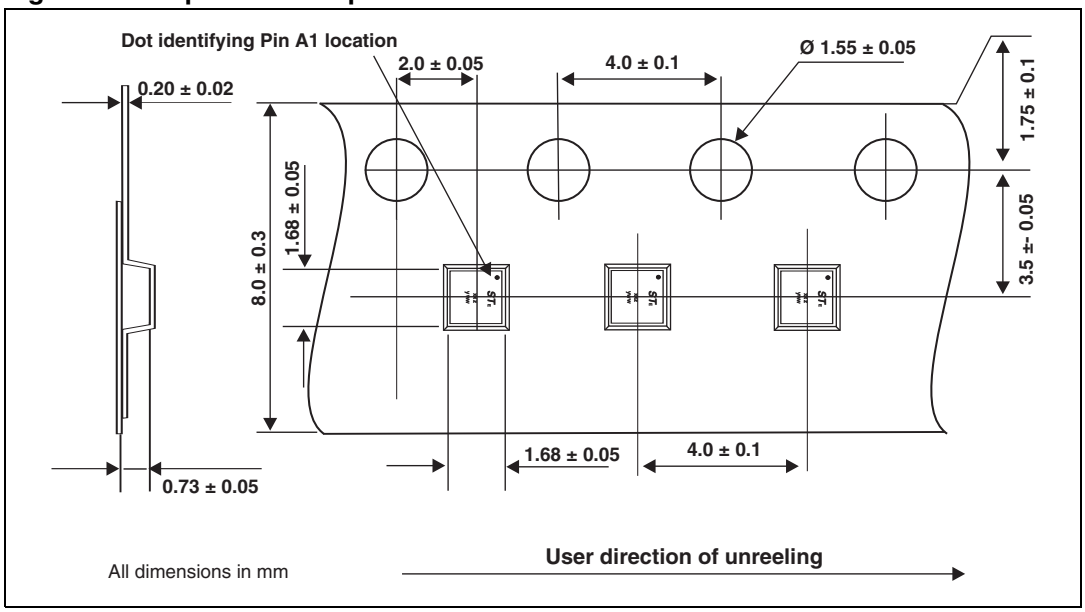


Figure 21. Tape and reel specification



5 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-MSD02C3	JP	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"

6 Revision history

Table 5. Document revision history

Date	Revision	Changes
12-Aug-2010	1	First issue.

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