



EMIF06-MSD04F3

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

Features

- EMI low-pass filter
- 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)

Application

Micro (T-Flash) secure digital memory card in:

- Mobile phones
- Communication systems

Description

The EMIF06-MSD04F3 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.

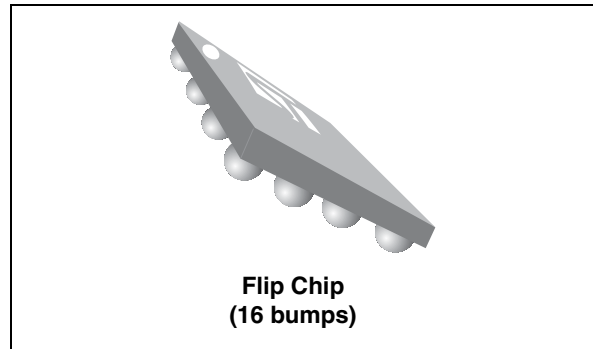
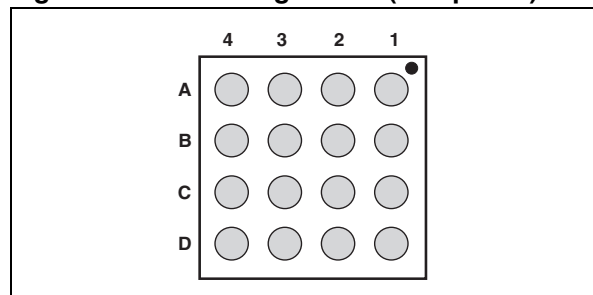


Figure 1. Pin configuration (bump side)



™: 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, level 4		
	Air discharge, card side	15	kV
	Contact discharge, card side	8	
	Air discharge, IC side	2	
	Contact discharge, IC side	2	
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-MSD04F3 configuration

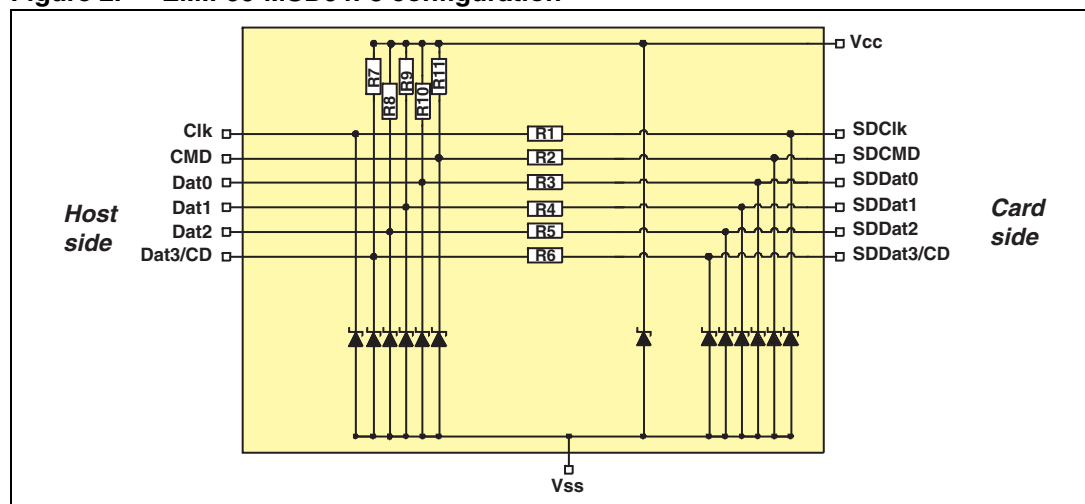


Table 2. Pin configuration

Pin	Signal	Pin	Signal
A1	Dat0	C1	CMD
A2	Dat1	C2	V _{ss}
A3	SDDat1	C3	V _{ss}
A4	SDDda0	C4	SDCMD
B1	Clk	D1	Dat3/CD
B2	V _{cc}	D2	Dat2
B3	V _{ss}	D3	SDDat2
B4	SDClk	D4	SDDat3/CD

Table 3. Electrical characteristic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage	$I_R = 1 \text{ mA}$	14	16		V
I_{RM}	Leakage current at V_{RM}	$V_{RM} = 3 \text{ V}$			0.1	μA
R1, R2, R3, R4, R5, R6	Serial resistance	Tolerance $\pm 10 \%$, matching $\pm 2 \%$	36	40	44	Ω
R7, R8, R9, R10, R11	Pull-up resistance	Tolerance $\pm 20 \%$, matching $\pm 2 \%$	20	25	30	$\text{k}\Omega$
C_{line}	Data line capacitance	$V = 1.8 \text{ V}$, $F = 10 \text{ MHz}$, $V_{OSC} = 30 \text{ mV}$		7.5	10	pF
		$V = 2.9 \text{ V}$, $F = 10 \text{ MHz}$, $V_{OSC} = 30 \text{ mV}$			9	
F_0	Cut-off frequency	$S_{21} = -3 \text{ dB}$		550		MHz
t_R, t_F	Rise and fall time	$C_{load} = 10 \text{ pF}$, low-ref = 0.58 V, high-ref = 1.27 V		0.98		ns

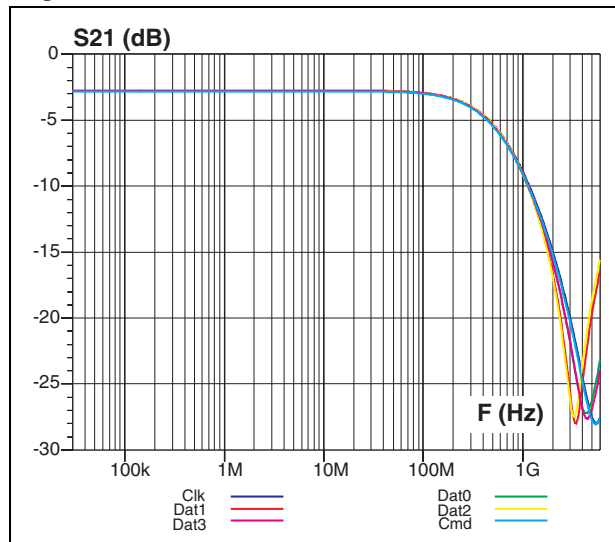
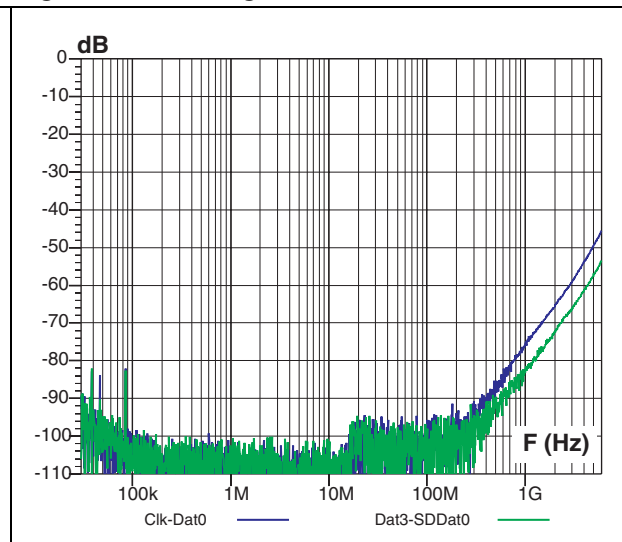
Figure 3. S21 attenuation measurements**Figure 4. Analog crosstalk measurements**

Figure 5. Line capacitance versus applied voltage (typical values)

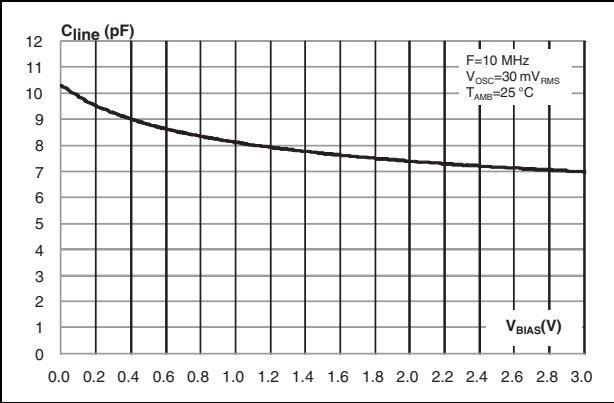


Figure 6. Line capacitance versus frequency (typical values)

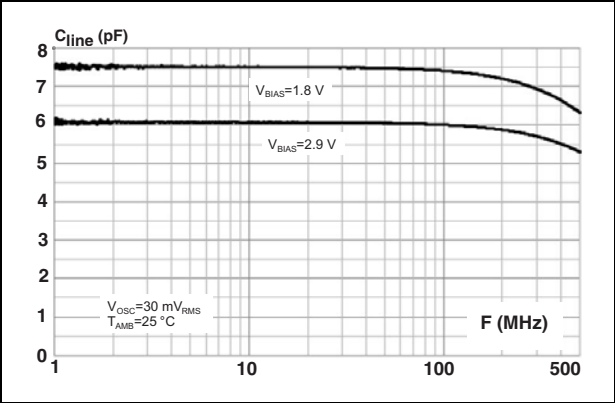


Figure 7. Digital crosstalk measurements

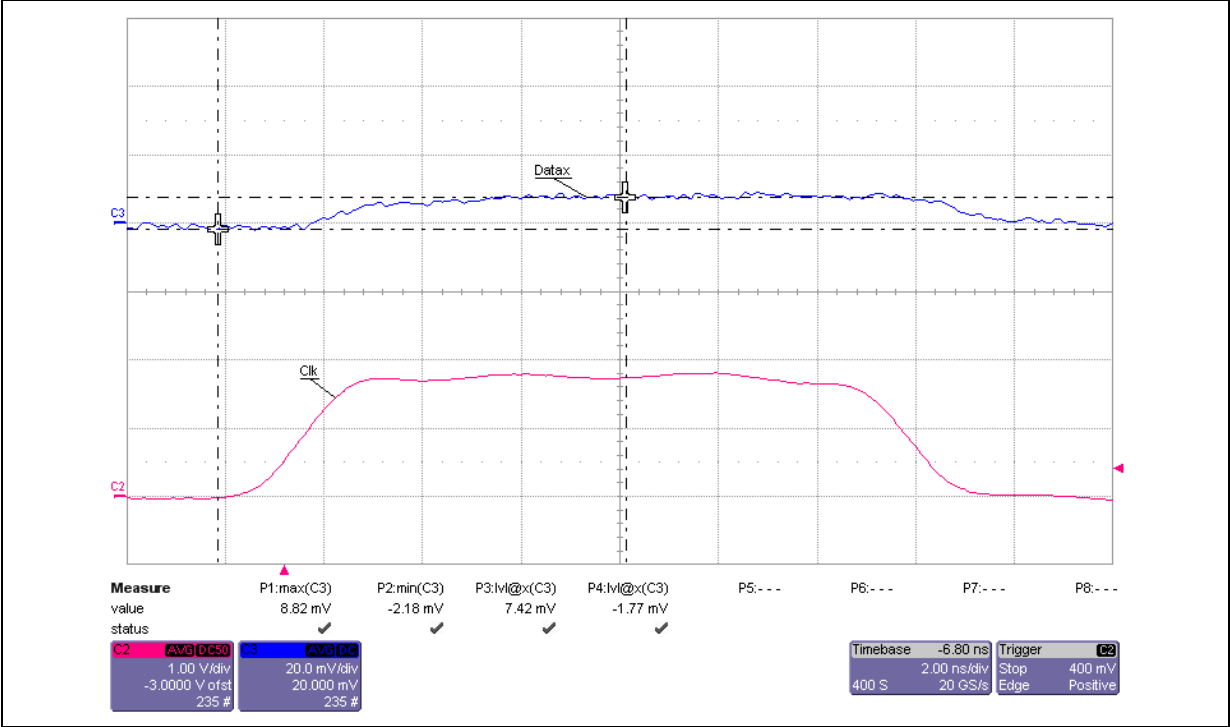


Figure 8. Host side response to IEC 61000-4-2 (+8 kV contact discharge) on card side

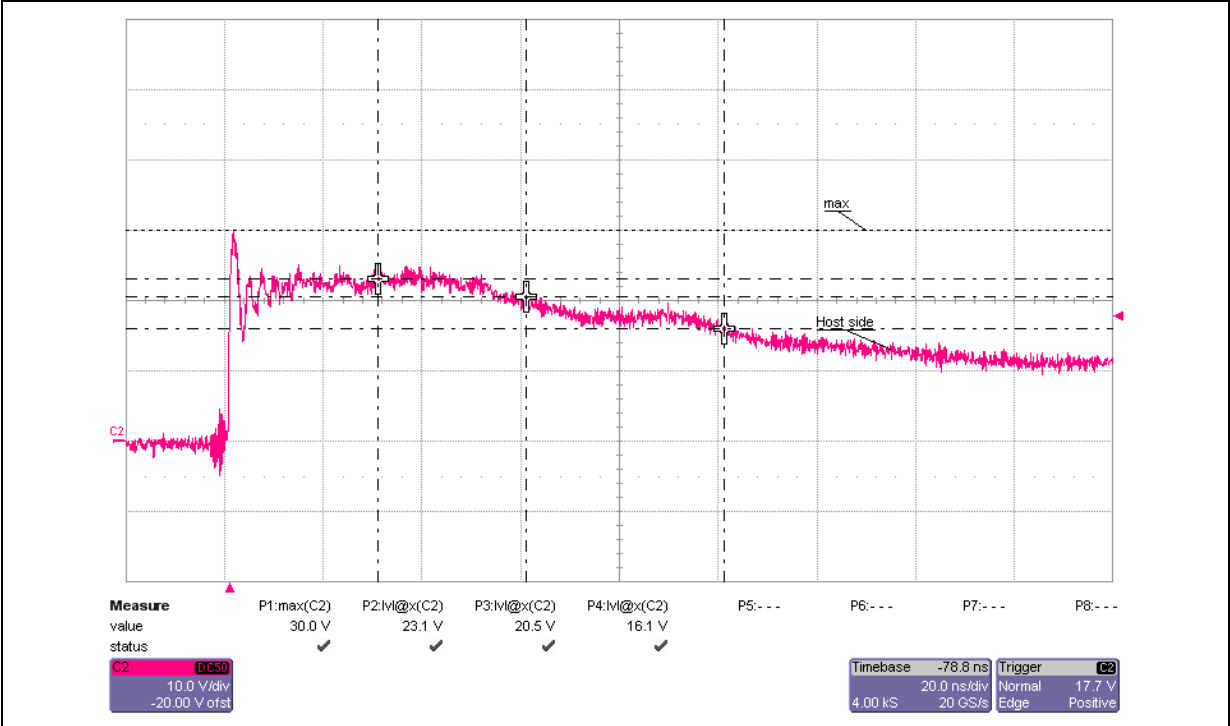
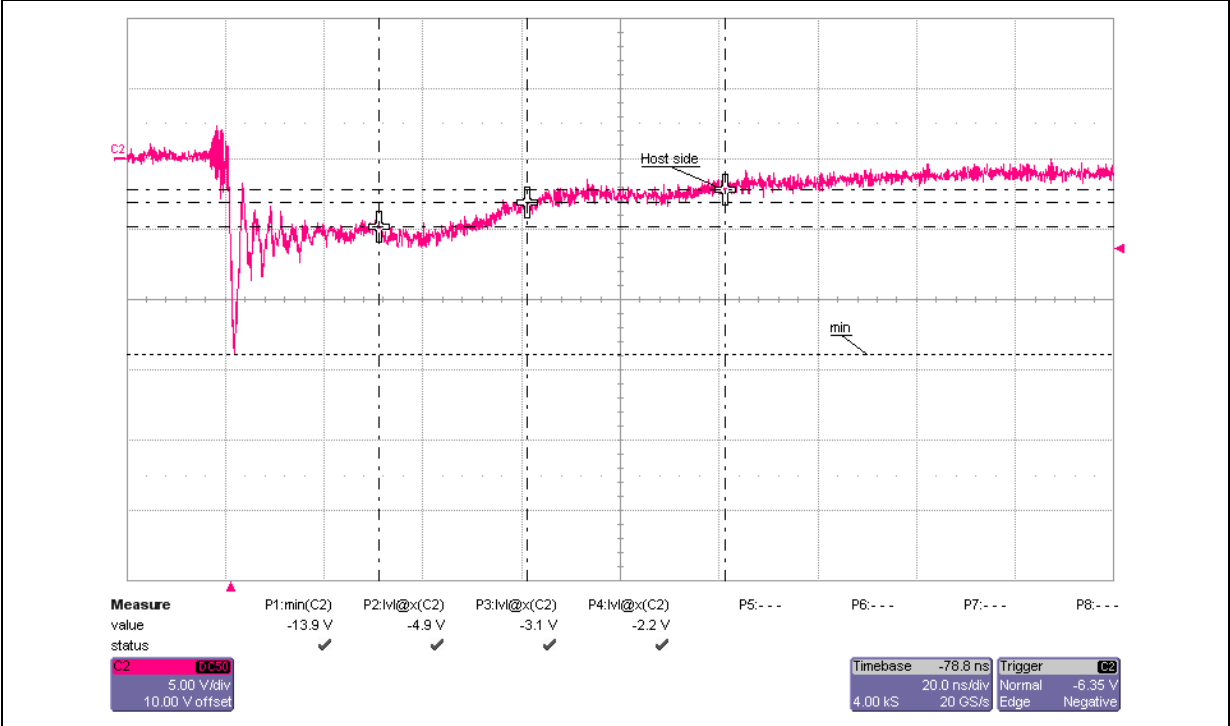
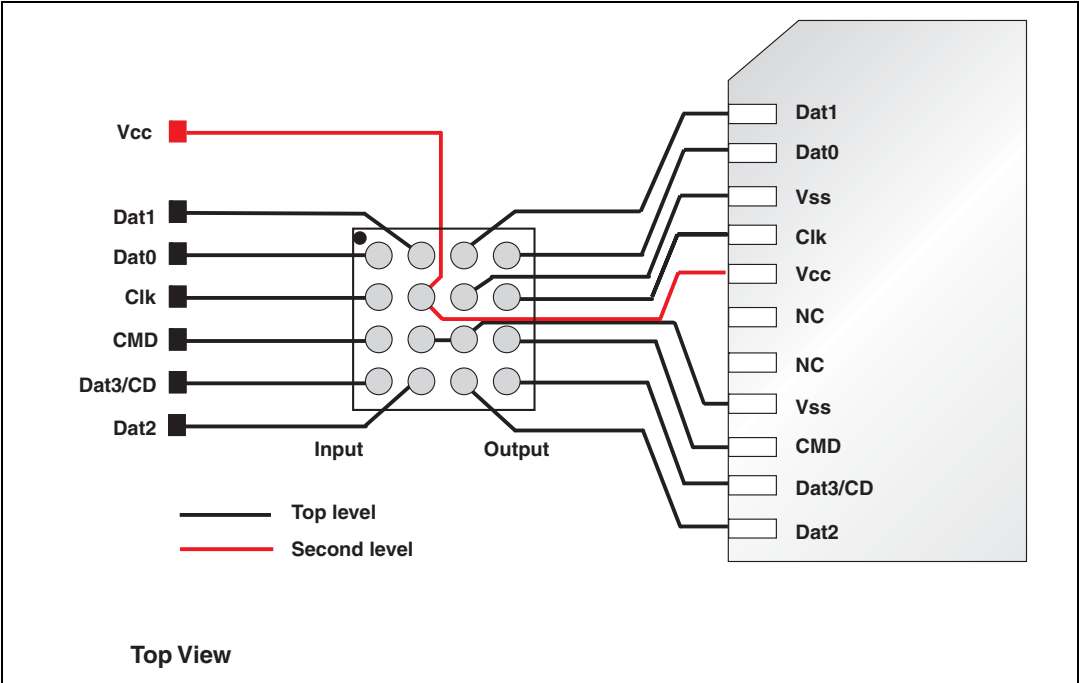


Figure 9. Host side response to IEC 61000-4-2 (-8 kV contact discharge) on card side



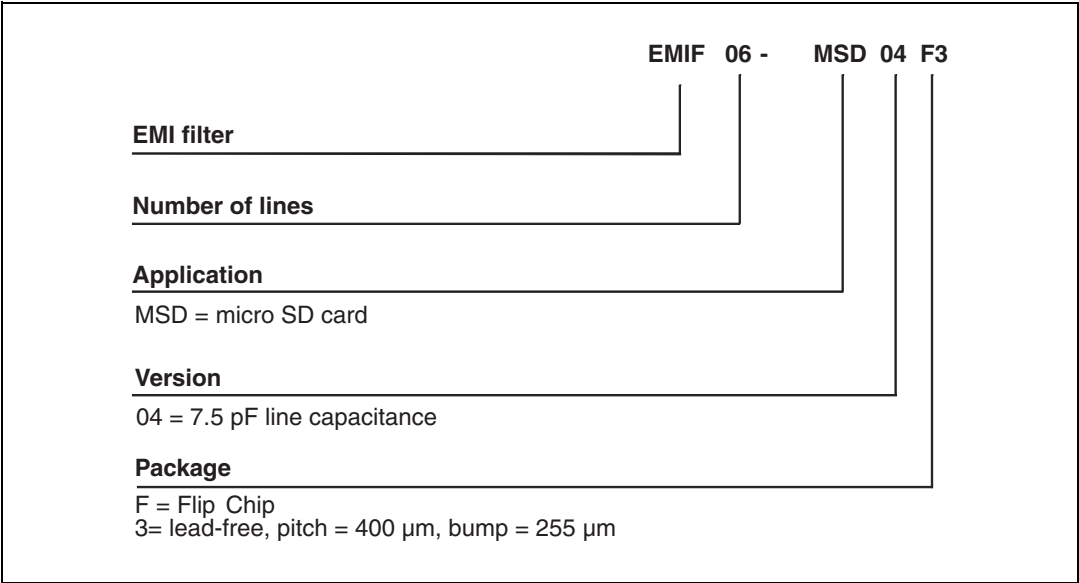
2 Layout recommendations

Figure 10. Layout recommendations



3 Ordering information scheme

Figure 11. 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 12. Package dimensions

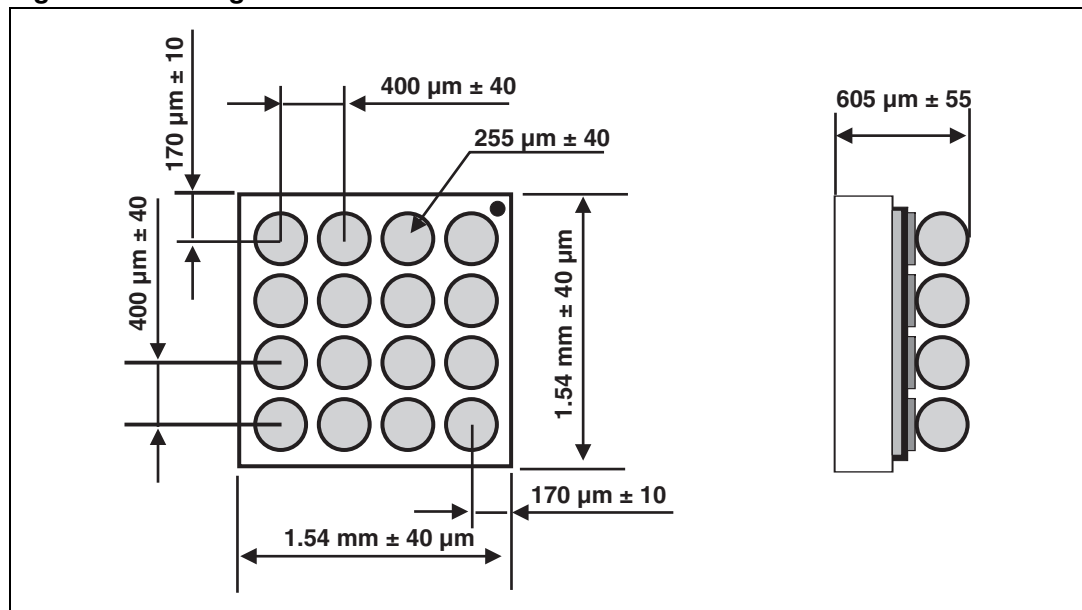


Figure 13. Footprint

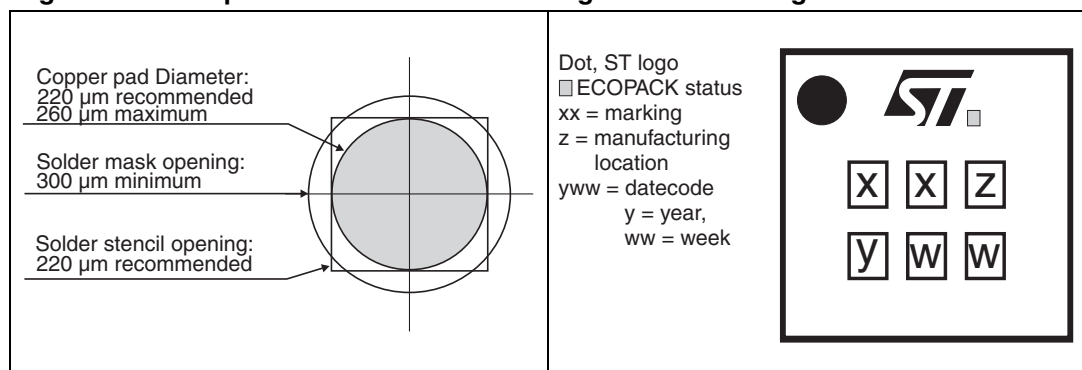


Figure 14. Marking

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

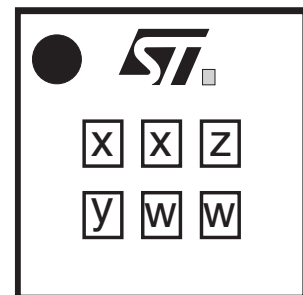
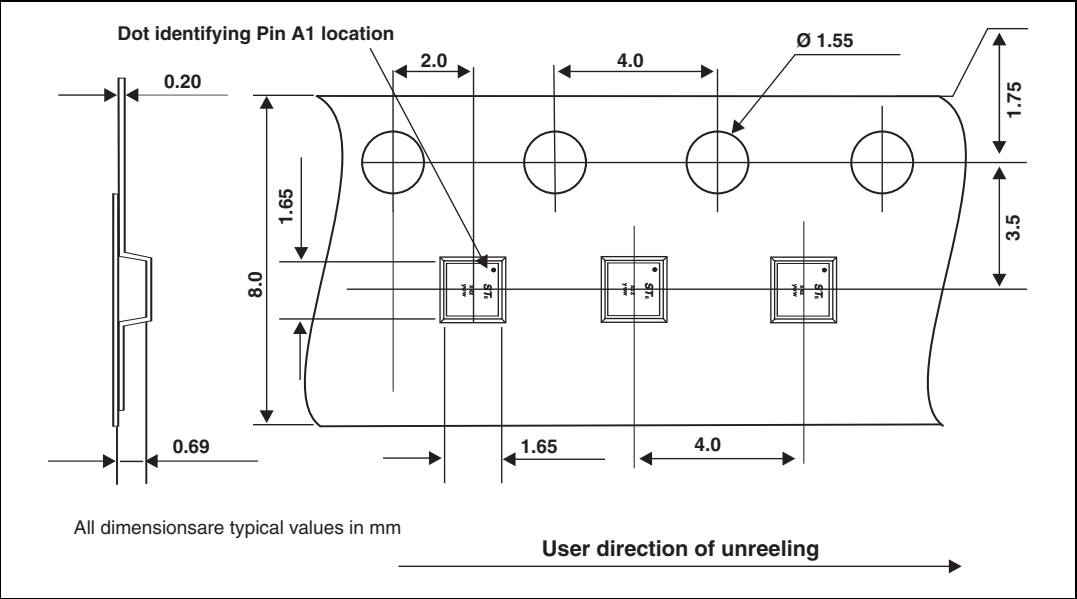


Figure 15. Tape and reel specification



5 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-MSD04F3	JW	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-July-2011	1	First issue.

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