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

Datasheet – production data

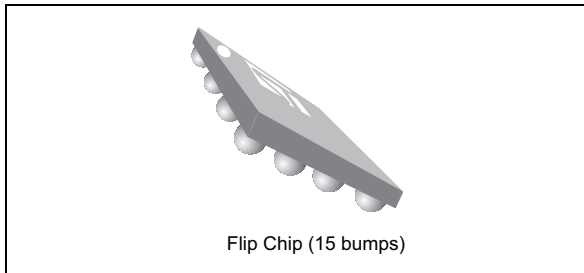
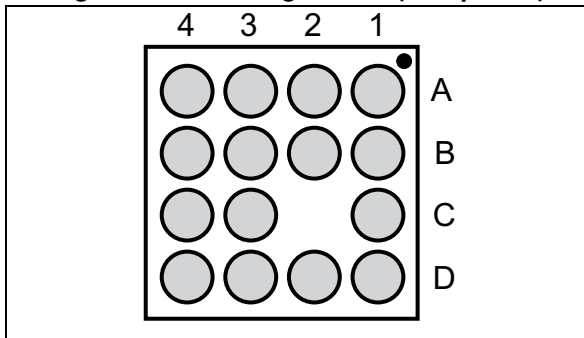


Figure 1. Pin configuration (bump side)



Features

- Very low line capacitance to compensate long PCB tracks (4.5 pF typ.)
- 208 MHz clock frequency compliant with SD3.0 UHS-1 SDR 104 standard
- High ESD robustness: up to ± 12 kV contact
- Lead-free package in 400 μm pitch
- Package thickness: 500 μm typ.
- Very low PCB space consumption
- High reliability offer by the monolithic integration

Complies with the following standards:

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

Application

Where ESD protection for sensitive equipment is required:

- Smartphones and Tablets
- Camera, Printers, Laptops and desktops

Description

The EMIF06-HSD04F3 chip is a highly integrated device designed to protect the application against ESD event during the insertion of the micro-SD card.

The EMIF06-HSD04F3 must be placed close to the micro-SD card connector for efficient ESD protection.

TM: IPAD is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute maximum ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

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	15	kV
	Contact discharge, external pins	12	
	ESD discharge IEC 61000-4-2, level 1 (on pins clk, dat0, dat1, dat2, dat3, cmd)	15	
	Air discharge	10	
	Contact discharge, internal pins		
T_j	Maximum junction temperature	125	$^{\circ}\text{C}$
T_{op}	Operating temperature range	- 40 to + 85	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	- 55 to + 150	$^{\circ}\text{C}$

Figure 2. EMIF06-HSD04F3 Schematic

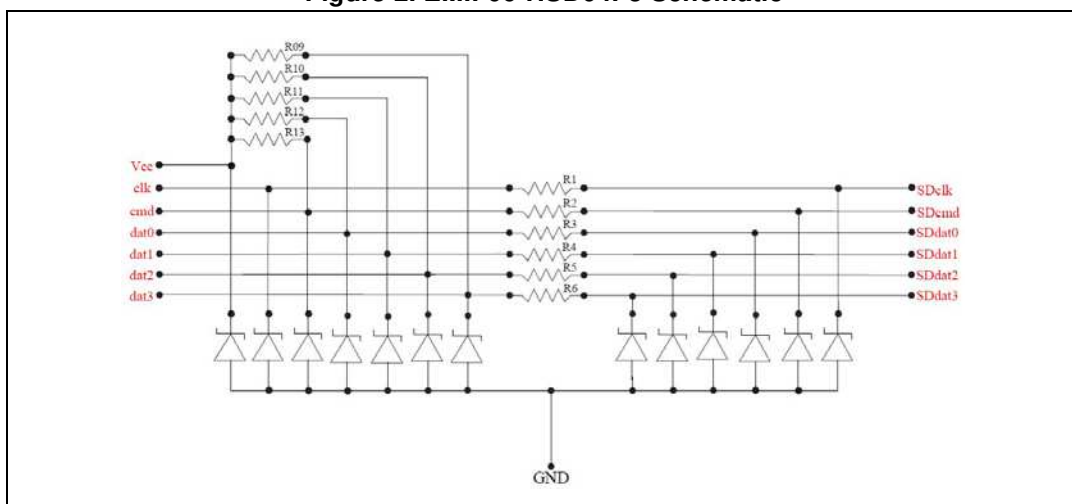


Table 2. Pin configuration

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, $T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage	$I_R = 1\text{ mA}$	5		9	V
I_{RM}	Leakage current at V_{RM}	$V_{RM} = 3\text{ V per line}$			100	nA
C_{line}	Data line capacitance	$V_{BIAS} = 0\text{ V}, F = 10\text{ MHz}, V_{OSC} = 30\text{ mV}$			4.5	pF
R1, R2, R3, R4, R5, R6	Serial resistance	Tolerance $\pm 23\%$		1		Ω
R9, R10, R11, R12	Pull-up resistance	Tolerance $\pm 20\%$	40	50	60	k Ω
R13	Pull-up resistance on cmd	Tolerance $\pm 20\%$	12	15	18	k Ω

Figure 3. Electrical characteristics (definitions)

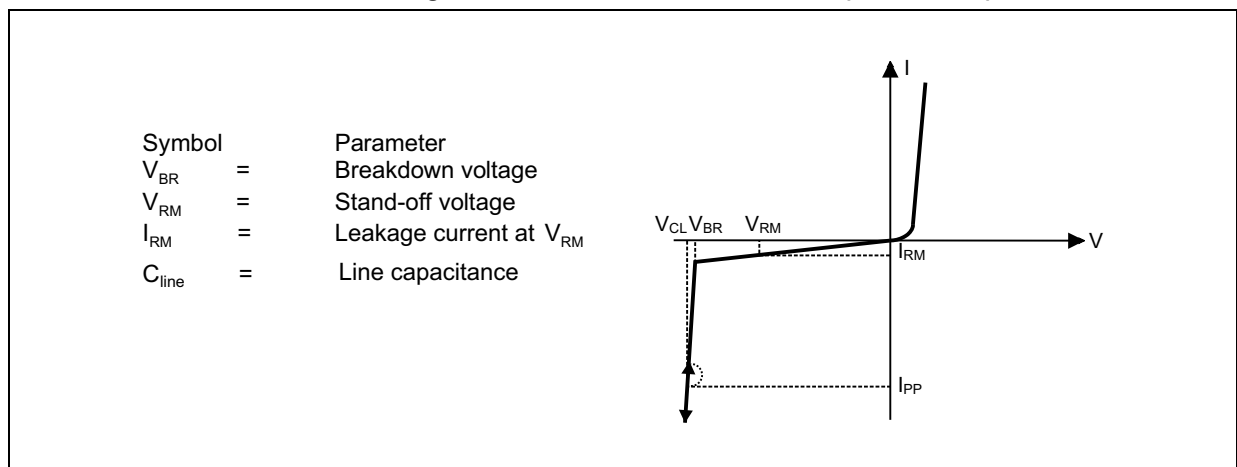


Figure 4. Attenuation versus frequency

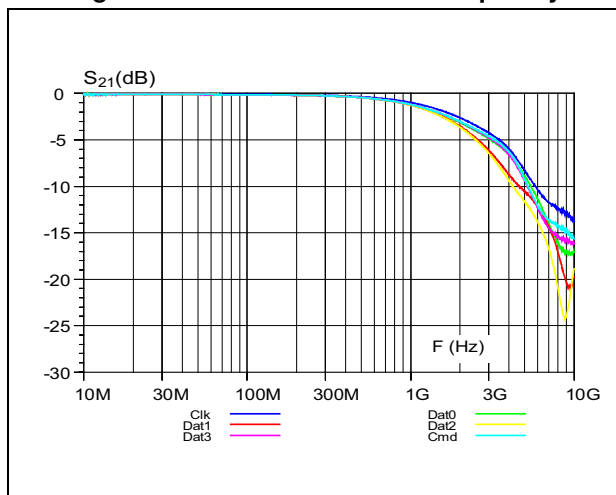


Figure 5. Analog crosstalk versus frequency

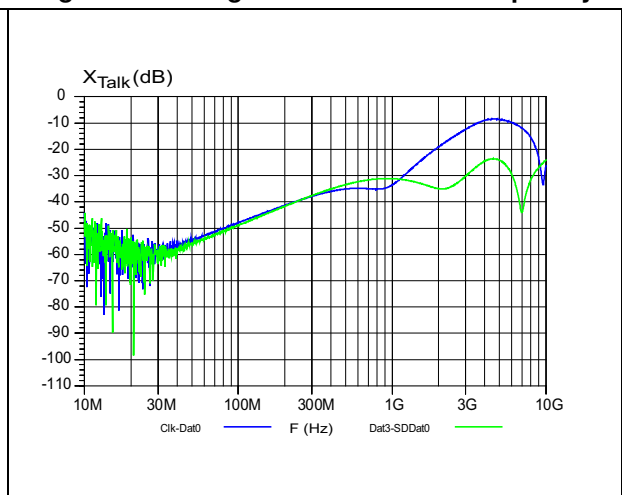


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

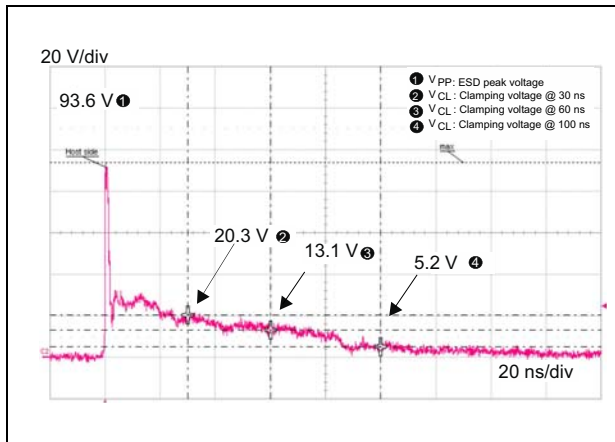


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

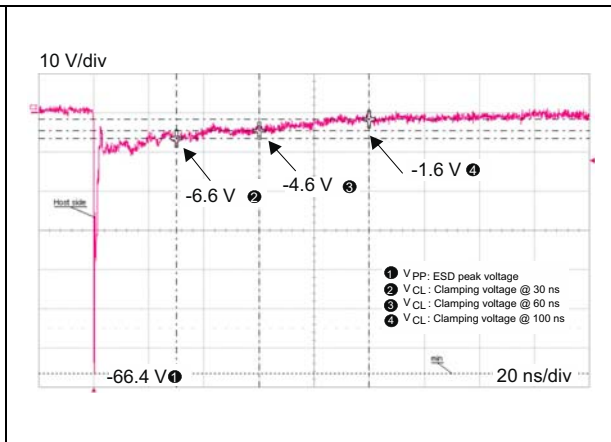


Figure 8. Digital crosstalk dat0 versus clk line ($V_{CC} = 3.9\text{ V}$, $R_{load} = 1\text{ M}\Omega$)

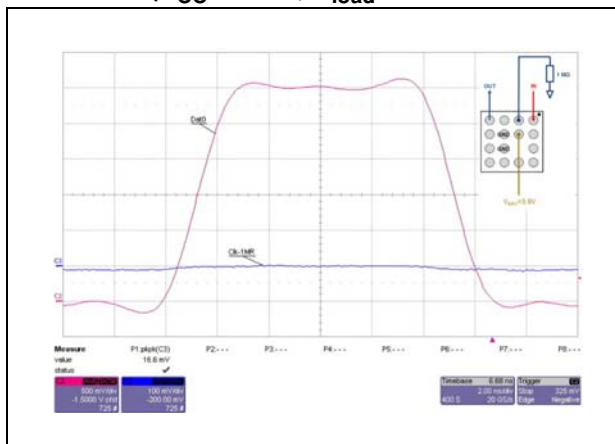


Figure 9. Line capacitance versus frequency

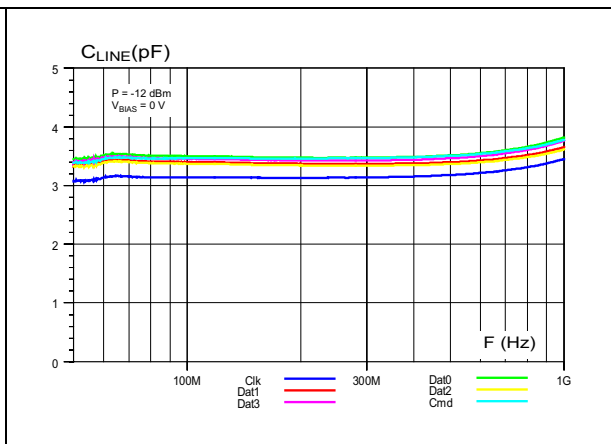
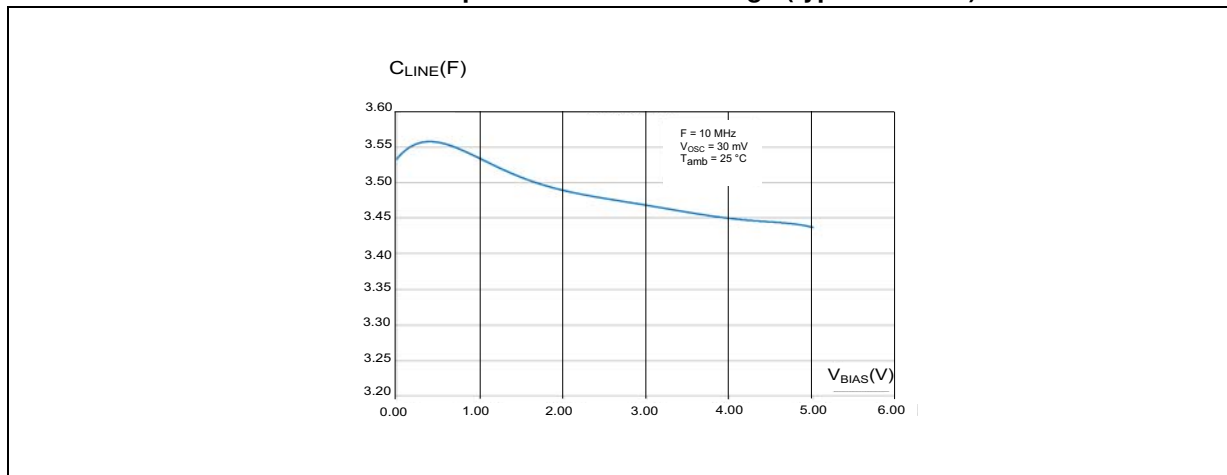


Table 4. Line capacitance versus voltage (typical values)



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 10. Flip-Chip package dimensions

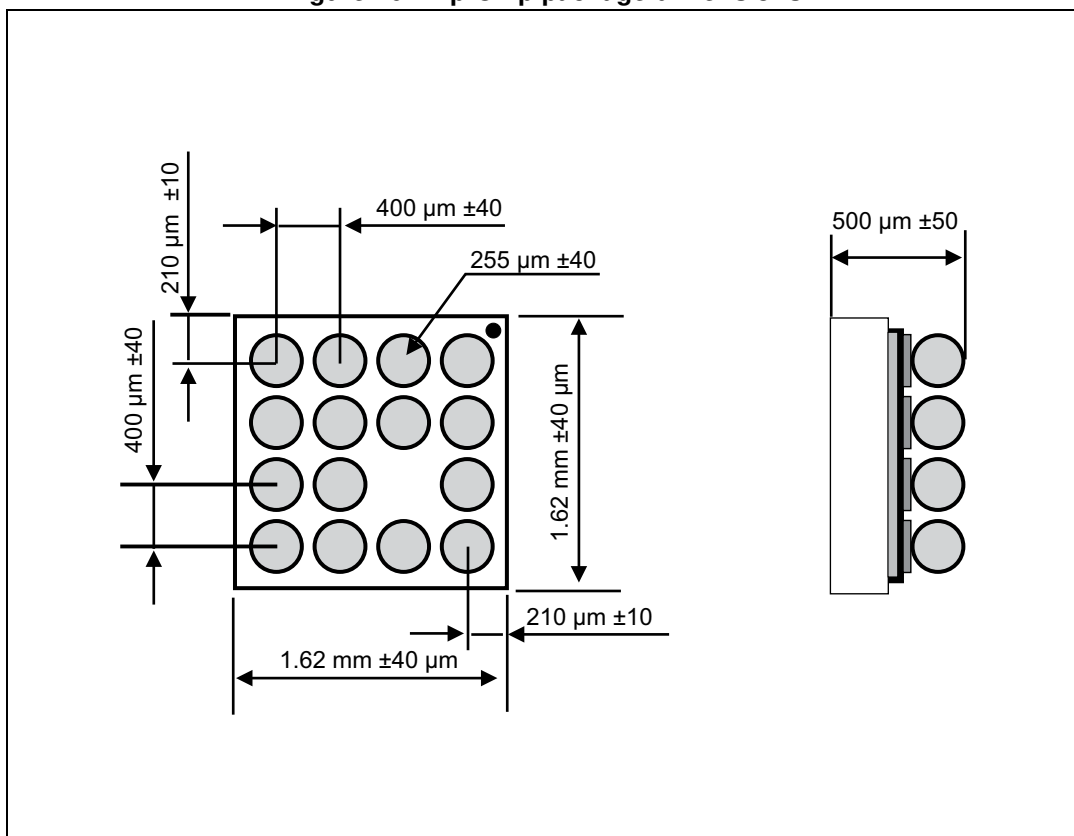


Figure 11. Footprint recommendations

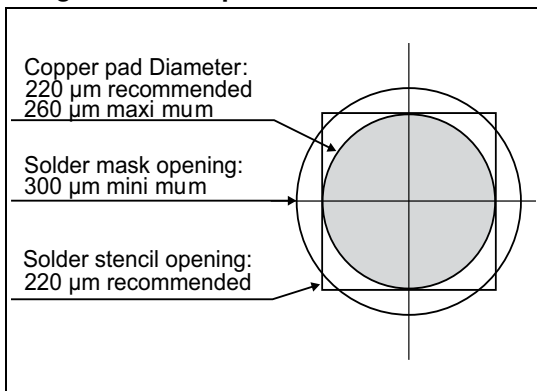


Figure 12. Marking

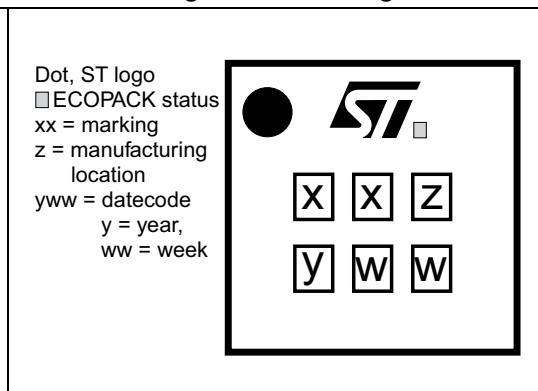
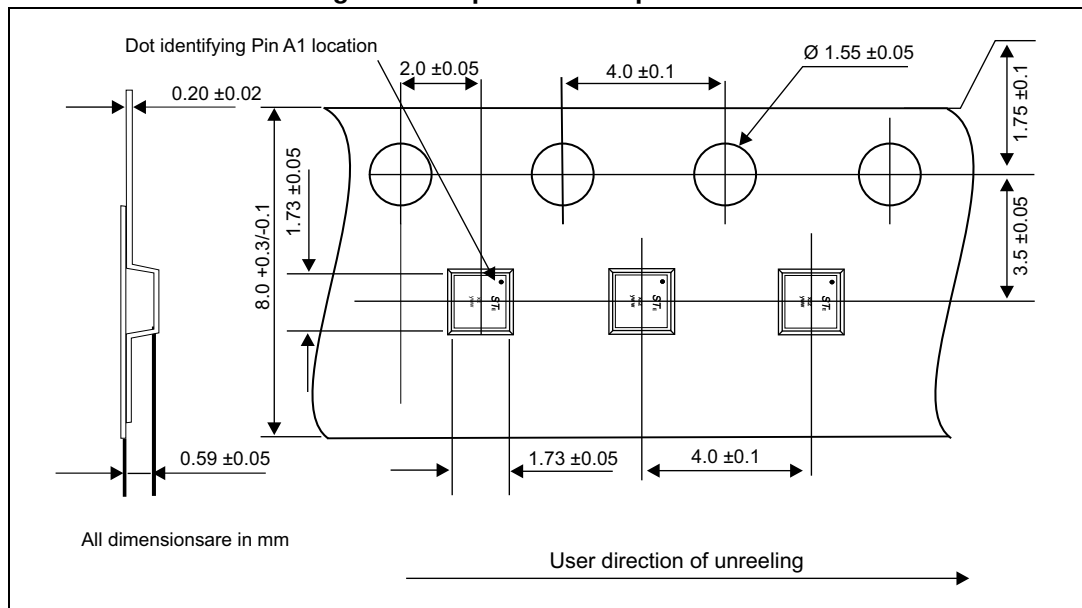


Figure 13. Tape and reel specification



Note:

More information is available in the application notes:

AN2348, "IPAD™ 400 µm 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 and filtering devices"

3 Ordering information

Figure 14. Ordering information scheme

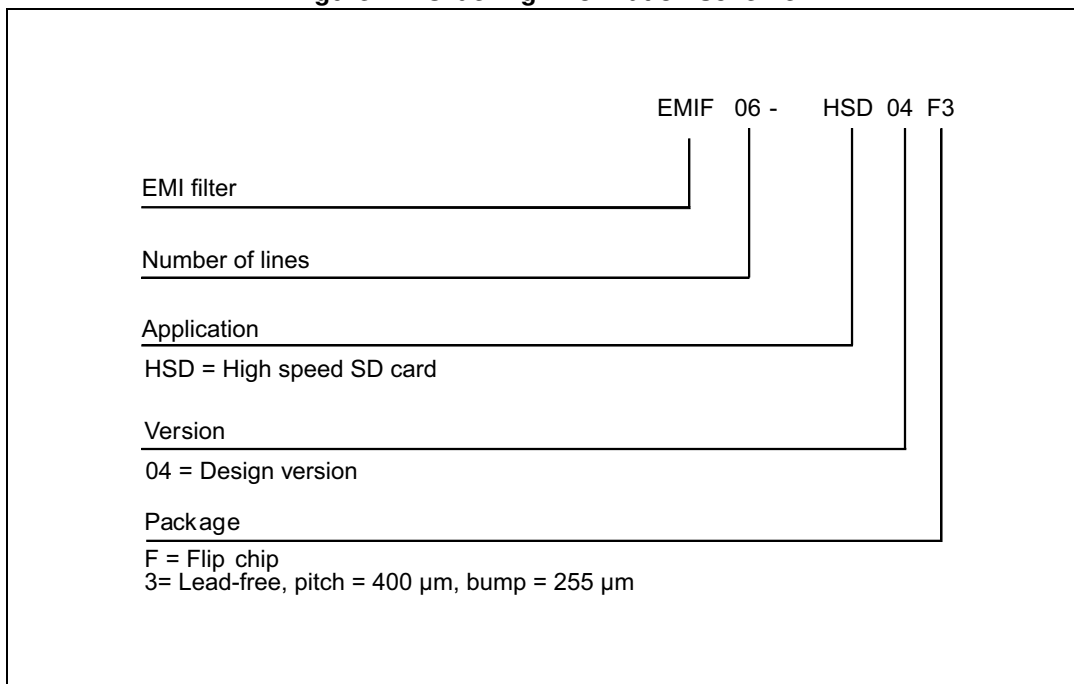


Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-HSD04F3	LF	Flip Chip	2.77 mg	5000	Tape and reel (7")

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
04-Nov-2014	1	Initial release

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