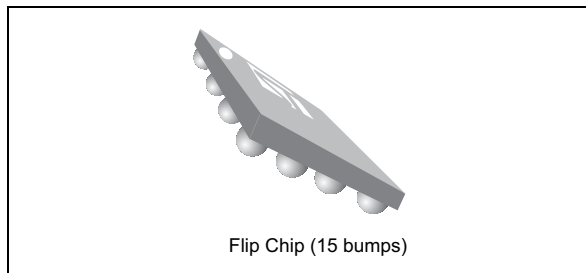
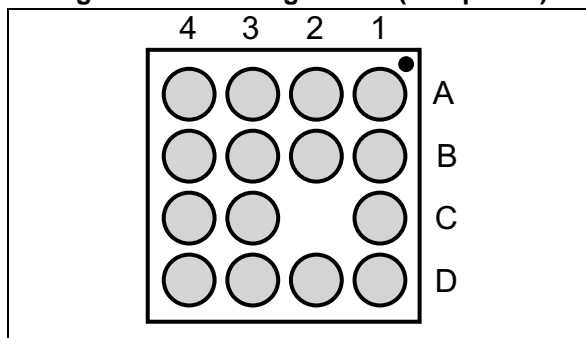


## 6-line low capacitance IPAD™ for micro-SD card with EMI filtering and ESD protection

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  $\pm 12$  kV contact
- Lead-free package in 400  $\mu\text{m}$  pitch
- Package thickness: 500  $\mu\text{m}$  typ.
- Very low PCB space consumption
- High reliability offer by the monolithic integration

### Complies with the following standards:

- IEC 61000-4-2 level 4
  - $\pm 15$  kV (air discharge)
  - $\pm 8$  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.

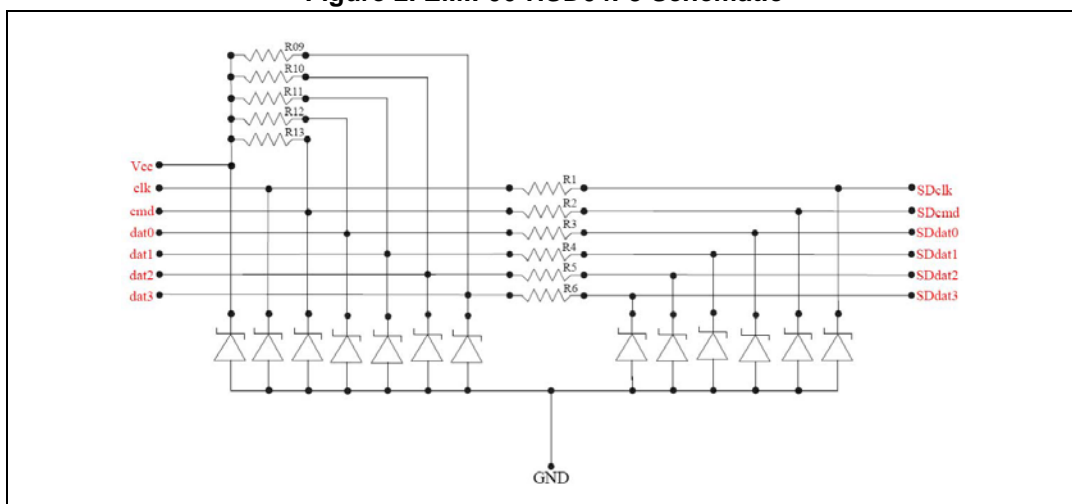
**TM:** IPAD is a trademark of STMicroelectronics

# 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 $V_{cc}$ , 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		$\Omega$
R9, R10, R11, R12	Pull-up resistance	Tolerance $\pm 20\%$	40	50	60	k $\Omega$
R13	Pull-up resistance on cmd	Tolerance $\pm 20\%$	12	15	18	k $\Omega$

Figure 3. Electrical characteristics (definitions)

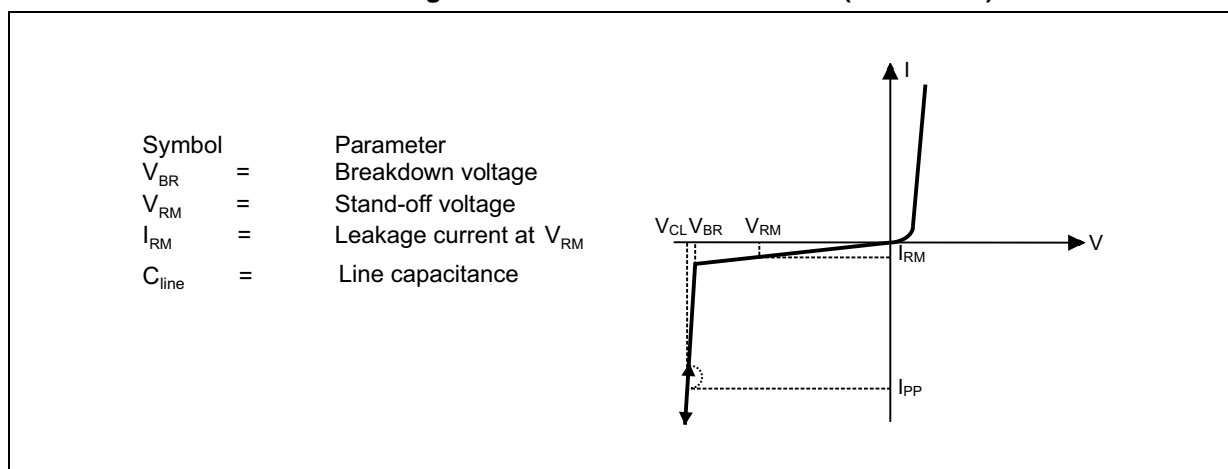


Figure 4. Attenuation versus frequency

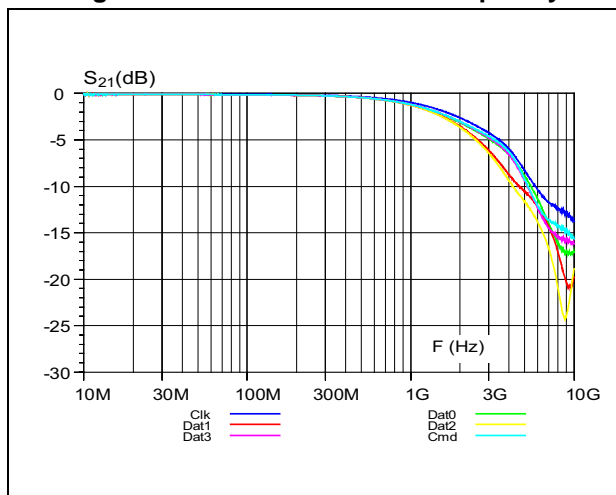


Figure 5. Analog crosstalk versus frequency

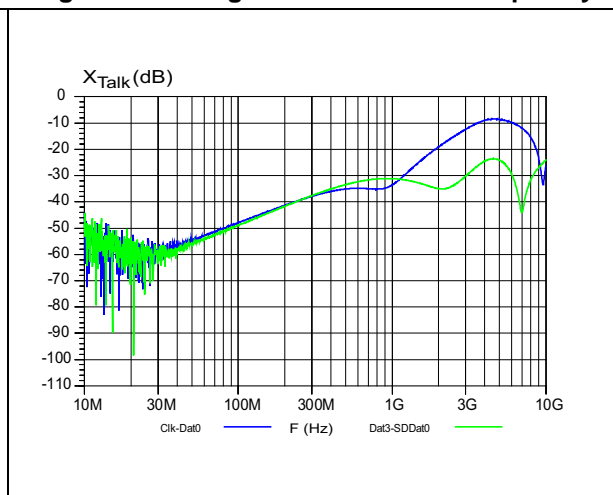


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

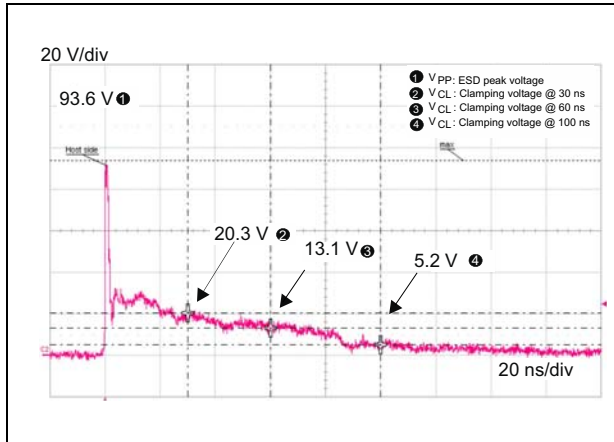


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

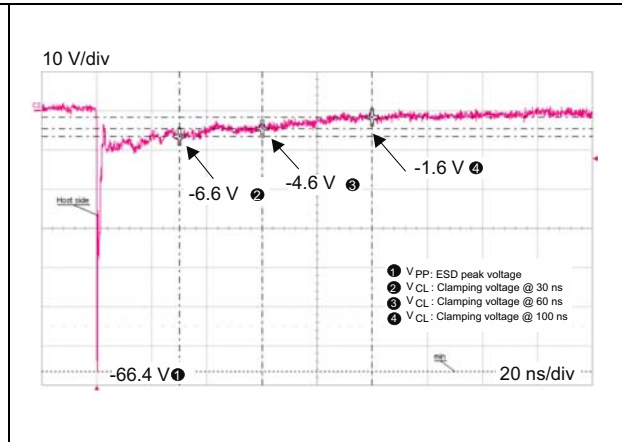


Figure 8. Digital crosstalk dat0 versus clk line ( $V_{CC} = 3.9\text{ V}$ ,  $R_{load} = 1\text{ M}\Omega$ )

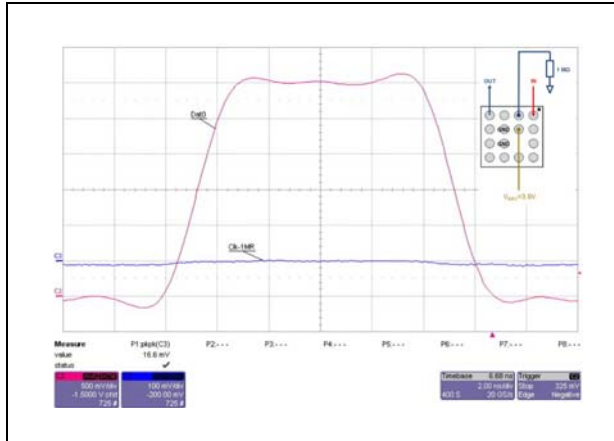


Figure 9. Line capacitance versus frequency

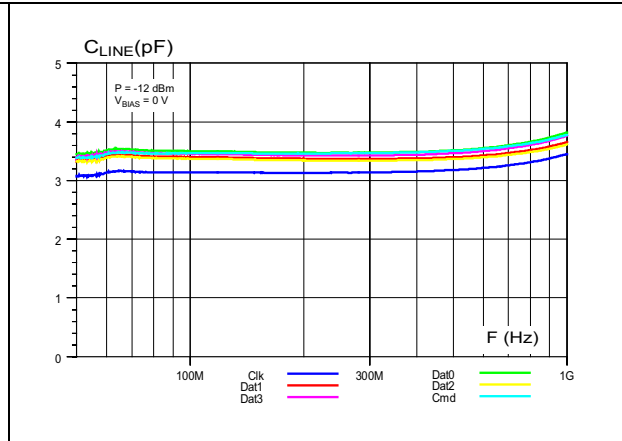
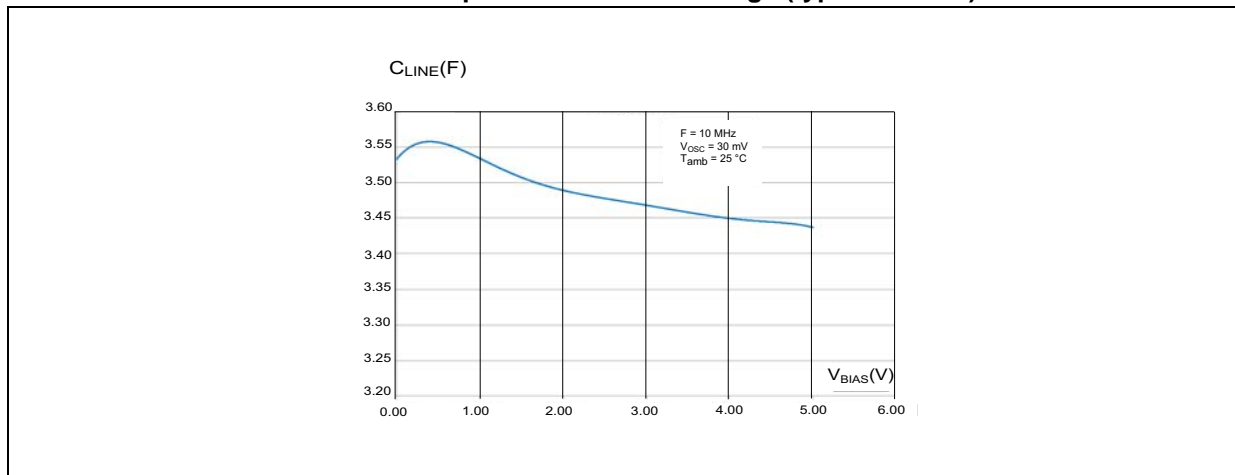


Table 4. Line capacitance versus voltage (typical values)



## 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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 10. Flip-Chip package dimensions

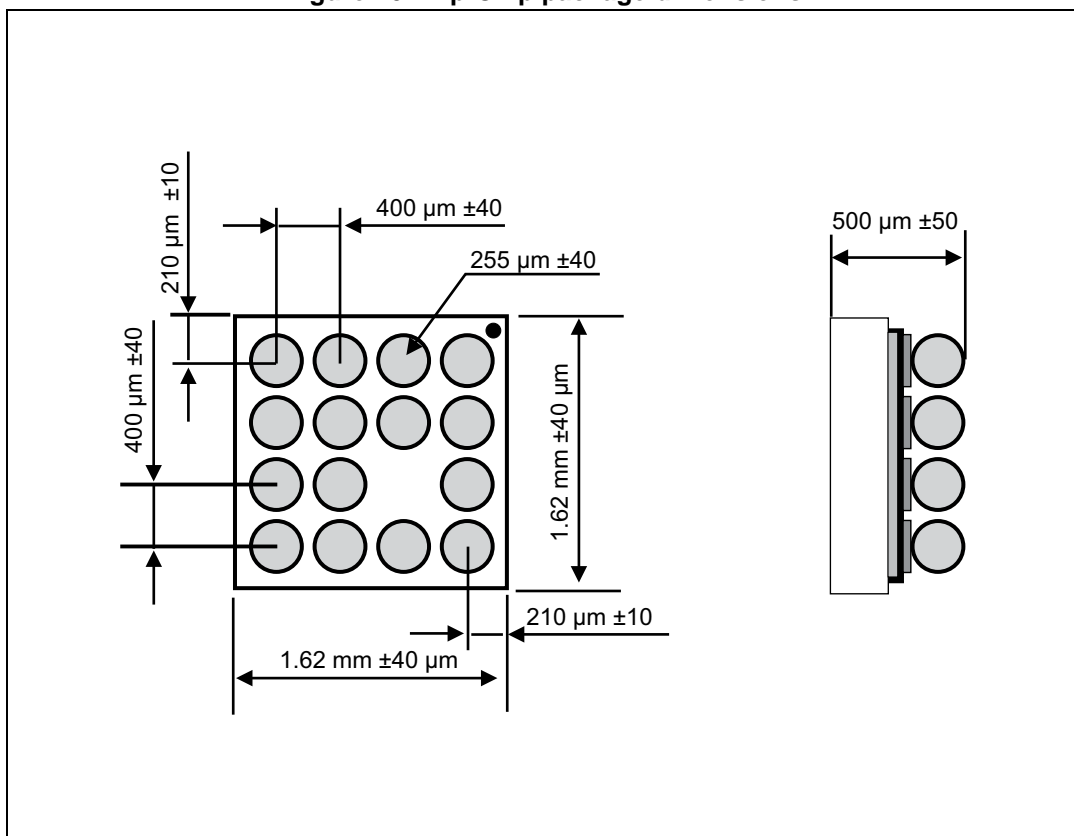


Figure 11. Footprint recommendations

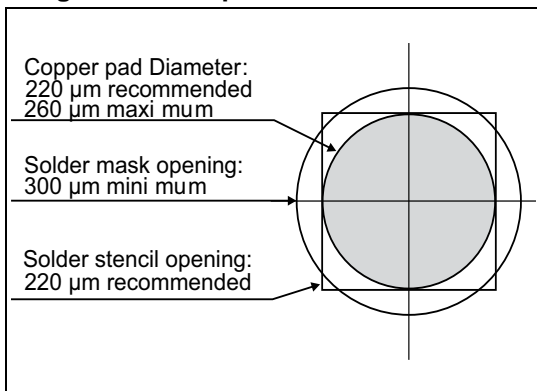


Figure 12. Marking

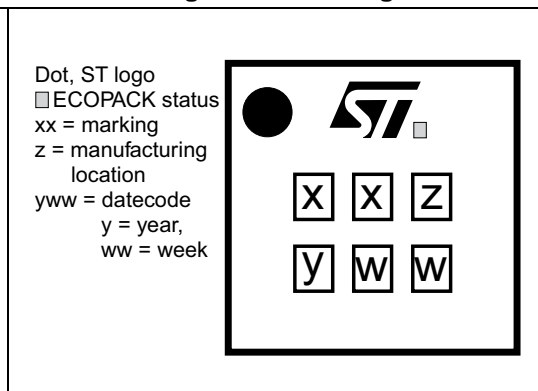
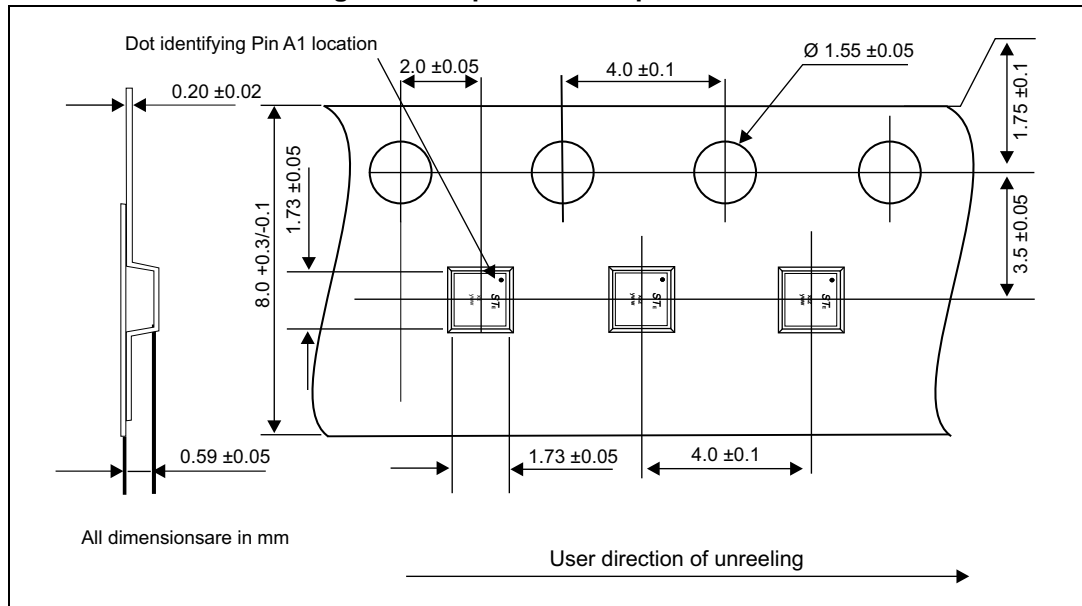


Figure 13. Tape and reel specification



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

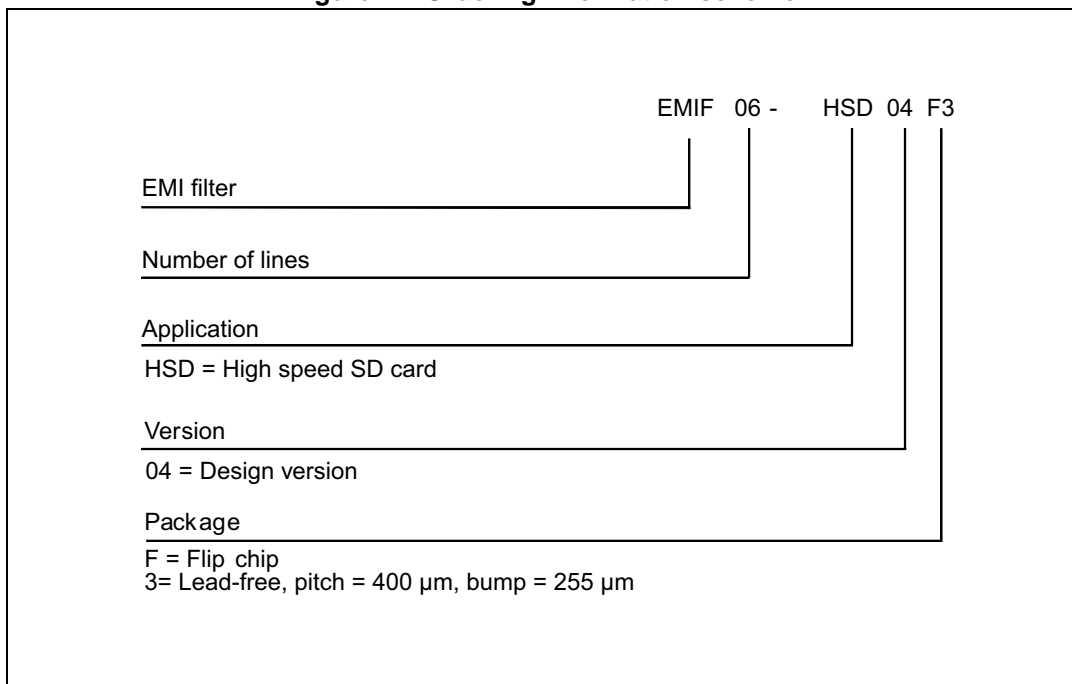


Table 5. Ordering information

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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