

EMI filter with integrated ESD protection for micro-SD Card™

Datasheet – production data

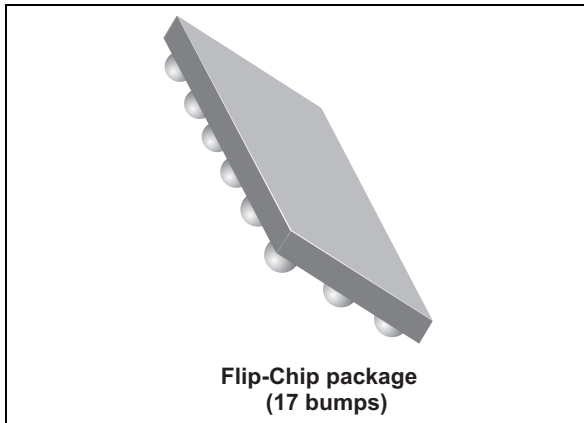


Figure 1. Pin configuration (bump side)

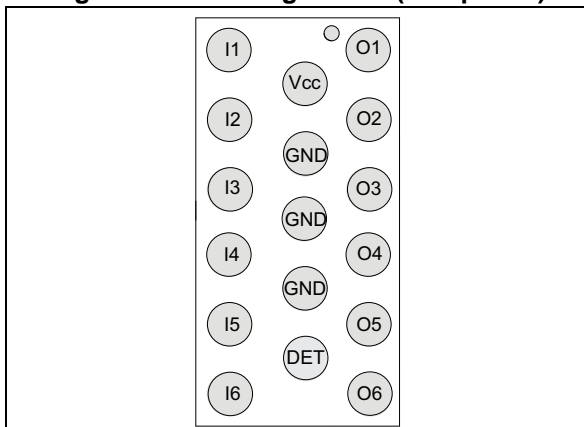
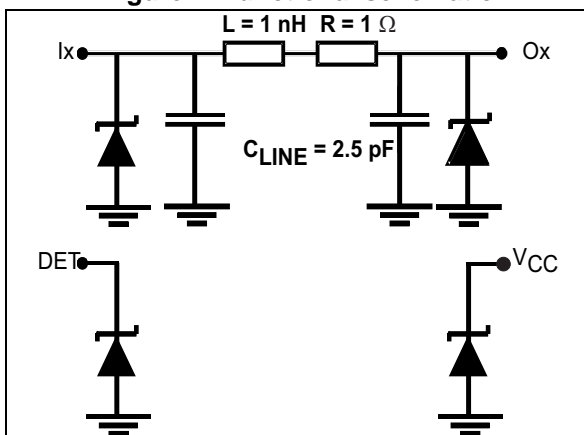


Figure 2. Functional schematic



Features

- Very low line capacitance to compensate long PCB tracks (2.5 pF typ.)
- High efficiency in ESD suppression up to 18 kV (IEC 61000-4-2)
- Very low PCB space consumption:
 - 1.1 x 2.4 mm
- Ultralow leakage current: 20 nA max.
- Very thin package: 0.605 mm
- Smart pinout for easier PCB layout
- High reduction of parasitic elements through integration and wafer level packaging
- Lead-free package
- Complies with the following standards:
 - IEC 61000-4-2 level 4: $\pm 15 \text{ kV}$ (air discharge), $\pm 8 \text{ kV}$ (contact discharge)

Application

- SD3.0, UHS-1 SDR104 (208 MHz)

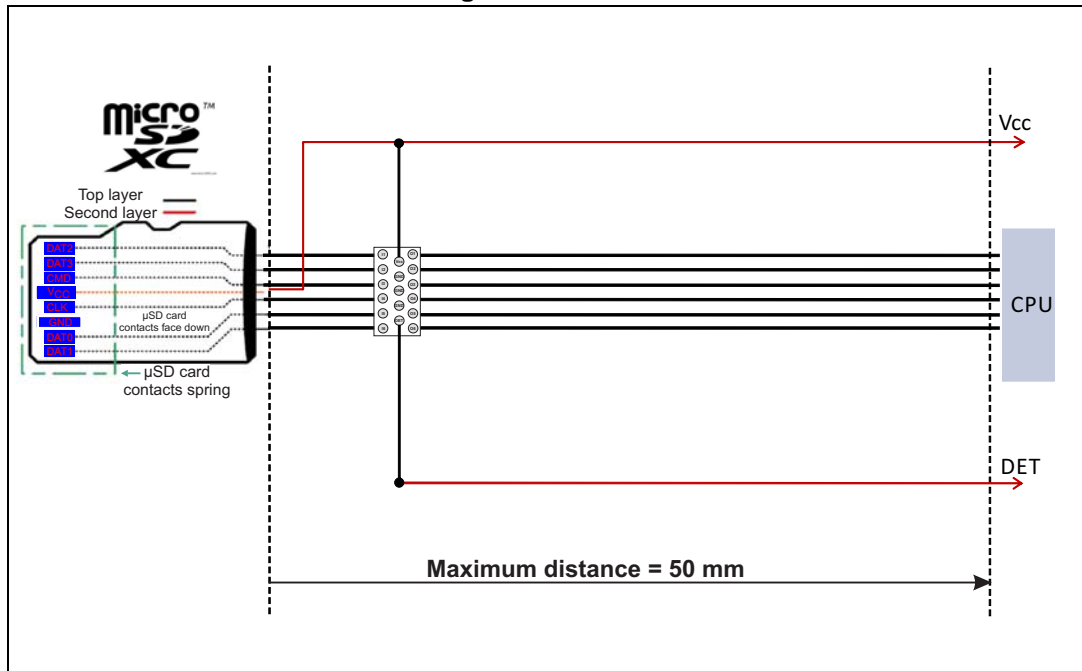
Description

The EMIF06-HSD03F3 chip is a highly integrated device designed to suppress EMI/RFI noise for interface line filtering.

The EMIF06-HSD03F3 Flip-Chip packaging means the package size is equal to the die size. That's why EMIF06-HSD03F3 is a very small device. Additionally, this filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 18 kV.

1 Application diagram

Figure 3. Schema



2 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 for Ix pins:		
	Air discharge	18	kV
	Contact discharge	18	
	ESD discharge IEC 61000-4-2, level 1 for Ox pins:		
Contact discharge	10		
T_j	Maximum junction temperature	125	$^{\circ}\text{C}$
T_{OP}	Operating temperature range	- 30 to + 85	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	- 55 to +150	$^{\circ}\text{C}$

Figure 4. Electrical characteristics (definitions)

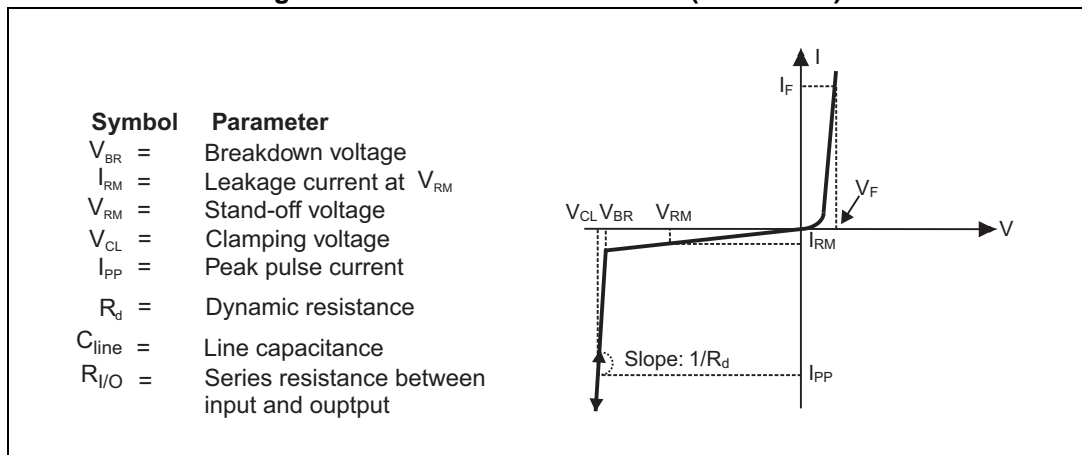


Table 2. Electrical characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Data lines, $I_R = 1\text{ mA}$	5		9	V
I_{RM}	$V_{RM} = 3\text{ V}$ per line			20	nA
$R_{I/O}$			1		Ω
C_{line}	$V_{line} = 0\text{ V}$, $V_{osc} = 30\text{ mV}$, $F = 1\text{ MHz}$		2.5	3	pF
L			1		nH
Rd	Dynamics resistance, $t_p = 100\text{ ns}$	IO-GND (positive polarity)		650	m Ω
		GND-IO (negative polarity)		320	
V_{CC}					
V_{BR}	$I_R = 1\text{ mA}$	5		9	V
I_{RM}	$V_{RM} = 3\text{ V}$			20	nA
C_{line}	$V_{line} = 0\text{ V}$, $V_{osc} = 30\text{ mV}$, $F = 1\text{ MHz}$		40		pF
DET					
V_{BR}	$I_R = 1\text{ mA}$	5		9	V
I_{RM}	$V_{RM} = 3\text{ V}$			20	nA
C_{line}	$V_{line} = 0\text{ V}$, $V_{osc} = 30\text{ mV}$, $F = 1\text{ MHz}$		40		pF

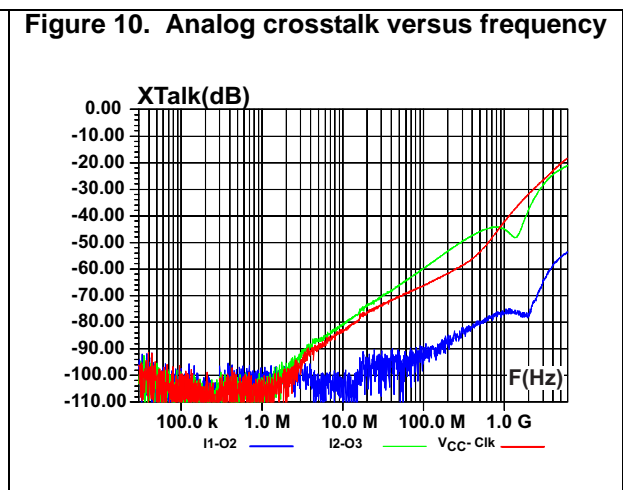
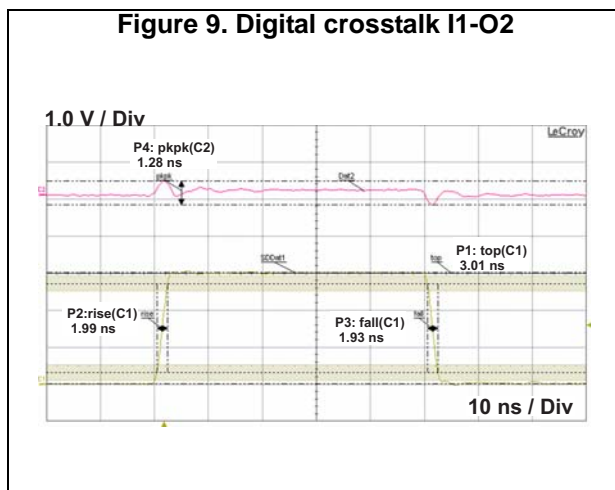
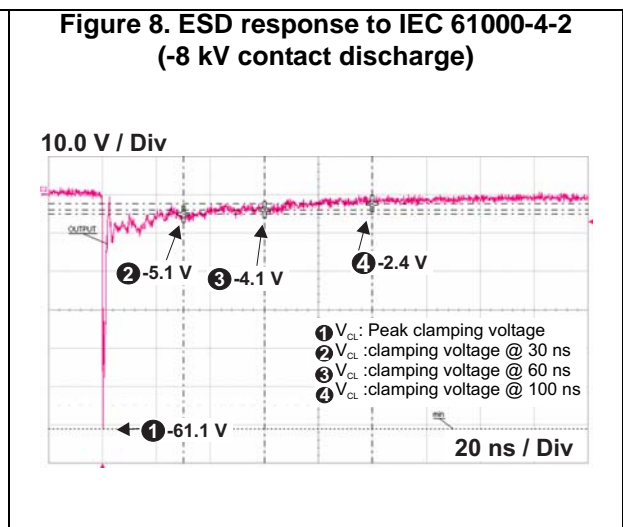
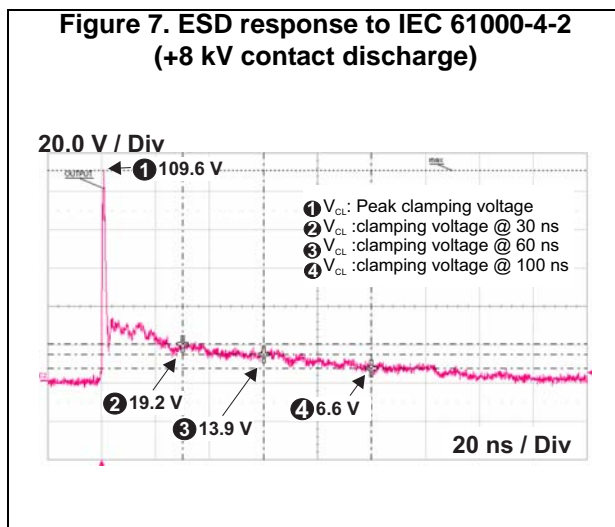
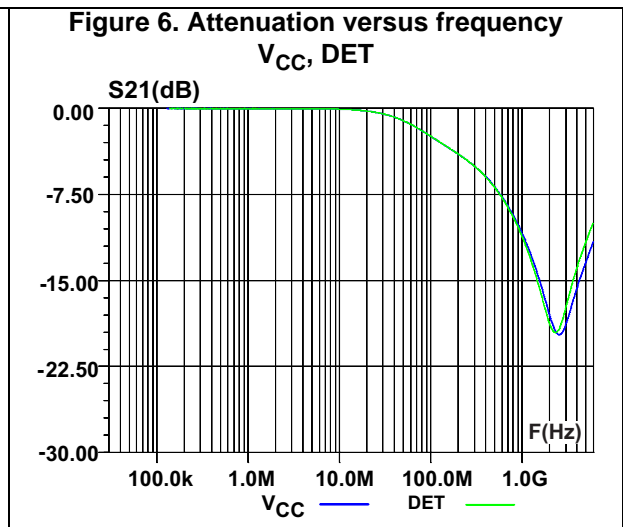
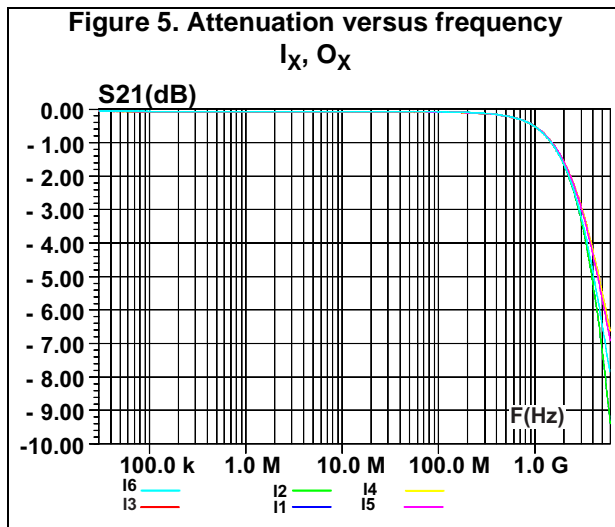
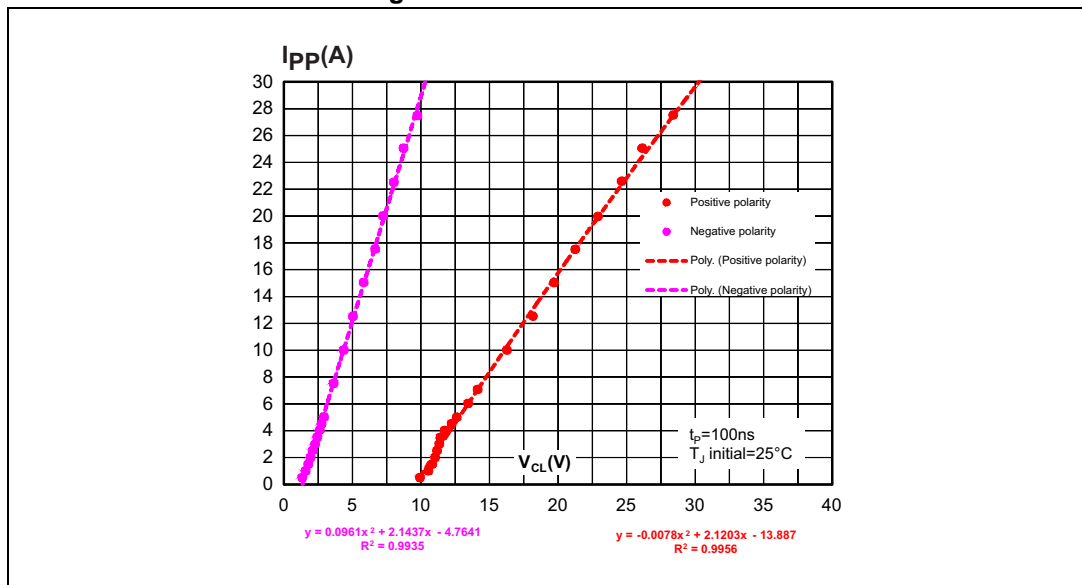


Figure 11. TLP measurement



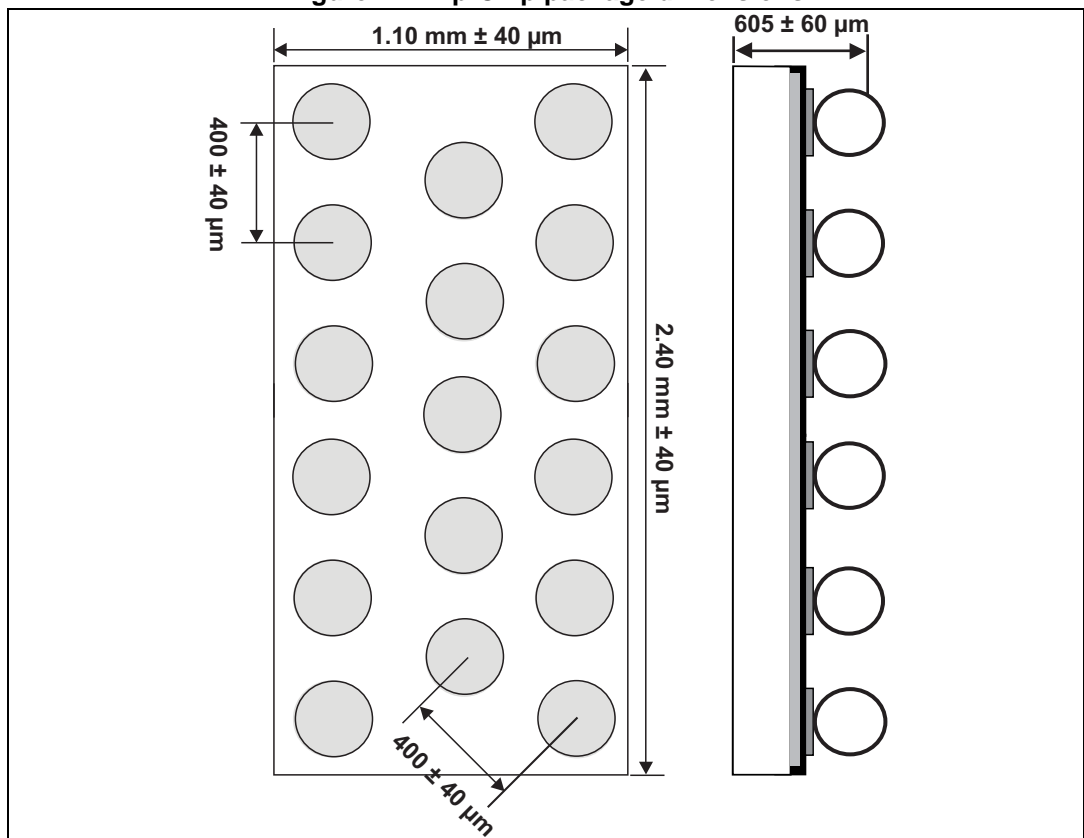
3 Package information

- 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.

3.1 Flip-Chip package information

Figure 12. Flip-Chip package dimensions



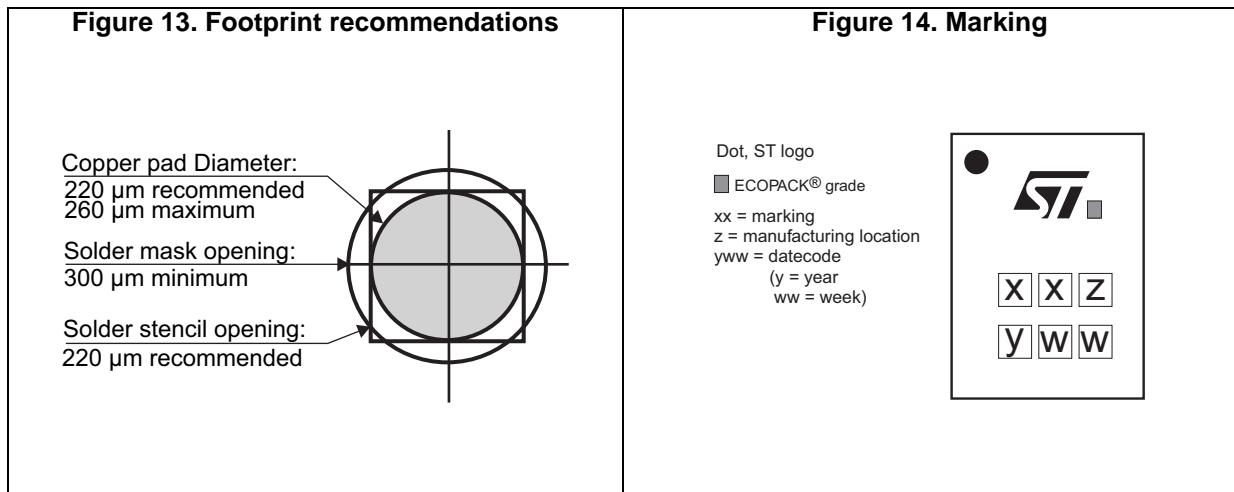
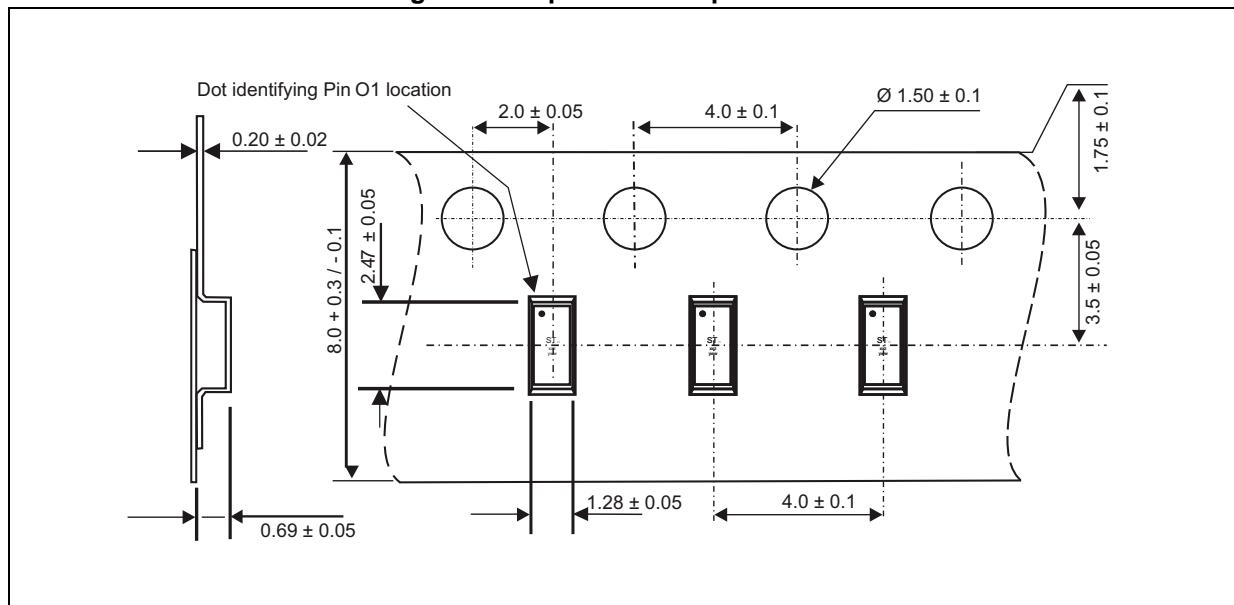


Figure 15. Tape and reel specification



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 protection and filtering devices"

4 Ordering information

Figure 16. Ordering information scheme

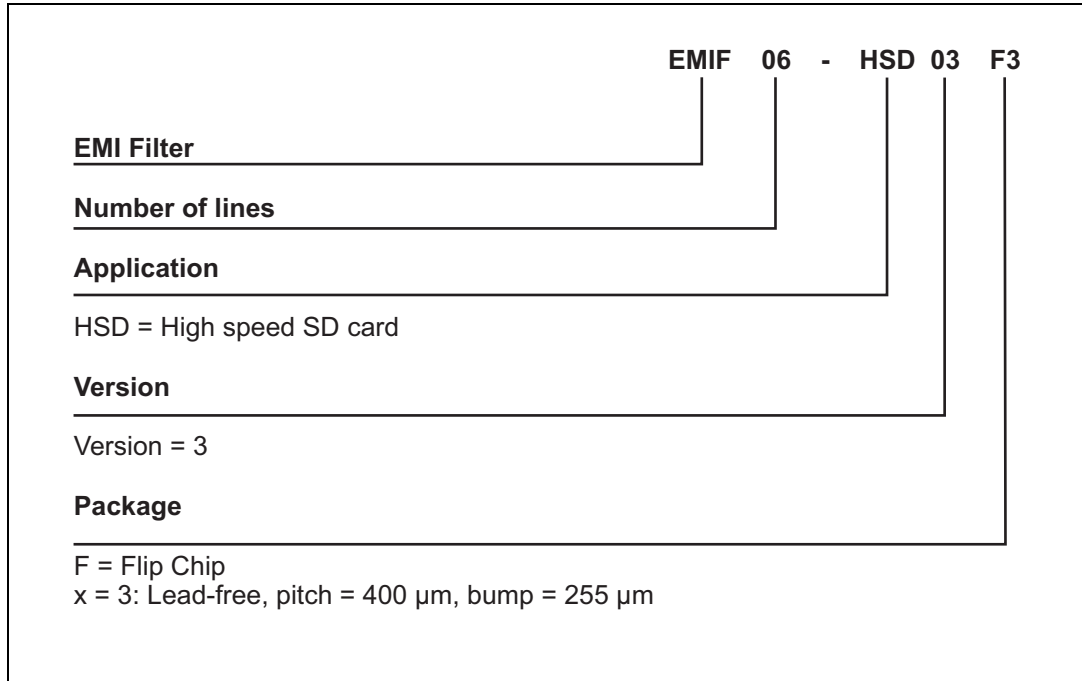


Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-HSD03F3	KK	Flip Chip	3.4 mg	5000	Tape and reel (7")

5 Revision history

Table 4. Document revision history

Date	Revision	Changes
19-Nov-2013	1	Initial release
09-Jan-2014	2	Corrected typographical error.
06-Jan-2015	3	Added mention for new AN4541.
06-Oct-2016		Updated Figure 1 .

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2016 STMicroelectronics – All rights reserved

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[EMIF06-HSD03F3](#)