Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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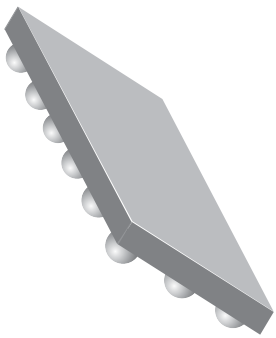
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

EMIF06-HSD03F3

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

Datasheet – production data



Flip-Chip package
(17 bumps)

Figure 1. Pin configuration (bump side)

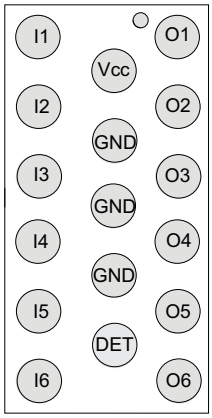
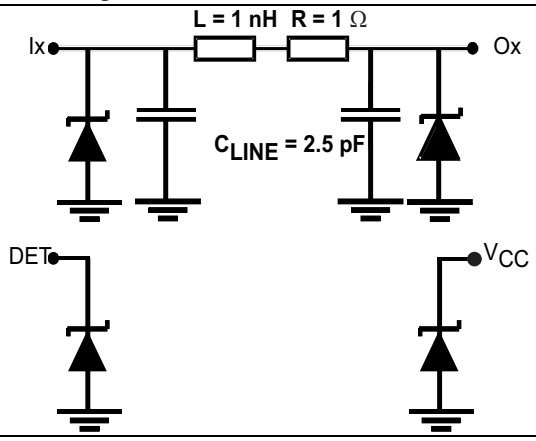


Figure 2. Functional schematic



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:±15 kV (air discharge), ±8 kV (contact discharge)

Application

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

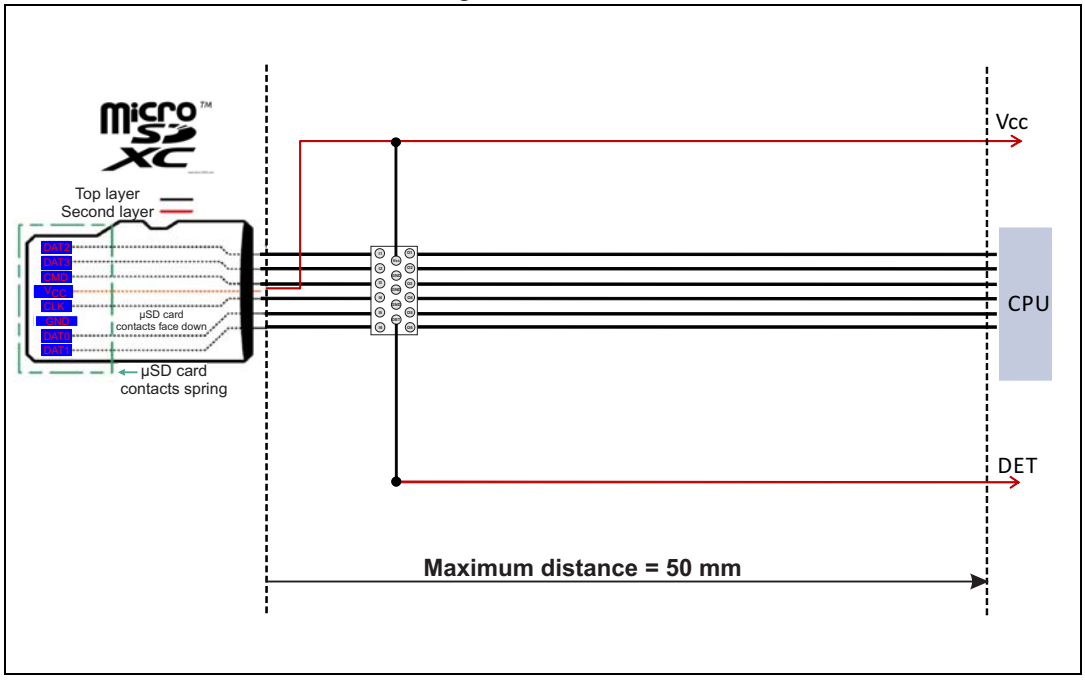
Description

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 18 kV.

1 Application diagram

Figure 3. Schema



2 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
V_{PP}	ESD discharge IEC 61000-4-2, level 4 for Ix pins: Air discharge Contact discharge ESD discharge IEC 61000-4-2, level 1 for Ox pins: Air discharge Contact discharge	 18 18 10 10	kV
T_j	Maximum junction temperature	125	°C
T_{OP}	Operating temperature range	- 30 to + 85	°C
T_{stg}	Storage temperature range	- 55 to +150	°C

Figure 4. Electrical characteristics (definitions)

Symbol		Parameter
V_{BR}	=	Breakdown voltage
I_{RM}	=	Leakage current at V_{RM}
V_{RM}	=	Stand-off voltage
V_{CL}	=	Clamping voltage
I_{PP}	=	Peak pulse current
R_d	=	Dynamic resistance
C_{line}	=	Line capacitance
$R_{I/O}$	=	Series resistance between input and ouptput

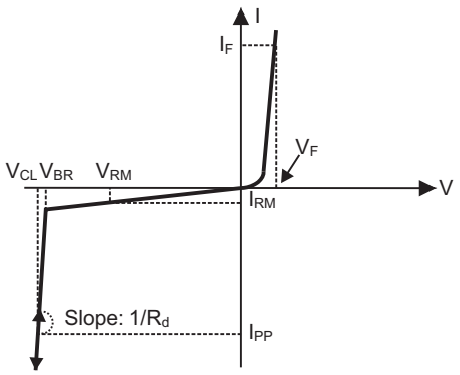


Table 2. Electrical characteristics (T_{amb} = 25 °C)

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

Figure 5. Attenuation versus frequency I_X, O_X

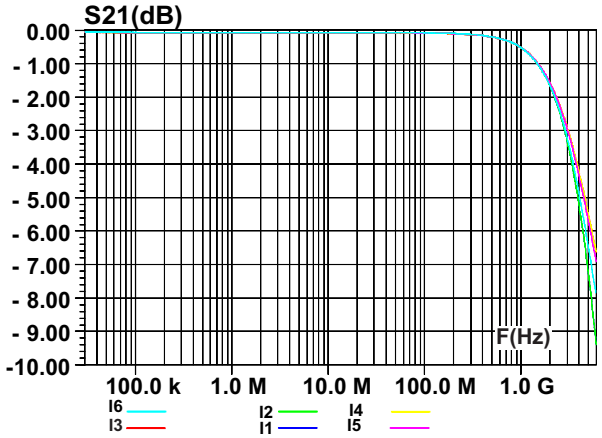


Figure 6. Attenuation versus frequency V_{CC}, DET

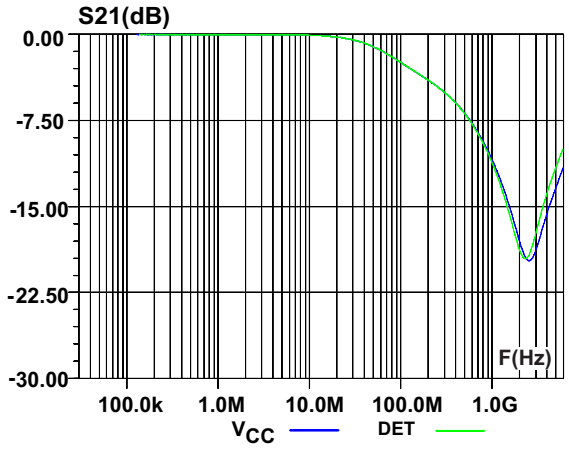


Figure 7. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

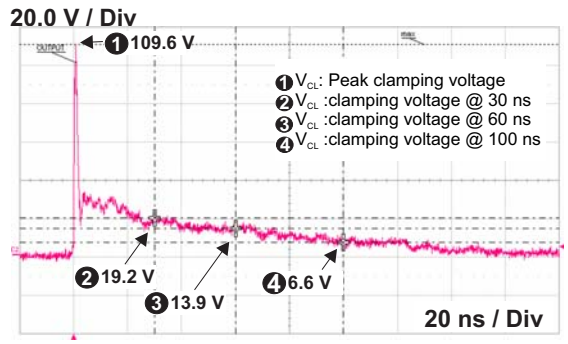


Figure 8. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

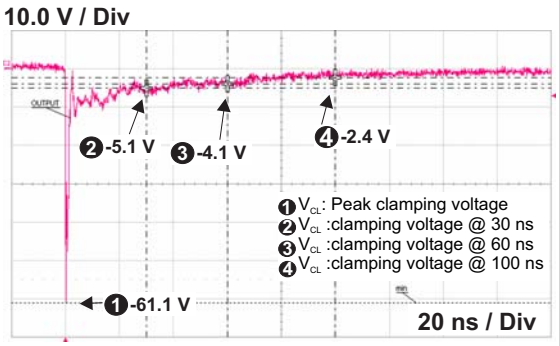


Figure 9. Digital crosstalk I1-O2

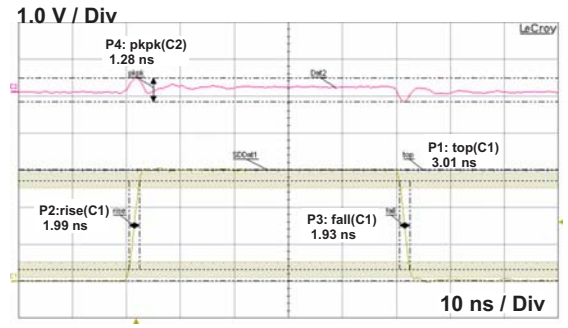


Figure 10. Analog crosstalk versus frequency

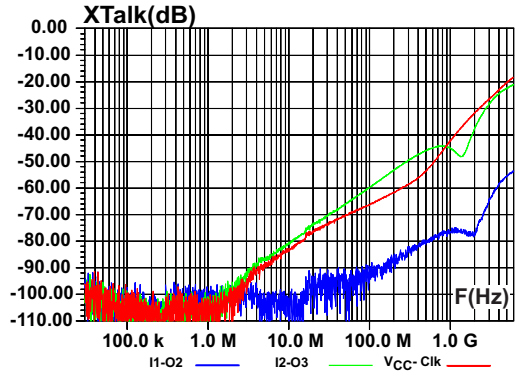
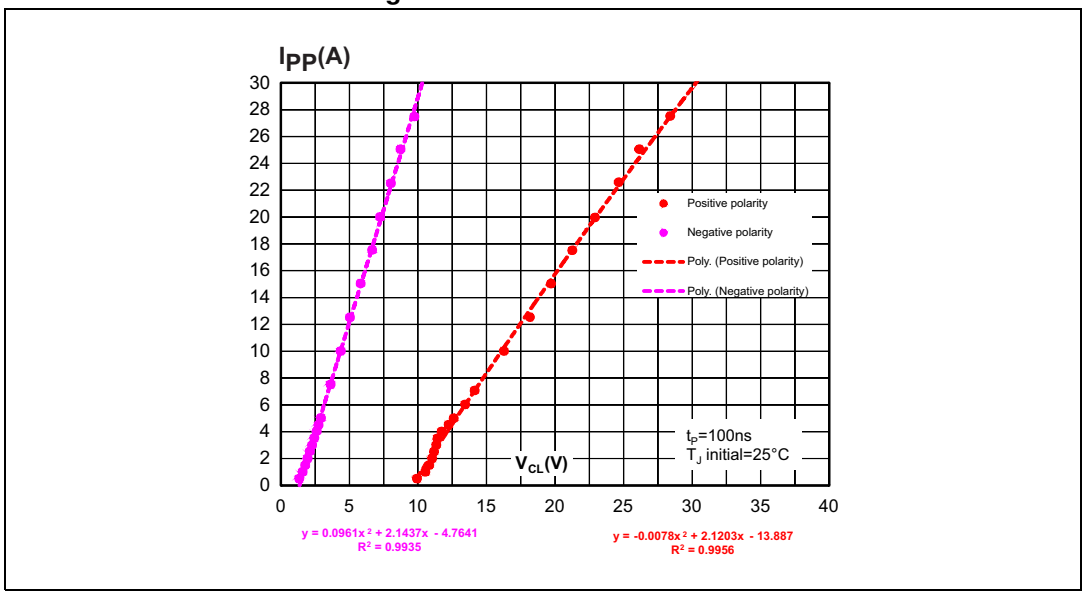


Figure 11. TLP measurement



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

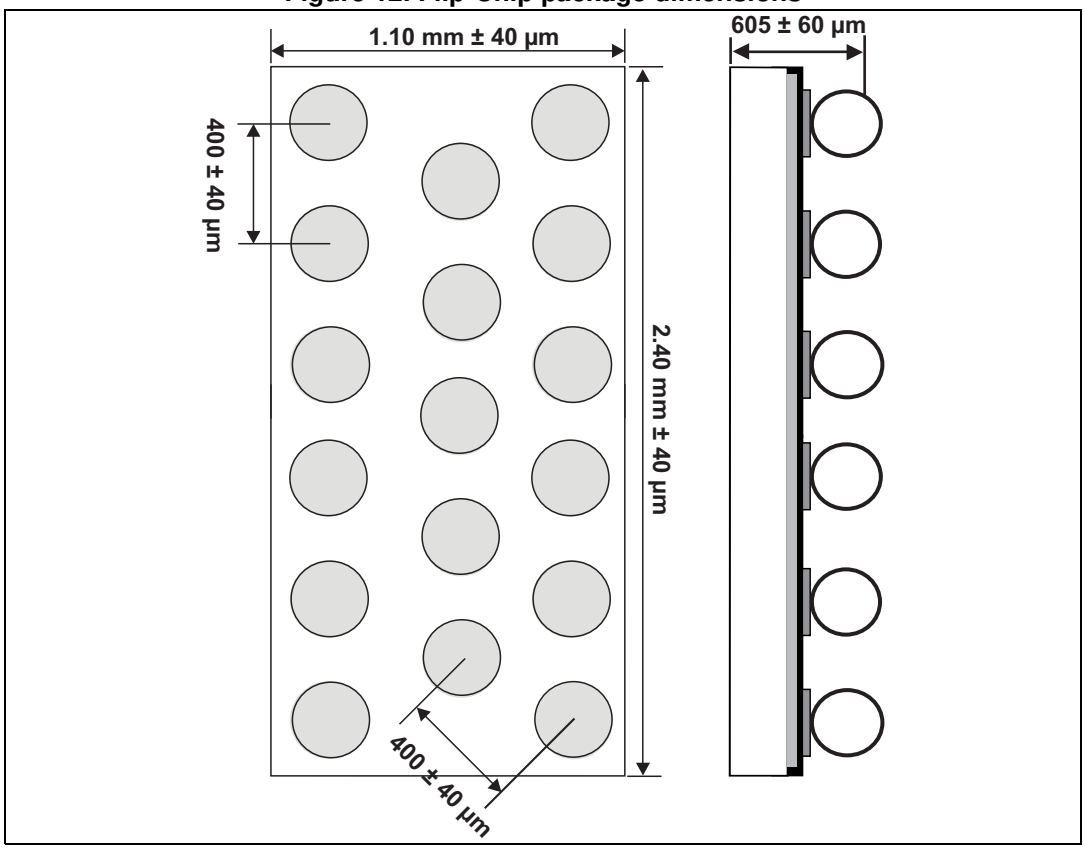


Figure 13. Footprint recommendations

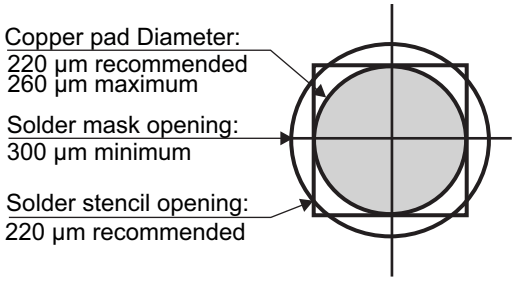


Figure 14. Marking

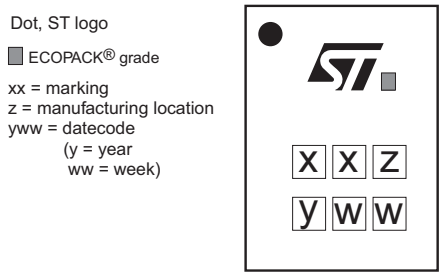
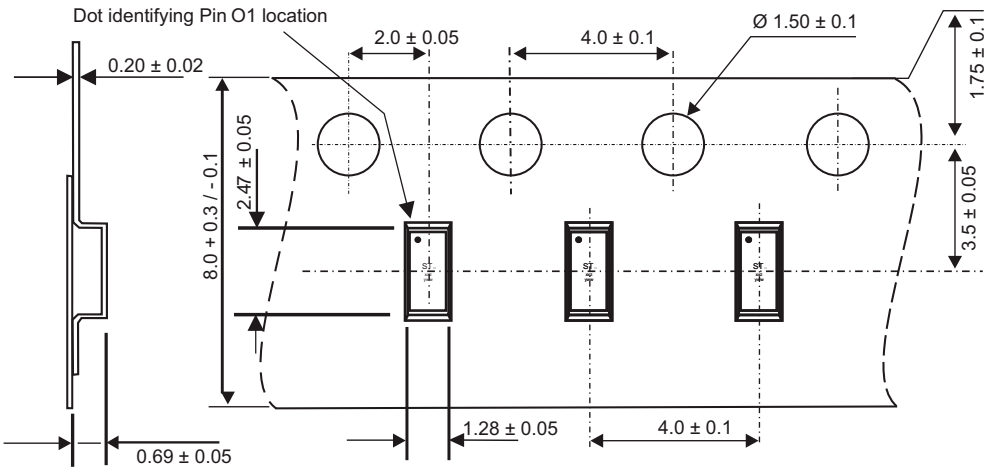


Figure 15. Tape and reel specification



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

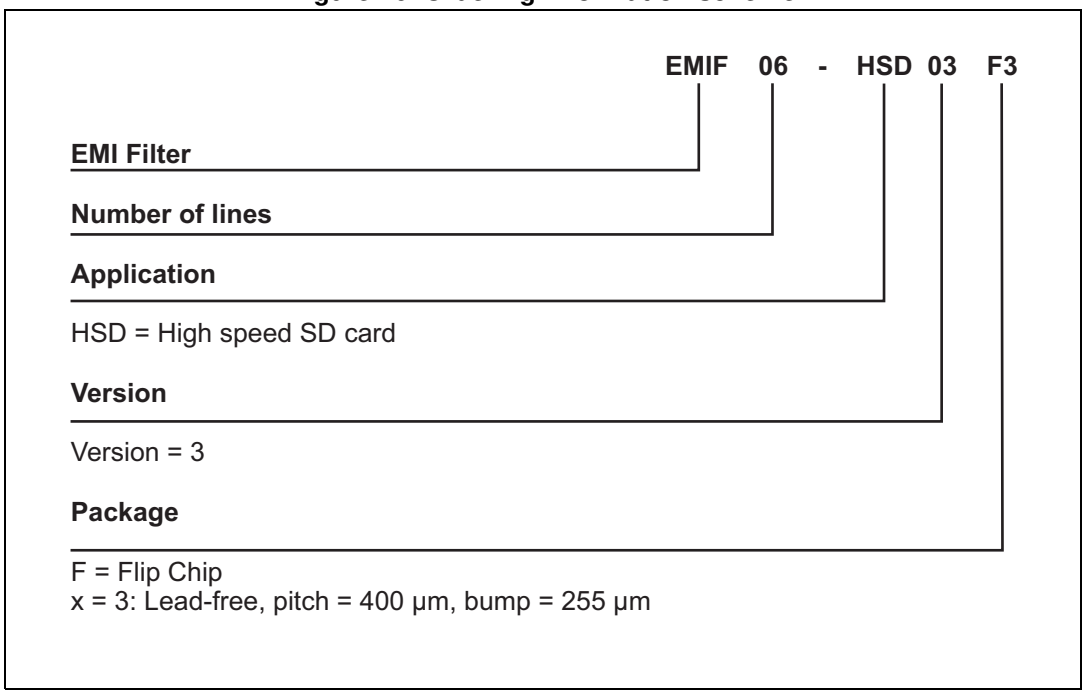


Table 3. Ordering information

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*.