EMIF04-MMC02F2

4 LINES EMI FILTER INCLUDING ESD PROTECTION

IPAD™

MAIN PRODUCT CHARACTERISTICS:

Where EMI filtering in ESD sensitive equipment is required:

- MultiMedia Card for mobile phones, Personal Digital Assistant, Digital Camera, MP3 players...

DESCRIPTION

The EMIF04-MMC02 is a highly integrated devices designed to suppress EMI/RFI noise for Multi-Media Card port. The EMIF04 flip chip packaging means the package size is equal to the die size. This filter includes an ESD protection circuitry which prevents the device from destruction when subjected to ESD surges up 15kV.

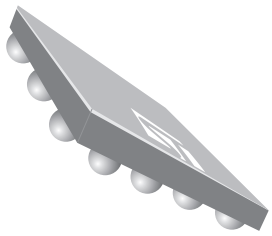
BENEFITS

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead free package
- Very low PCB space consuming: 1.57 mm x 2.07 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging.

COMPLIES WITH THE FOLLOWING STANDARDS:

IEC61000-4-2

Level 4 15kV (air discharge)
8kV (contact discharge)



Flip-Chip (11 Bumps)

Table 1: Order Code

Part Number	Marking
EMIF04-MMC02F2	FH

Figure 1: Pin Configuration (ball side)

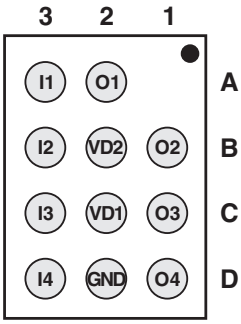


Figure 2: Configuration

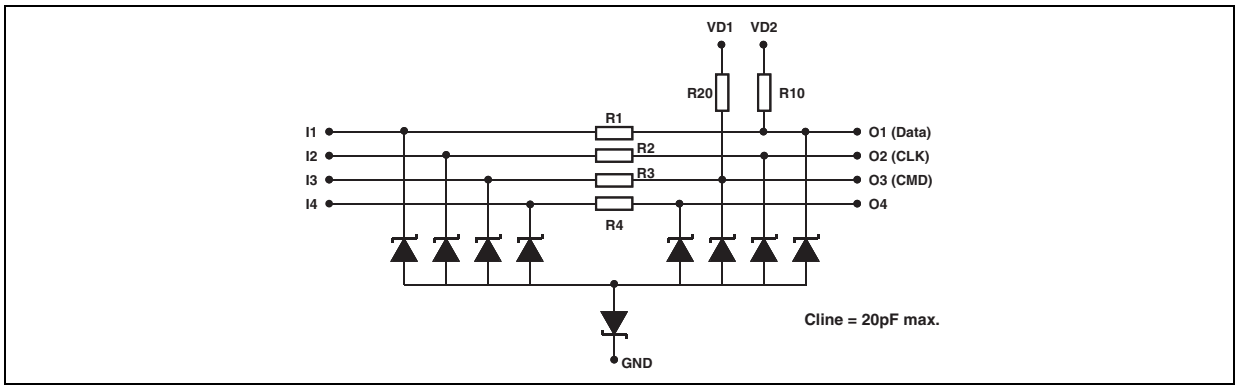


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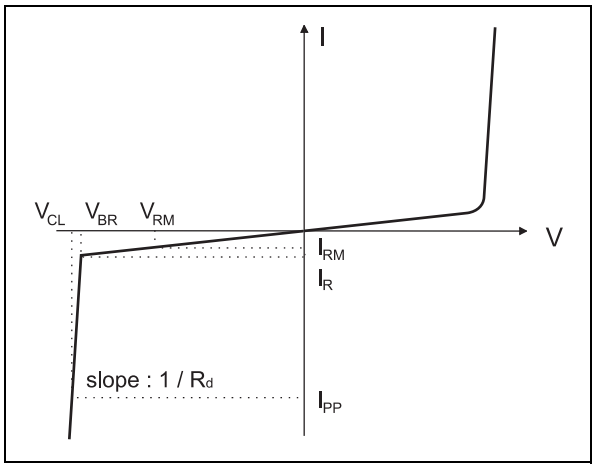
Table 2: Absolute Ratings (T_{amb} = 25°C))

Symbol	Parameter and test conditions	Value	Unit
P_R	DC power per resistor	70	mW
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

Table 3: Electrical Characteristics (T_{amb} = 25°C)

Symbol	Parameter
V_{BR}	Breakdown voltage
I_{RM}	Leakage current @ V_{RM}
V_{RM}	Stand-off voltage
V_{CL}	Clamping voltage
R_d	Dynamic impedance
I_{PP}	Peak pulse current
$R_{I/O}$	Series resistance between Input & Output
C_{line}	Input capacitance per line



Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	6			V
I_{RM}	V_{RM} = 3V		100	500	nA
C_{line}	@ 0V			20	pF
R_1,R_2,R_3,R_4	Tolerance ± 5%		47		Ω
R_{10}	Tolerance ± 5%		13		kΩ
R_{20}	Tolerance ± 5%		56		kΩ

Figure 3: S21 (dB) attenuation measurement and Aplac simulation

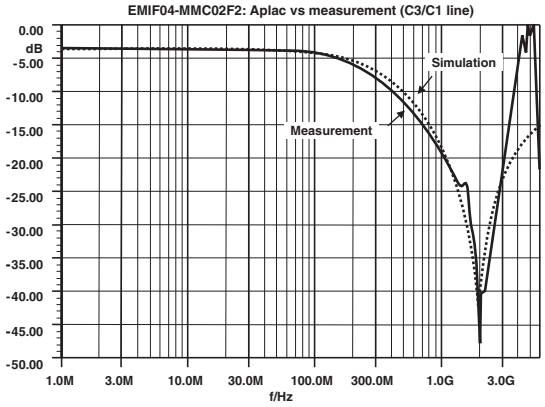


Figure 4: Crosstalk measurements

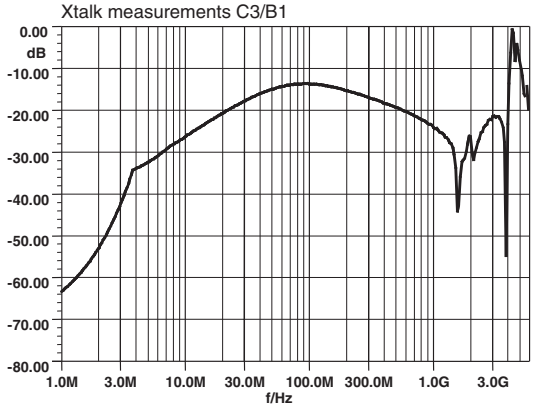


Figure 5: ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and on one output (Vout)

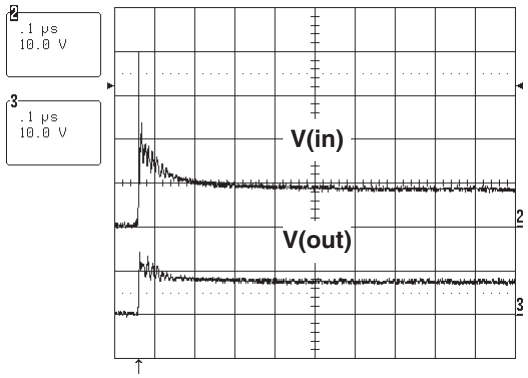


Figure 6: ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and on one output (Vout)

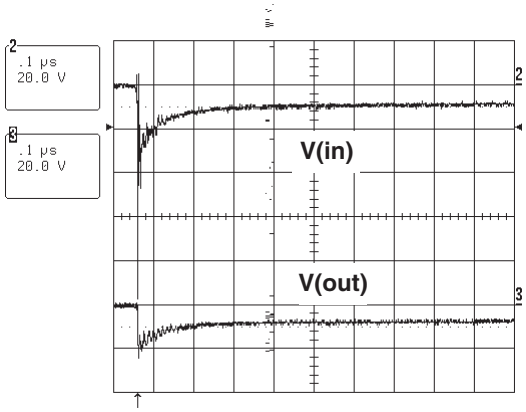


Figure 7: Junction capacitance versus reverse voltage applied (typical values)

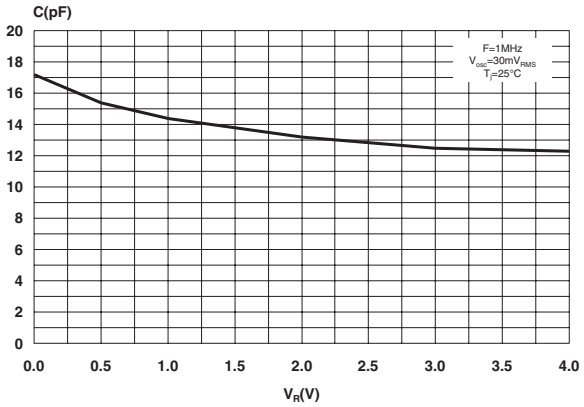


Figure 8: Aplac model device structure

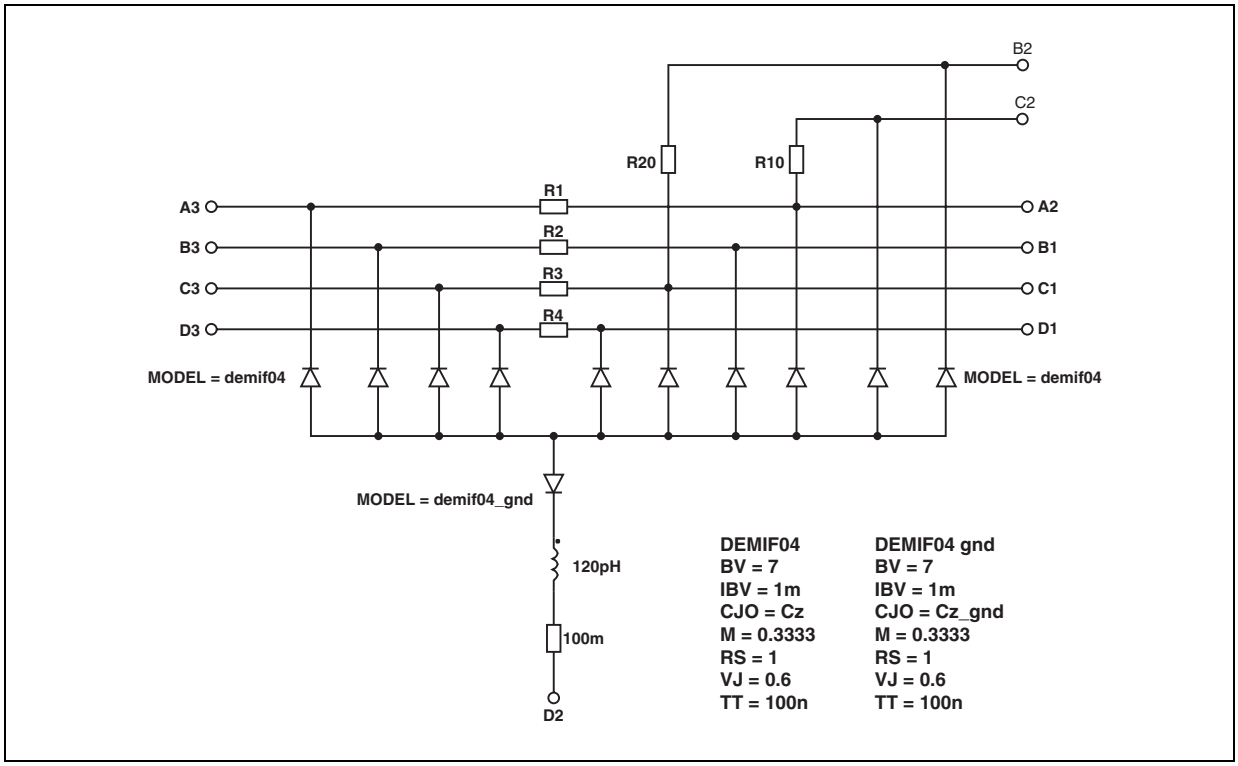


Figure 9: Aplac model connections

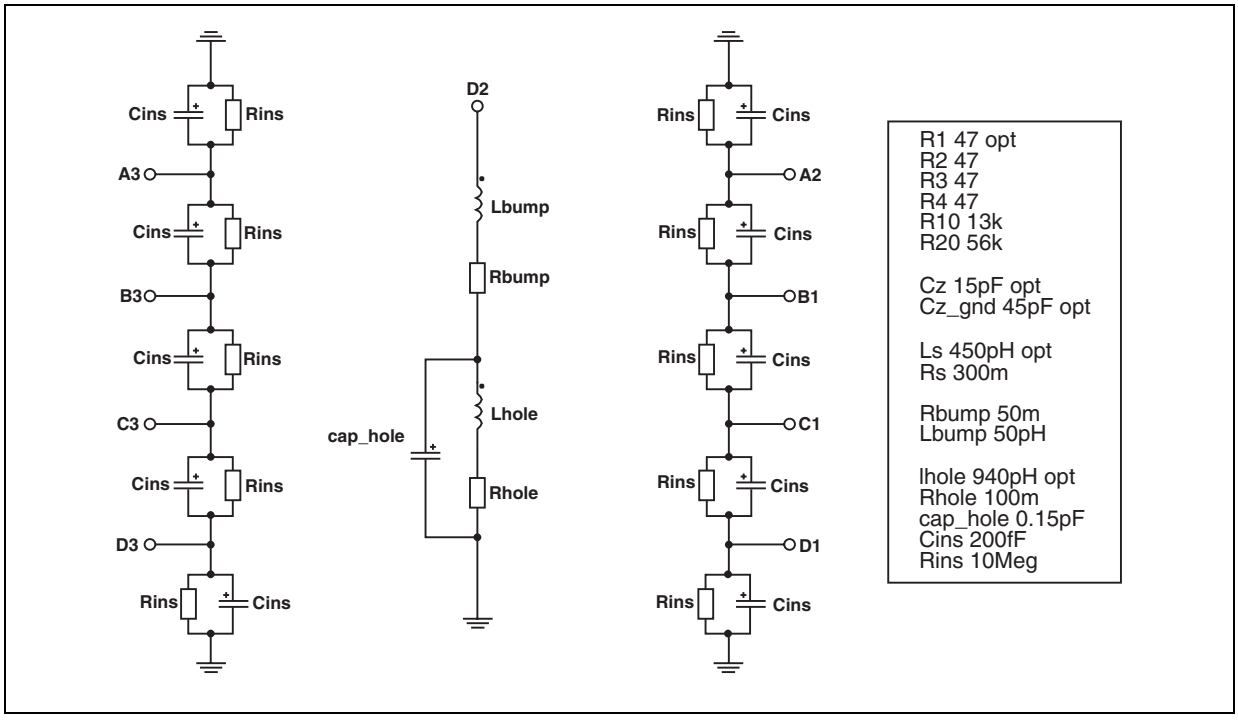


Figure 10: Order Code

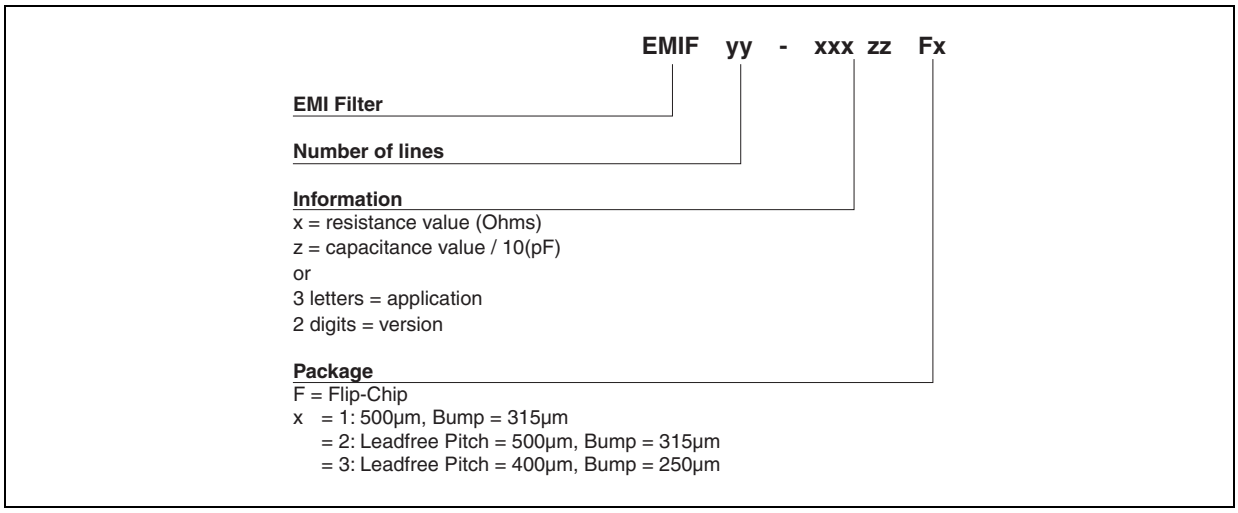


Figure 11: FLIP-CHIP Package Mechanical Data

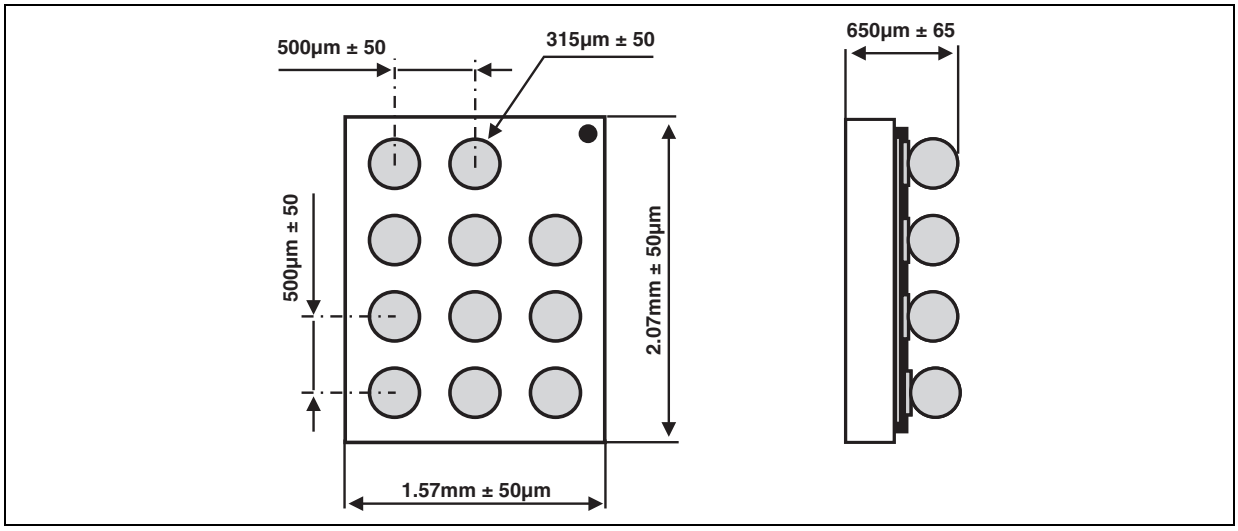


Figure 12: Foot Print Recommendations

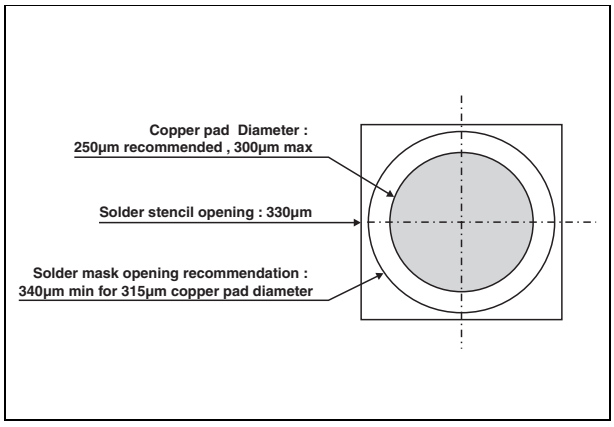


Figure 13: Marking

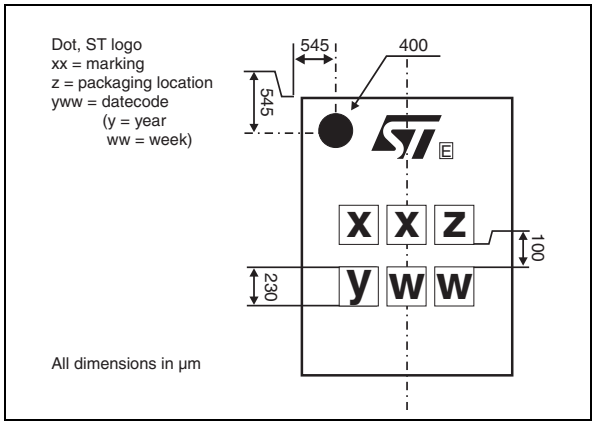


Figure 14: FLIP-CHIP Tape and Reel Specification

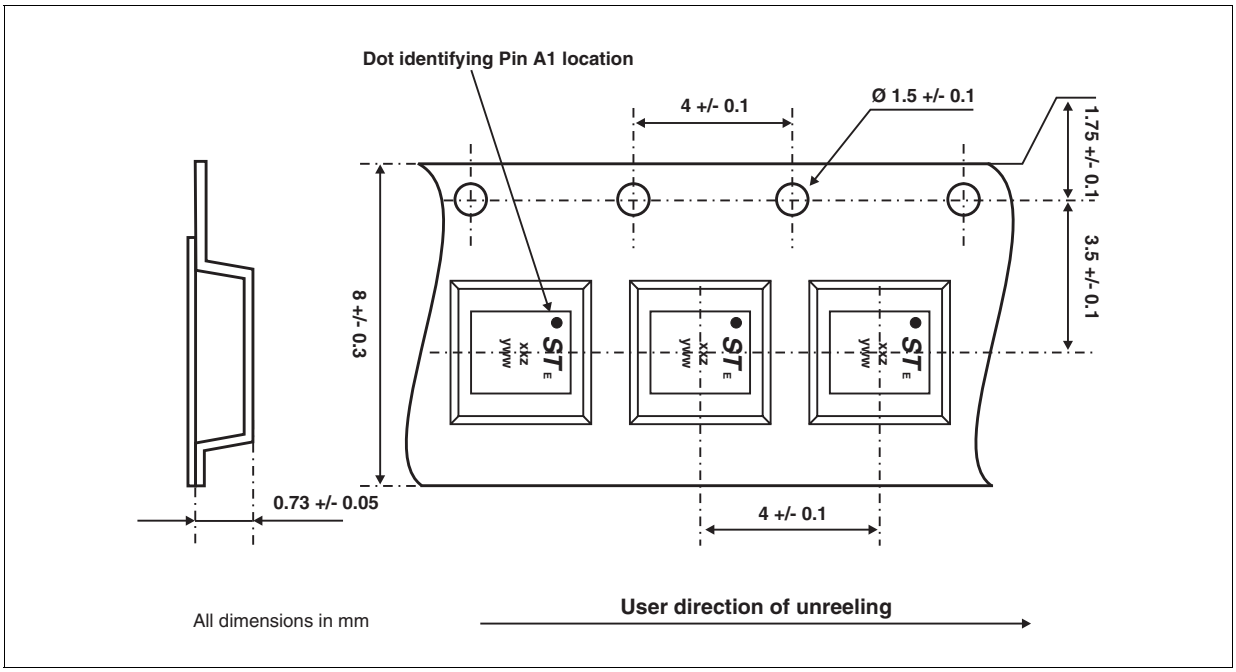


Table 4: Ordering Information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF04-MMC02F22	FH	Flip-Chip	4.5 mg	5000	Tape & reel 7”

Note: More packing informations are available in the application note
AN1235: “Flip-Chip: Package description and recommendations for use”
AN1751: "EMI Filters: Recommendations and measurements"

Table 5: Revision History

Date	Revision	Description of Changes
14-Oct-2004	1	First issue