



EMIF04-MMC02F3

4 LINES EMI FILTER AND ESD PROTECTION FOR MULTIMEDIA CARD

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-MMC02F3 is a highly integrated device designed to suppress EMI/RFI noise for MultiMedia Card ports. The EMIF04 Flip-Chip packaging means the package size is equal to the die size.

This filter includes ESD protection circuitry which prevents damage to the application when subjected to ESD surges up to 15kV.

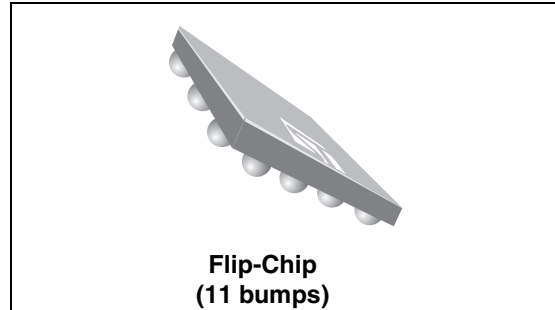
Benefits

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead free package
- 400µm pitch
- Compatible with high speed data rate
- Very low PCB space consuming: < 2 mm²
- Very thin package: 0.60 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging

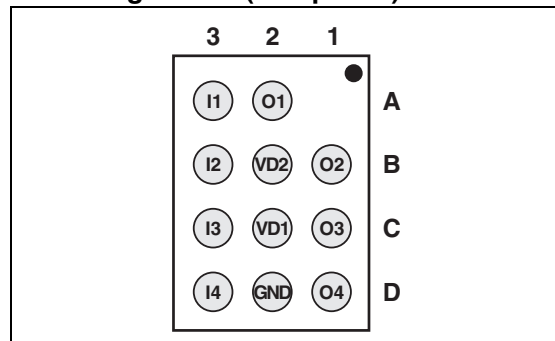
Complies with the following standards:

IEC61000-4-2:

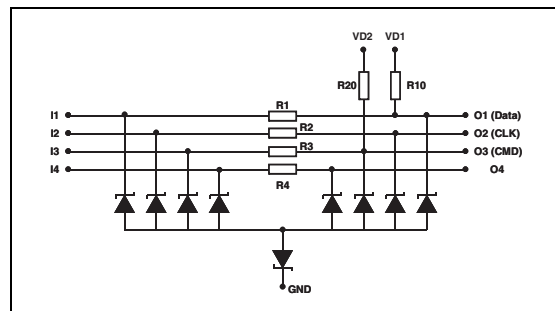
Level 4	15kV	(air discharge)
	8kV	(contact discharge)



Pin configuration (bump side)



Schematic



Order codes

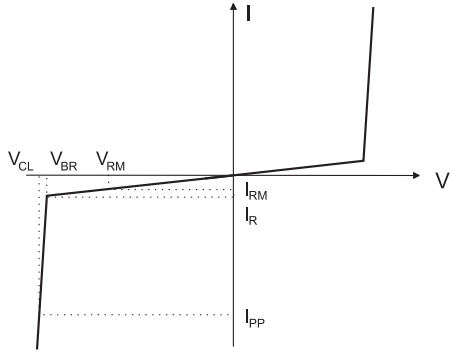
Part number	Marking
EMIF04-MMC02F3	GP

Table 1. Absolute maximum rating (limiting values)

Symbol	Parameter	Value	Unit
V_{PP}	ESD discharge IEC61000-4-2, air discharge ESD discharge IEC61000-4-2, contact discharge	15 8	kV
T_j	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	$^{\circ}\text{C}$

1 ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$)

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



Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	$I_R = 1 \text{ mA}$	6			V
I_{RM}	$V_{RM} = +3\text{V}$		100	250	nA
Cline	$V_{LINE} = 0 \text{ V}$, $V_{OSC} = 30 \text{ mV}$, $F = 1\text{MHz}$			20	pF
R_1, R_2, R_3, R_4	Tolerance $\pm 10\%$		47		Ω
R_{10}	Tolerance $\pm 10\%$		13		k Ω
R_{20}	Tolerance $\pm 10\%$		56		k Ω

Figure 1. S21 attenuation measurements A2 - A3 line

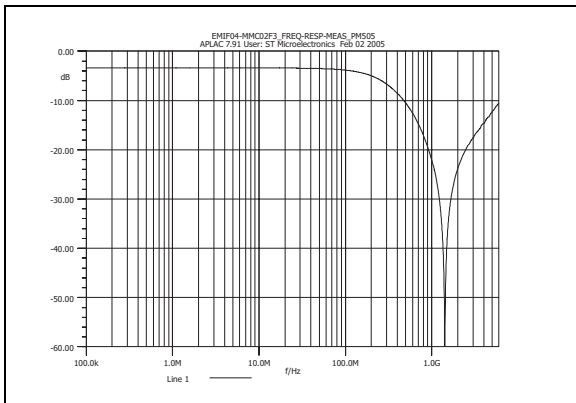


Figure 2. S21 attenuation measurements B1 - B3 line

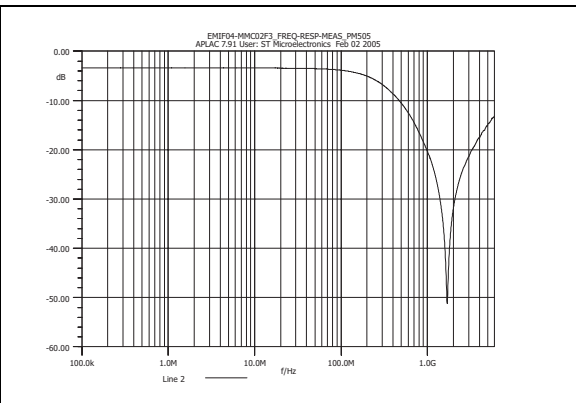


Figure 3. S21 attenuation measurements C1 - C3 line

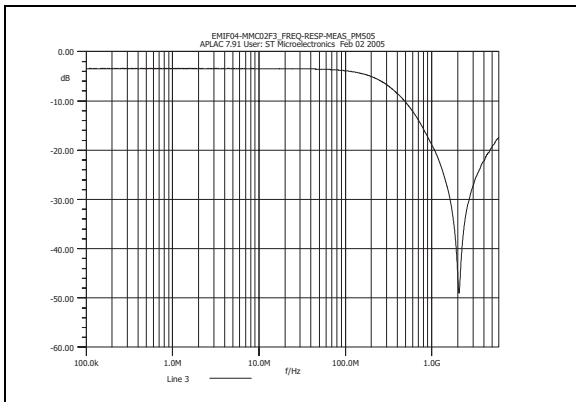


Figure 4. S21 attenuation measurements D1 - D3 line

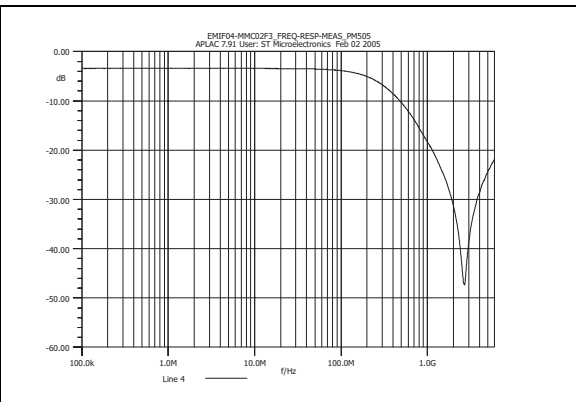


Figure 5. Crosstalk behaviour (A2 - B3 line)

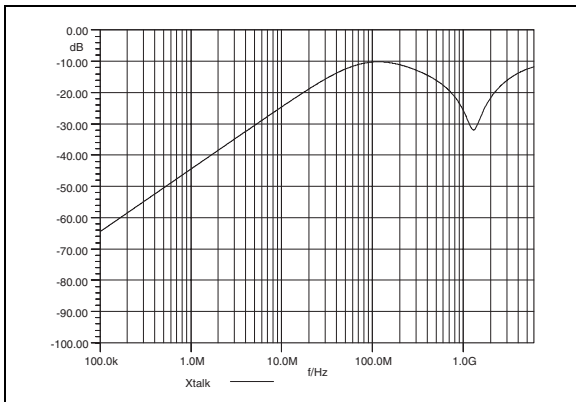


Figure 6. Line capacitance versus reverse applied voltage

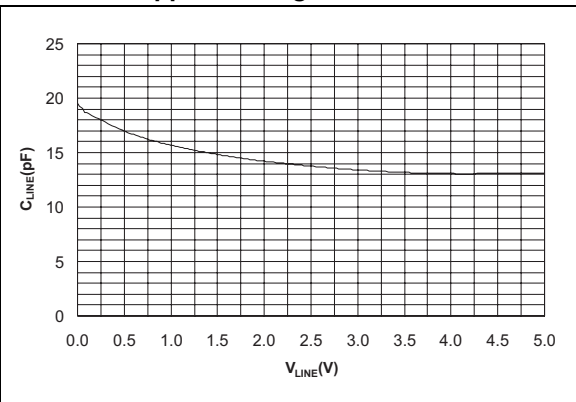


Figure 7. ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and on one output (Vout).

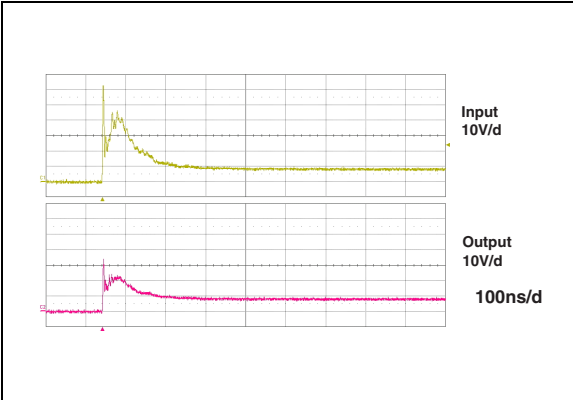
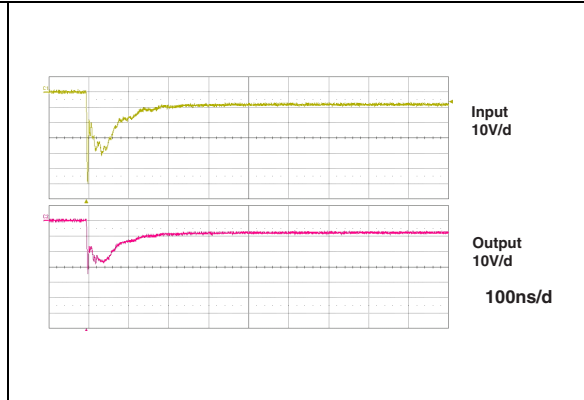


Figure 8. ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and on one output (Vout).



2 Aplac model

Figure 9. Device structure

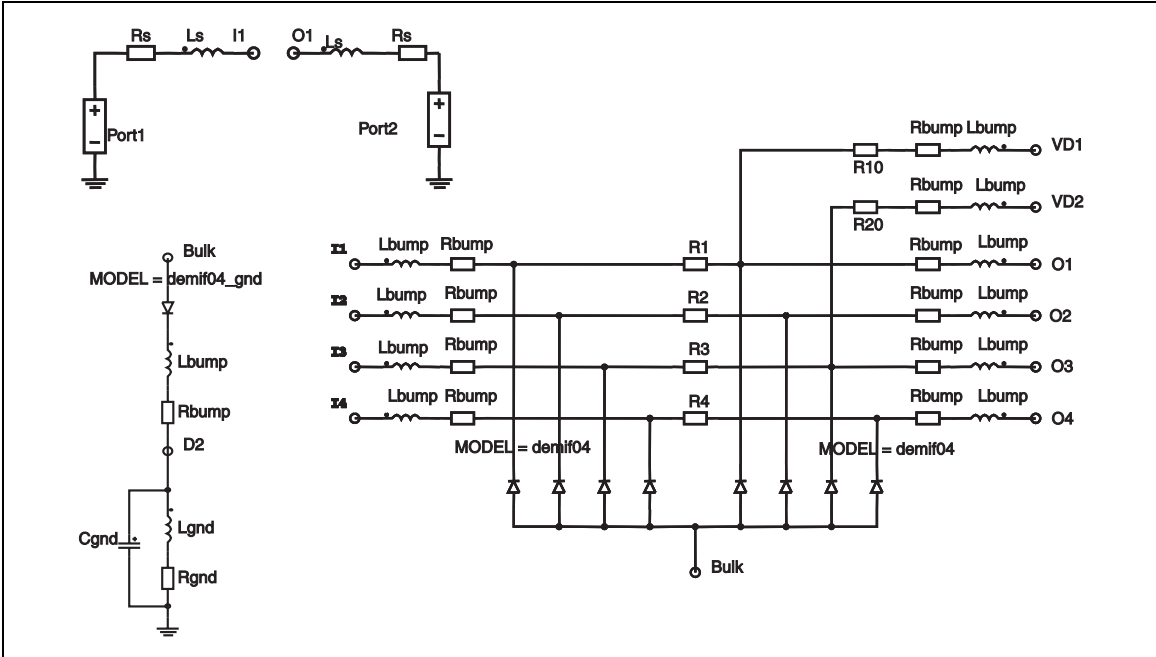
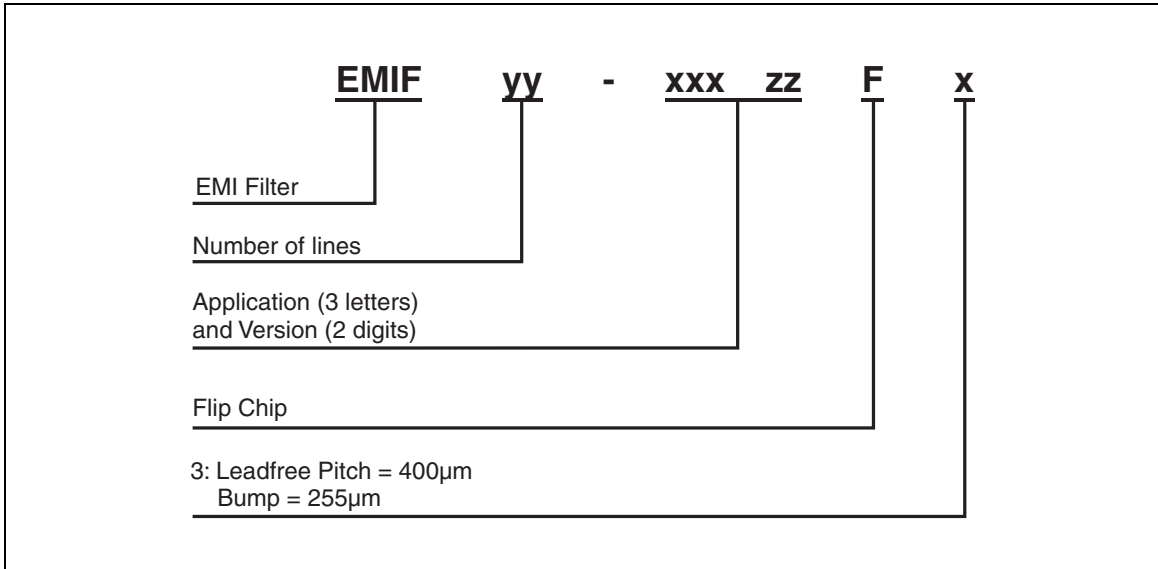


Figure 10. Aplac model variables

aplacvar R1 47		
aplacvar R2 47		
aplacvar R3 47		
aplacvar R4 47		
aplacvar R10 13k	Diode Demif04	Diode Demif04_gnd
aplacvar R20 56k	BV=7	BV=7
aplacvar Rsub 120m	IBV=1m	IBV=1m
aplacvar Cz 16.65pF	CJO=Cz	CJO=Cz_gnd
aplacvar Cz_gnd 49.95pF	M=0.31	M=0.31
aplacvar RS_gnd 480m	RS=1	RS=RS_gnd
aplacvar Ls 950pH	VJ=0.6	VJ=0.6
aplacvar Rs 150m	TT=100n	TT=100n
aplacvar Rbump 20m		
aplacvar Lbump 50pH		
aplacvar Lgnd 250pH		
aplacvar Rgnd 200m		
aplacvar Cgnd 0.6pF		

3 Order code



4 Package information

Figure 11. Mechanical data

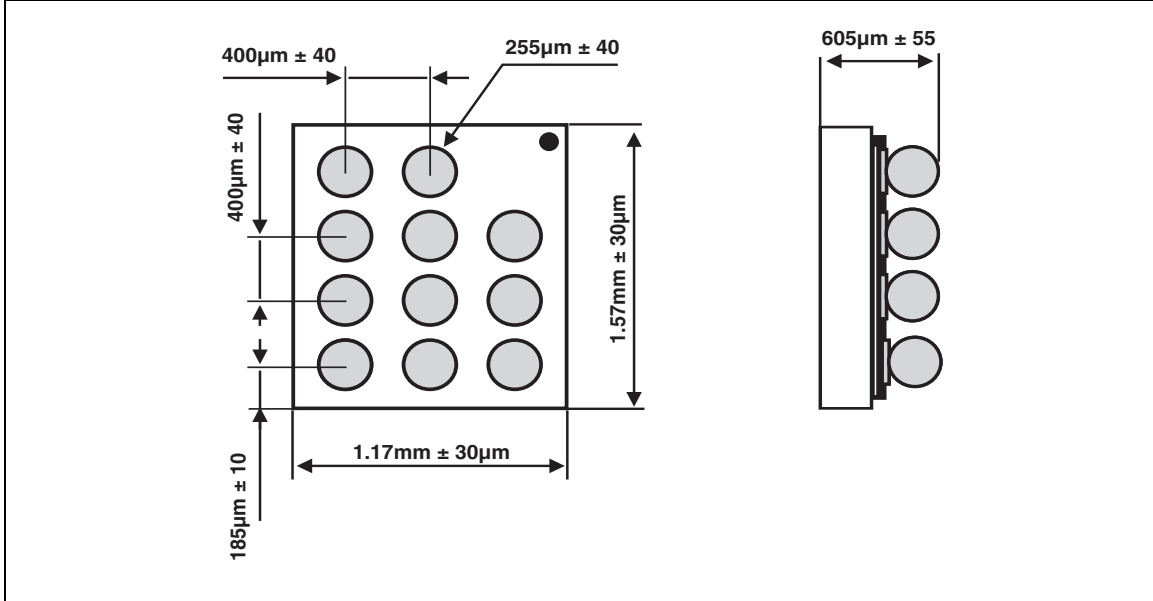


Figure 12. Foot print recommendations

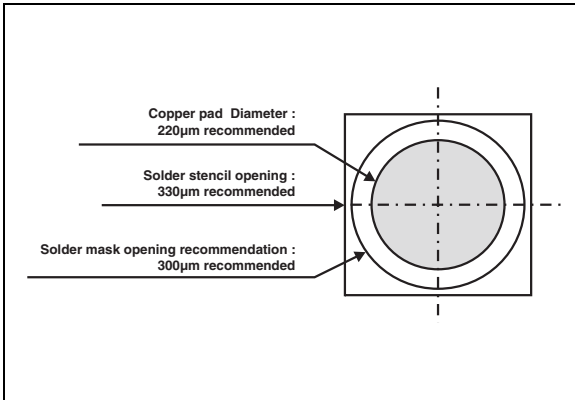
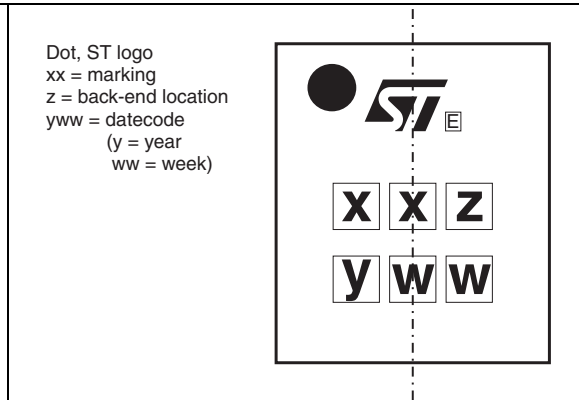
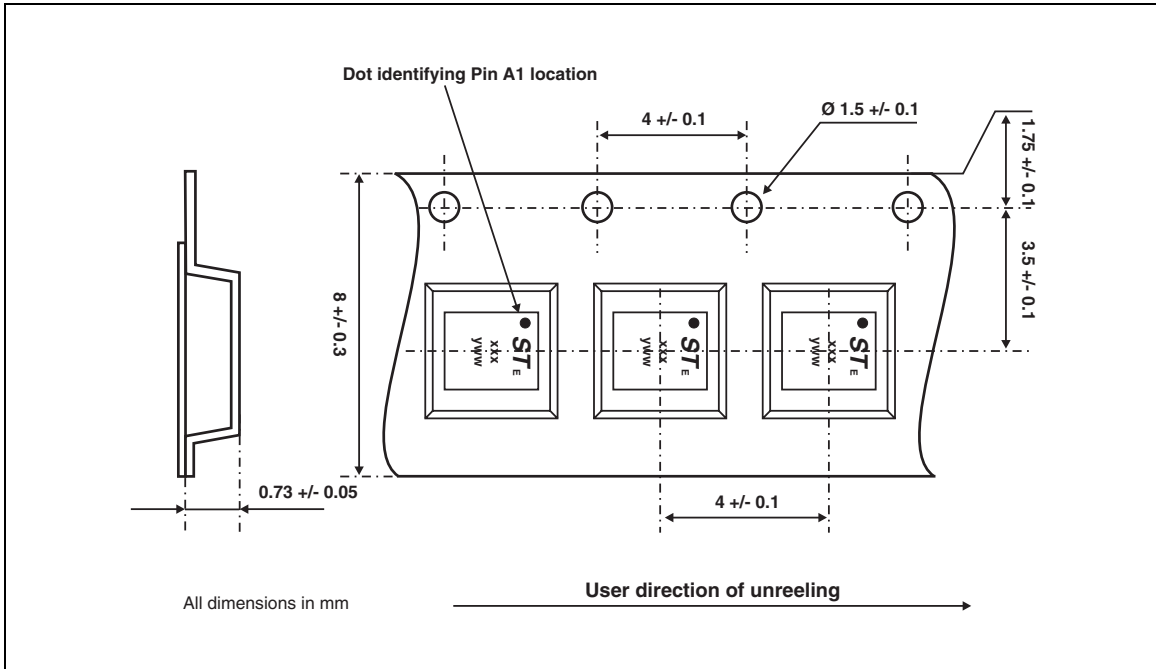


Figure 13. Marking



5 Flip-chip tape and reel specification



6 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
EMIF04-MMC02F3	GP	Flip-Chip	2.4 mg	5000	Tape and reel 7"

Note: More information is available in the application notes:

- AN1235: "Flip-Chip: Package description and recommendations for use"
- AN1751: "EMI Filters: Recommendations and measurements"

7 Revision history

Date	Revision	Description of Changes
16-Jun-2005	1	First issue

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