

## EMIF10-1K010F2

IPAD™

## EMI FILTER INCLUDING ESD PROTECTION

## MAIN PRODUCT CHARACTERISTICS:

Where EMI filtering in ESD sensitive equipment is required

- Mobile phones and communication systems
- Computers, printers and MCU Boards

## DESCRIPTION

The EMIF10-1K010F2 is a highly integrated devices designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF10 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

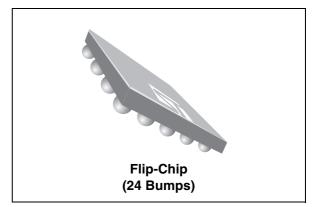
- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead free package
- Very low PCB space consuming: 2.57 mm x 2.57 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging.

## COMPLIES WITH THE FOLLOWING STANDARDS: IEC61000-4-2

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

### MIL STD 883E -Method 3015-6 Class 3

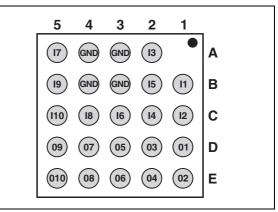
#### Figure 2: Basic Cell Configuration

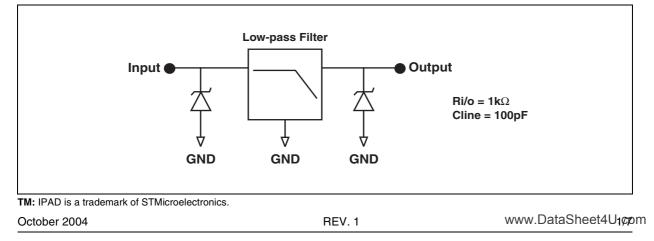


#### Table 1: Order Code

Part Number	Marking	
EMIF10-1K010F2	FD	

## Figure 1: Pin Configuration (ball side)





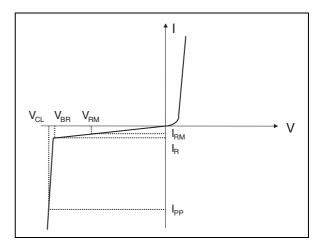
## EMIF10-1K010F2

Symbol	Parameter and test conditions	Value	Unit
Tj	Junction temperature	125	°C
T <sub>op</sub>	Operating temperature range	- 40 to + 85	°C
T <sub>stg</sub>	Storage temperature range	- 55 to + 150	°C

## Table 2: Absolute Maximum Ratings (T<sub>amb</sub> = 25°C)

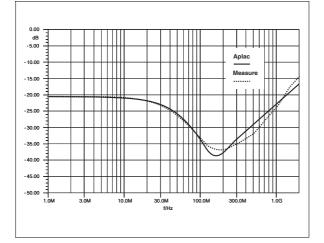
## Table 3: Electrical Characteristics ( $T_{amb} = 25^{\circ}C$ )

Symbol	Parameters	
V <sub>BR</sub>	Breakdown voltage	
I <sub>RM</sub>	Leakage current @ V <sub>RM</sub>	
V <sub>RM</sub>	Stand-off voltage	
V <sub>CL</sub>	Clamping voltage	
R <sub>d</sub>	Dynamic impedance	
I <sub>PP</sub>	Peak pulse current	
R <sub>I/O</sub>	Series resistance between Input & Output	
C <sub>in</sub>	Input capacitance per line	

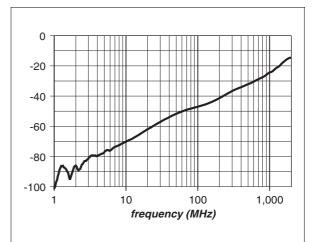


Symbol	Test conditions	Min.	Тур.	Max.	Unit
V <sub>BR</sub>	I <sub>R</sub> = 1 mA	6	8	10	V
I <sub>RM</sub>	V <sub>RM</sub> = 3V per line			500	nA
R <sub>I/O</sub>		900	1000	1100	Ω
R <sub>line</sub>	At 0V bias	80	100	120	pF

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



## Figure 4: Analog crosstalk measurements



## Figure 5: Digital crosstalk measurement

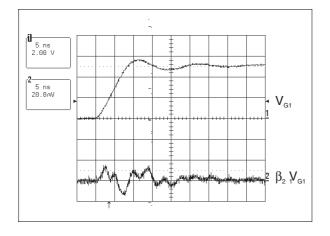


Figure 7: ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and on one output (Vout)

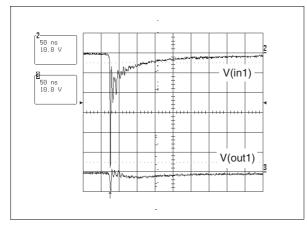


Figure 6: ESD response to IEC61000-4-2 (+15kV air disc.harge) on one input V(in) and on one output (Vout)

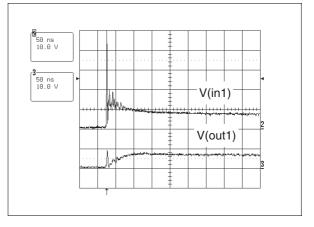
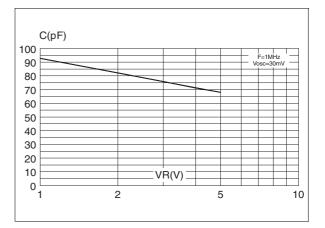


Figure 8: Line capacitance versus applied voltage



## EMIF10-1K010F2

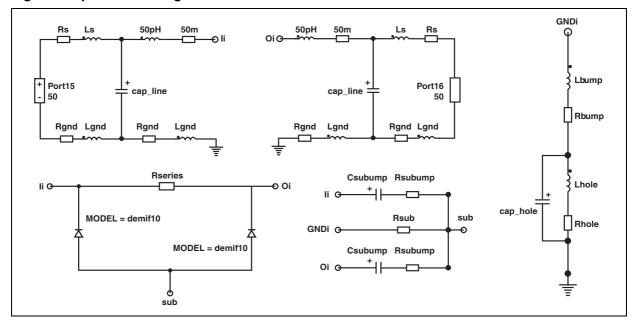
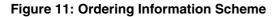


Figure 9: Aplac model single line structure

## Figure 10: Aplac model parameters

Cz	57pF	Model demif10	
Rseries	960	BV = 7	
cap_line	0.8pF	IBV = 1m	
Ls	0.6nH	CJO = Cz	
Rbump	50m	M = 0.3333	
Lbump	50pH	Rs = 1	
Rs	0.15	VJ = 0.6	
Csubump	15pF	TT = 100n	
Rsubump	0.15		
Rsub	0.1		
lhole	1.2nH opt		
Rhole	0.15		
cap_hole	0.15pF		
Rgnd	0.25		
Ignd	0.4nH		
5			

57



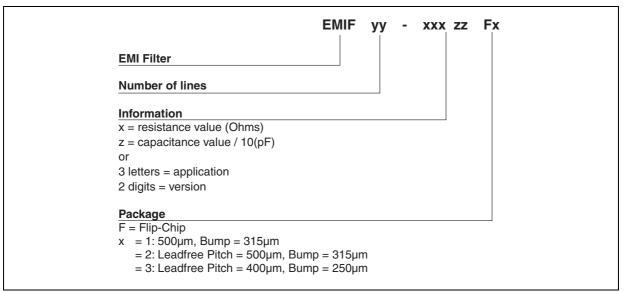
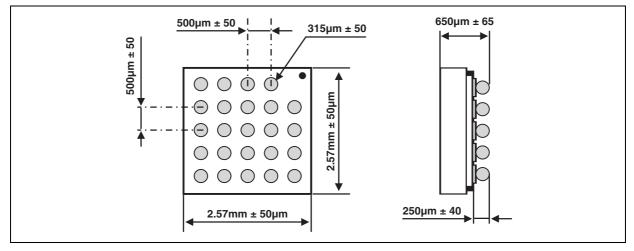
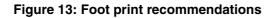
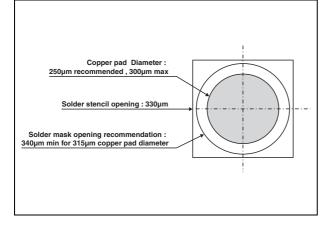
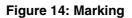


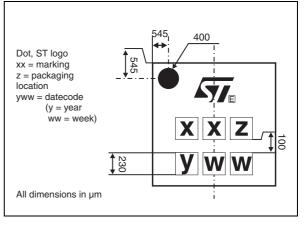
Figure 12: FLIP-CHIP Package Mechanical Data

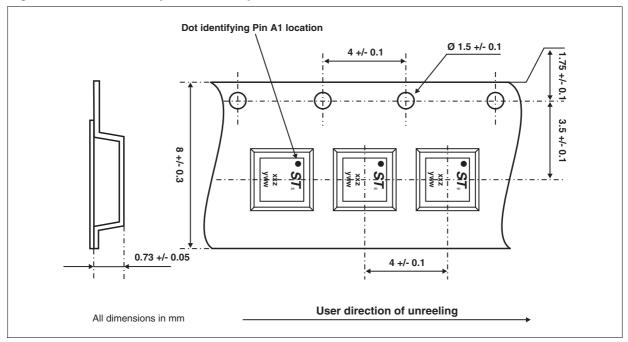












## Figure 15: FLIP-CHIP Tape and Reel Specification

## **Table 4: Ordering Information**

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF010-1K010F2	FD	Flip-Chip	9.2 mg	5000	Tape & reel 7"

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

### **Table 5: Revision History**

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



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