



# EMIF02-MIC07F3

## EMI filter and ESD protection

### Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI/ESD protection
- Lead-free package
- Very thin package
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging

### Complies with the following standards

- IEC 61000-4-2 level 4 (on external pins B1 and C1)
  - $\pm 15$  kV (air discharge)
  - $\pm 8$  kV (contact discharge)
- IEC 61000-4-2 level 1 (on external pins)
  - $\pm 2$  kV (air discharge)
  - $\pm 2$  kV (contact discharge)

### Applications

Where EMI filtering in ESD sensitive equipment is required:

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

### Description

The EMIF02-MIC07F3 chip is a highly integrated audio filter device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference.

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

**TM:** IPAD is a trademark of STMicroelectronics.

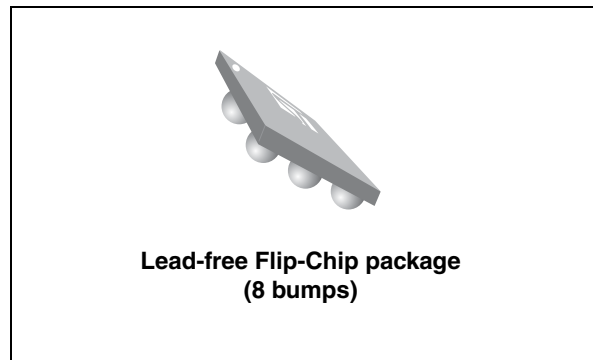


Figure 1. Pin configuration (bump side)

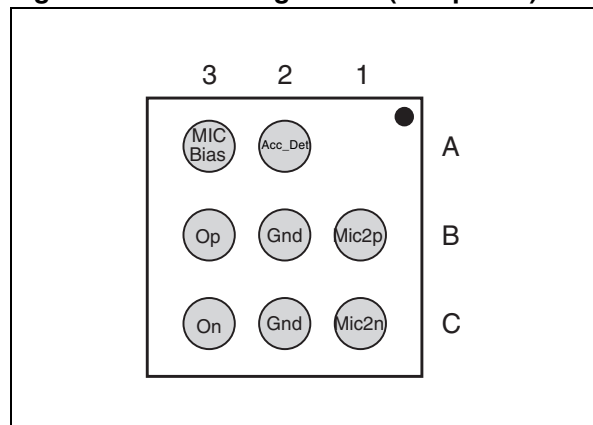
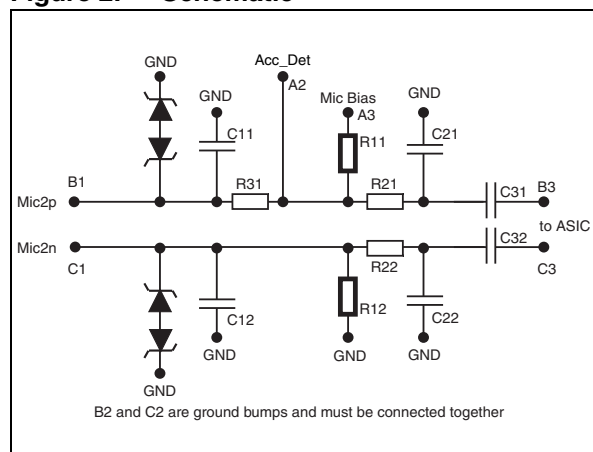


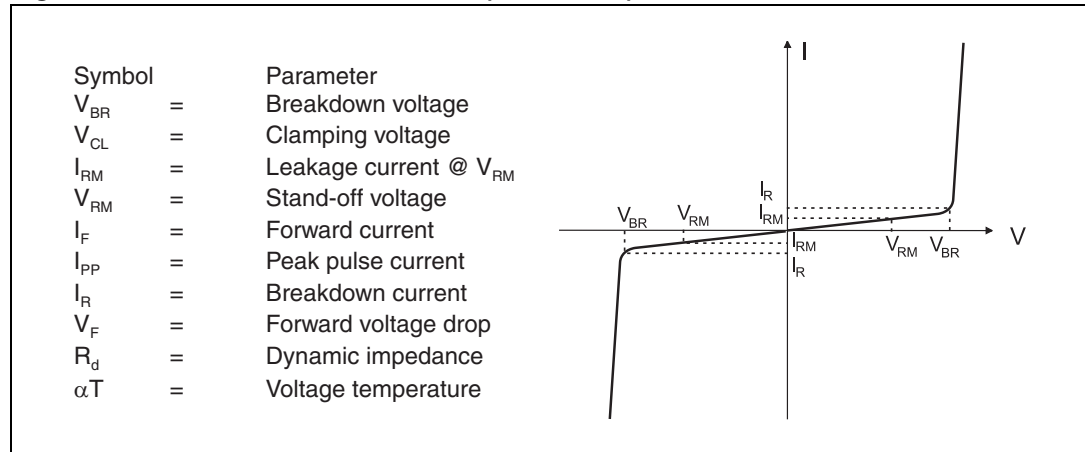
Figure 2. Schematic



# 1 Characteristics

**Table 1. Absolute ratings (limiting values)**

Symbol	Parameter and test conditions	Value	Unit
$V_{PP}$	<b>Pins B1 and C1:</b> ESD discharge IEC 61000-4-2, level 4 air discharge contact discharge	15 8	kV
	<b>Pins A2, A3, B3, C3:</b> ESD discharge IEC 61000-4-2, level 1 air discharge contact discharge	2 2	
$P_D$	Power dissipation at $T_{amb} = 25\text{ °C}$	60	mW
$T_{op}$	Operating temperature range	- 40 to + 85	°C
$T_{stg}$	Storage temperature range	- 55 to + 150	°C

**Figure 3. Electrical characteristics (definitions)**

**Table 2. Electrical characteristics - values ( $T_{amb} = 25\text{ °C}$ )**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	7			V
$I_{RM}$	$V_{RM} = 3\text{ V per line}$		50	200	nA
$R_{11}$		1900	2000	2100	$\Omega$
$R_{12}$		800	1000	1200	
$R_{21}, R_{22}$		1760	2200	2640	
$R_{31}$		20	25	30	
$C_{11}, C_{12}$	$V_{line} = 0\text{ V}, V_{osc} = 30\text{ mV}, F = 1\text{ MHz}$ (measured under zero light conditions and with bumps B2 and C2 connected together)	0.66	0.83	1	nF
$C_{21}, C_{22}$		1	1.25	1.5	
$C_{31}, C_{32}$		7	8.75	10.5	

Figure 4. Attenuation versus frequency

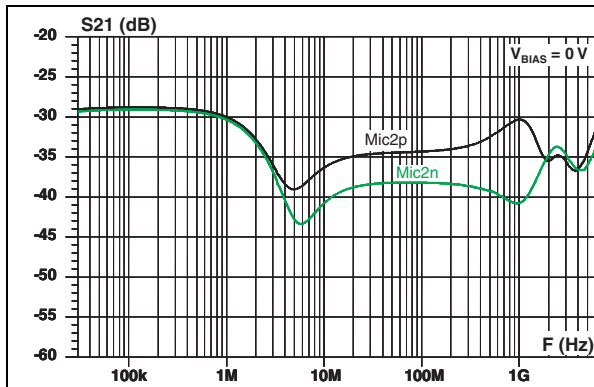


Figure 5. Attenuation simulation with 2 kΩ input and 47 kΩ output

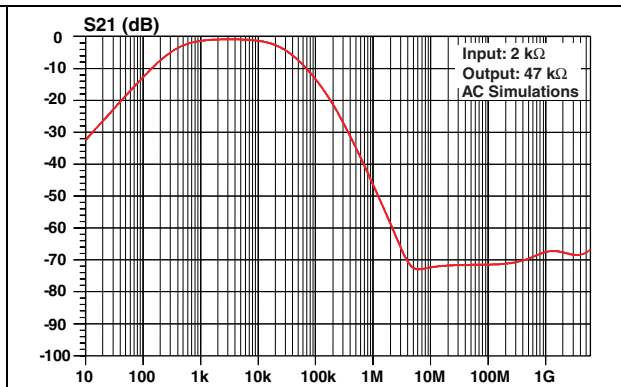


Figure 6. Analog crosstalk measurement

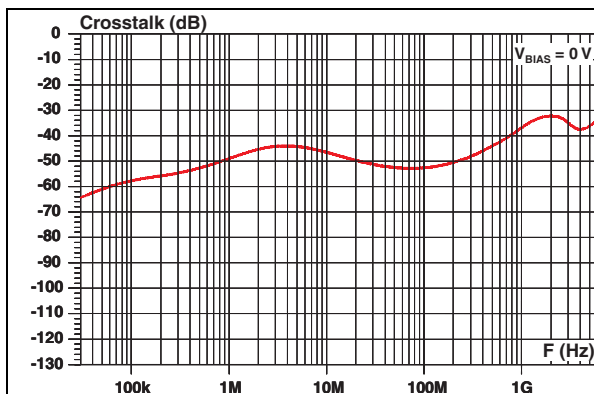


Figure 7. ESD response to IEC 61000-4-2 on one input  $V_{(in)}$  and on one output  $V_{(out)}$

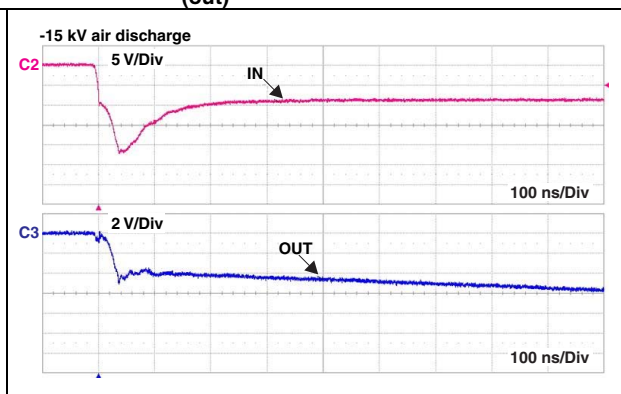


Figure 8. ESD response to IEC 61000-4-2 on one input  $V_{(in)}$  and on one output  $V_{(out)}$

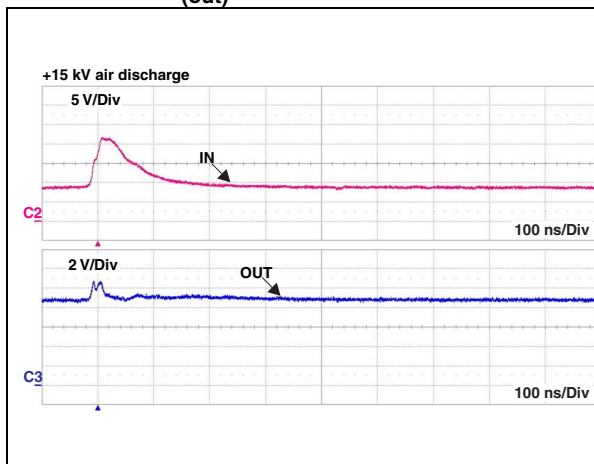
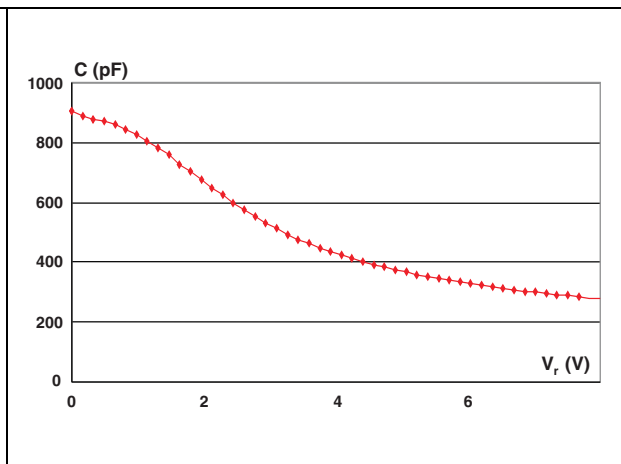
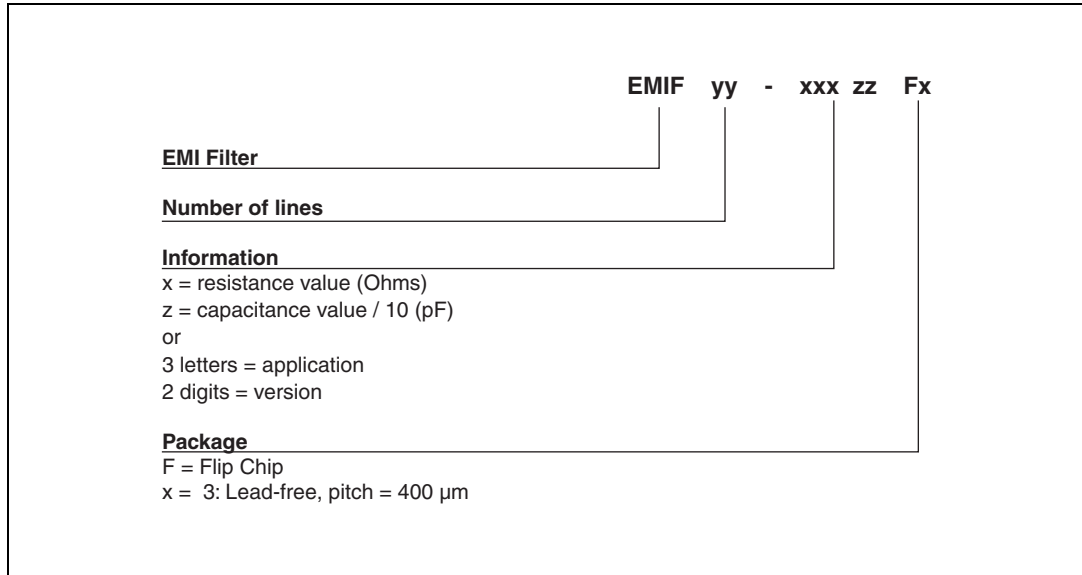


Figure 9. Line capacitance versus applied voltage (C11)



## 2 Ordering information scheme

Figure 10. Ordering information scheme



## 3 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 11. Flip-Chip package dimensions

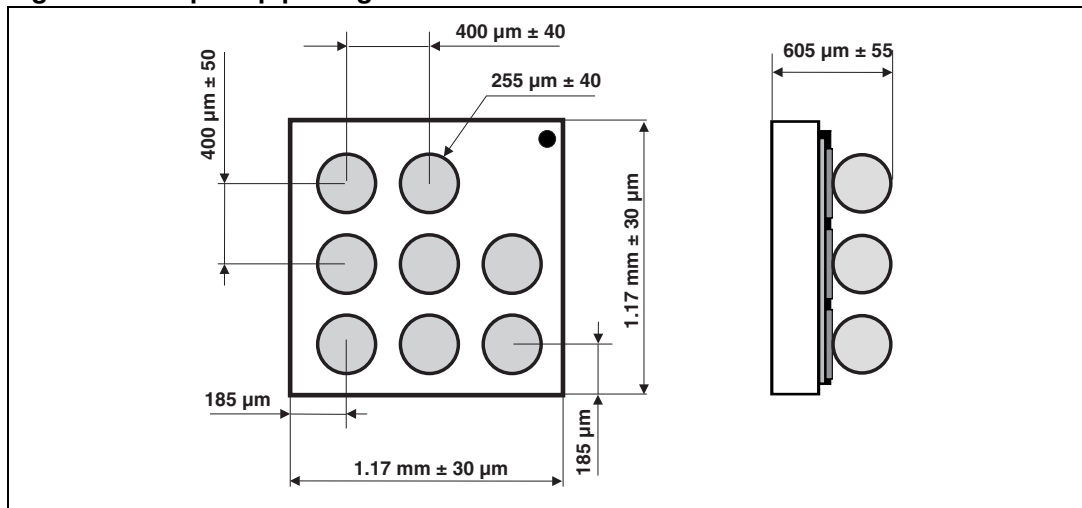


Figure 12. Footprint recommendations    Figure 13. Marking

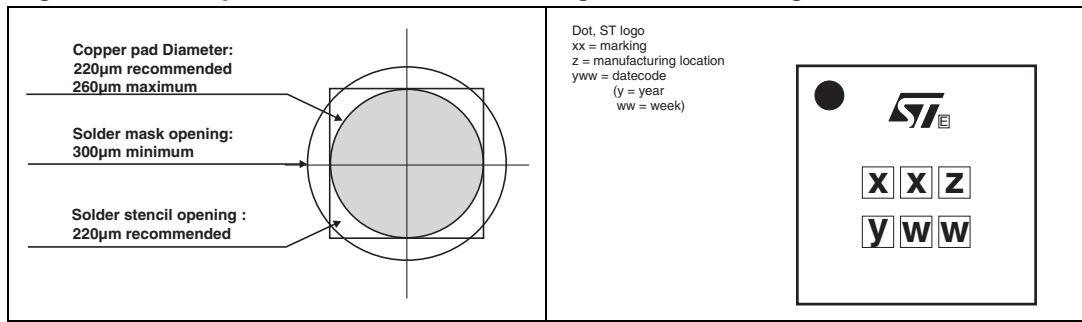
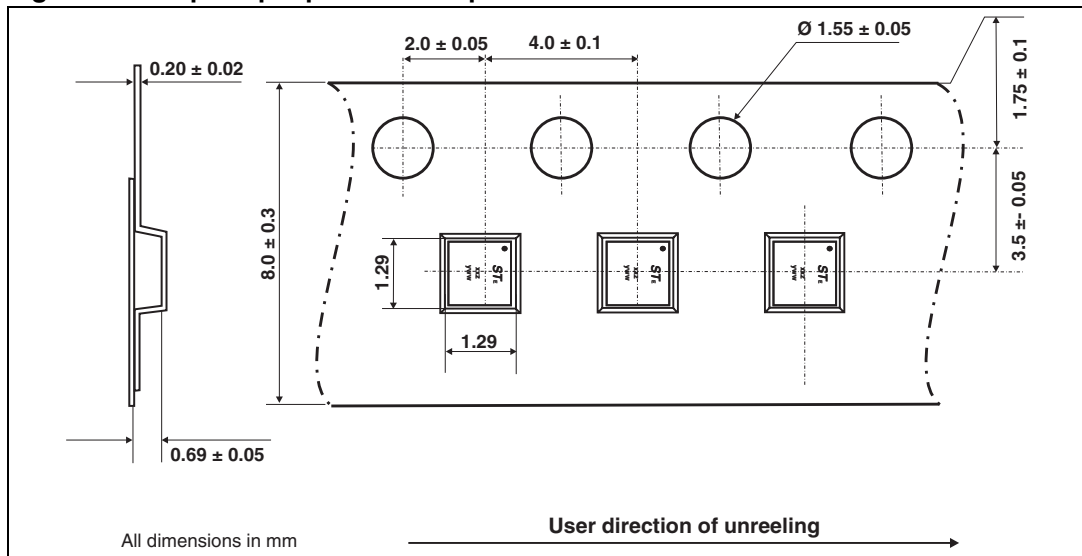


Figure 14. Flip-Chip tape and reel specification



## 4 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC07F3	JE	Flip Chip	1.8 mg	5000	Tape and reel 7"

Note:

More information is available in the application notes  
 AN2348: "Flip Chip: Package description and recommendations for use"  
 AN1751: "EMI Filters: Recommendations and measurements"

## 5 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
16-Mar-2010	1	Initial release.

**EMIF02-MIC07F3**

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