

## 3-line IPAD™, EMI filter including 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:
  - ± 15 kV (air discharge)
  - ± 8 kV (contact discharge)
- IEC 61000-4-2 level 1:
  - ± 2 kV (air discharge)
  - ± 2 kV (contact discharge)

### Applications

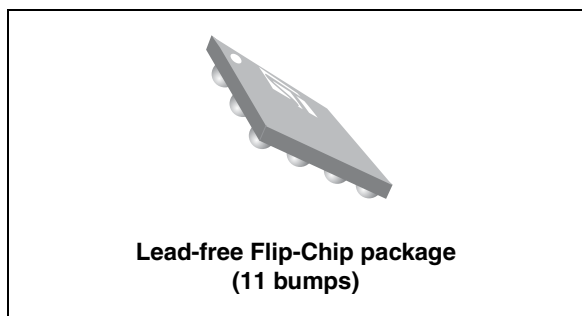
Where EMI filtering in ESD sensitive equipment is required:

- mobile phones and communication systems
- computers, printers and MCU Boards

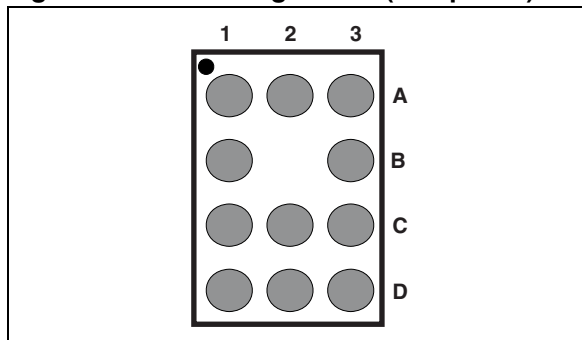
### Description

The EMIF03-SIM04F3 Flip Chip is a low capacitance EMI filter designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference.

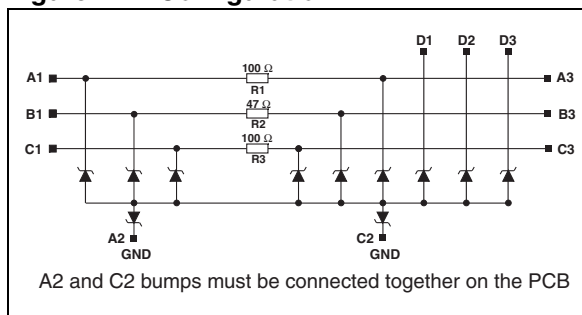
This filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 15 kV.



**Figure 1. Pin configuration (bump side)**



**Figure 2. Configuration**



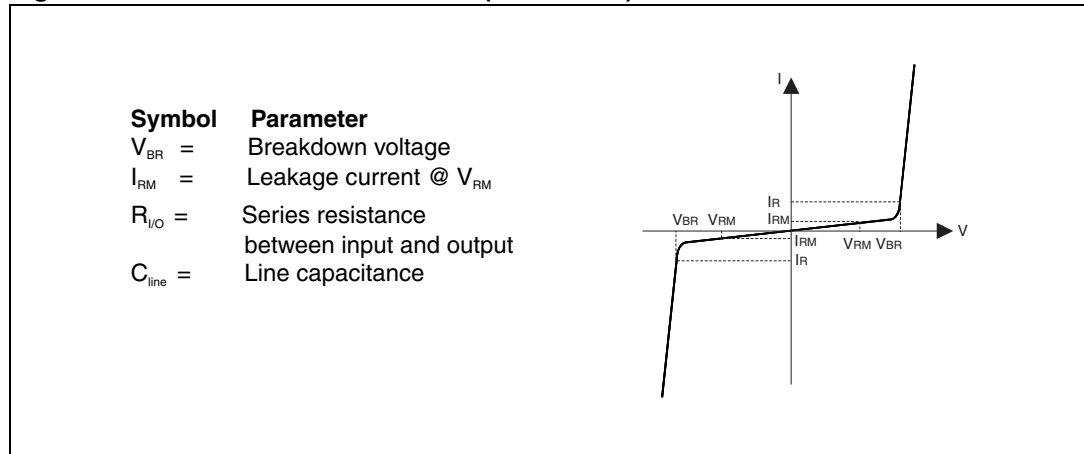
TM: IPAD is a trademark of STMicroelectronics.

# 1 Electrical characteristics

**Table 1. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter	Value	Unit
$V_{PP}$	<b>Internal pins (A1, B1, C1):</b>		
	ESD discharge IEC 61000-4-2, level 1, air discharge	$\pm 2$	kV
	ESD discharge IEC 61000-4-2, level 1, contact discharge	$\pm 2$	
	<b>External pins (A3, B3, C3, D1, D2 and D3):</b>		
ESD discharge IEC 61000-4-2, level 4, air discharge	$\pm 15$		
$P_d$	Line resistance power dissipation at $70\text{ }^{\circ}\text{C}$	60	mW
$T_{op}$	Operating temperature range	- 40 to + 85	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range	- 55 to 150	$^{\circ}\text{C}$

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



**Table 2. Electrical characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	6			V
$I_{RM}$	$V_{RM} = 3\text{ V per line}$		50	200	nA
$R_1, R_3$	Tolerance $\pm 20\%$	80	100	120	$\Omega$
$R_2$	Tolerance $\pm 20\%$	37.6	47	56.4	$\Omega$
$C_{line}$	$V_{line} = 0\text{ V}, V_{osc} = 30\text{ mV}, F = 1\text{ MHz}$ (measured under zero light conditions) <sup>(1)</sup>	8	10	12	pF

1. A2 and C2 bumps must be connected together on the printed circuit board

Figure 4. S21 (dB) attenuation measurement B3 - B1

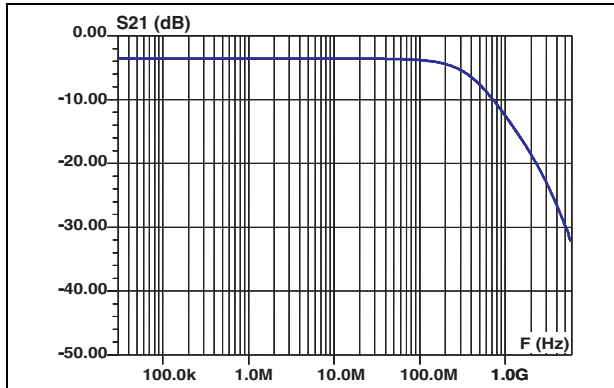


Figure 5. S21 (dB) analog crosstalk measurements C3 - A1

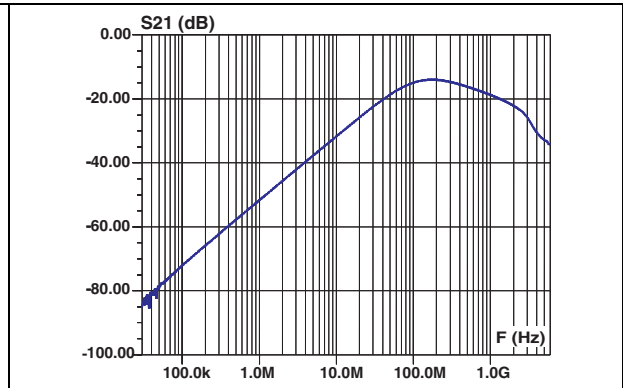


Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one line

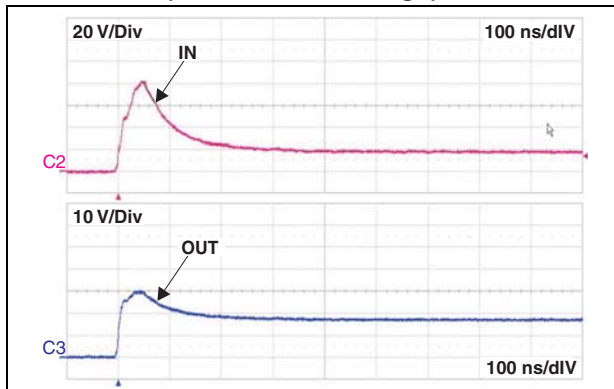


Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one line

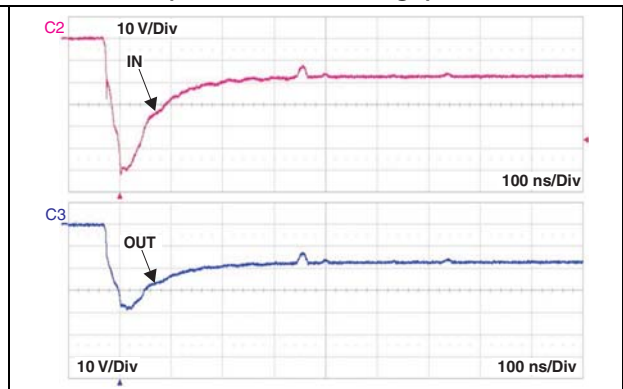
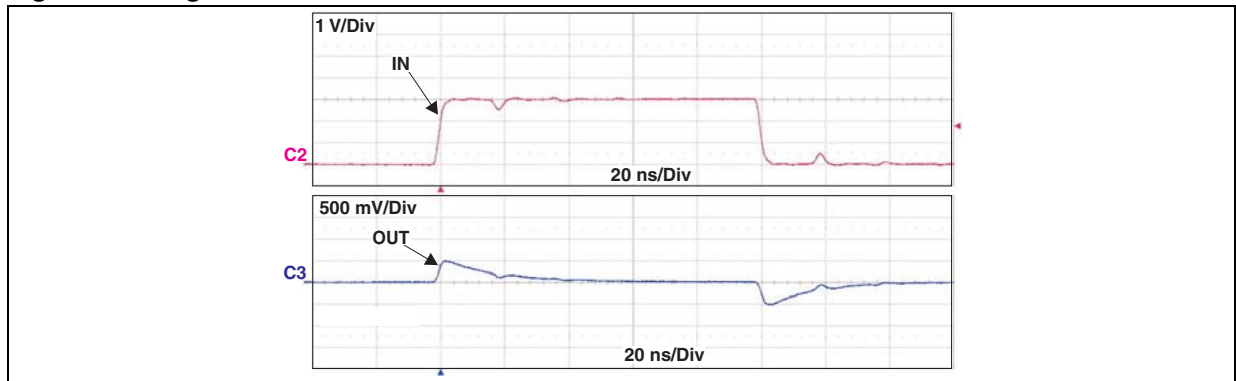
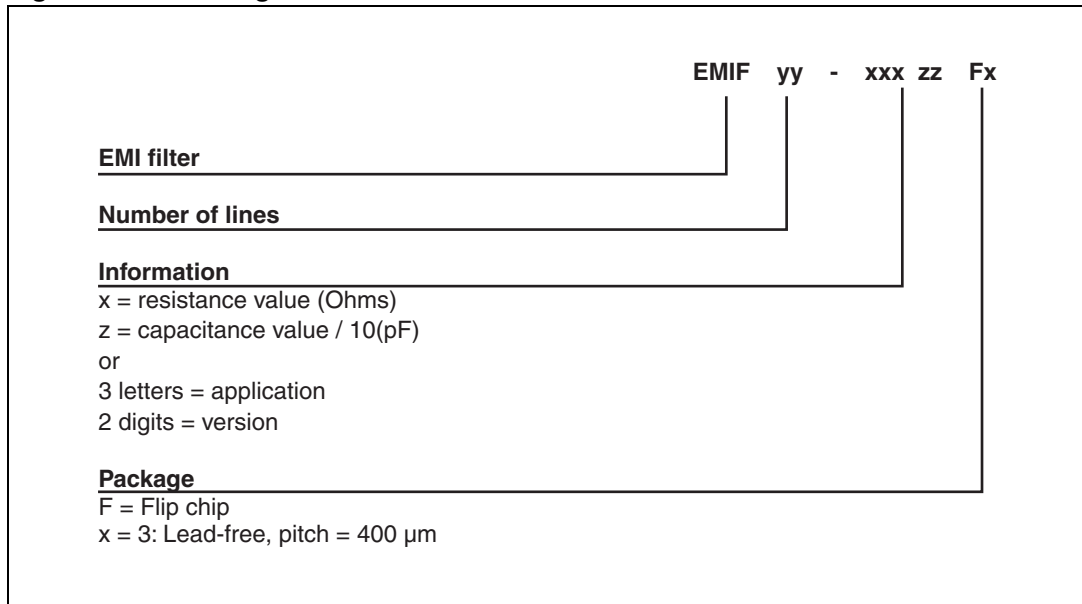


Figure 8. Digital crosstalk measurement



## 2 Ordering information scheme

Figure 9. Ordering information scheme



### 3 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 10. Package dimensions

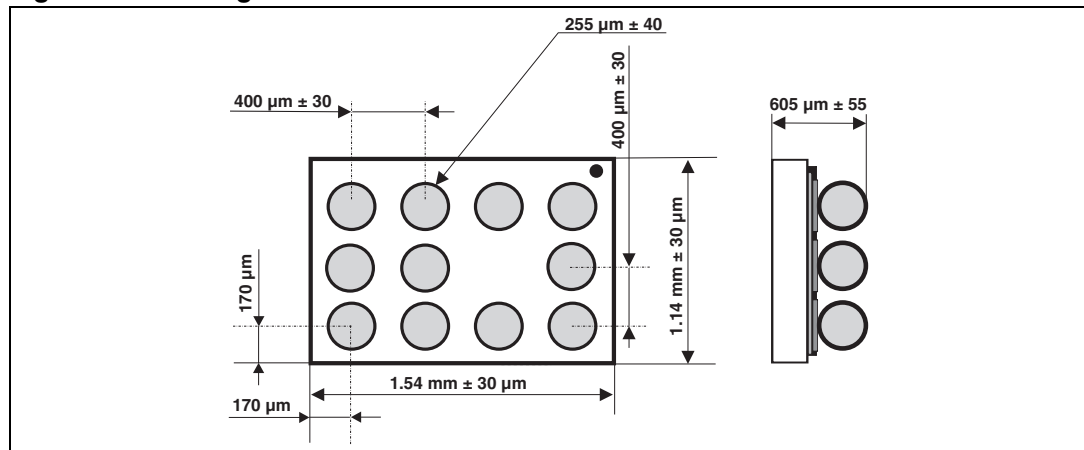


Figure 11. Footprint

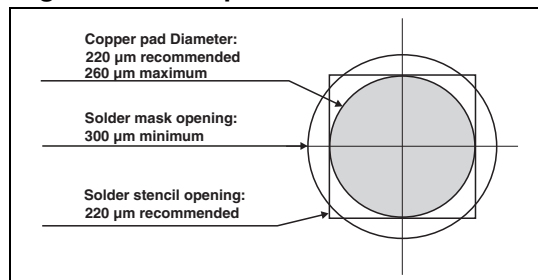


Figure 12. Marking

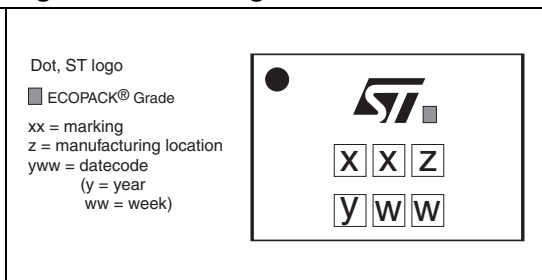
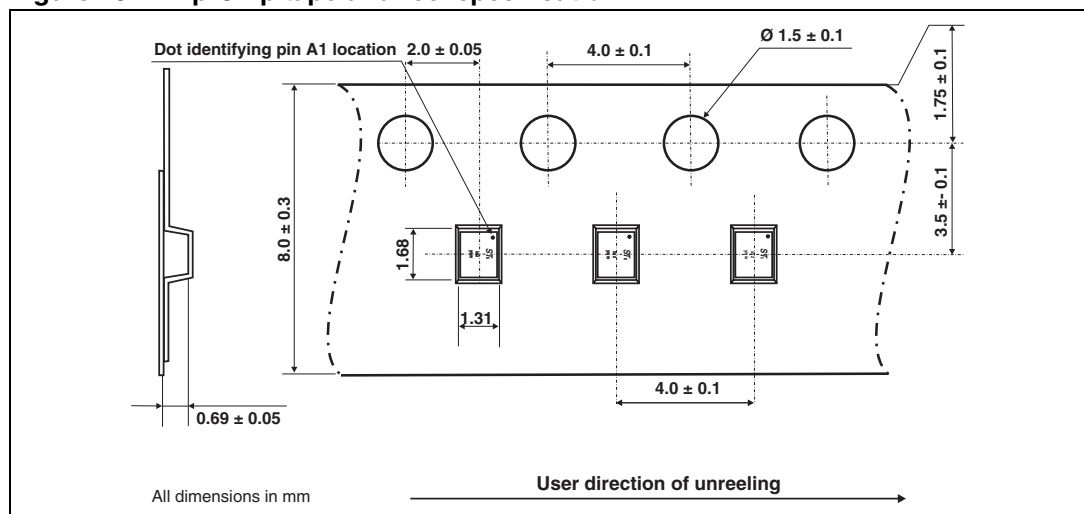


Figure 13. Flip-Chip tape and reel specification



## 4 Ordering information

**Table 3. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF03-SIM04F3	J1	Flip Chip	1.74 mg	5000	Tape and reel 7"

Note:

*More information is available in the application notes:*

*AN2348: "STMicroelectronics 400 micro-metre Flip Chip: package description and recommendation for use"*

*AN1751: "EMI filters: recommendations and measurements"*

## 5 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
03-May-2010	1	Initial release.
12-Oct-2010	2	Updated value $I_{RM}$ in <a href="#">Table 2</a> .

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