

## 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)
- ETSI 102.221 (configuration FIDI = 97)

### Applications

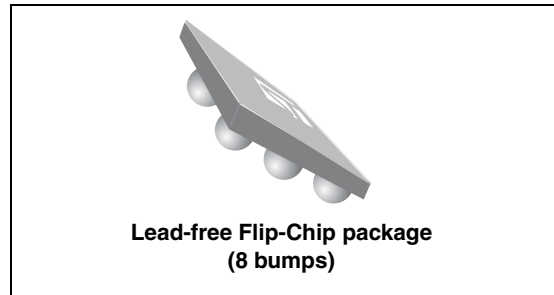
Where EMI filtering in ESD sensitive equipment is required:

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

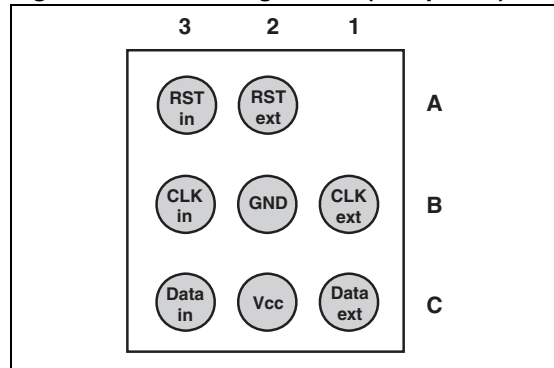
### Description

The EMIF03-SIM03F3 chip is a very low capacitance EMI filter designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference.

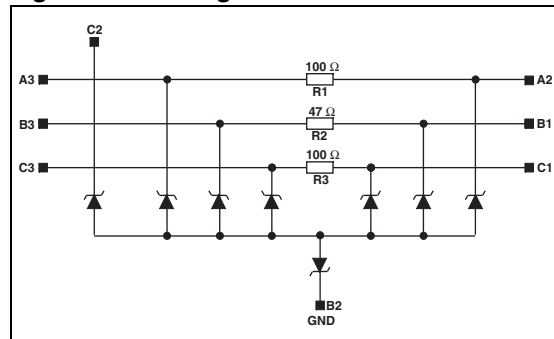
This filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 15 kV.



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



**Figure 2. Configuration**



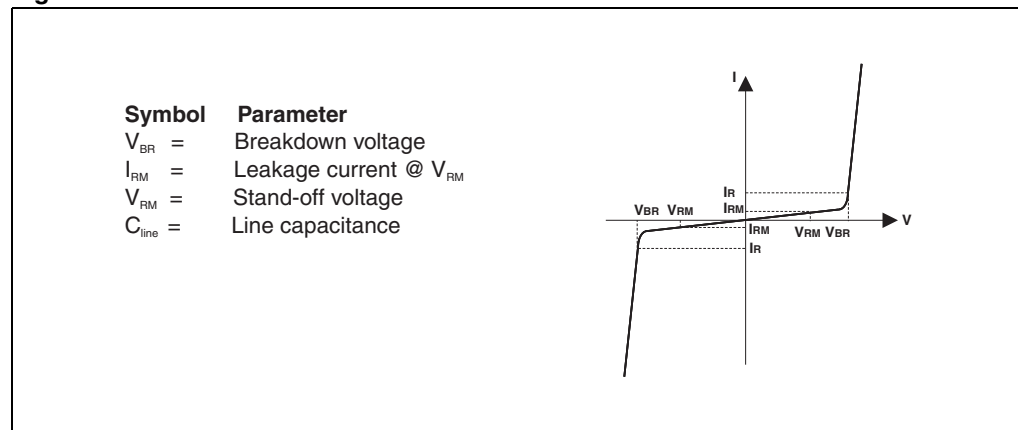
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# 1 Electrical characteristics

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

Symbol	Parameter	Value	Unit
$V_{PP}$	<b>Internal pins (A3, B3, C3):</b>		
	ESD discharge IEC 61000-4-2, level 1, air discharge	2	kV
	ESD discharge IEC 61000-4-2, level 1, contact discharge	2	
	<b>External pins (A2, B1, C1, C2):</b>		
ESD discharge IEC 61000-4-2, level 4, air discharge	15		
	ESD discharge IEC 61000-4-2, level 4, contact discharge	8	
$P_d$	Line resistance power dissipation at 70 °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
$V_{BR}$	$I_R = 1\text{ mA}$	14			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)	8	10	12	pF

Figure 4. Attenuation measurement A2 - A3

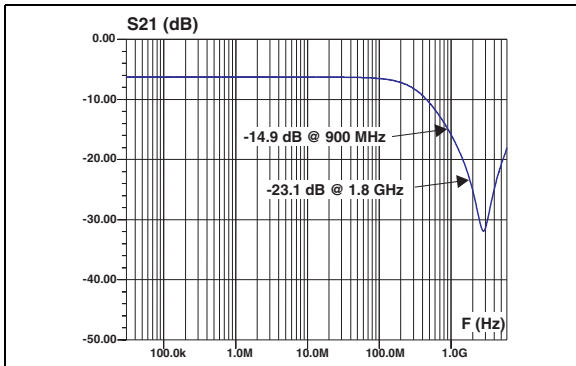


Figure 5. Attenuation measurement B1 - B3

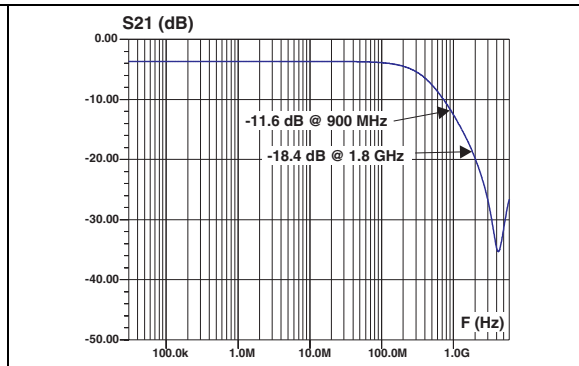


Figure 6. Attenuation measurement C1 - C3

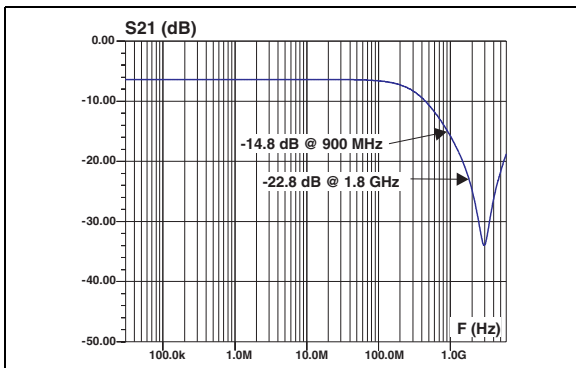


Figure 7. Analog crosstalk measurement A2 - B3  
(30 kHz < F < 6 GHz > 11.8 dB)

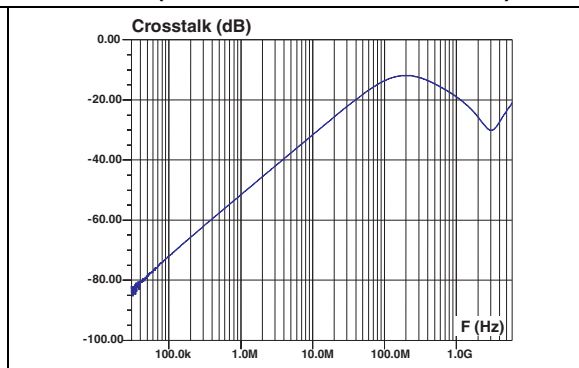


Figure 8. Analog crosstalk measurement A2 - C3 (30 kHz < F < 6 GHz > 13.8 dB)

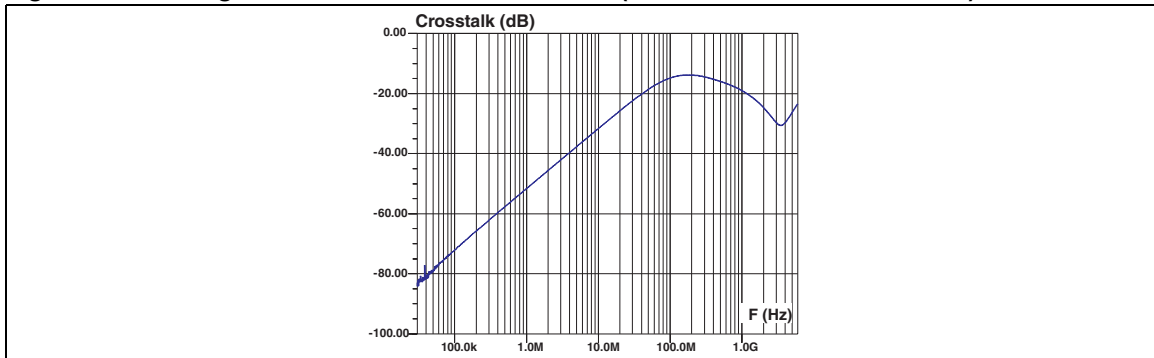


Figure 9. Digital crosstalk measurements

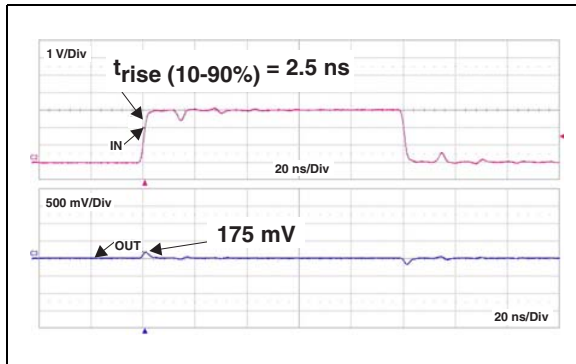


Figure 10. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one line

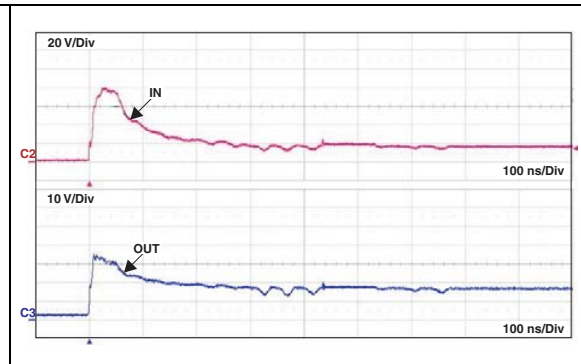


Figure 11. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one line

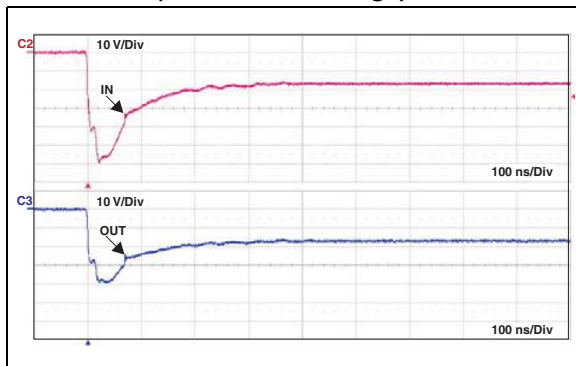
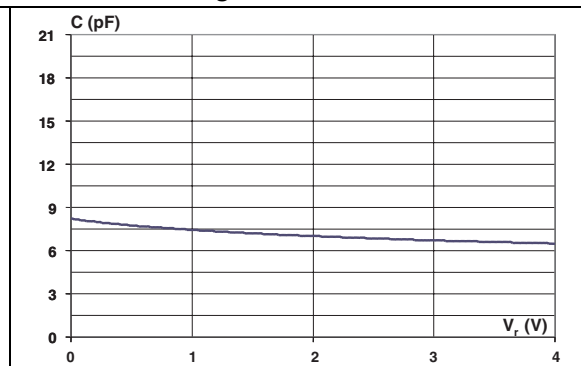
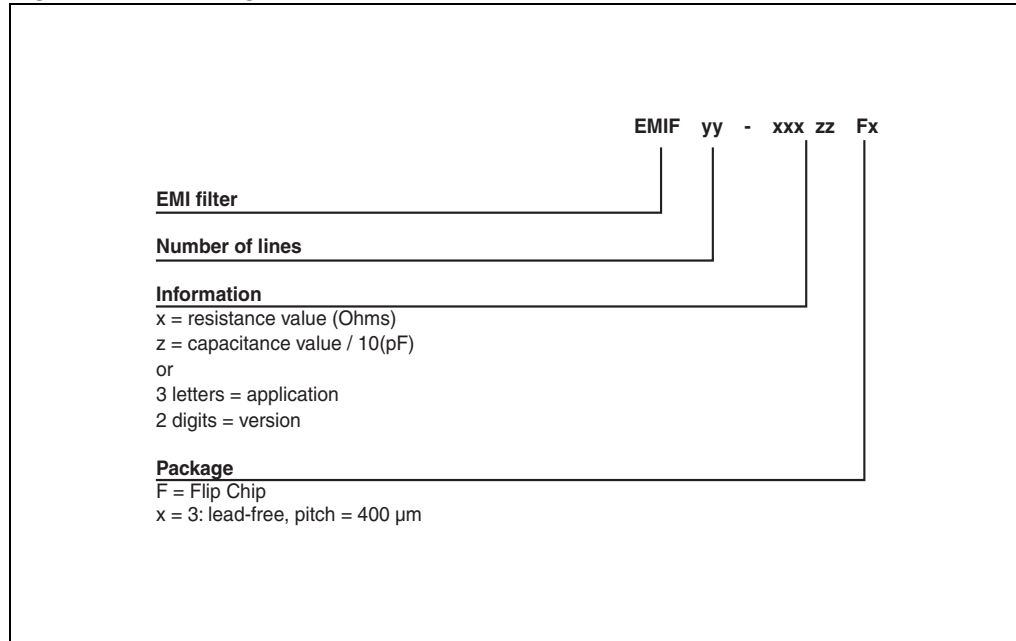


Figure 12. Line capacitance versus applied voltage



## 2 Ordering information scheme

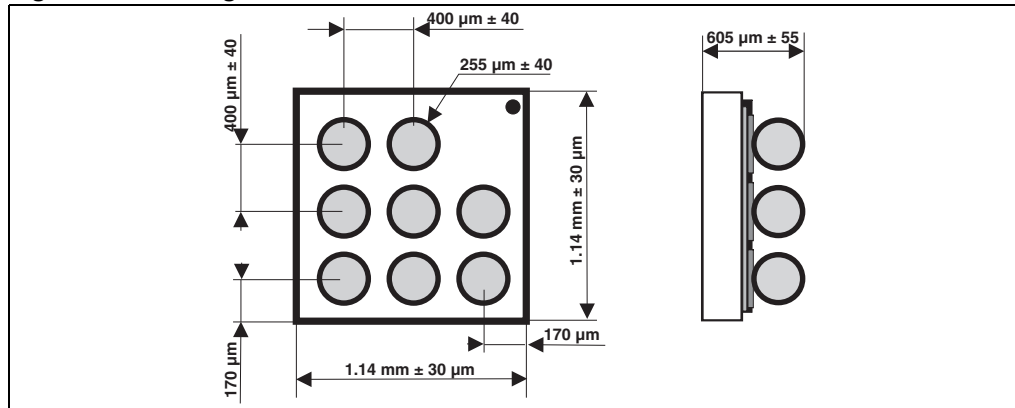
Figure 13. Ordering information scheme



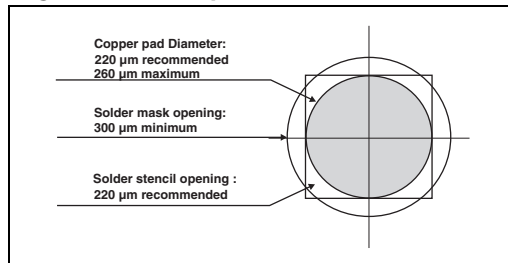
### 3 Package information

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.

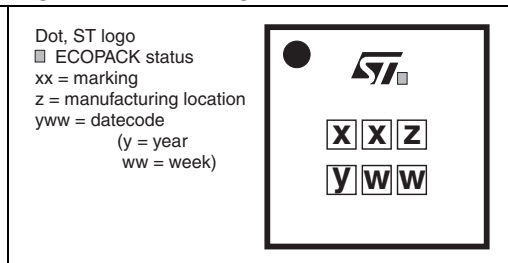
**Figure 14. Package dimensions**



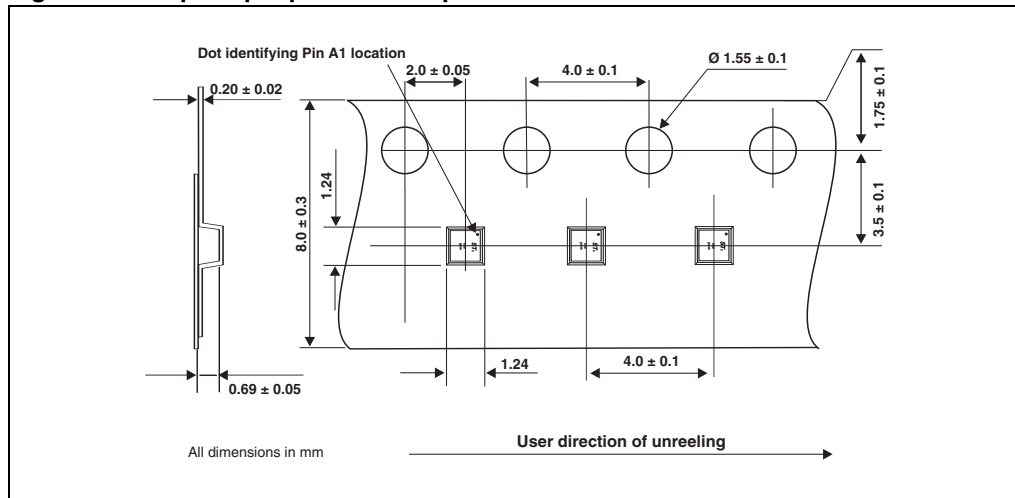
**Figure 15. Footprint**



**Figure 16. Marking**



**Figure 17. Flip-Chip tape and reel specification**



## 4 Ordering information

**Table 3. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF03-SIM03F3	JH	Flip Chip	1.8 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 <a href="#">Figure 2</a> and value $I_{RM}$ in <a href="#">Table 2</a> .

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