

## Dual audio and video line IPAD™, EMI filter and ESD protection

### Features

- High-density capacitor
- EMI low-pass filter and ESD protection
- High-efficiency in EMI filtering
- Lead-free package
- 400 µm pitch
- Very small PCB footprint: 0.77 mm x 1.17 mm
- Very thin package: 0.605 mm
- High reliability offered by monolithic integration
- Reduction of parasitic elements thanks to CSP integration

### Complies with the following standards

- IEC 61000-4-2 level 4 on external pin (A2, C2)
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- IEC 61000-4-2 level 1 on internal pin (A1, C1)
  - 2 kV (air discharge)
  - 2 kV (contact discharge)

### Application

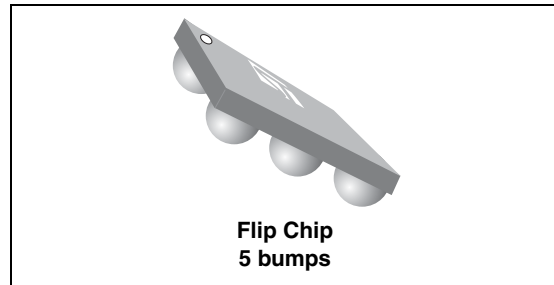
- Dual audio and video line interface protection and filtering in mobile phones

### Description

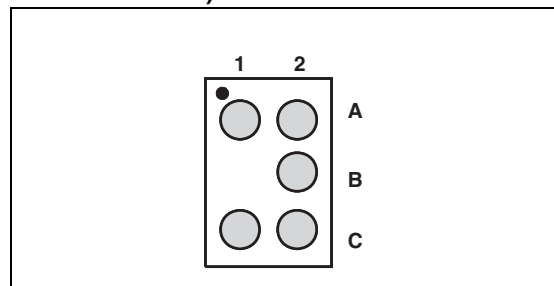
The EMIF02-AV01F3 is a highly integrated array designed to suppress EMI / RFI noise and provide impedance matching for mobile phones and portable applications.

The EMIF02-AV01F3 is in Flip-Chip package to offer space saving and high RF performance.

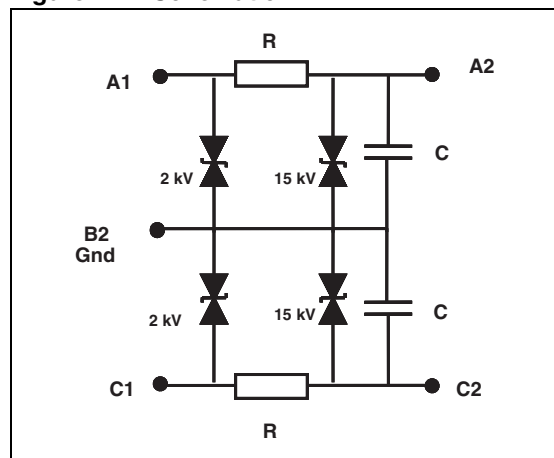
Additionally, this low-pass filter includes an ESD protection circuitry to prevent damage to the application when subjected to ESD surges up to 15 kV.



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



**Figure 2.** Schematic



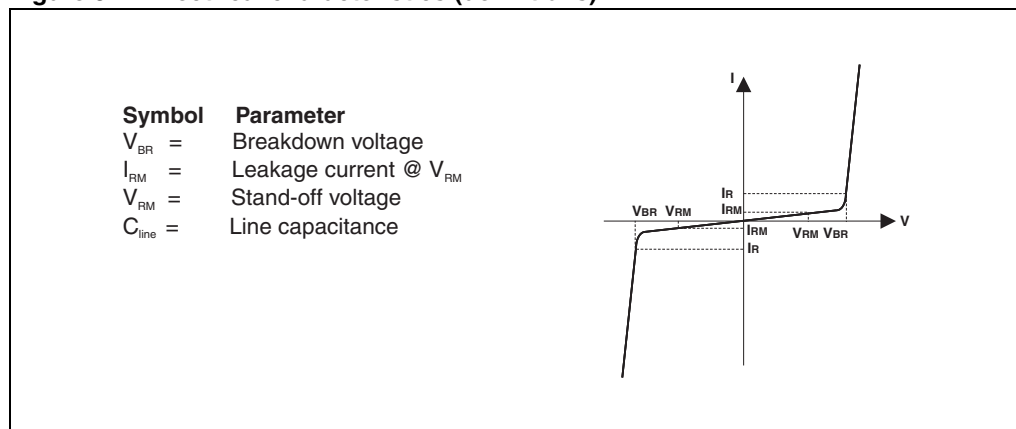
**TM:** IPAD is a trademark of STMicroelectronics.

# 1 Characteristics

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

Symbol	Parameter	Value	Unit
$V_{pp}$	<b>Internal pins (A1, C1)</b>		
	ESD discharge IEC 61000-4-2, air discharge	2	kV
	ESD discharge IEC 61000-4-2, contact discharge	2	
	<b>External pins (A2, C2)</b>		
	ESD discharge IEC 61000-4-2, air discharge	15	
ESD discharge IEC 61000-4-2, contact discharge	8		
$T_j$	Maximum junction temperature	125	$^{\circ}\text{C}$
$P_{TOT}$	Total Power Dissipation	200	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 (values,  $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	14		18	V
$I_{RM}$	$V_{RM} = 3\text{ V per line}$			0.5	$\mu\text{A}$
$R_{I/O}$		12	15	18	$\Omega$
$C_{line}$	$V_{line} = 0\text{ V}, V_{osc} = 30\text{ mV}, F = 100\text{ kHz}$	2.56	3.2	3.84	nF

Figure 4. Attenuation simulation with 1 kΩ input and 10 kΩ output

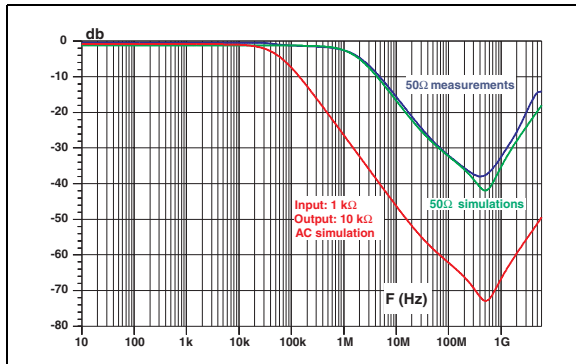


Figure 5. Analog crosstalk

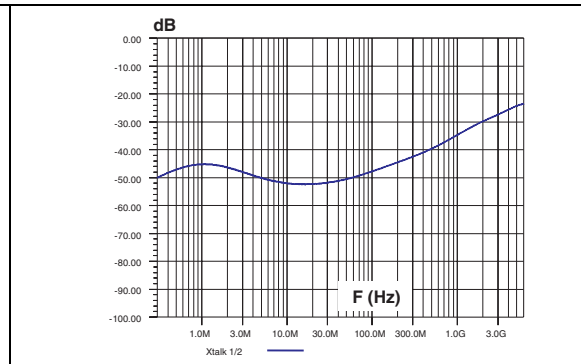


Figure 6. Digital crosstalk

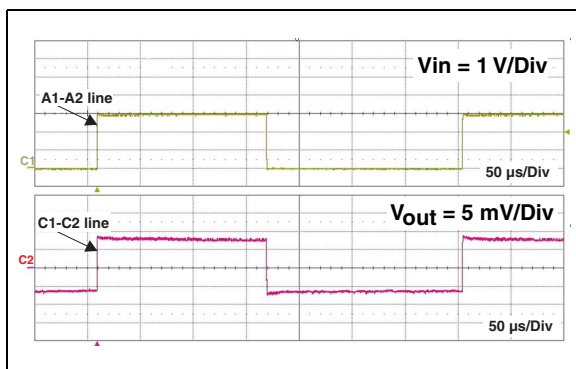


Figure 7. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input (VIN) and one output (VOUT)

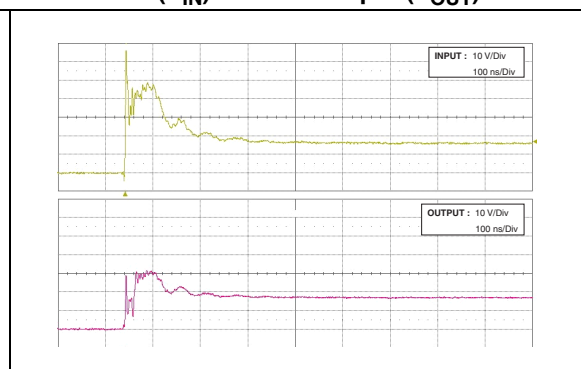


Figure 8. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input (VIN) and one output (VOUT)

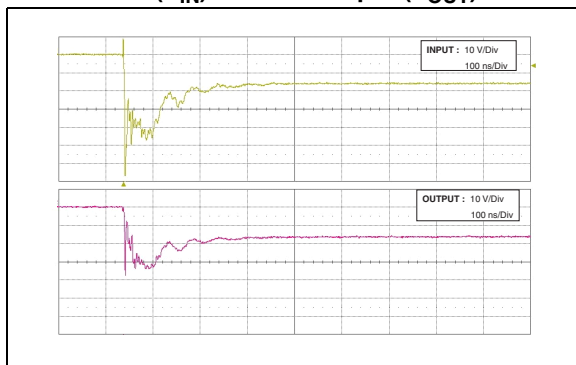
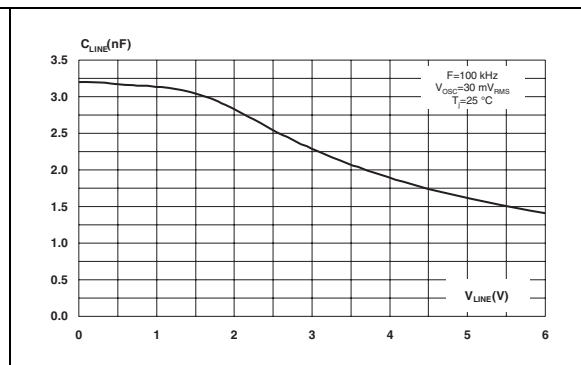
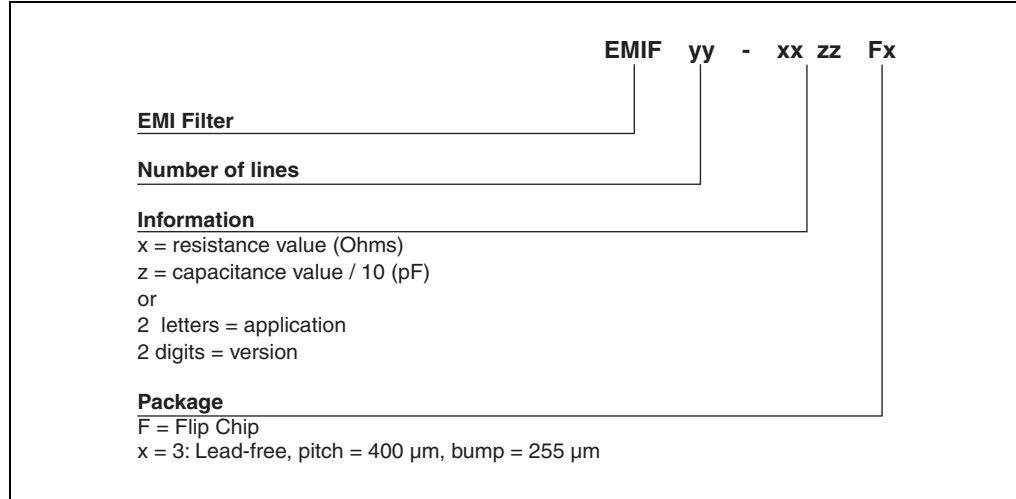


Figure 9. Line capacitance versus applied voltage



## 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® 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 11. Package dimensions

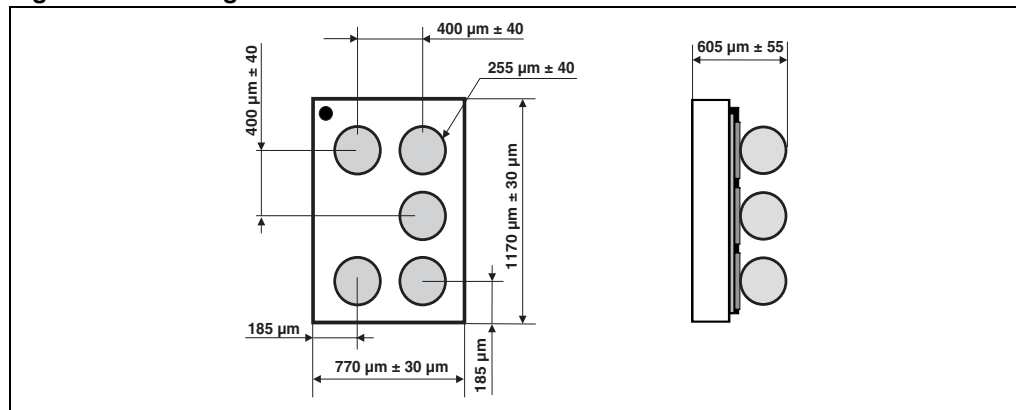


Figure 12. Footprint

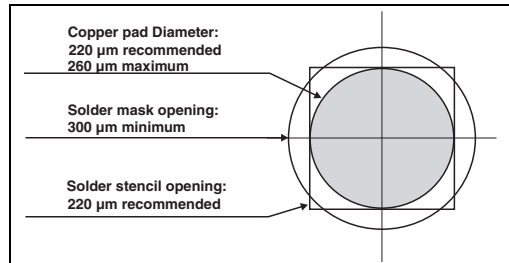


Figure 13. Marking

Dot  
xx = marking  
z = manufacturing location  
yww = datecode  
(y = year  
ww = week)

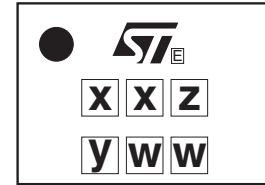
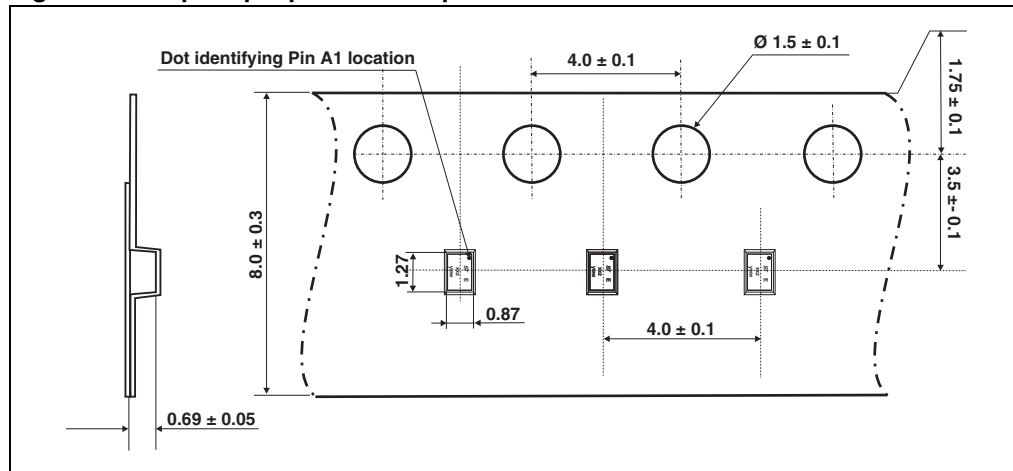


Figure 14. Flip Chip tape and reel specification



Note:

Note: More information is available in the application note:

AN2348: "Flip Chip: Package description and recommendations for use"

AN1751: "EMI filters: Recommendations and measurements"

## 4 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EIMF02-AV01F3	HH	Flip Chip	1.4 mg	5000	Tape and reel 7"

## 5 Revision history

Table 4. Document revision history

Date	Revision	Changes
06-Oct-2006	1	Initial release.
11-Oct-2006	2	Corrected test conditions for $C_{line}$ in Table 2.
17-Apr-2008	3	Updated ECOPACK statement. Updated <a href="#">Figure 10</a> , <a href="#">Figure 11</a> and <a href="#">Figure 14</a> . Reformatted to current standards.
08-Apr-2010	4	Updated dimensions on page 1 and <a href="#">Figure 4</a> , <a href="#">Figure 11</a> , <a href="#">Figure 14</a> .

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