

## 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: 0.91 mm x 1.31 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.

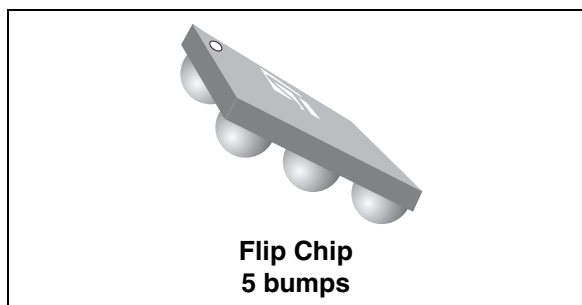


Figure 1. Pin configuration (bump side view)

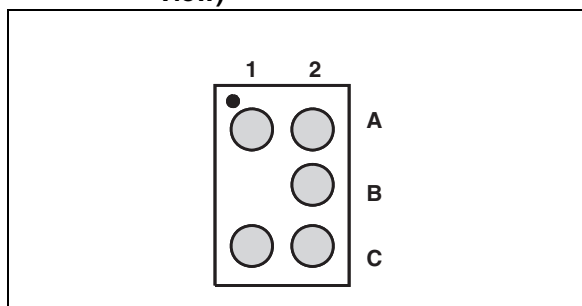
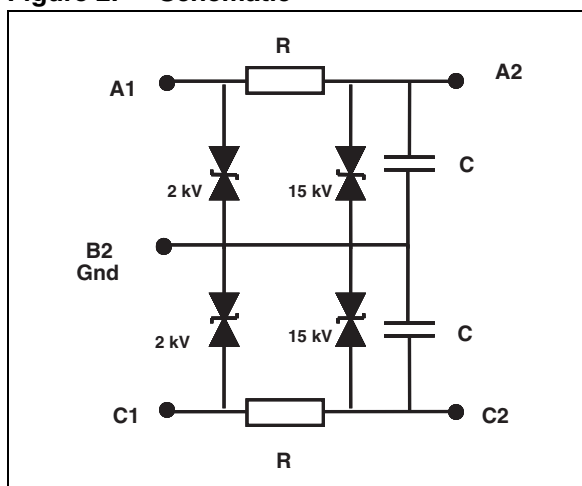


Figure 2. Schematic



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# 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	$^{\circ}\text{C}$

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

Symbol	Parameters				
$V_{BR}$	Breakdown voltage				
$I_{RM}$	Leakage current @ $V_{RM}$				
$V_{RM}$	Stand-off voltage				
$V_{CL}$	Clamping voltage				
$R_d$	Dynamic impedance				
$I_{PP}$	Peak pulse current				
$R_{I/O}$	Series resistance between input and output				
$C_{line}$	Input capacitance per line				
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 3. S21 (dB) attenuation

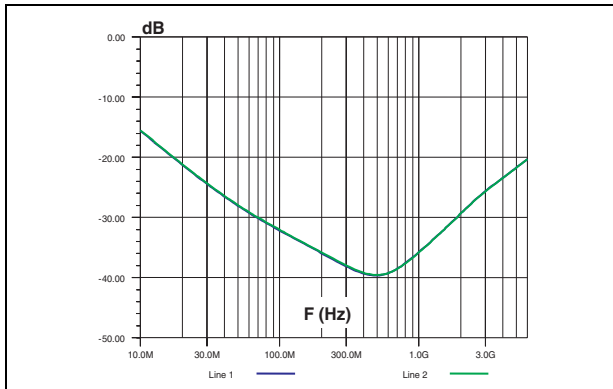


Figure 4. Analog crosstalk

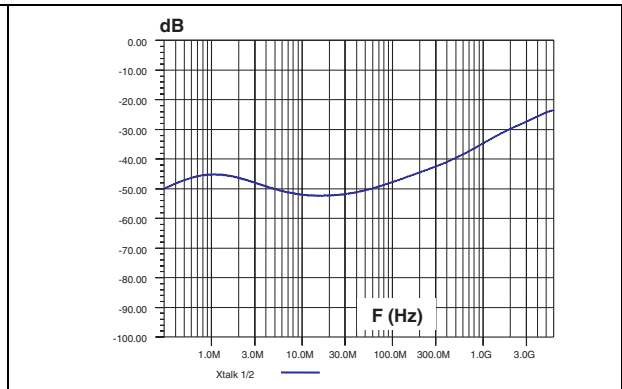


Figure 5. Digital crosstalk

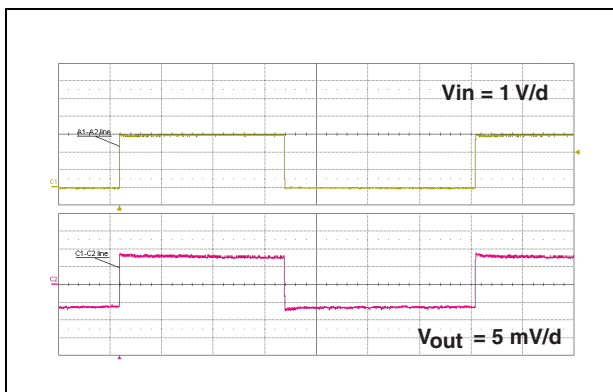


Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input (VIN) and one output (VOUT)

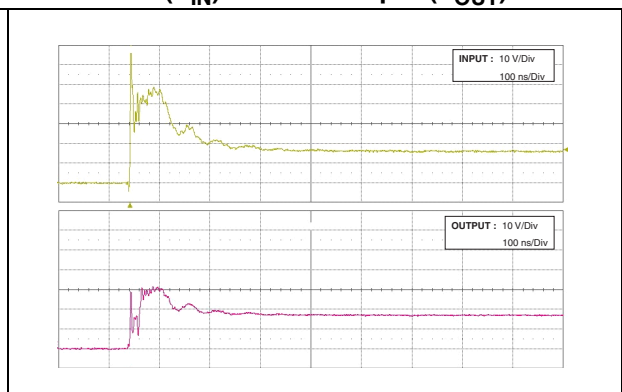


Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input (VIN) and one output (VOUT)

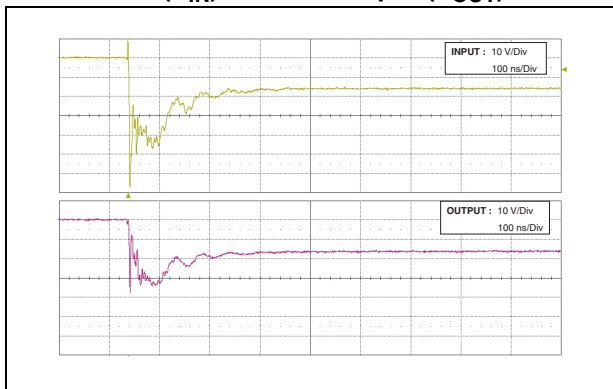
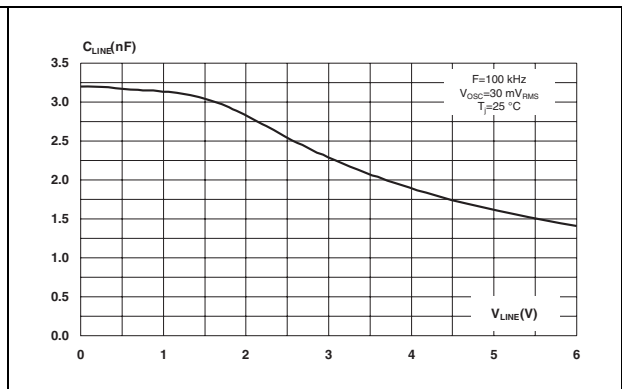
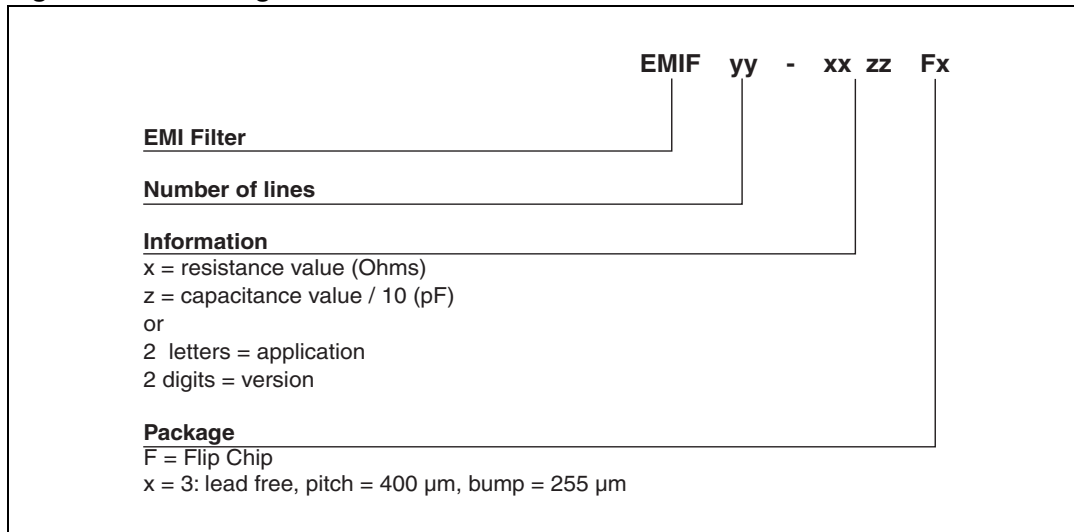


Figure 8. Line capacitance versus applied voltage



## 2 Ordering information scheme

Figure 9. Ordering information scheme



## 3 Package information

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at [www.st.com](http://www.st.com).

Figure 10. Package dimensions

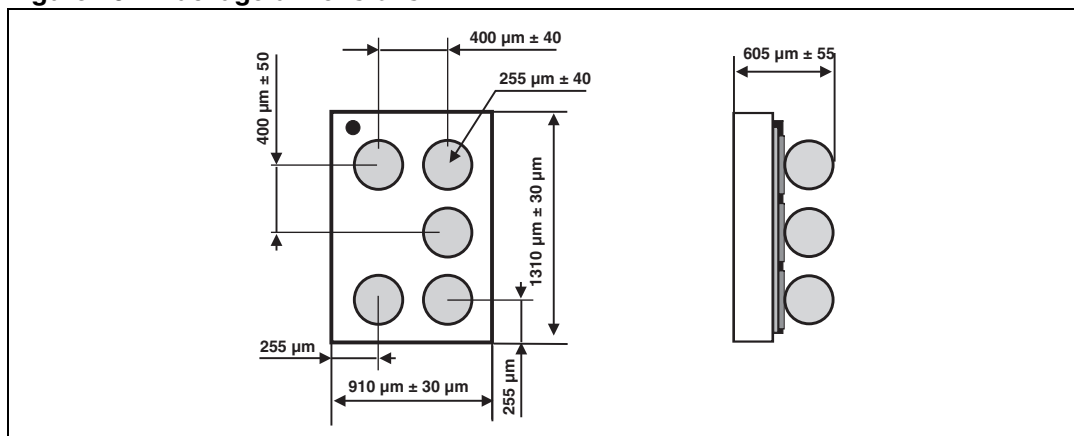


Figure 11. Footprint

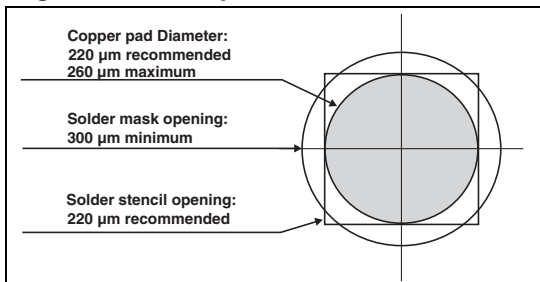


Figure 12. Marking

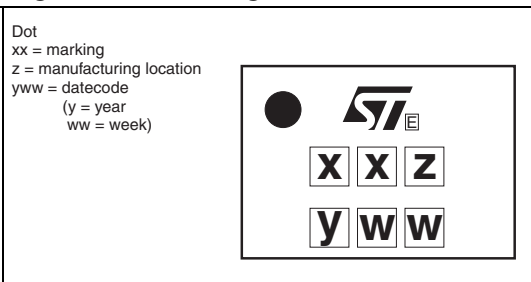
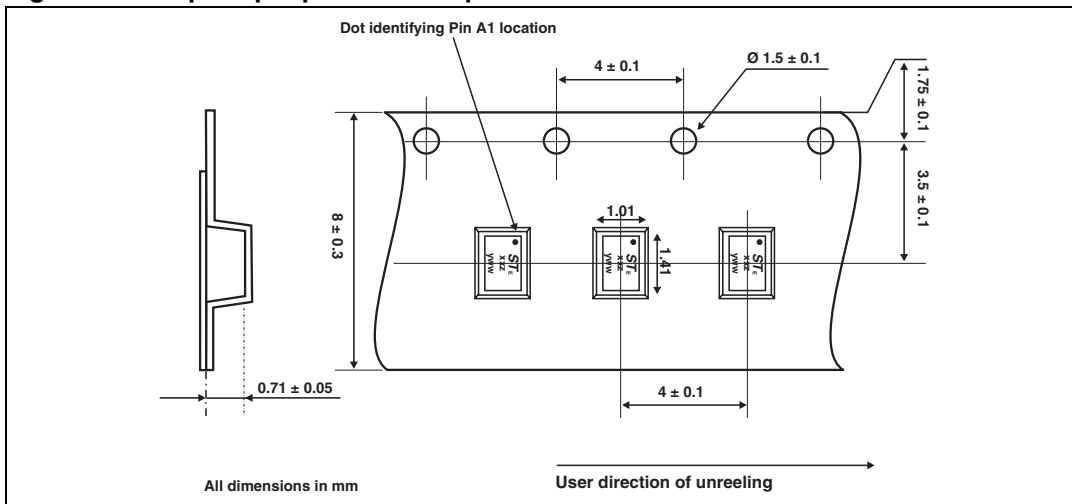


Figure 13. Flip Chip tape and reel specification



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 $C_{jine}$ in Table 2.
17-Apr-2008	3	Updated ECOPACK statement. Updated <a href="#">Figure 9</a> , <a href="#">Figure 10</a> and <a href="#">Figure 13</a> . Reformatted to current standards.

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