

## Single line IPAD™, EMI filter and ESD protection

### Features

- user-customizable filtering solution (recommended use of 2.2  $\mu$ H external inductor)
- 8 MHz bandwidth
- provides very high attenuation at 27 MHz
- ultralow stand-by power consumption compared to active filters, ideal for portable applications
- accurate  $75\ \Omega \pm 5\%$  impedance matching
- high efficiency in ESD protection (IEC standards)
- high reliability offered by monolithic integration

### Complies with the following standards

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

### Application

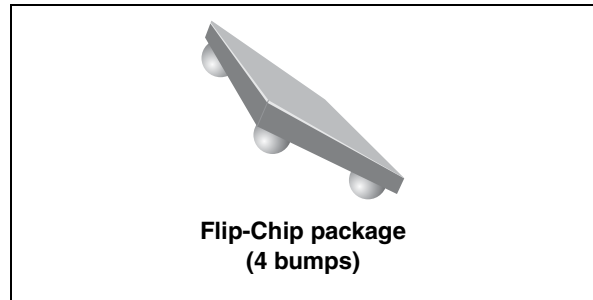
Portable applications with analog TV output

### Description

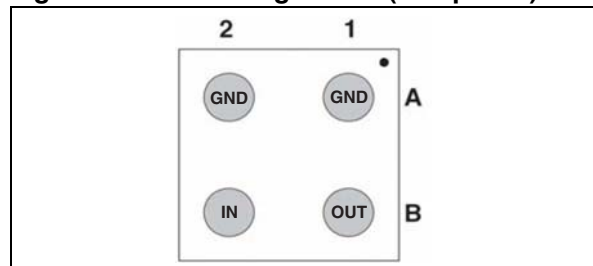
The EMIF01-TV02F3 chip is a highly integrated device designed to suppress EMI and RFI noise in all systems with a TV analog output signal subjected to electromagnetic interferences.

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

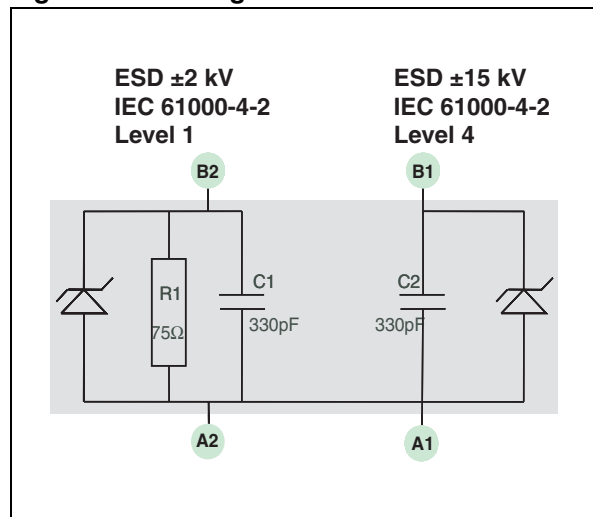
The EMIF01-TV02F3 provides high anti-aliasing filtering performances to reject frequencies above 8 MHz, with high attenuation at 27 MHz when an external inductor of 2.2  $\mu$ H is connected between pins B2 and B1.



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



**Figure 2. Configuration**



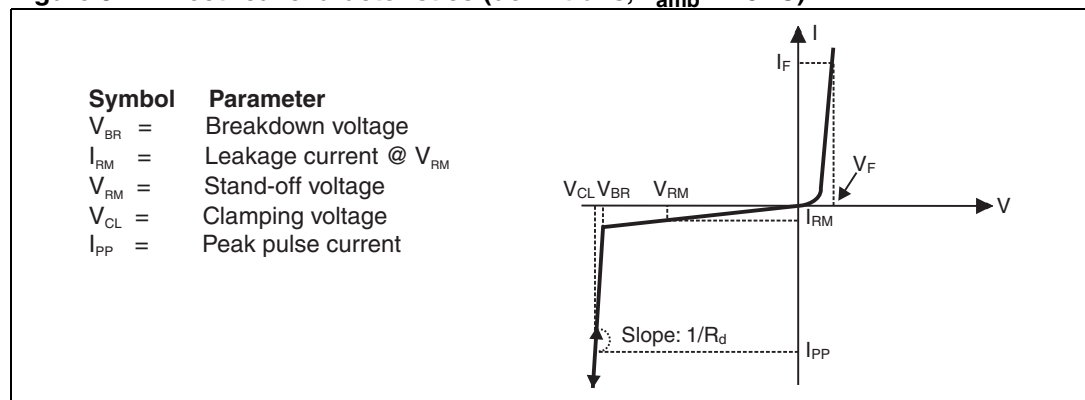
**TM:** IPAD is a trademark of STMicroelectronics.

# 1 Characteristics

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{PP}$	Internal pins (B1) and external pin (B2):		
	ESD discharge IEC 61000-4-2, air discharge	15	kV
	ESD discharge IEC 61000-4-2, contact discharge	15	
$T_j$	Maximum junction temperature	150	°C
$T_{op}$	Operating temperature range	-40 to +85	°C
$T_{stg}$	Storage temperature range	-55 to 150	°C

**Figure 3. Electrical characteristics (definitions,  $T_{amb} = 25\text{ °C}$ )**



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

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	6.1		7.9	V
$I_{RM}$	$V_R = 1\text{ mA}$ , between bumps B1 and A1			200	nA
R1	Tolerance $\pm 5\%$		75		$\Omega$
C1, C2	$V_{line} = 0\text{ V}$ , $V_{osc} = 30\text{ mV}$ , $F = 1\text{ MHz}$ (measured under zero light conditions) Tolerance: $\pm 20\%$		330		pF

Figure 4. S21 attenuation measurement (typical value) in 75/75 environment

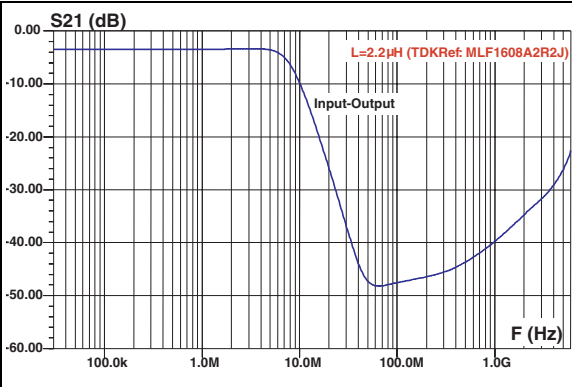


Figure 5. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input  $V_{(in)}$  and on one output  $V_{(out)}$

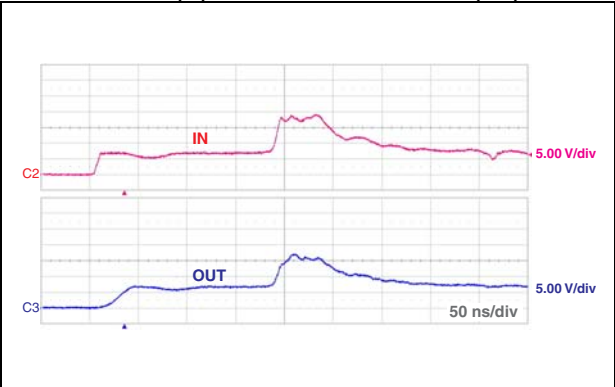
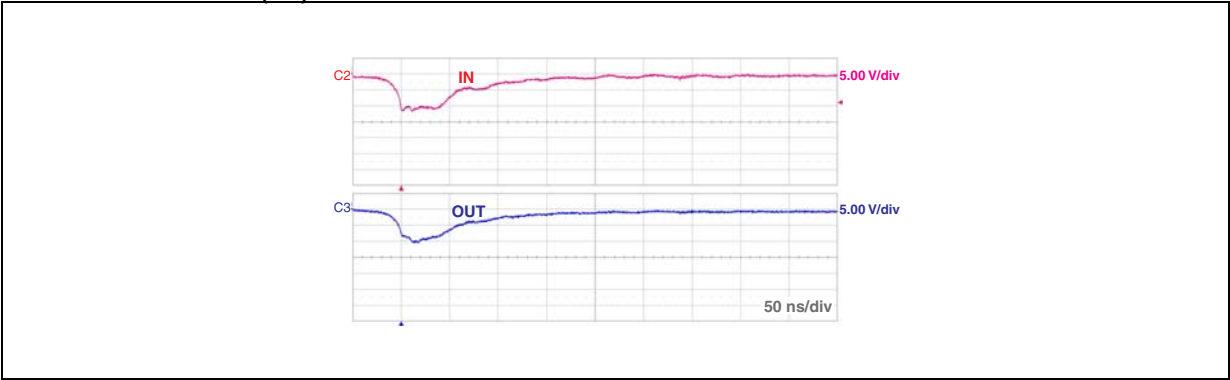


Figure 6. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input  $V_{(in)}$  and on one output  $V_{(out)}$



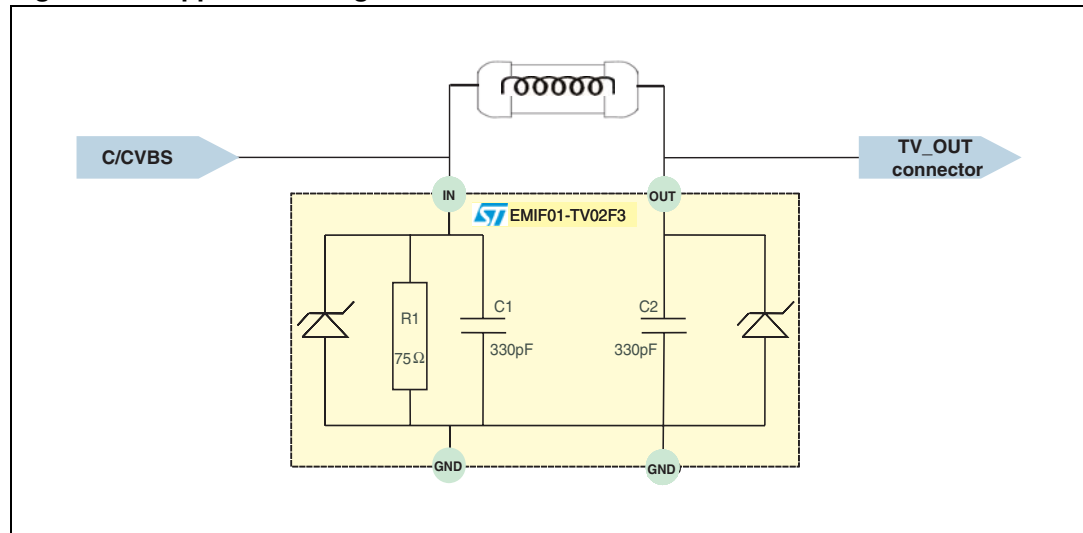
## 2 Application information

An external inductor is used to provide the filtering performance required by the TV-out application.

ST recommends one of these two references:

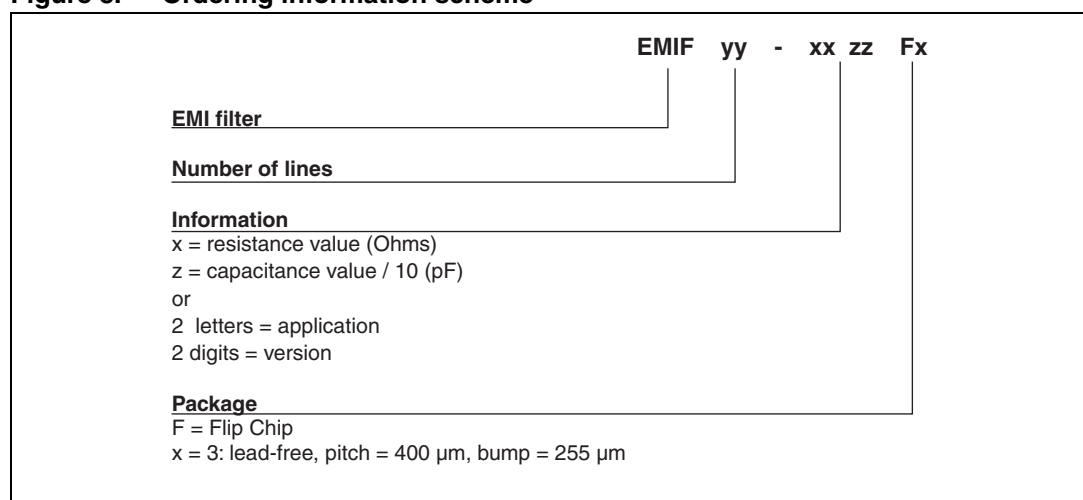
- TDK: MLF1608A2R2J
- MURATA: LQM18NN2R2J

**Figure 7. Application diagram**



## 3 Ordering information scheme

**Figure 8. Ordering information scheme**



# 4 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 9. Package dimensions

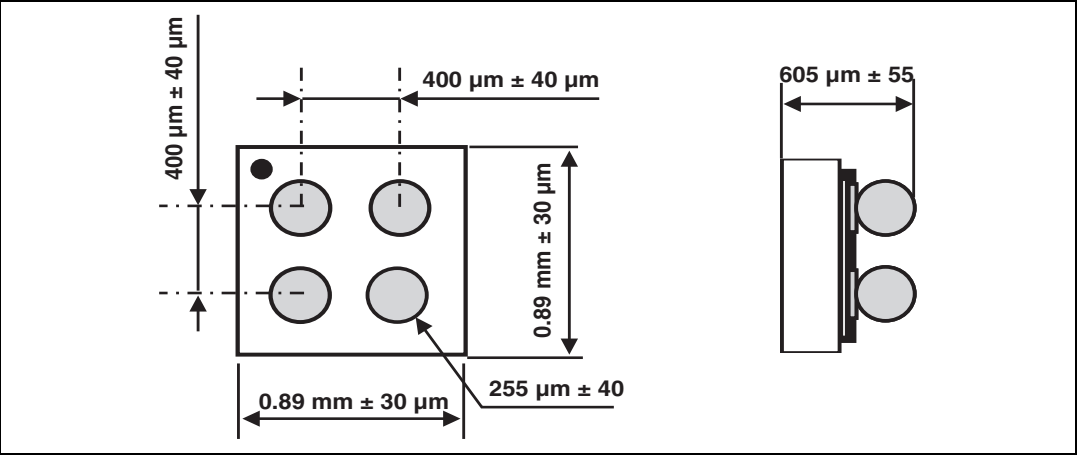


Figure 10. Footprint

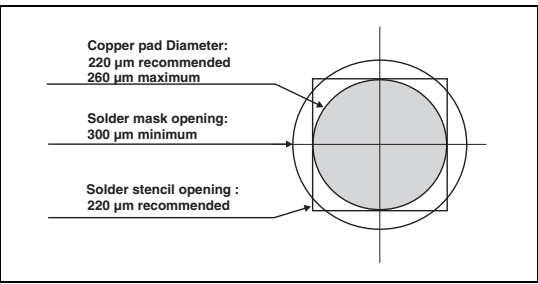
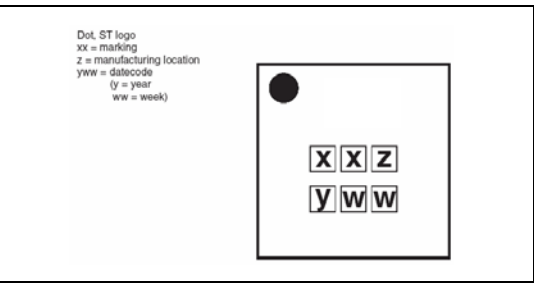


Figure 11. Marking



Technical drawing of a component with dimensions and a side view.

**Dimensions:**

- Overall width:  $4.0 \pm 0.1$
- Overall height:  $8.0 \pm 0.3$
- Top edge radius:  $R1.75 \pm 0.1$
- Bottom edge radius:  $R3.5 \pm 0.1$
- Pin diameter:  $\varnothing 1.5 \pm 0.1$
- Pin spacing (center-to-center):  $4 \pm 0.1$
- Pin offset from centerline:  $0.95$
- Pin offset from bottom edge:  $56.0$
- Side view width:  $0.71 \pm 0.05$

**Labels:**

- Dot identifying Pin A1 location
- User direction of unreeling

**Text:**

All dimensions in mm

**Table 3. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF01-TV02F3	HZ	Flip Chip	1.1 mg	5000	Tape and reel 7"

More information is available in the application note:  
AN1235: "Flip Chip: Package description and recommendations for use"  
AN1751: "EMI filters: Recommendations and measurements"

**Table 4. Document revision history**

Date	Revision	Changes
20-Jan-2009	1	Initial release.
18-Sep-2009	2	Updated <a href="#">Figure 5</a> and <a href="#">Figure 6</a> .
06-Oct-2010	3	Added text above <a href="#">Figure 7</a> .

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