



# EMIF07-LCD02F3

IPAD™

7 line EMI filter and ESD protection for LCD and cameras

## Main product characteristics:

Where EMI filtering in ESD sensitive equipment is required :

- LCD for Mobile phones
- Computers and printers
- Communication systems
- MCU Boards

## Description

The EMIF07-LCD02F3 is a 7 line highly integrated devices designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF07 flip-chip packaging means the package size is equal to the die size.

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

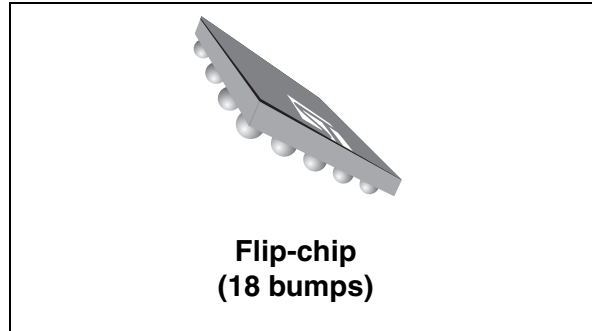
## Benefits

- Lead free package
- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- 400 µm pitch
- Compatible with high speed data rate
- Very low PCB space consuming: < 3.1 mm<sup>2</sup>
- Very thin package: 0.6 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging

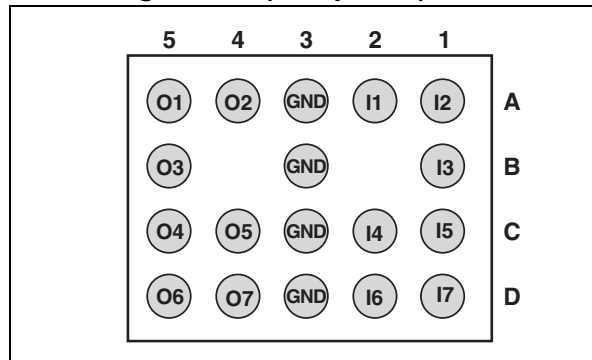
## Order Code

Part Number	Marking
EMIF07-LCD02F3	GX

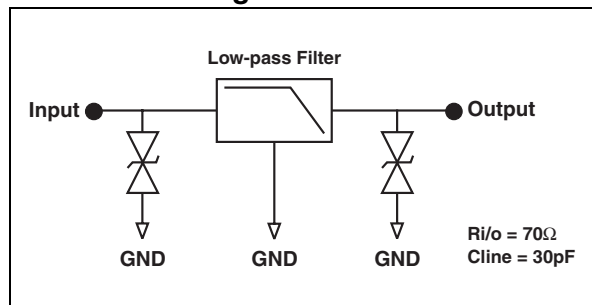
TM: IPAD is a trademark of STMicroelectronics



## Pin Configuration (bump side)



## Basic Cell Configuration



## Complies with the following standards:

### IEC61000-4-2:

- Level 4                      15 kV (air discharge)
- 8 kV ( contact discharge)

on inputs and outputs

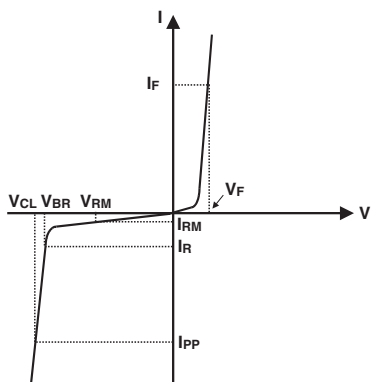
### MIL STD 883E - Method 3015-6 Class 3

**Table 1. Absolute Maximum Ratings**

Symbol	Parameter	Value	Unit
T <sub>j</sub>	Junction temperature	125	°C
T <sub>op</sub>	Operating temperature range	-40 to + 85	°C
T <sub>stg</sub>	Storage temperature range	-55 to +150	°C

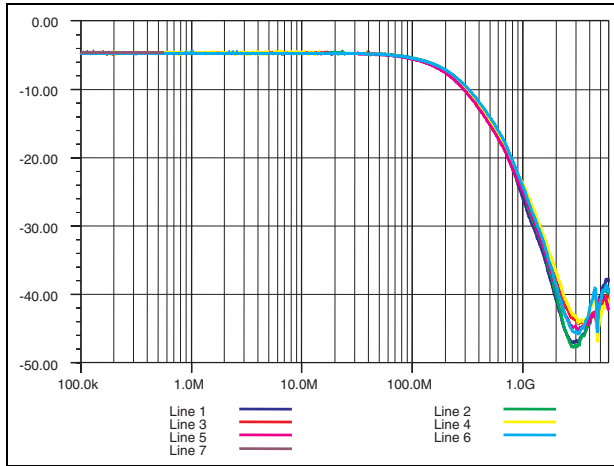
# 1 Electrical characteristics (T<sub>amb</sub> = 25°C)

Symbol	Parameter
V <sub>BR</sub>	Breakdown voltage
I <sub>RM</sub>	Leakage current @ V <sub>RM</sub>
V <sub>RM</sub>	Stand-off voltage
V <sub>CL</sub>	Clamping voltage
I <sub>PP</sub>	Peak pulse current
R <sub>I/O</sub>	Series resistance between Input & Output
C <sub>line</sub>	Input capacitance per line

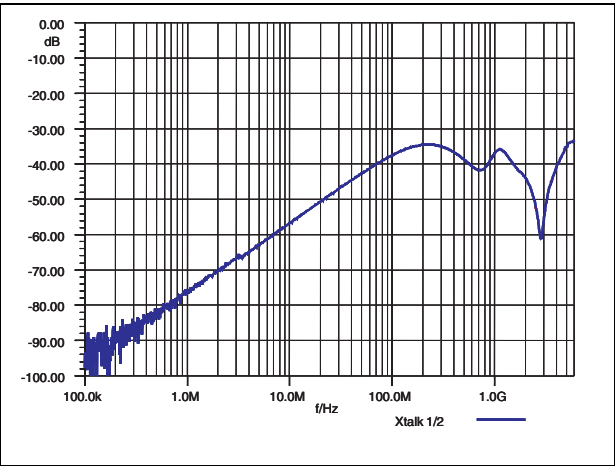


Symbol	Test conditions	Min.	Typ.	Max.	Unit
V <sub>BR</sub>	I <sub>R</sub> = 1 mA	6	8	10	V
I <sub>RM</sub>	V <sub>RM</sub> = 3 V		50	200	nA
R <sub>I/O</sub>	Tolerance ± 20 %		70		Ω
C <sub>line</sub>	V <sub>line</sub> = 0 V, V <sub>OSC</sub> = 30 mV, F = 1 MHz			30	pF

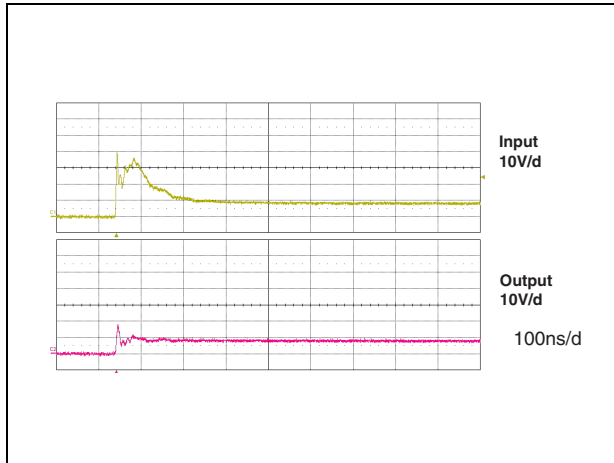
**Figure 1. S21(dB) all lines attenuation measurement and APlac simulation**



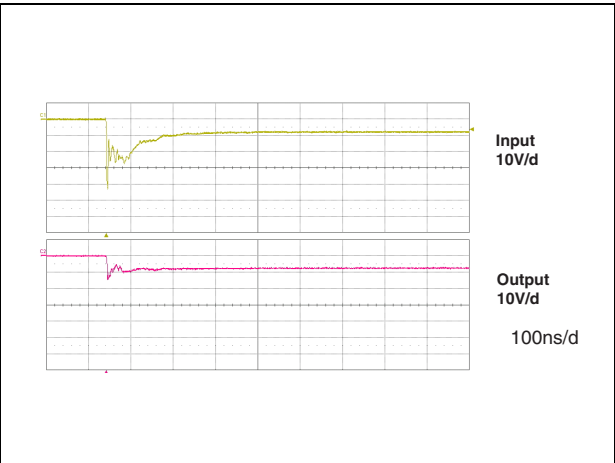
**Figure 2. Analog cross talk measurements**



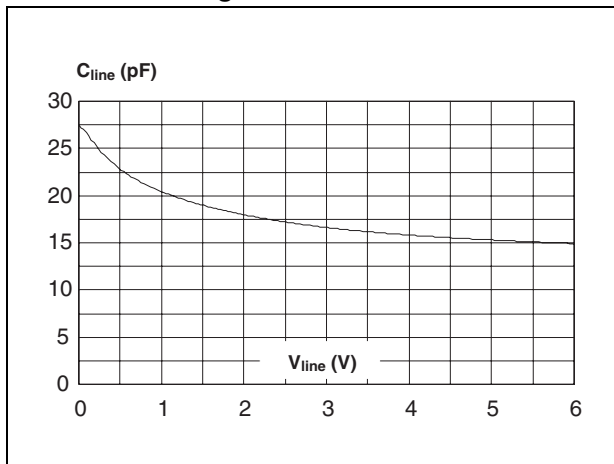
**Figure 3. Voltages when IEC61000-4-2 (+15kV air discharge) applied to input pin**



**Figure 4. Voltages when IEC61000-4-2 (-15kV air discharge) applied to input pin**



**Figure 5. Line capacitance versus applied voltage**



## 2 Aplac model

Figure 6. Device structure (one cell)

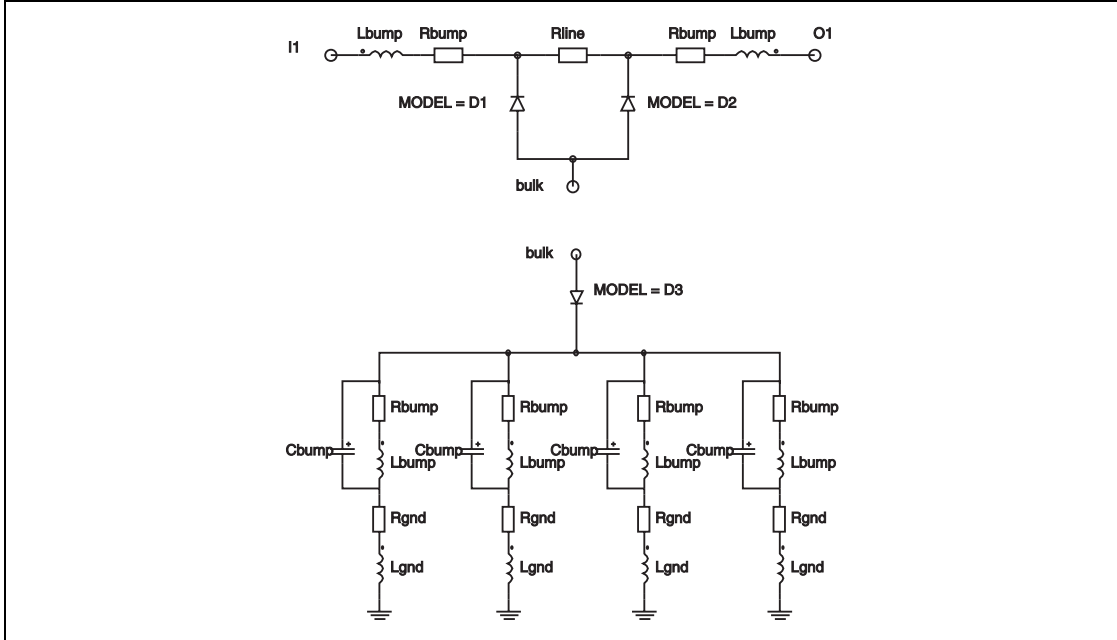
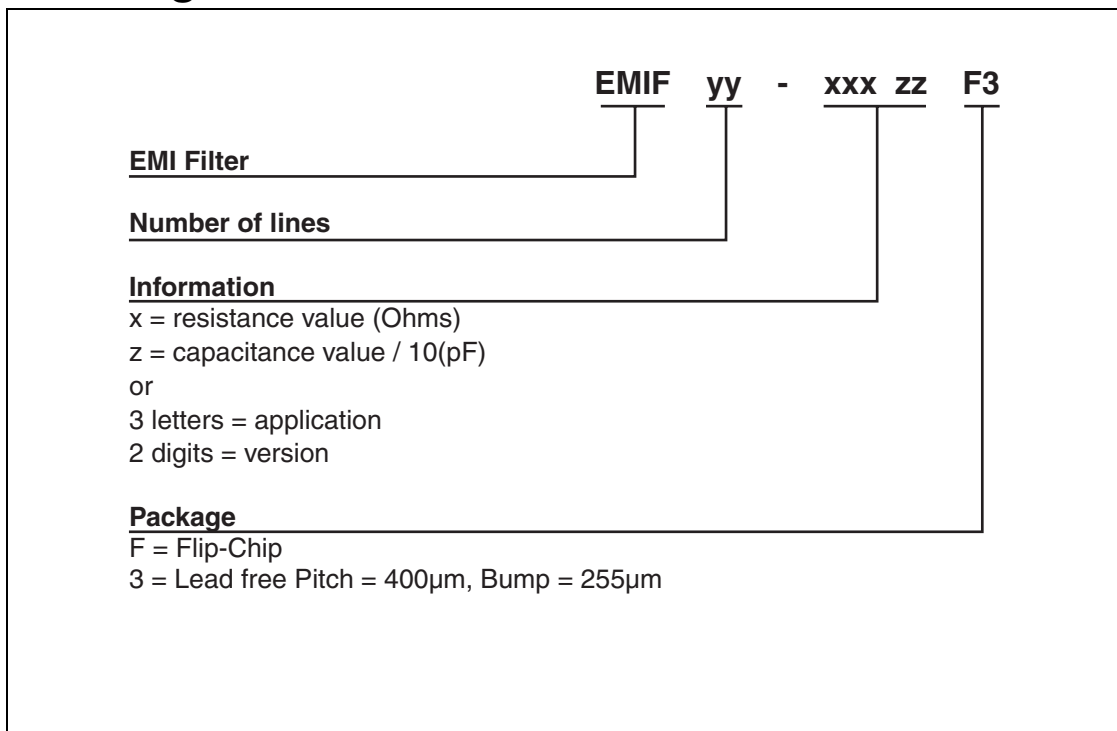


Figure 7. Aplac model variables

aplacvar Rline 70			
aplacvar C_d1 15p			
aplacvar C_d2 15p			
aplacvar C_d3 600p			
aplacvar Ls 950pH			
aplacvar Rs 150m			
aplacvar Lbump 50pH			
aplacvar Rbump 20m			
aplacvar Cbump 150f			
aplacvar Lgnd 50pH			
aplacvar Rgnd 100m			
aplacvar Rsub 10m			
	<b>Diode D1</b>	<b>Diode D2</b>	<b>Diode D3</b>
	BV=7	BV=7	BV=7
	IBV=1m	IBV=1m	IBV=1m
	CJO=C_d1	CJO=C_d2	CJO=C_d3
	M=0.28	M=0.28	M=0.28
	RS=0.1	RS=0.1	RS=0.01
	VJ=0.6	VJ=0.6	VJ=0.6
	TT=100n	TT=100n	TT=100n

### 3 Ordering information scheme



# 4 Package information

Figure 8. Mechanical data

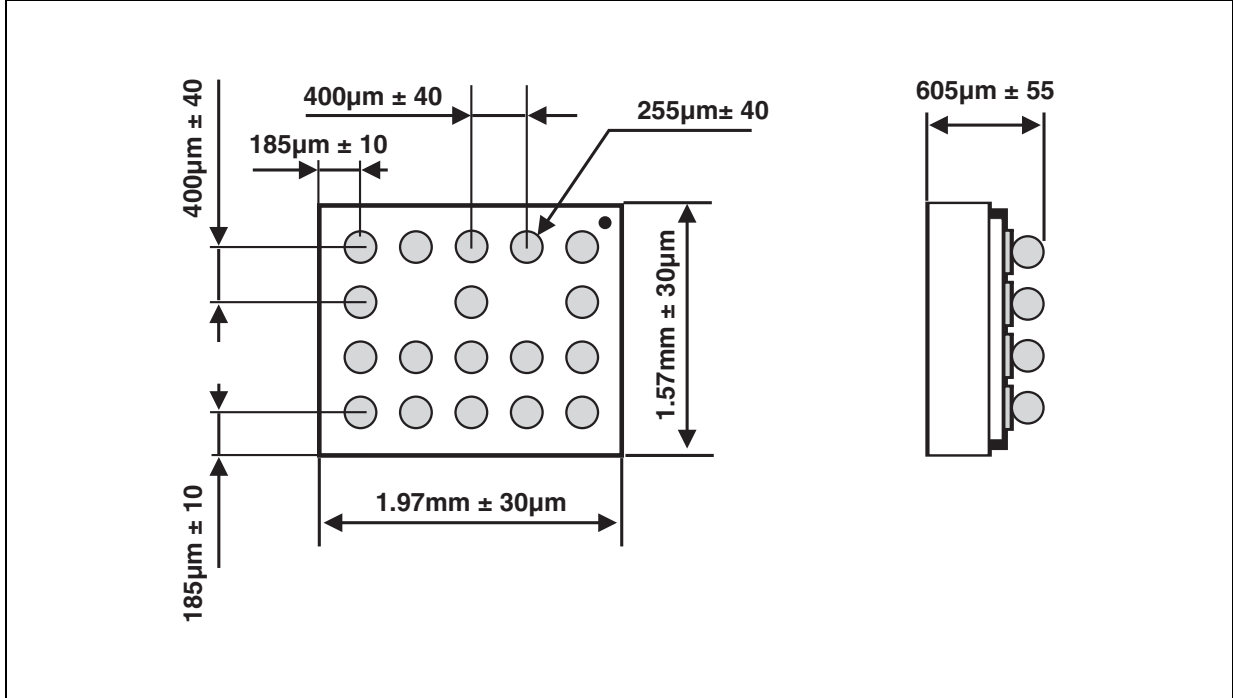


Figure 9. Foot print recommendations

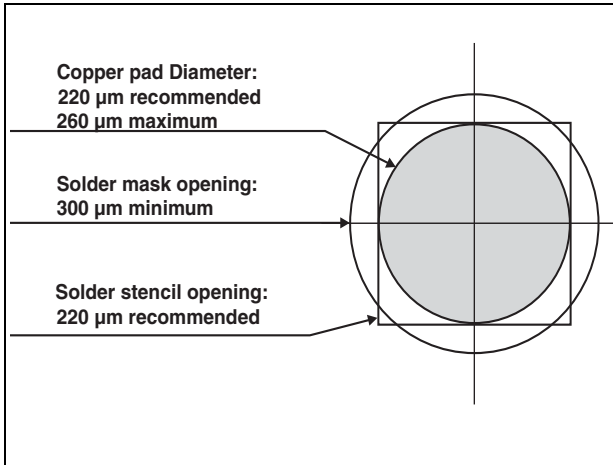


Figure 10. Marking

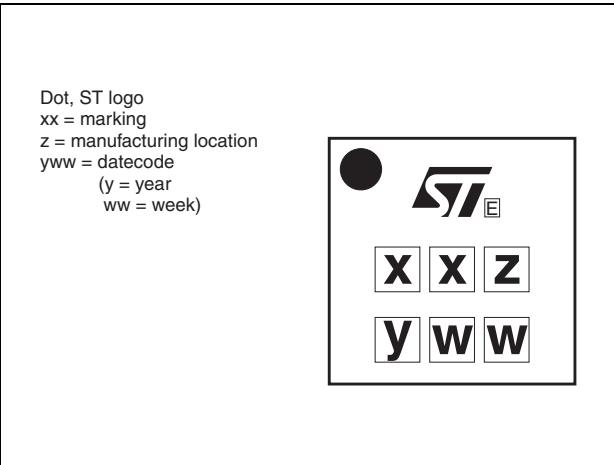
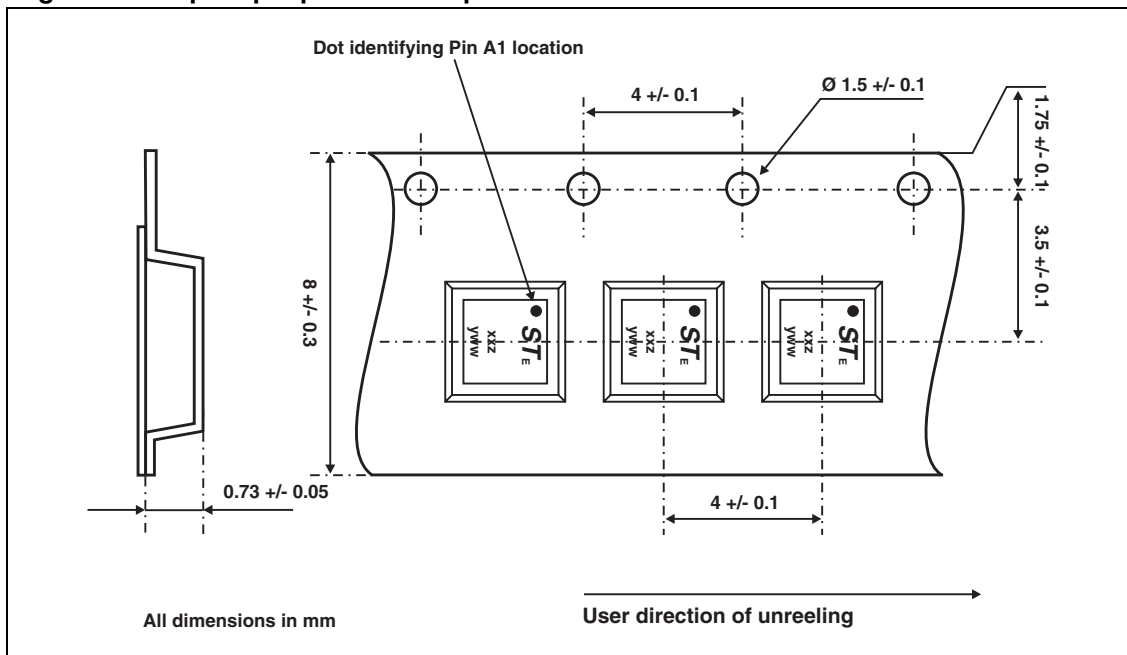


Figure 11. Flip-chip tape and reel specifications



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).

- Note: Further packing information is available in the application notes
- AN1235: "Flip-Chip: Package description and recommendations for use"
  - AN1751: "EMI Filters: Recommendations and measurements"

## 5 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
EMIF07-LCD02F3	GX	Flip-chip	3.9 mg	5000	Tape and reel (7")

## 6 Revision history

Date	Revision	Changes
12-Sep-2005	1	Initial release.

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