EMIF07-LCD02F3

7-line IPAD™, EMI filter and ESD protection for LCD and cameras

Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead-free package
- Very low PCB space occupation: 1.94 mm x 1.54 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression
- 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 on inputs and outputs:
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G - Method 3015-7 Class 3

Applications

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 device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference. The EMIF07 Flip Chip package means the package size is equal to the die size.

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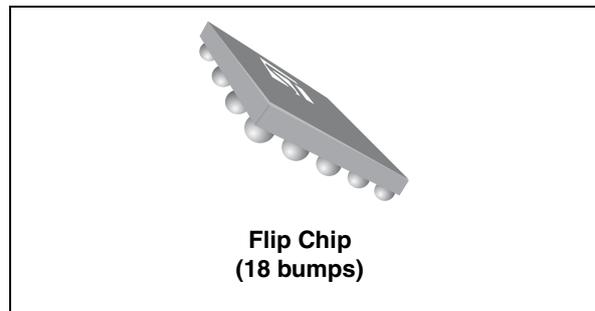

Flip Chip (18 bumps)

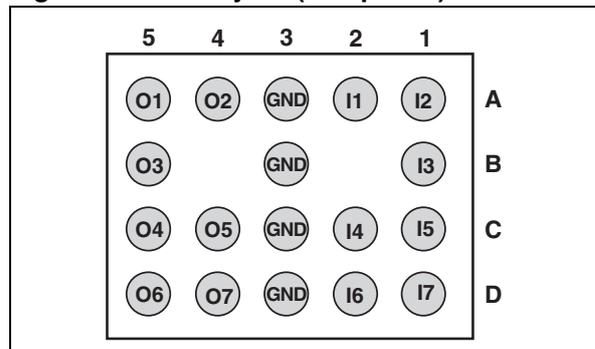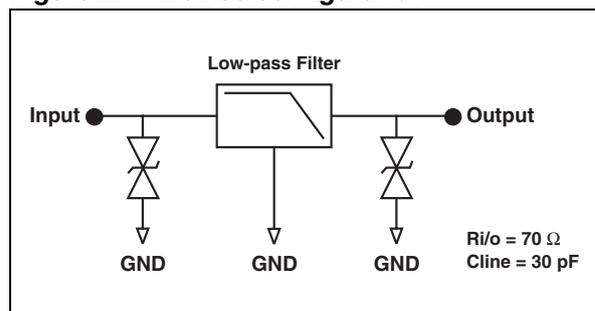**Figure 1.   Pin layout (bump side)**

Figure 2.   Device configuration

TM: IPAD is a trademark of STMicroelectronics.

1   Characteristics

Table 1.   Absolute maximum ratings (T$_{amb}$ = 25 °C)

Symbol	Parameter and test conditions	Value	Unit
T$_j$	Maximum junction temperature	125	°C
T$_{op}$	Operating temperature range	-40 to +85	°C
T$_{stg}$	Storage temperature range	-55 to 150	°C

Table 2.   Electrical characteristics (T$_{amb}$ = 25 °C)

Symbol	Parameters
V$_{BR}$	Breakdown voltage
I$_{RM}$	Leakage current @ V$_{RM}$
V$_{RM}$	Stand-off voltage
V$_{CL}$	Clamping voltage
I$_{PP}$	Peak pulse current
R$_{I/O}$	Series resistance between input and output
C$_{line}$	Input capacitance per line
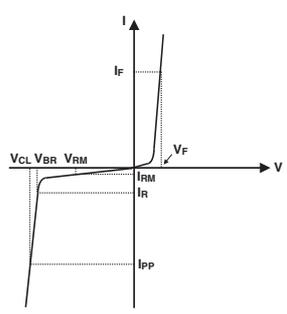
Symbol	Test conditions	Min	Typ	Max	Unit
V$_{BR}$	I$_R$ = 1 mA	6	8	10	V
I$_{RM}$	V$_{RM}$ = 3 V		50	200	nA
R$_2$	Tolerance ± 20%		70		Ω
C$_{line}$	Vline = 0 V, V$_{OSC}$ = 30 mV, F =1 MHz			30	pF

Figure 3.   Attenuation measurement and Aplac simulation
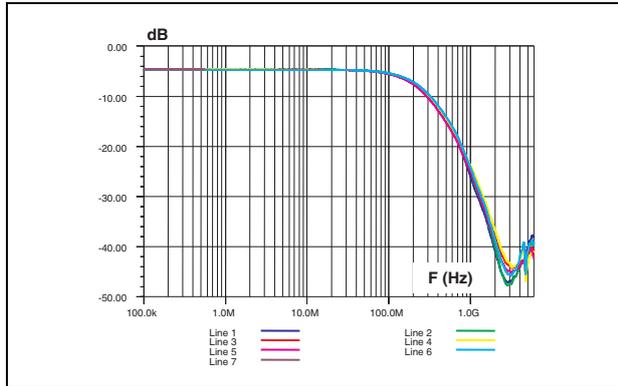

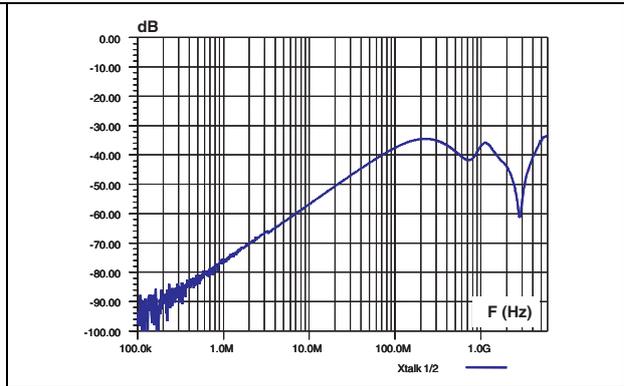**Figure 4.   Analog cross talk measurement**

Figure 5.   Voltages when IEC 61000-4-2 (+15 kV air discharge) applied to input pin
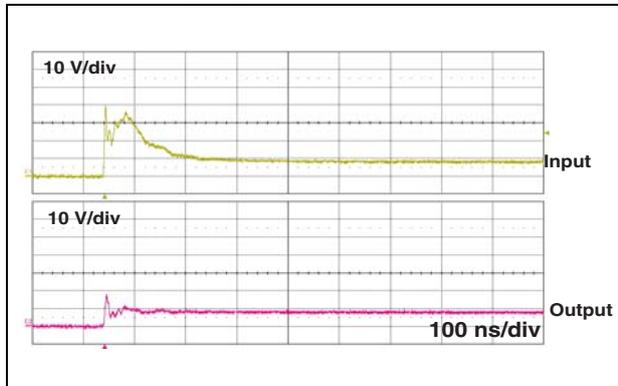

Figure 6.   Voltages when IEC 61000-4-2 (-15 kV air discharge) applied to input pin
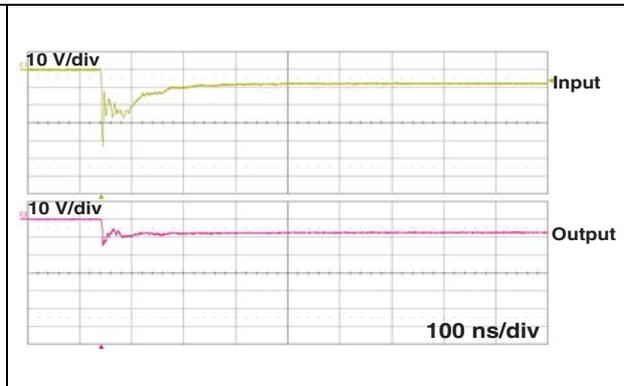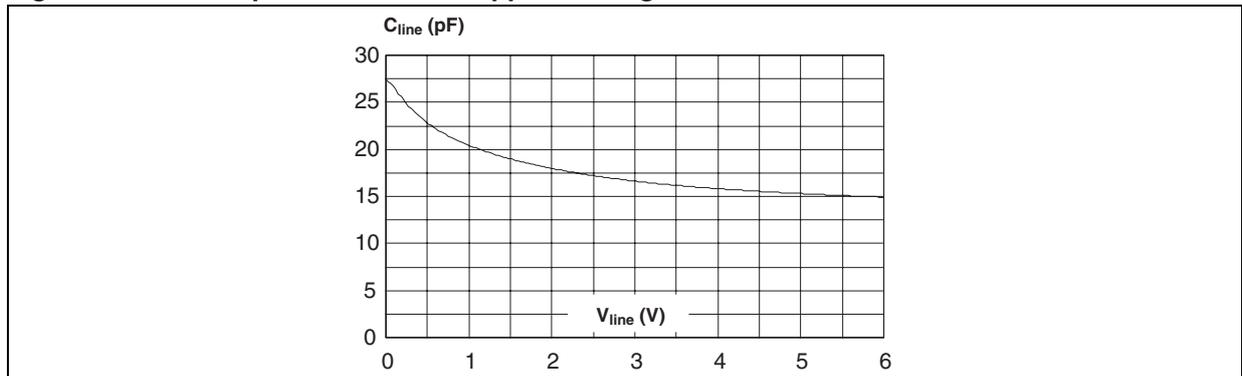

Figure 7.   Line capacitance versus applied voltage

2   Application information
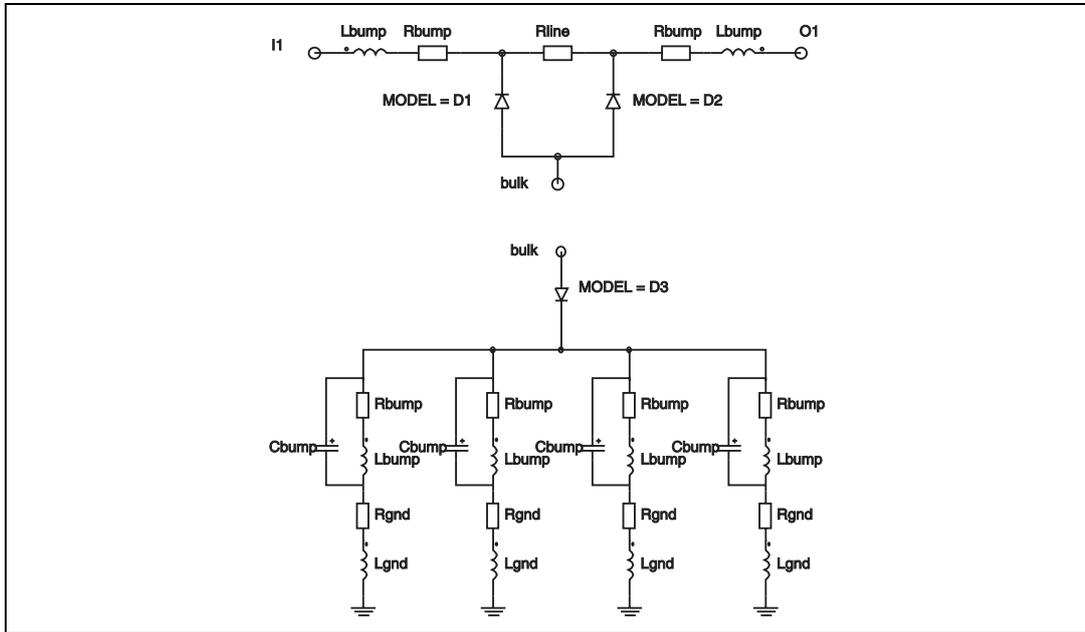
Figure 8.   Aplac model

Figure 9.   Aplac parameters

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

3 Ordering information scheme

Figure 10. Ordering information scheme

EMI filter

Number of lines

Information
x = resistance value (ohm)
z = capacitance value / 10 (pF)
or
3 letters = application
2 digits = version

Package
F = Flip Chip
3 = Lead-free, pitch = 400 μm, bump = 255 μm
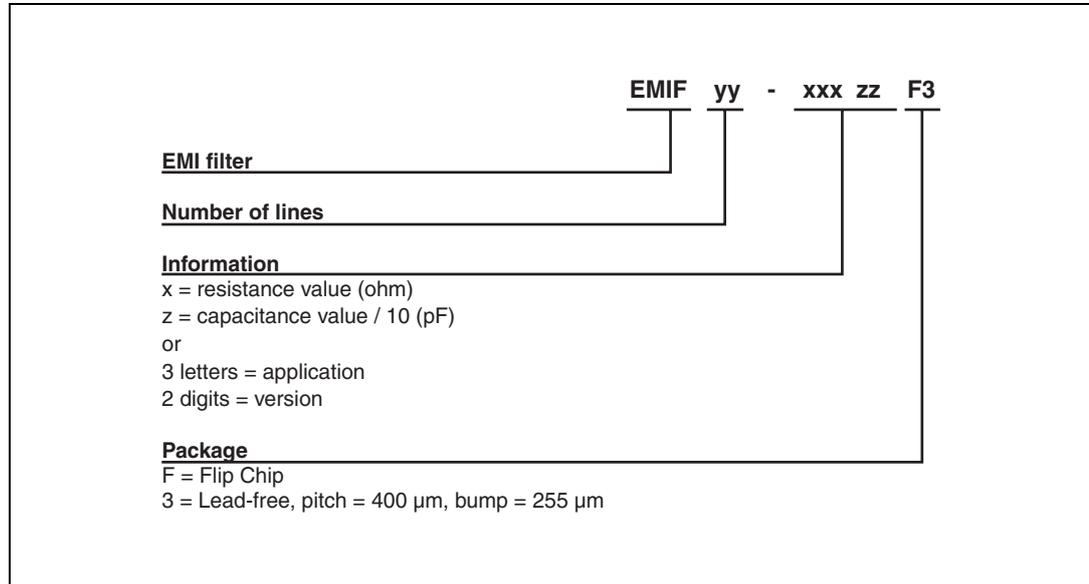
4 Package information

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*. ECOPACK® is an ST trademark.
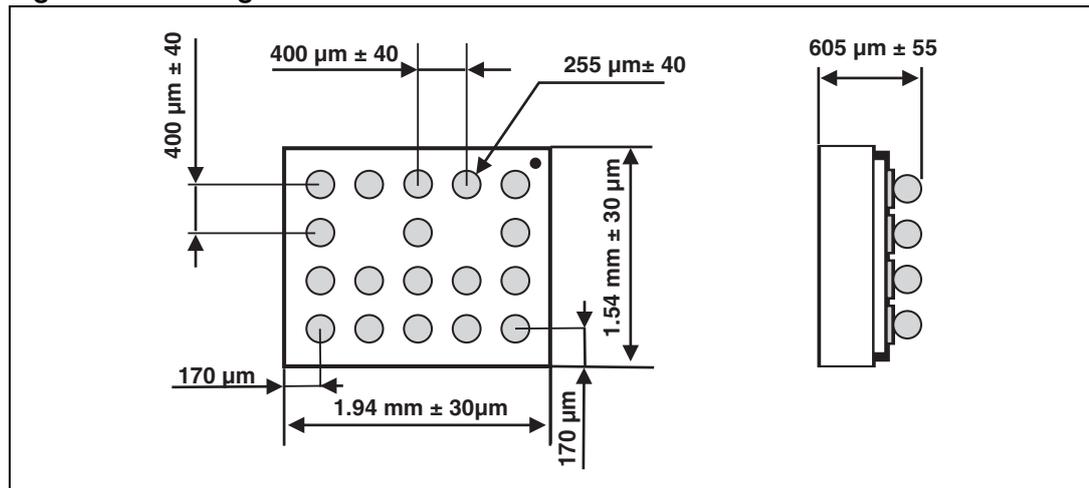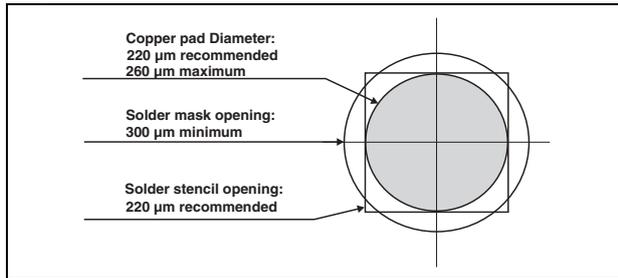
Figure 11. Package dimensions

Figure 12.   Footprint
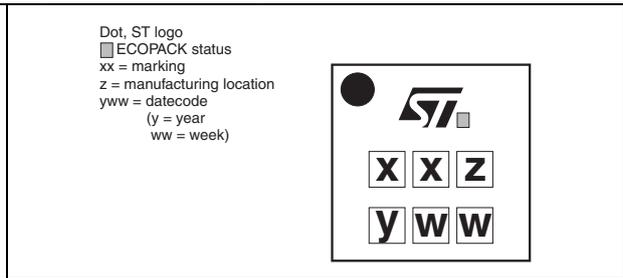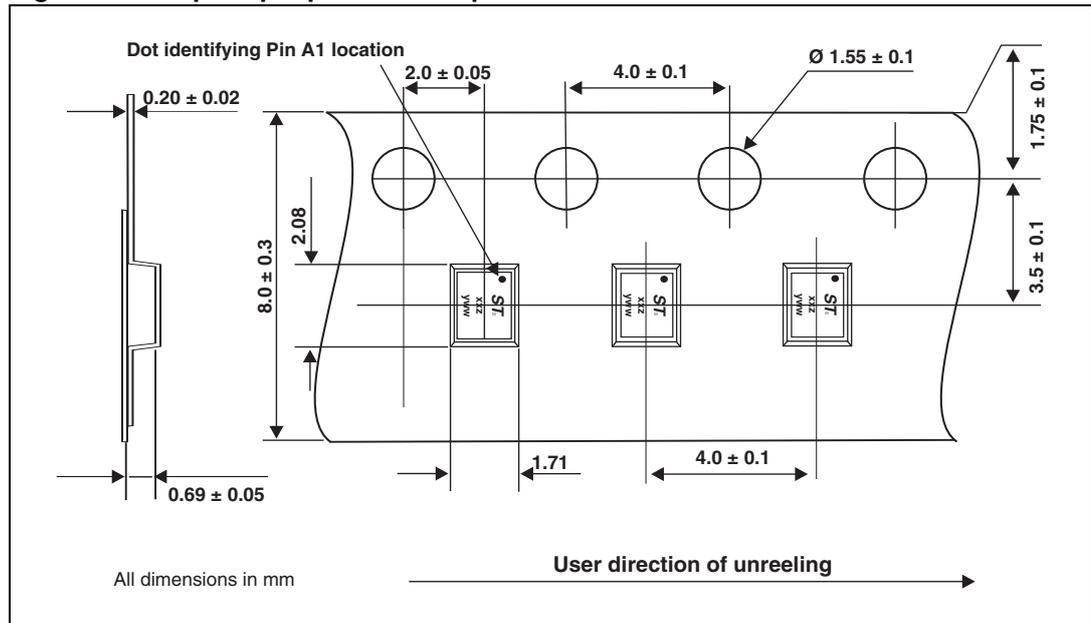

Figure 13.   Marking

Figure 14.   Flip Chip tape and reel specification

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   Ordering information

Table 3.   Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF07-LCD02F3	GX	Flip Chip	3.9 mg	5000	Tape and reel 7"

6 Revision history

Table 4.   Document revision history

Date	Revision	Changes
12-Sep-2005	1	First issue.
28-Apr-2008	2	Updated ECOPACK statement. Updated *Figure 10*, *Figure 11* and *Figure 14.* Reformatted to current standards.
19-Feb-2010	3	Updated die size in *Figure 11*.

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SNZF220DFT1G CM1442-06CP EMI8041MUTAG SBSPP0500473MXB SBSPP0500683MXT SBSPP1000101MCT SBSPP1000220MCB
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MEA2010PE360T001 NFA18SL307V1A45L 1-6609037-5 CM1690-06DE EMIF05-SK01F3 EMIF02-USB03F2 BNX022-01L
BNX024H01L BNX025H01L BNX026H01L NFA21SL806X1A48L NFL18SP157X1A3D NFL21SP106X1C3D NFL21SP207X1C3D
NFL21SP307X1C3D NFL21SP506X1C3D NFL21SP706X1C3D NFW31SP207X1E4L