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: 1.42 mm x 1.42 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

- IEC61000-4-2 level 4 on inputs and outputs:
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883E - Method 3015-6 Class 3

Applications

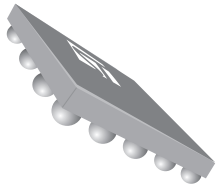
Where EMI filtering in ESD sensitive equipment is required:

- 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 packaging 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)

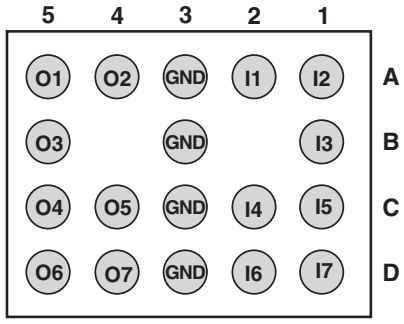
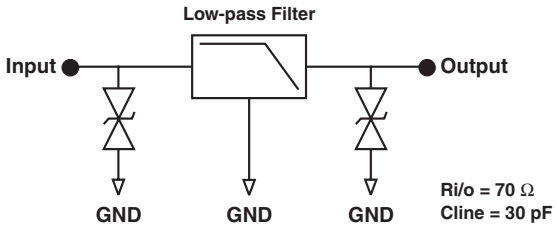


Figure 2. Device configuration



TM: IPAD is a trademark of STMicroelectronics.

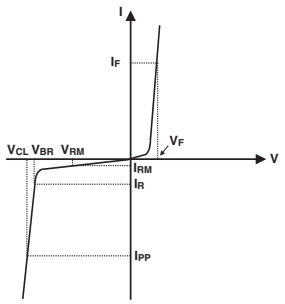
1 Characteristics

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. S21(dB) all lines attenuation measurement and Aplac simulation

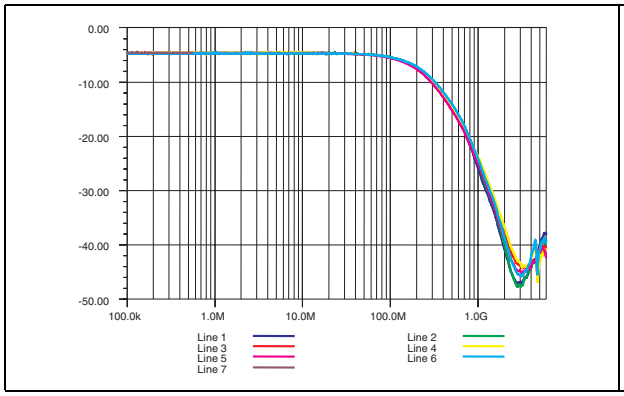


Figure 4. Analog cross talk measurement

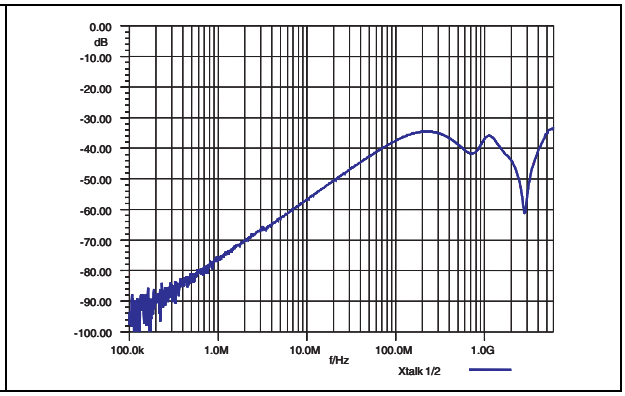


Figure 5. Voltages when IEC61000-4-2 (+15 kV air discharge) applied to input pin

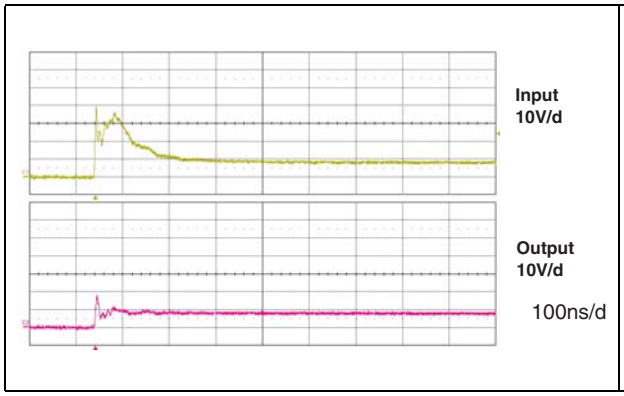


Figure 6. Voltages when IEC61000-4-2 (-15 kV air discharge) applied to input pin

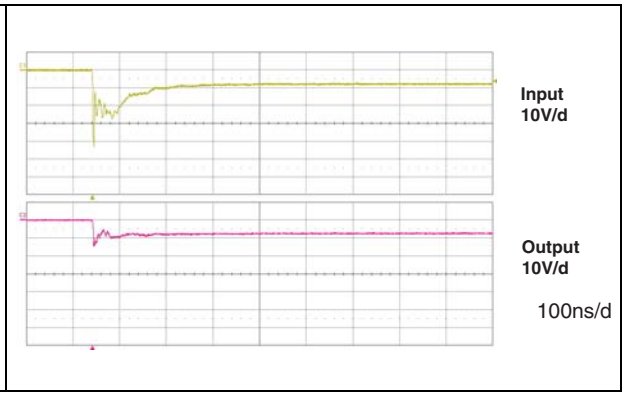
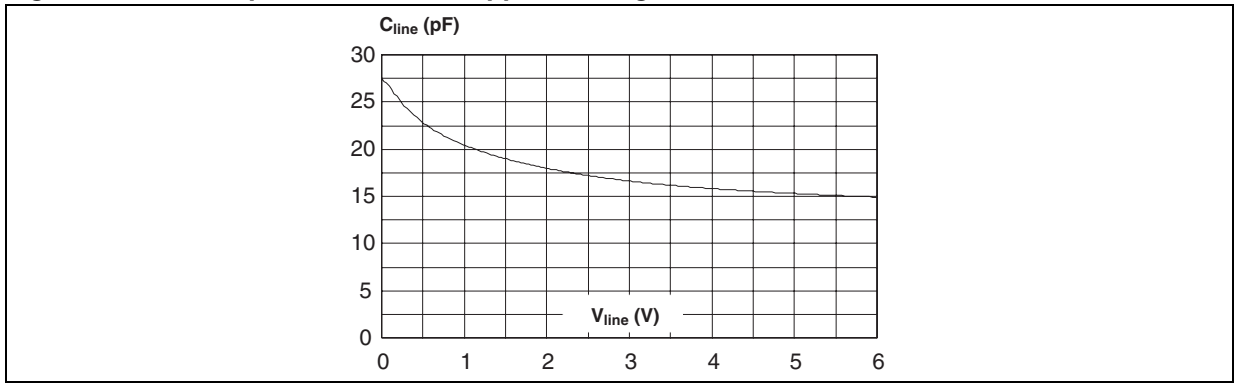


Figure 7. Line capacitance versus applied voltage



2 Application information

Figure 8. Aplac model

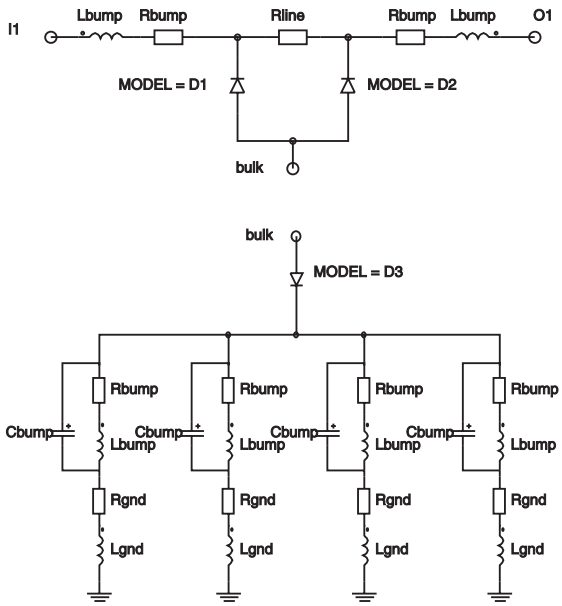


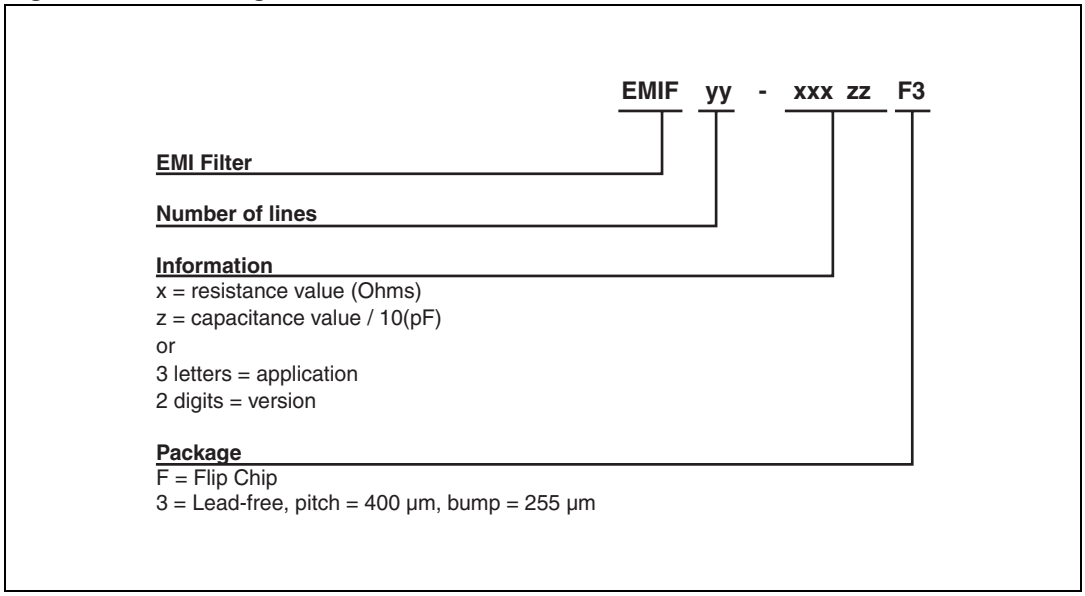
Figure 9. Aplac parameters

```
aplacvar Rline 70
aplacvar C_d1 15p
aplacvar C_d2 15p
aplacvar C_d3 600p
aplacvar Ls 950pH
aplacvar Rs 150m
aplacvar Lbump 50pH
aplacvar Rbump 20m
aplacvar Cbump 150f
aplacvar Lgnd 50pH
aplacvar Rgnd 100m
aplacvar Rsub 10m
```

Diode D1	Diode D2	Diode D3
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

Figure 10. Ordering information scheme



4 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*.

Figure 11. Package dimensions

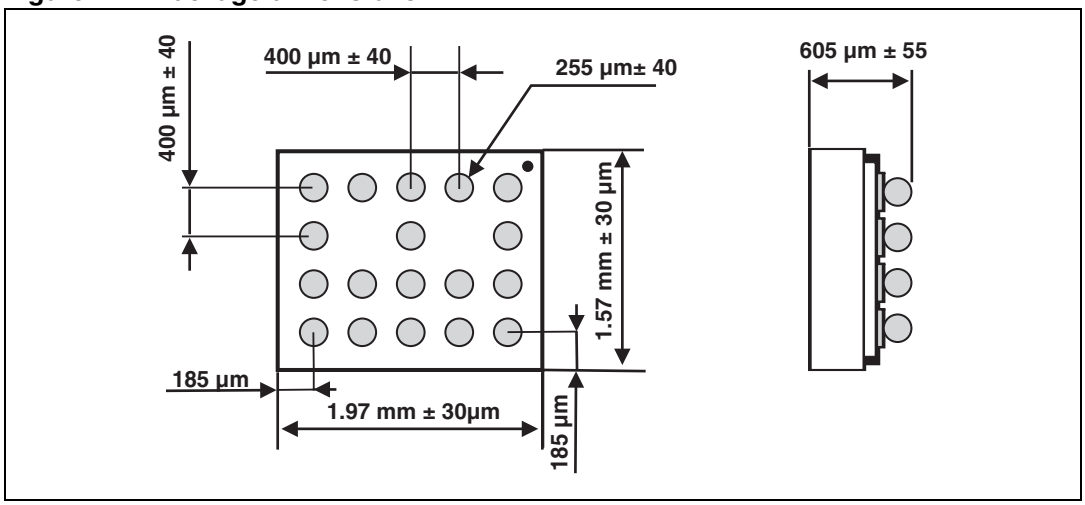


Figure 12. Footprint

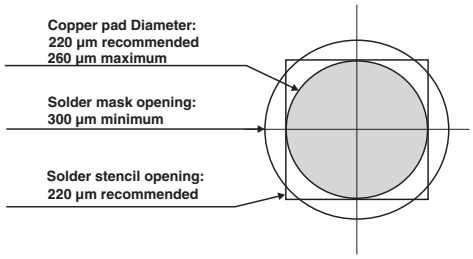


Figure 13. Marking

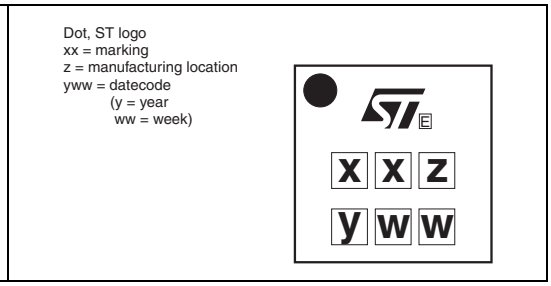
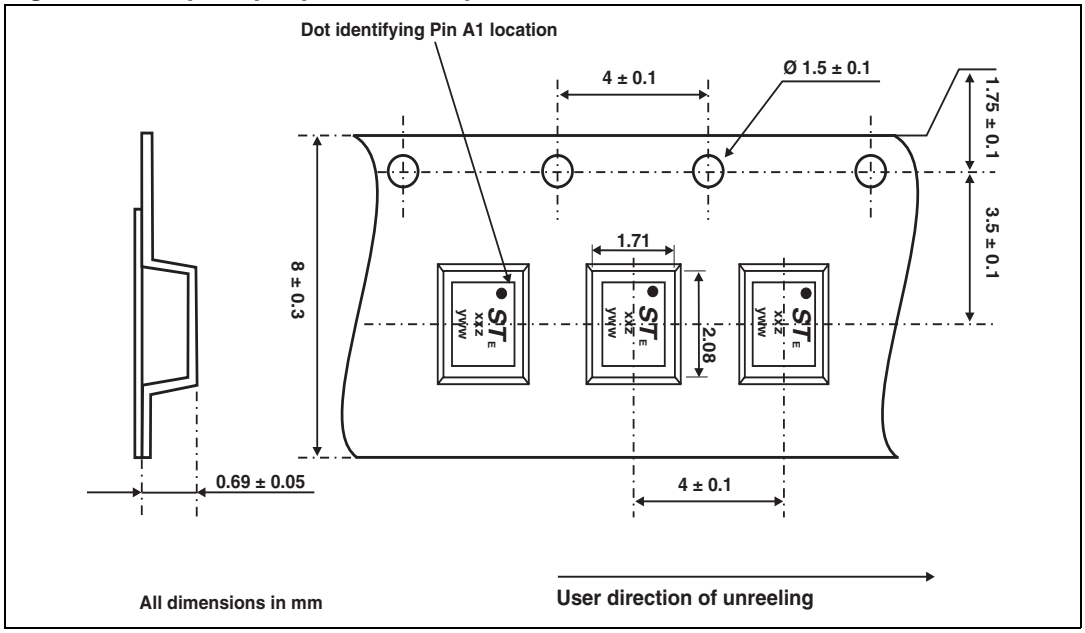


Figure 14. Flip Chip tape and reel specification



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.

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