

EMIF10-LCD01F2

10 line EMI filter and ESD protection

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 EMIF10-LCD01F2 is a 10 line highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF10 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 it is subjected to ESD surges up to 15 kV.

Benefits

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming: < 6 mm²
- Lead free package
- Very thin package: 0.69 mm
- High efficiency in ESD suppression on input pins (IEC 61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging.

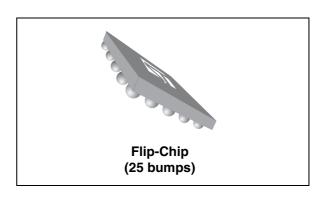
Complies with following standards:

IEC 61000-4-2

level 4 input pins 15 kV (air discharge)

8 kV (contact discharge)

MIL STD 883G - Method 3015-7 Class 3



Order code

Part Number	Marking		
EMIF10-LCD01F2	FL		

Figure 1. Pin Configuration (bump side)

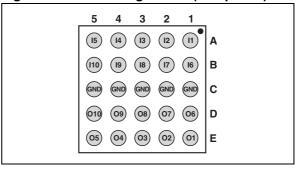
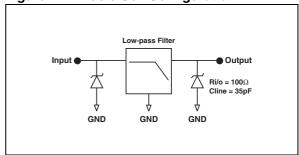


Figure 2. Basic Cell Configuration



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Characteristics EMIF10-LCD01F2

1 Characteristics

Table 1. Absolute Maximum Ratings $(T_{amb} = 25^{\circ} C)$

Symbol	Parameter	Value	Unit
T _j	Junction temperature	125	° C
T _{op}	Operating temperature range	-40 to + 85	° C
T _{stg}	Storage temperature range	-55 to +150	° C

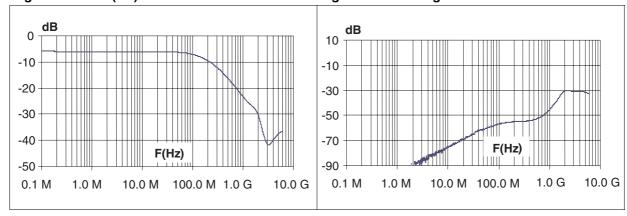
Table 2. Electrical Characteristics $(T_{amb} = 25^{\circ} C)$

Symbol	Parameter	¹ ↑ ,
V _{BR}	Breakdown voltage	l _F
I _{RM}	Leakage current @ V _{RM}	
V _{RM}	Stand-off voltage	
V _{CL}	Clamping voltage	VcL VBR VRM
R_d	Dynamic resistance	l _R
I _{PP}	Peak pulse current	
R _{I/O}	Series resistance between Input and Output	
C _{line}	Input capacitance per line	1

Symbol	Test conditions	Min.	Тур.	Max.	Unit
V _{BR}	I _R = 1 mA	6	8	10	V
I _{RM}	V _{RM} = 3 V			500	nA
R _{I/O}		90	100	110	Ω
C _{line}	@ 0 V bias		28	35	pF
Rt / Ft	Induced rise and fall time 10-90% at 26 MHz frequency signal V = 1.9 V (Rt / Ft input 1 ns, 50Ω impedance generator)		8 ⁽¹⁾		ns

^{1.} guaranteed by design

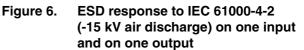
Figure 3. S21(dB) attenuation measurement Figure 4. Analog cross talk measurement

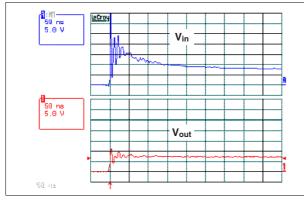


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EMIF10-LCD01F2 Characteristics

Figure 5. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input and on one output





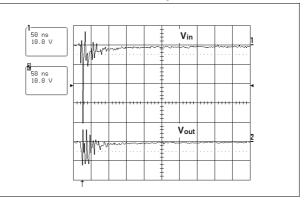
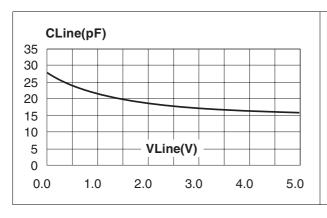


Figure 7. Line capacitance versus applied voltage

Figure 8. Rise time 10-90% measurements with 1.9 V signal at 26 MHz frequency (50 Ω generator)



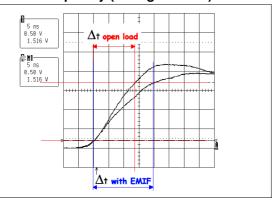
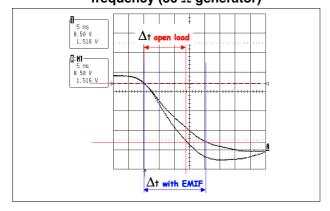


Figure 9. Fall time 10-90% measurements with 1.9 V signal at 26 MHz frequency (50 Ω generator)



Characteristics EMIF10-LCD01F2

Figure 10. Aplac model

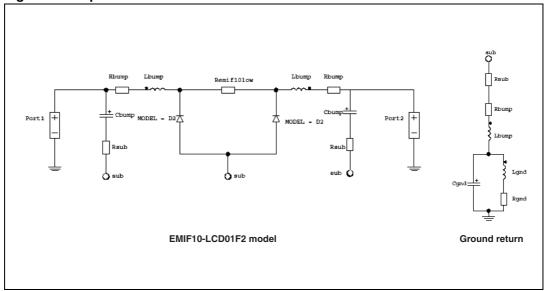
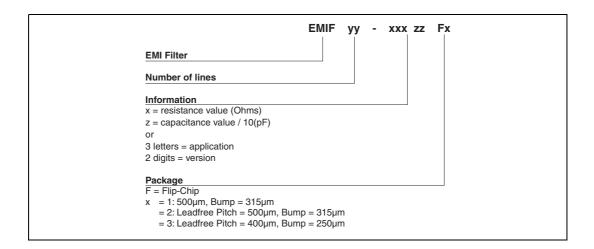


Figure 11. Aplac parametersl

ZRZ structure aplacvar Remif10low 100 aplacvar Cemif10flow 17.5pF Bumps aplacvar Lbump 50pH aplacvar Rbump 20m aplacvar Cbump 1.5pF Bulk aplacvar Rsub 100m Gnd connections aplacvar Rgnd 100m aplacvar Lgnd 200pH aplacvar Cgnd 0.15pF	BV = 7 CJO = Cemif10low IBV = 1u IKF = 1000 IS = 10f ISR = 100p N = 1 M = 0.3333 RS = 0.015 VJ = 0.6 TT = 50n
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2 Ordering information scheme



3 Package information

Figure 12. Flip-Chip Dimensions

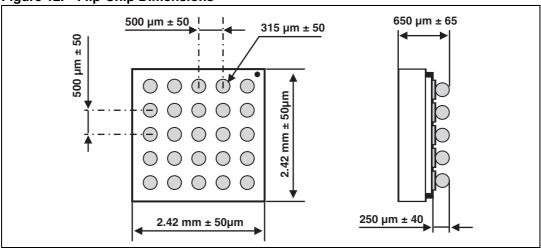


Figure 13. Marking

Copper pad Diameter:
250µm recommended, 300 µm max
Solder stencil opening: 330 µm
Solder mask opening recommendation:
340 µm min for 315 µm copper pad diameter



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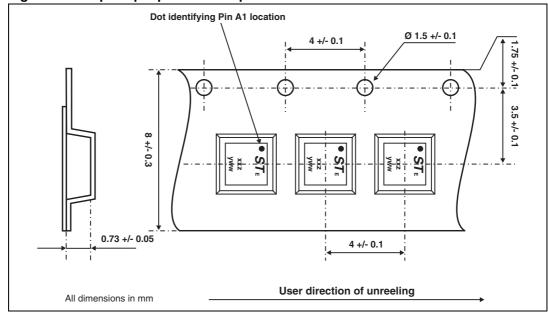


Figure 15. Flip-Chip tape and reel specification

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 package and 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.

Note: More packing information is available in the application notes:

AN1235: "Flip-Chip: Package description and recommendations for use"

AN1751: "EMI Filters: Recommendations and measurements"

4 Ordering information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF10-LCD01F2	FL	Flip-Chip	9.3 mg	5000	Tape and reel (7")

EMIF10-LCD01F2 Revision history

5 Revision history

Date	Revision	Changes
14-Feb-2005	1	Initial release.
17-Mar-2005	2	Capacitance C_{line} specification changed from 47 pF (typ) to 28 pF (typ) and 35 pF (max).
30-Jan-2007	3	Reformatted to current standards. Reduced die size and updated Figures 3 and 4.



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