

# EMIF10-LCD01C1

IPAD™

# 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-LCD01C1 is a 10 lines highly integrated devices 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 an ESD protection circuitry, which prevents the device from destruction when subjected to ESD surges up 15kV.

#### BENEFITS

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming: < 7mm<sup>2</sup>
- Coating resin on back side
- Very thin package: 0.69 mm
- High efficiency in ESD suppression on input pins (IEC61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging.

#### COMPLIES WITH THE FOLLOWING STANDARDS:

#### IEC61000-4-2:

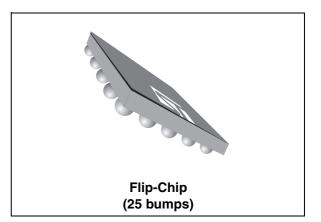
Level 4 input pins	15kV	(air discharge)	
	8kV	(contact discharge)	
Level 1 output pins	2kV	(air discharge)	
	2kV	(contact discharge)	
MIL STD 833E - Method 3015-6 Class 3			

#### Table 1: Order Code

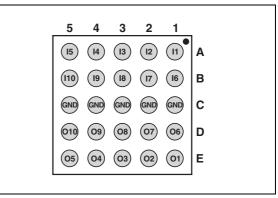
Part Number	Marking
EMIF10-LCD01C1	FL

June 2005

# 10 LINES EMI FILTER

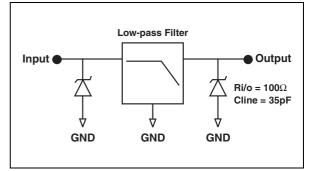


# Figure 1: Pin Configuration (ball side)



#### Figure 2: Basic Cell Configuration

REV. 2



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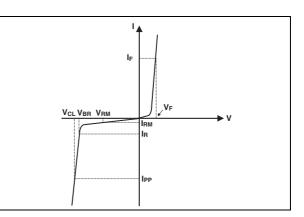
# EMIF10-LCD01C1

Symbol	Parameter	Value	Unit
Тj	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

#### Table 2: Absolute Maximum Ratings ( $T_{amb} = 25^{\circ}C$ )

# Table 3: Electrical Characteristics (T<sub>amb</sub> = 25°C)

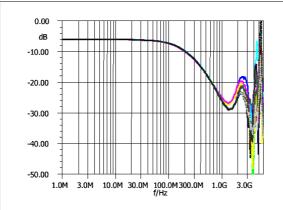
Symbol	Parameter
V <sub>BR</sub>	Breakdown voltage
I <sub>RM</sub>	Leakage current @ V <sub>RM</sub>
V <sub>RM</sub>	Stand-off voltage
V <sub>CL</sub>	Clamping voltage
Rd	Dynamic resistance
I <sub>PP</sub>	Peak pulse current
R <sub>I/O</sub>	Series resistance between Input & Output
Cline	Input capacitance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



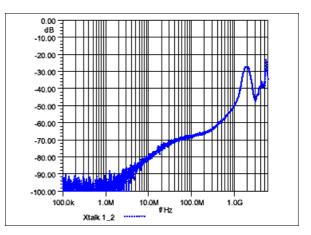
Symbol	Test conditions	Min.	Тур.	Max.	Unit
V <sub>BR</sub>	I <sub>R</sub> = 1 mA	6	8	10	V
I <sub>RM</sub>	V <sub>RM</sub> = 3V			500	nA
R <sub>I/O</sub>		90	100	110	Ω
Cline	@ 0V bias		28	35	pF
Rt / Ft	Induced rise and fall time 10-90% at 26 MHz frequency signal V = 1.9 V (Rt / Ft input 1 ns, $50\Omega$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

(1) guaranteed by design

# Figure 3: S21(dB) all lines attenuation measurement and Aplac simulation







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Figure 5: ESD response to IEC61000-4-2 (+15kV air discharge) on one input and on one output

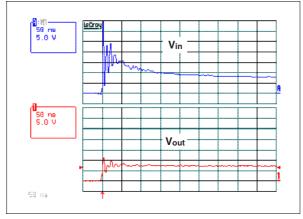


Figure 7: Line capacitance versus applied voltage

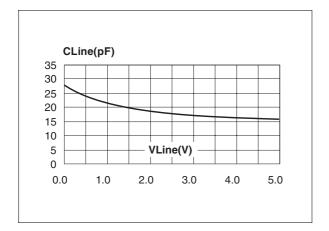


Figure 9: Fall time 10-90% measurements with 1.9V signal at 26 MHz frequency (50 $\Omega$  generator)

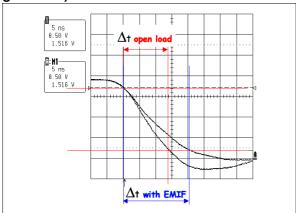


Figure 6: ESD response to IEC61000-4-2 (-15kV air discharge) on one input and on one output

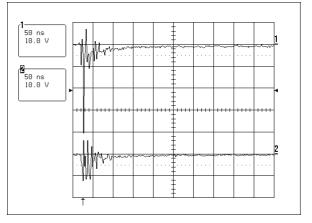
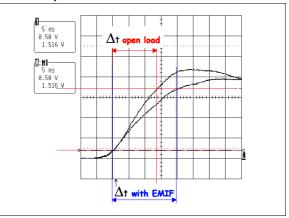
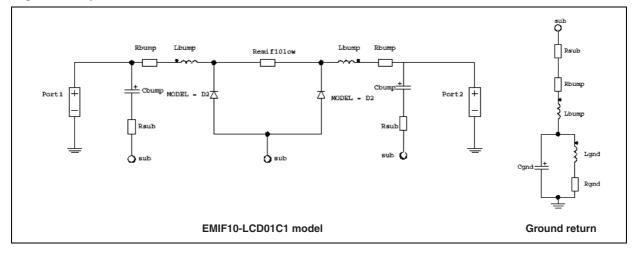


Figure 8: Rise time 10-90% measurements with 1.9V signal at 26 MHz frequency (50 $\Omega$  generator)



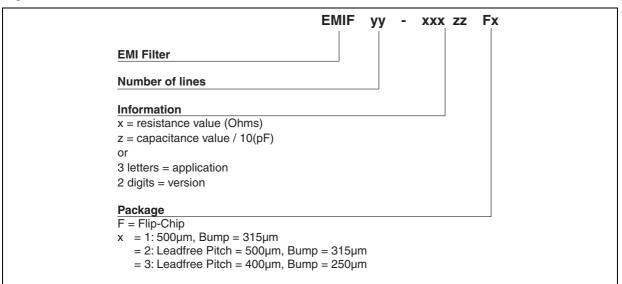
### Figure 10: Aplac model



### Figure 11: Aplac parameters

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

# Figure 12: Order Code



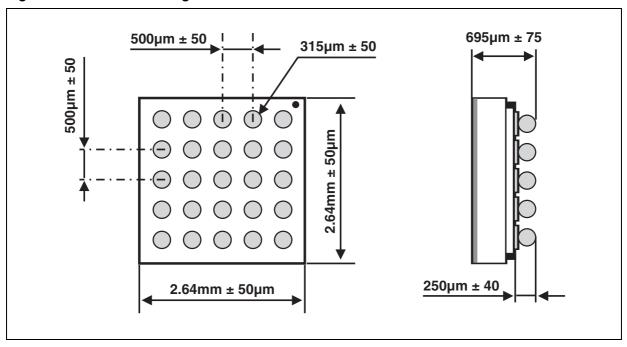
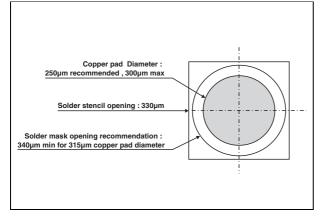


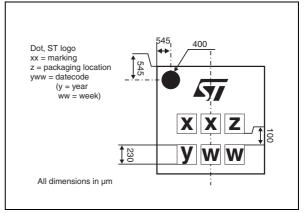
Figure 13: FLIP-CHIP Package Mechanical Data



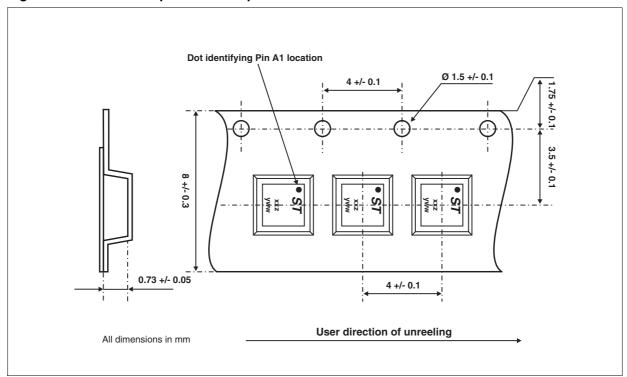
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# Figure 15: Marking



# EMIF10-LCD01C1



# Figure 16: FLIP-CHIP Tape and Reel Specification

# **Table 4: Ordering Information**

Part Number	Marking	Package	Weight	Base qty	Delivery mode
EMIF10-LCD01C1	FL	Flip-Chip	9.3 mg	5000	Tape & reel (7")

 $\ensuremath{\textbf{Note:}}$  Further packing information available in the application notes

AN1235: "Flip-Chip: Package description and recommandations for use"
AN1751: "EMI Filters: Recommendations and measurements"

#### **Table 5: Revision History**

Date	Revision	Description of Changes
Sep-2004	1	First issue
09-Jun-2005	2	Modified C <sub>line</sub> Typical and Maximum values

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