

# EMIF10-LCD01C1

# 10 LINES EMI FILTER AND ESD PROTECTION

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: < 7n:::::?
- Coating resin on back side
- Very thin package: 0.69 mm
- High efficiency in ESD suppression on input pins (IEC61000-4-? !avel 4)
- High reliability on each by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging.

# COMP. IF.S WITH THE FOLLOWING STANDARDS:

### NEC 61000-4-2:

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      |

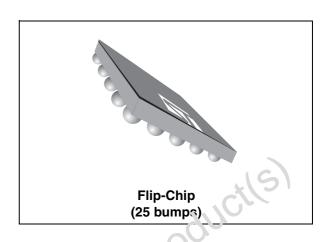


Figure 1: Pin Configuration (ball side)

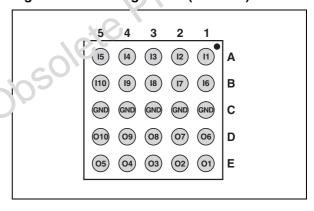
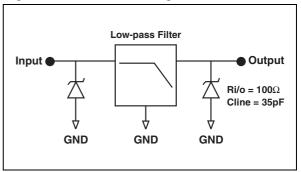


Figure 2: Basic Cell Configuration

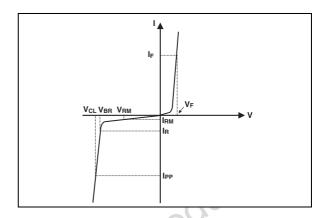


**Table 2: Absolute Maximum Ratings**  $(T_{amb} = 25^{\circ}C)$ 

| 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   |

**Table 3: Electrical Characteristics**  $(T_{amb} = 25^{\circ}C)$ 

| Symbol           | Parameter                                |  |
|------------------|--|--|
| $V_{BR}$         | 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> | 60,   | 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   |

<sup>(1)</sup> guaranteed by design

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

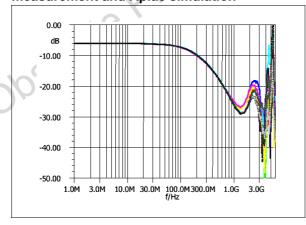
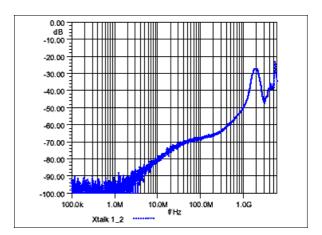


Figure 4: Analog cross talk measurements



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

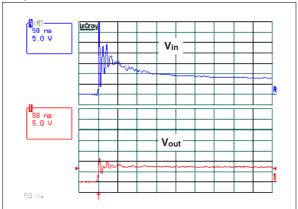


Figure 7: Line capacitance versus applied voltage

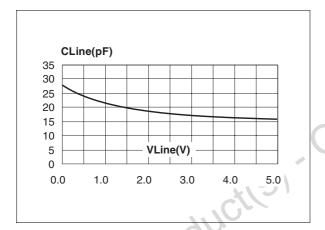


Figure 9: Fall time 10-90% measurements with 1.9V signal at 26 MHz frequency (50 $\Omega$  generator)

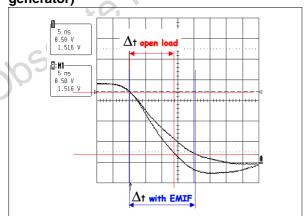


Figure 6: ESD response to IEC61000-4-2 (-15kV air discharge) on one input and on one output

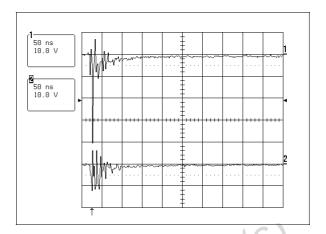


Figure 8: Rise time 10-90% measurements with 1.9V signal at 26 MHz frequency (50 $\Omega$  generator)

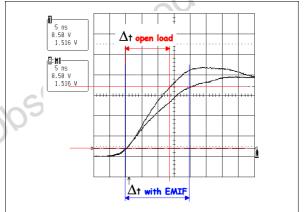


Figure 10: Aplac model

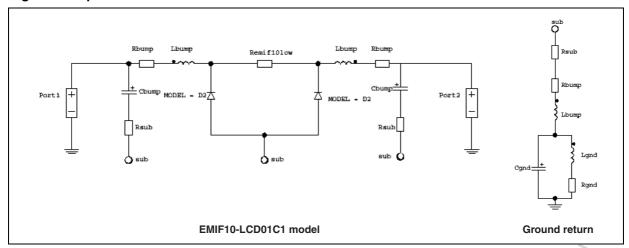


Figure 11: Aplac parameters

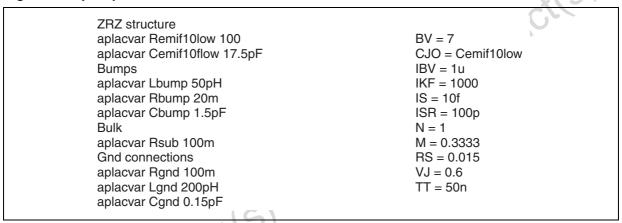
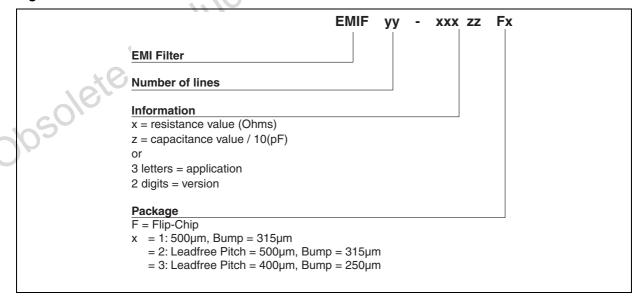


Figure 12: Order Code



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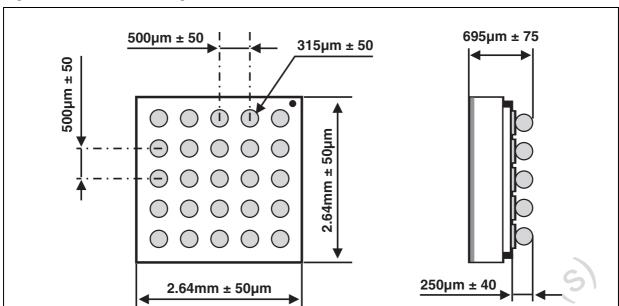


Figure 13: FLIP-CHIP Package Mechanical Data



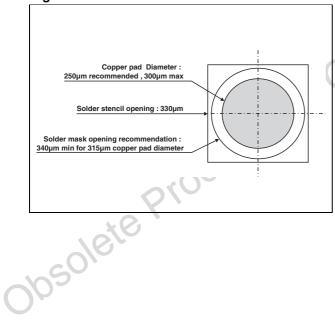
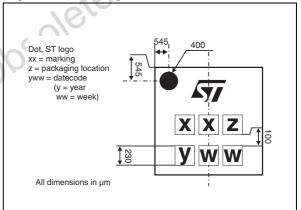


Figure 15: Marking



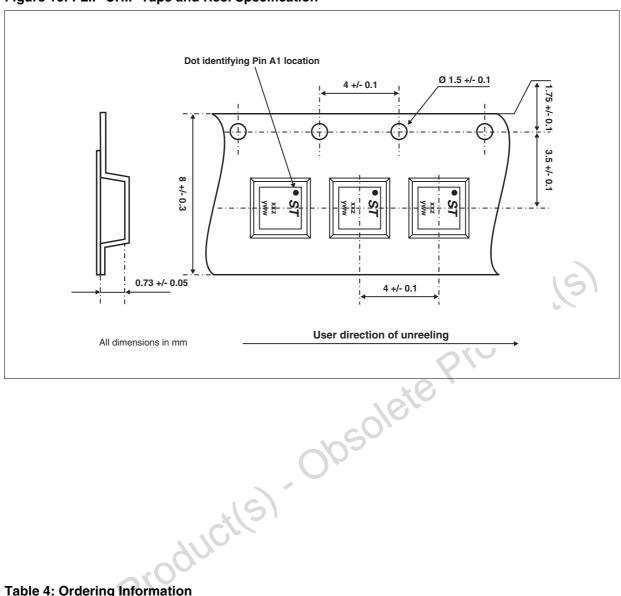


Figure 16: FLIP-CHIP Tape and Reel Specification

**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") |

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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