



# EMIF10-LCD01F1

## 10 LINES EMI FILTER AND ESD PROTECTION

IPAD™

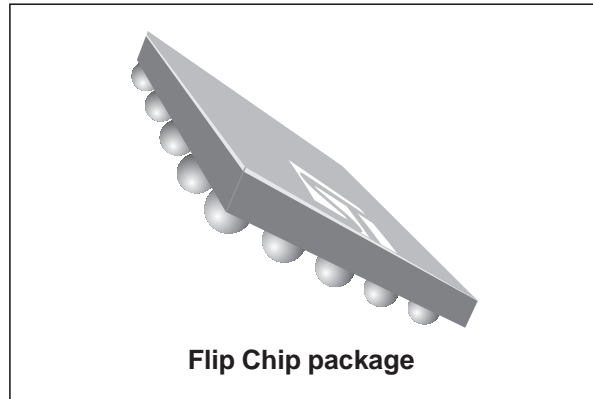
### MAIN PRODUCT CHARACTERISTICS:

Where EMI filtering in ESD sensitive equipment is required :

- LCD for Mobile phones
- Computers and printers
- Communication systems
- MCU Boards

### DESCRIPTION

The EMIF10-LCD01F1 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.

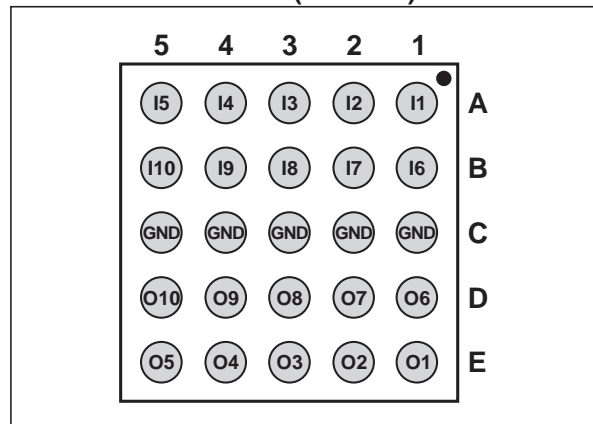


Flip Chip package

### BENEFITS

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming:  
2.64mm x 2.64mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression on input pins (IEC6100-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging.

### PIN CONFIGURATION (ball side)



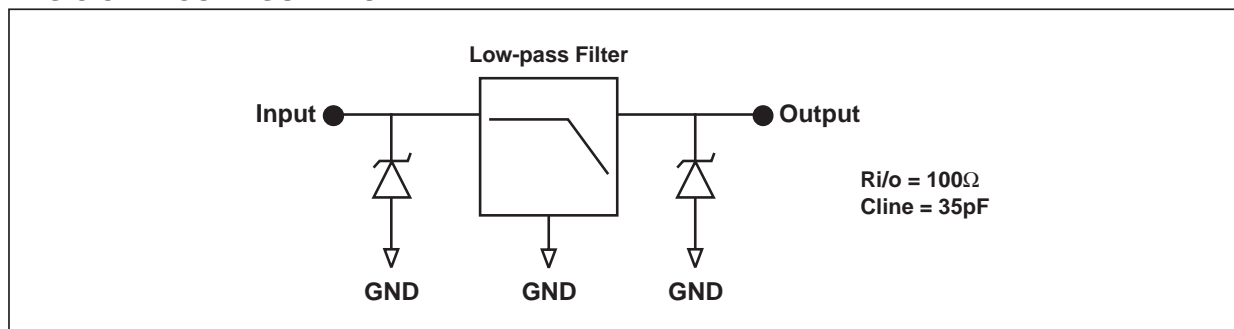
### COMPLIES WITH THE FOLLOWING STANDARDS: IEC61000-4-2

Level 4 input pins 15kV (air discharge)  
8 kV (contact discharge)

Level 1 output pins 2kV (air discharge)  
2kV (contact discharge)

### MIL STD 883E - Method 3015-6 Class 3

### BASIC CELL CONFIGURATION



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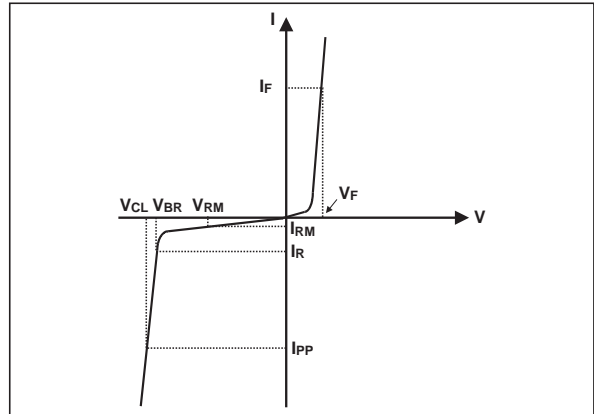
# EMIF10-LCD01F1

## ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

Symbol	Parameter and test conditions	Value	Unit
$T_j$	Maximum junction temperature	125	$^{\circ}\text{C}$
$T_{op}$	Operating temperature range	-40 to + 85	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range	-55 to +150	$^{\circ}\text{C}$

## ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

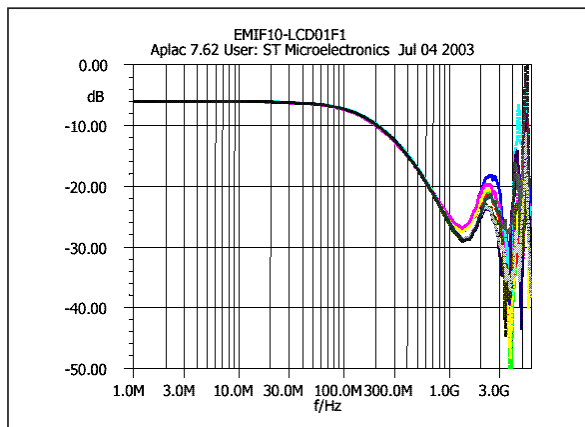
Symbol	Parameters
$V_{BR}$	Breakdown voltage
$I_{RM}$	Leakage current @ $V_{RM}$
$V_{RM}$	Stand-off voltage
$V_{CL}$	Clamping voltage
$R_d$	Dynamic impedance
$I_{PP}$	Peak pulse current
$R_{I/O}$	Series resistance between Input & Output
$C_{line}$	Input capacitance per line



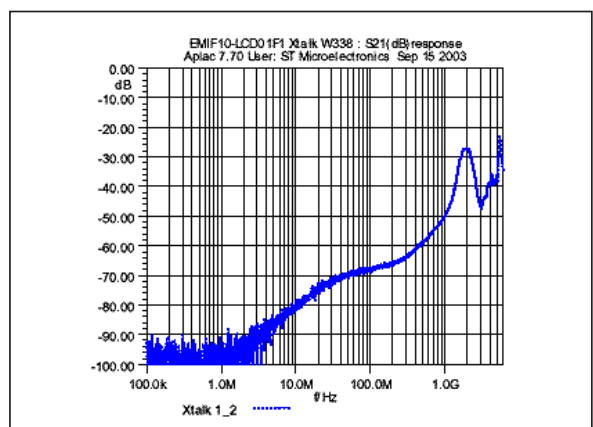
Symbol	Test conditions	Min	Typ	Max	Unit
$V_{BR}$	$I_R = 1\text{ mA}$	6	8	10	V
$I_{RM}$	$V_{RM} = 3\text{ V}$			500	nA
$R_{I/O}$		90	100	110	$\Omega$
$C_{line}$	At 0V bias			35	pF
Rt / Ft	Induced rise and fall time 10-90% at 26 MHz frequency signal $V = 1.9\text{ V}$ (Rt / Ft input 1 ns, 50 $\Omega$ impedance generator)		8 <sup>(1)</sup>		ns

(1) guaranteed by design

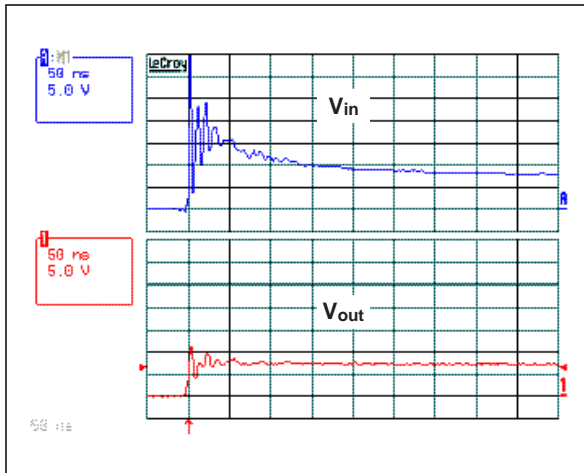
**Fig. 1:** S21(dB) all lines attenuation measurement and Aplac simulation.



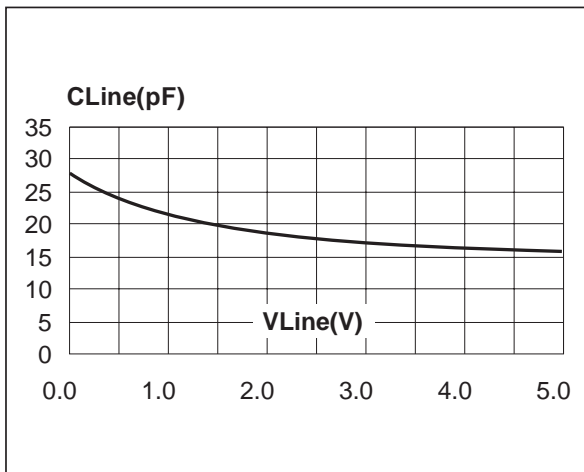
**Fig. 2:** Analog crosstalk measurements.



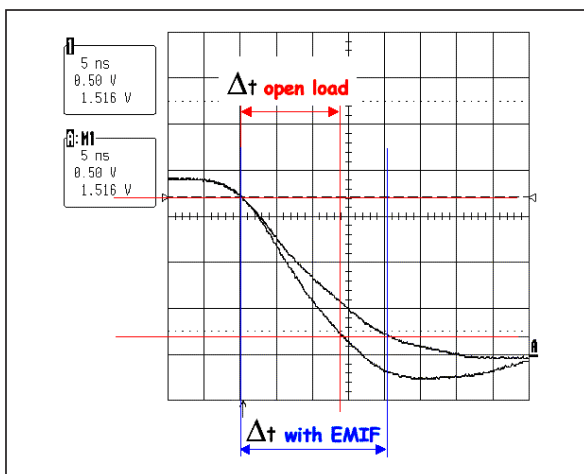
**Fig. 3:** ESD response to IEC61000-4-2 (+15kV air discharge) on one input and one output.



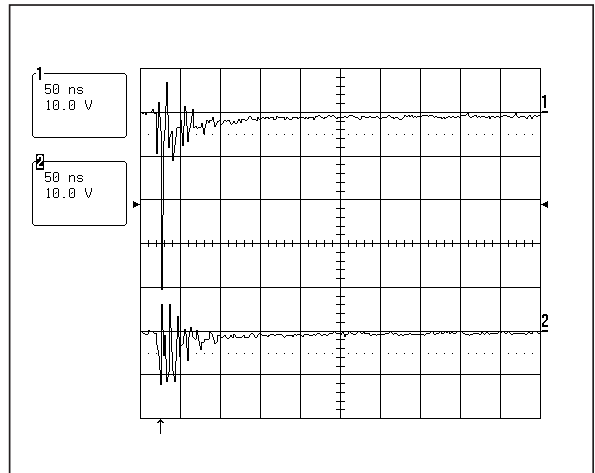
**Fig. 5:** Line capacitance versus applied voltage.



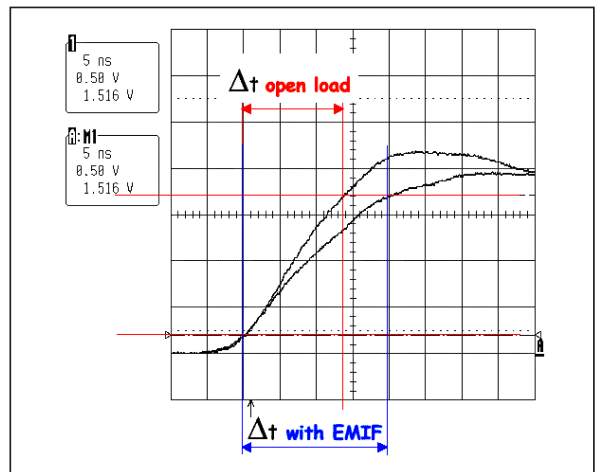
**Fig. 7:** Fall time 10-90% measurements with 1.9V signal at 26 MHz frequency (50Ω generator).



**Fig. 4:** ESD response to IEC61000-4-2 (-15kV air discharge) on one input and one output.

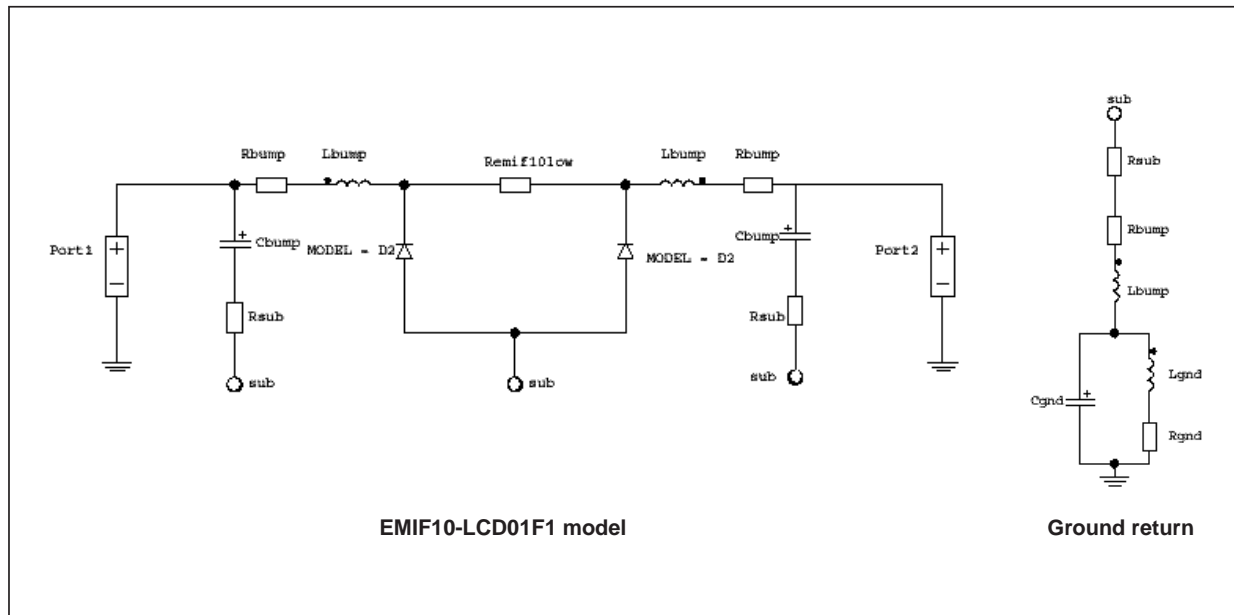


**Fig. 6:** Rise time 10-90% measurements with 1.9V signal at 26 MHz frequency (50Ω generator).



# EMIF10-LCD01F1

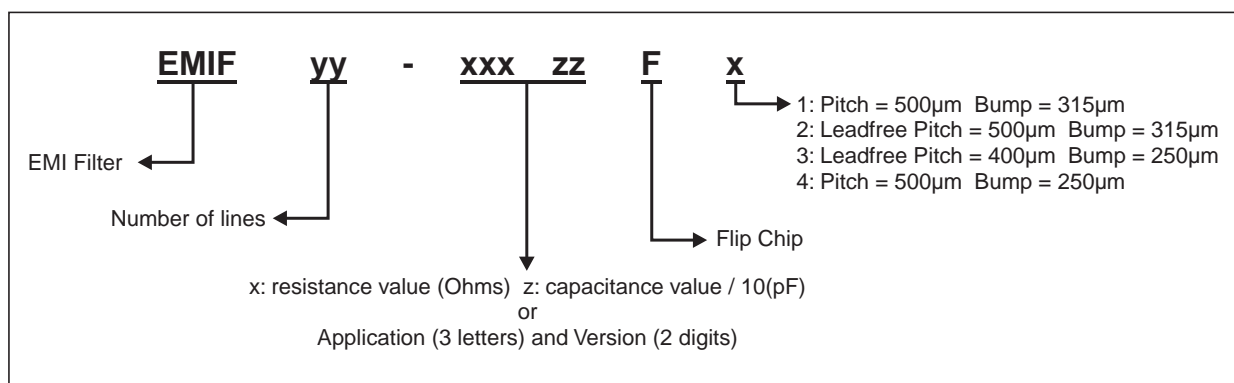
## Aplac model.



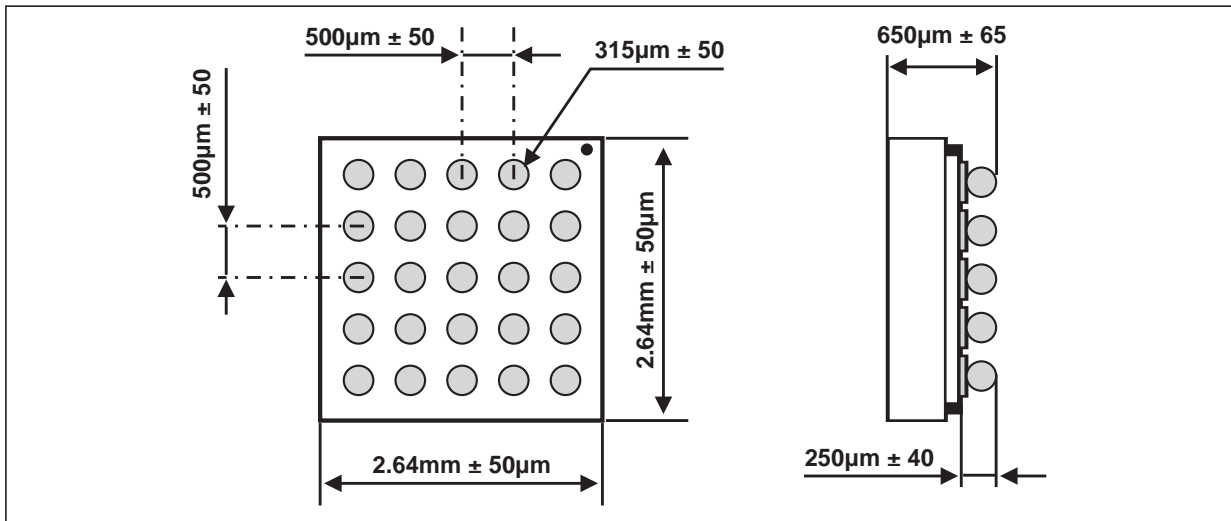
## Aplac parameters.

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

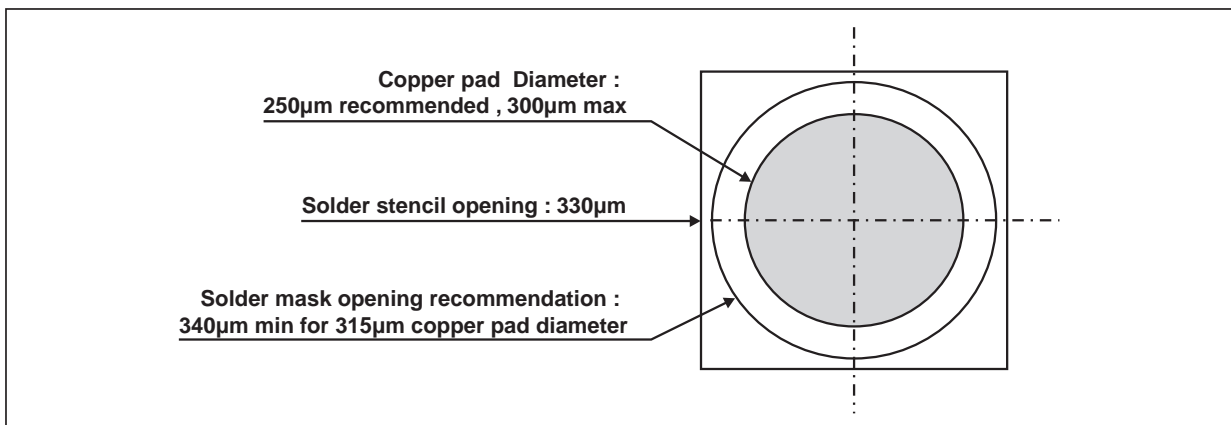
## ORDER CODE



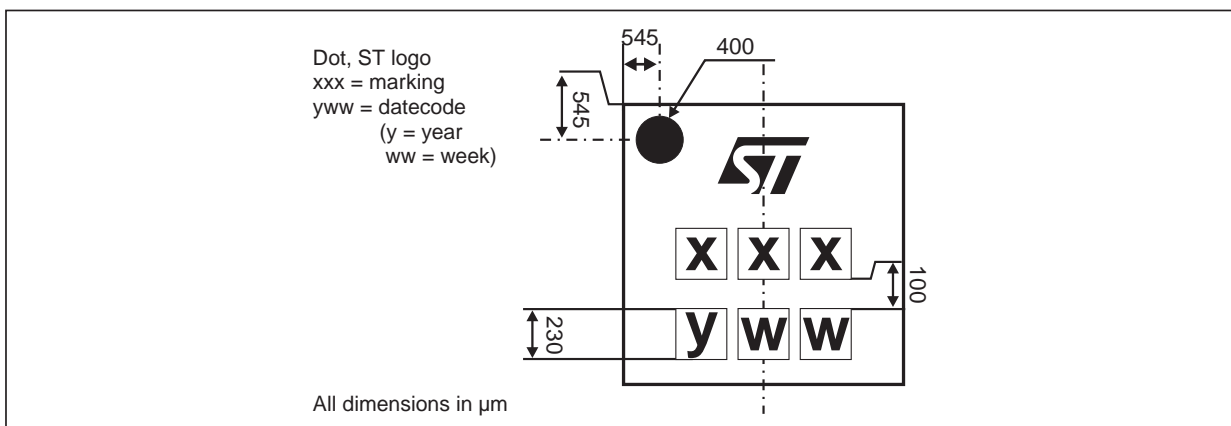
## PACKAGE MECHANICAL DATA FLIP CHIP



## FOOT PRINT RECOMMENDATIONS

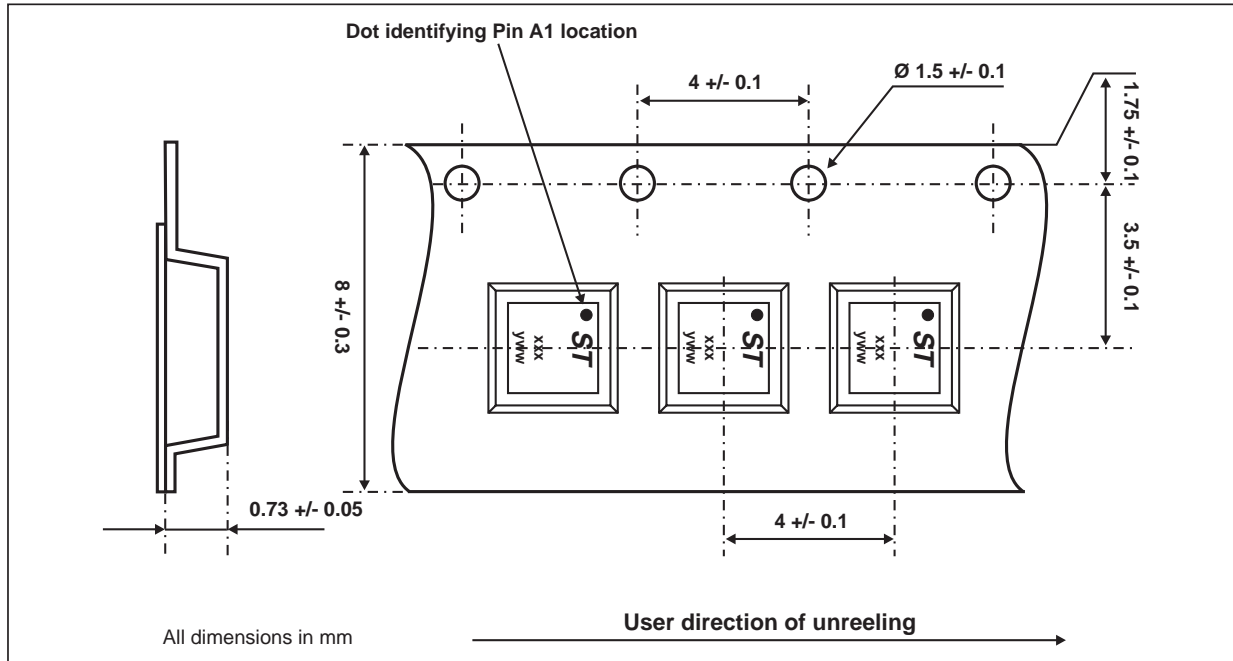


## MARKING



# EMIF10-LCD01F1

## PACKING



## OTHER INFORMATION

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF10-LCD01F1	FLT	Flip Chip	9.3 mg	5000	Tape & reel (7")

**Note:** More information are available in the application notes:

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

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