



IPAD™

# EMIF04-MMC02F1

## 4 LINES EMI FILTER INCLUDING ESD PROTECTION

### MAIN APPLICATION

- MULTIMEDIACARD™

### DESCRIPTION

The EMIF04-MMC02F1 is a highly integrated array designed to suppress EMI / RFI noise for MULTIMEDIACARD™ port filtering.

The EMIF04-MMC02F1 flip-chip packaging means the package size is equal to the die size. That's why EMIF04-MMC02F1 is a very small device.

Additionally, this filter includes an ESD protection circuitry which prevents the protected device from destruction when subjected to ESD surges up to 15 kV.

### BENEFITS

- 4 lines low-pass-filter
- High efficiency in EMI filtering
- Very low PCB space consuming: < 3.3 mm<sup>2</sup>
- Very thin package: 0.65 mm
- High efficiency in ESD suppression (IEC61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging.

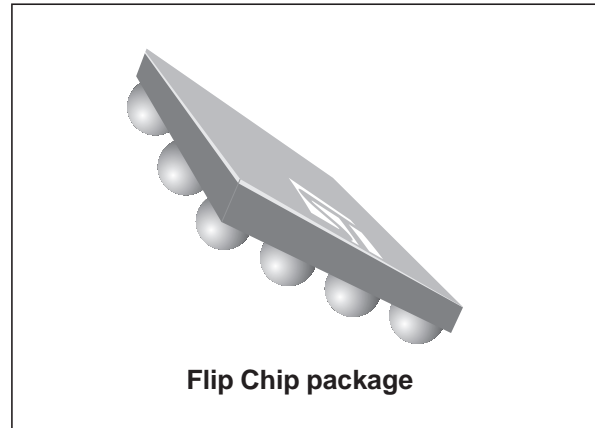
### COMPLIES WITH THE FOLLOWING STANDARDS :

IEC 61000-4-2 Level 4:

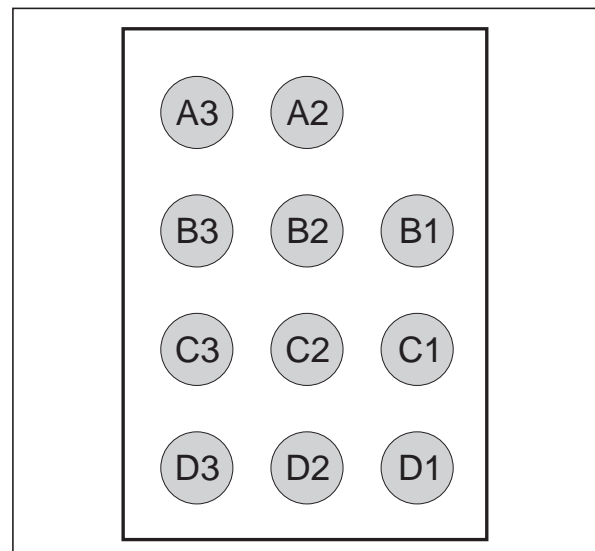
15kV (air discharge)  
8 kV (contact discharge)

on input & output pins.

MIL STD 883E - Method 3015-6 Class 3



### PIN CONFIGURATION

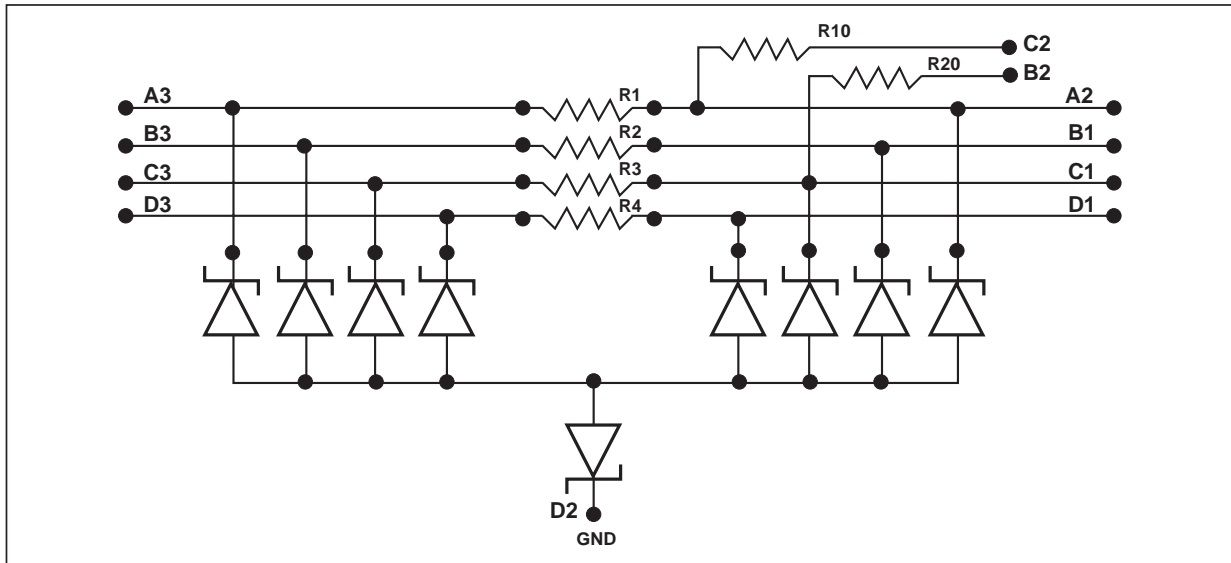


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SCHEMATIC

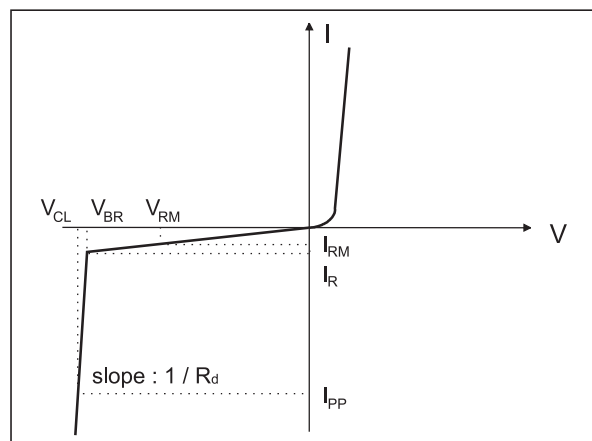


ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )

Symbol	Parameter and test conditions	Value	Unit
$V_{PP}$	ESD discharge IEC61000-4-2, air discharge ESD discharge IEC61000-4-2, contact discharge	15 8	kV
$T_j$	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	Parameter
$V_{BR}$	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



Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1 \text{ mA}$	6			V
$I_{RM}$	$V_{RM} = 3V$		0.1	0.5	$\mu\text{A}$
$C_{line}$	@ 0V			20	pF
$R_1, R_2, R_3, R_4$	Tolerance $\pm 5\%$		47		$\Omega$
$R_{10}$	Tolerance $\pm 5\%$		13		$\text{k}\Omega$
$R_{20}$	Tolerance $\pm 5\%$		56		$\text{k}\Omega$
P				70	mW

Fig. 1: Filtering measurements

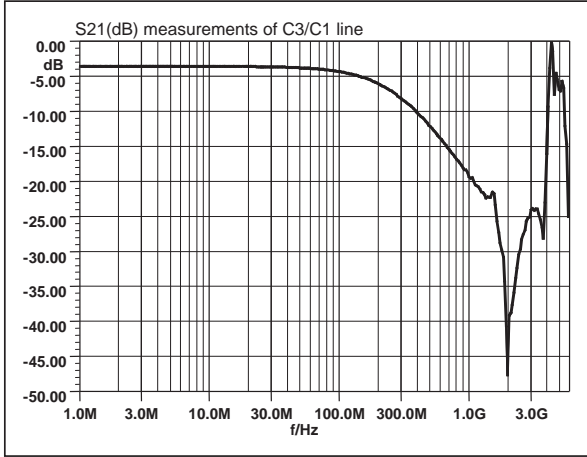
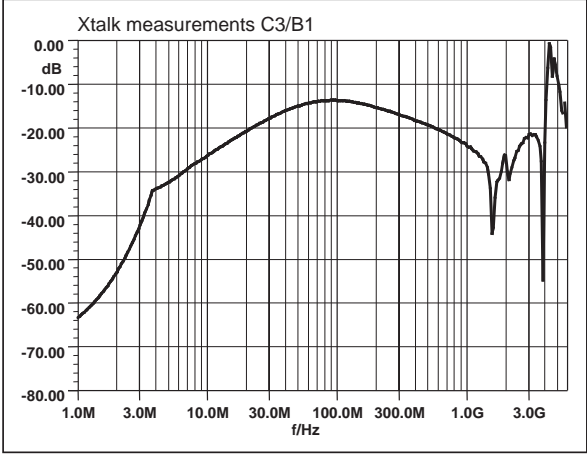


Fig. 2: Cross talk measurements



Note: spikes at high frequencies are induced by the PCB layout.

Fig. 3: Line capacitance versus reverse applied voltage.

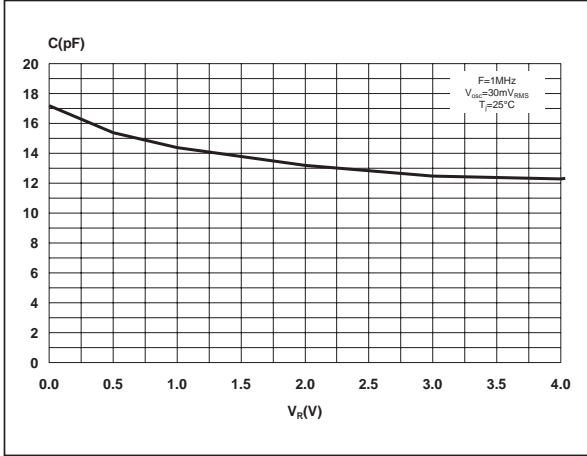
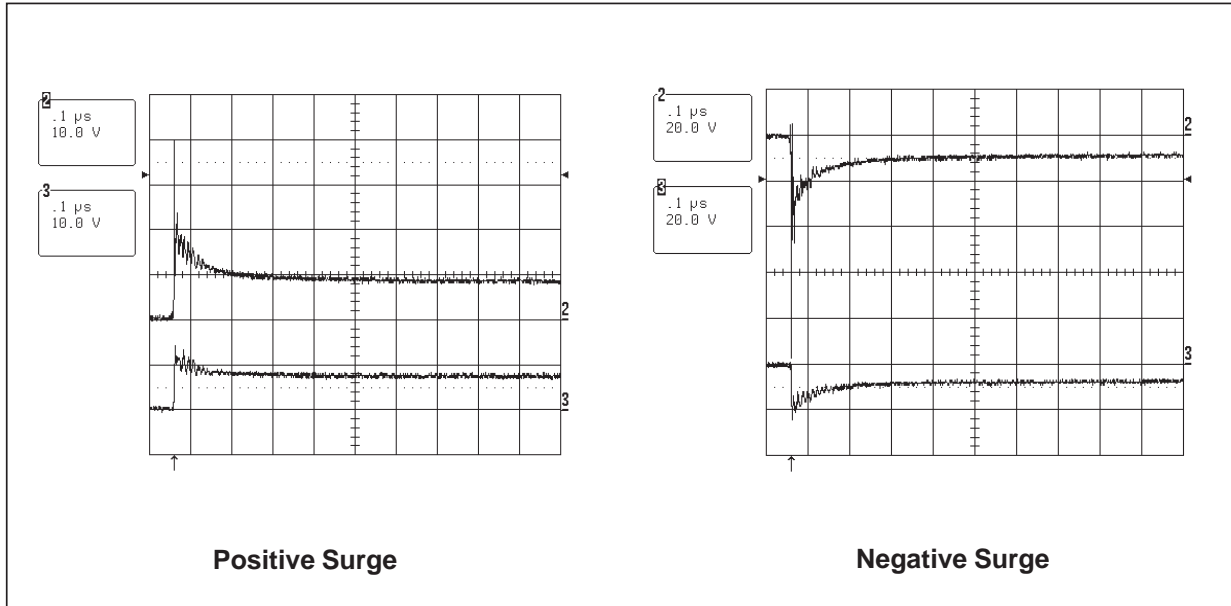


Fig. 4: ESD response to IEC61000-4-2 (+15kV contact discharge).



APLAC MODEL

Fig. 5: Device structure

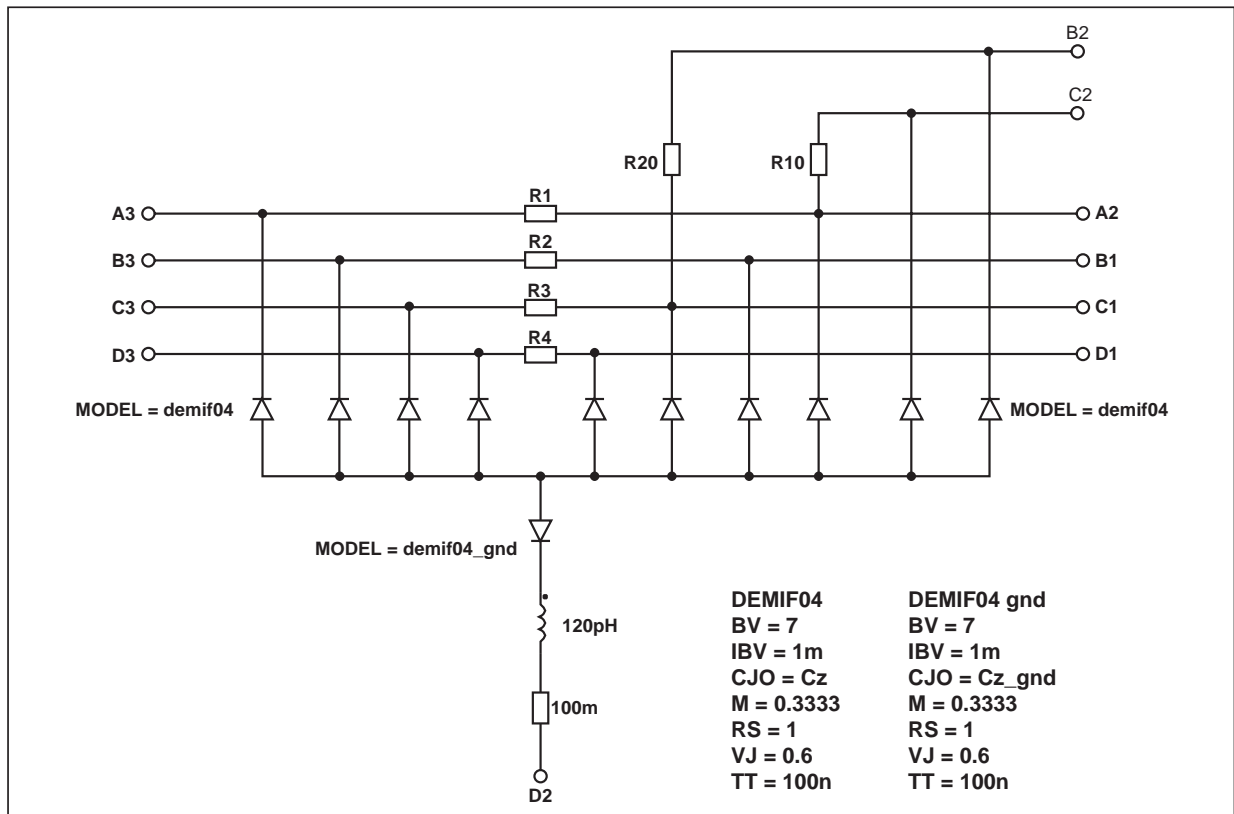
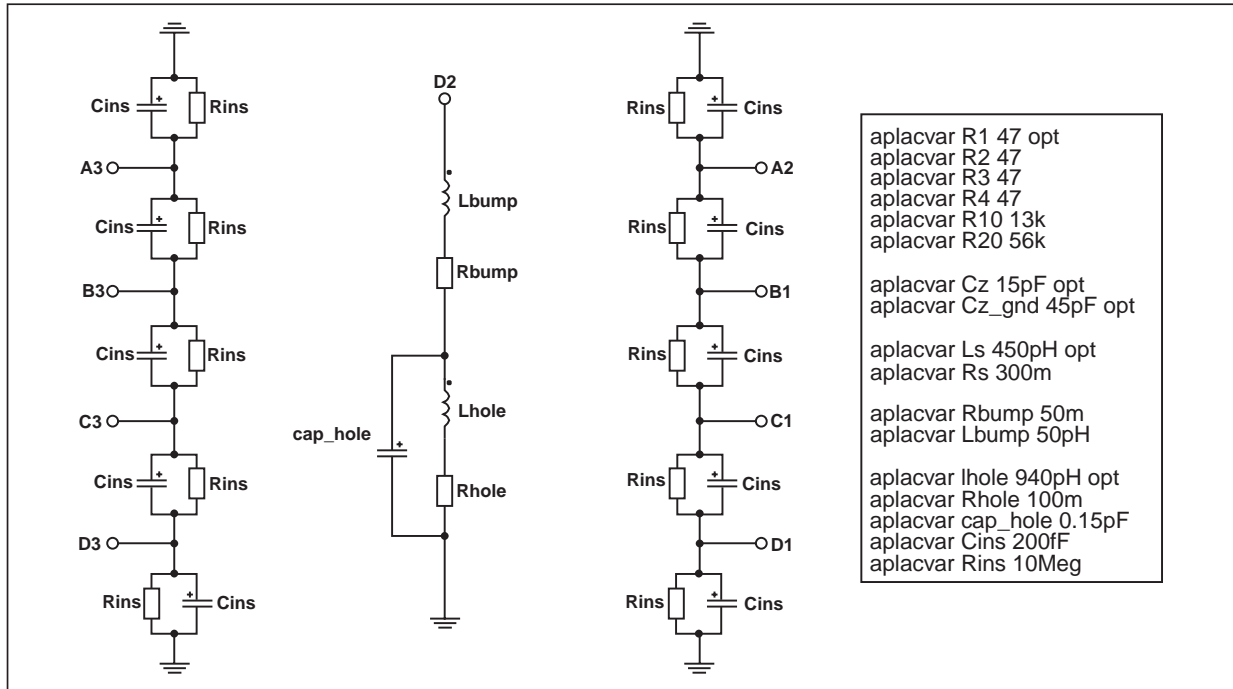
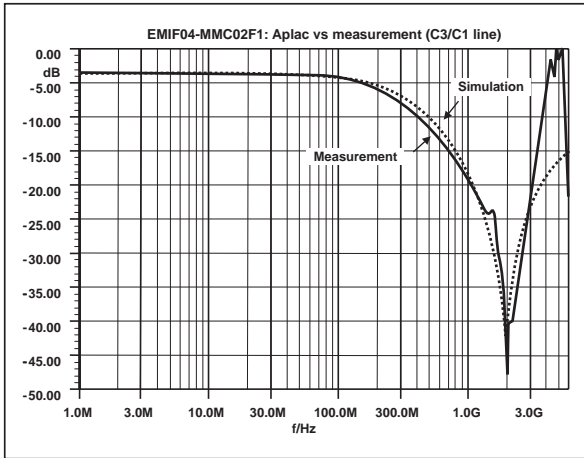


Fig. 6: Aplac model connections

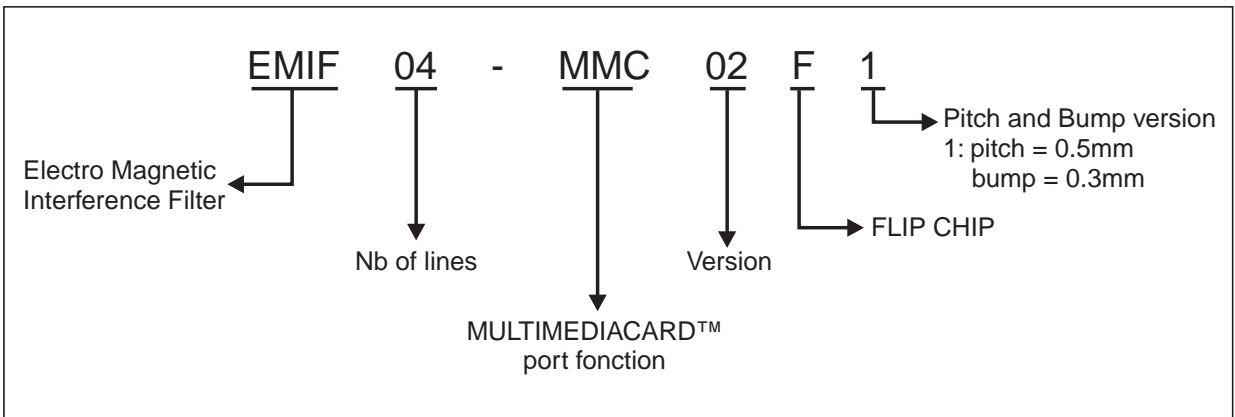


# EMIF04-MMC02F1

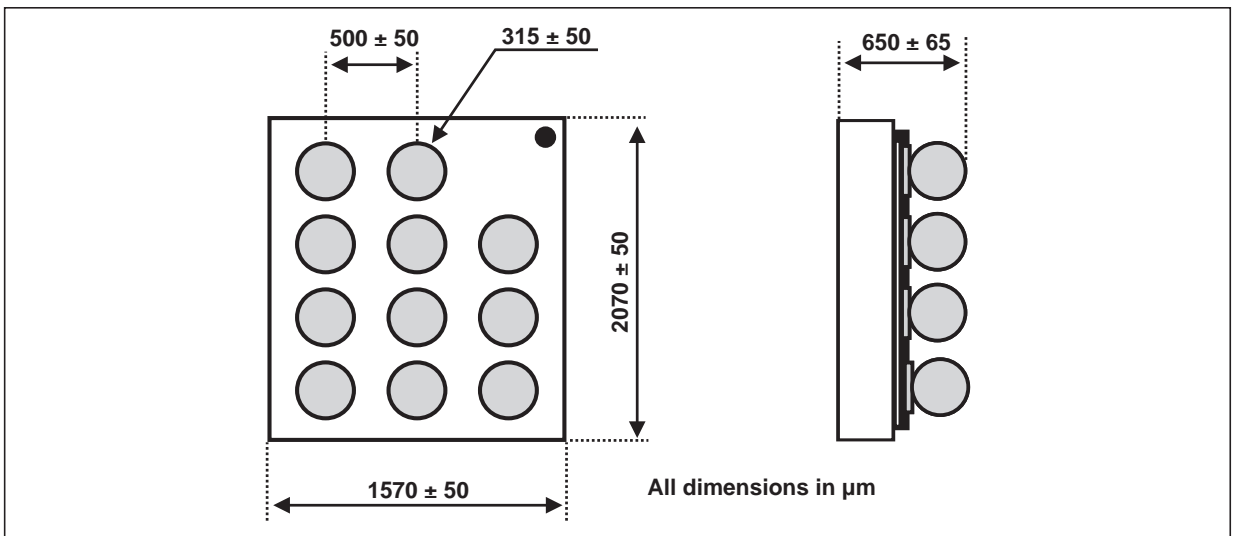
**Fig. 7:** Aplac simulation versus frequency measurement.



## ORDER CODE

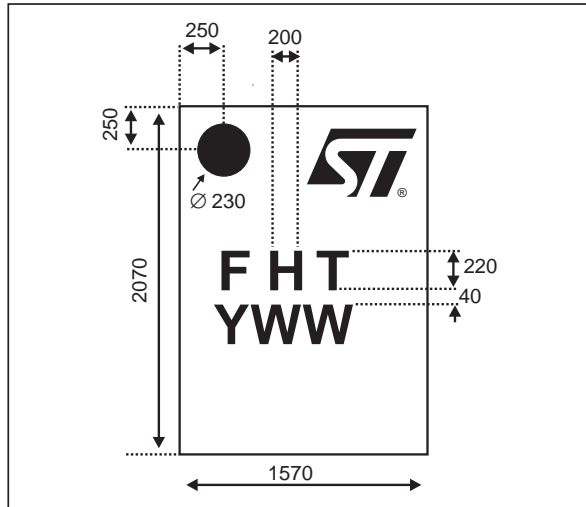


## PACKAGE MECHANICAL DATA



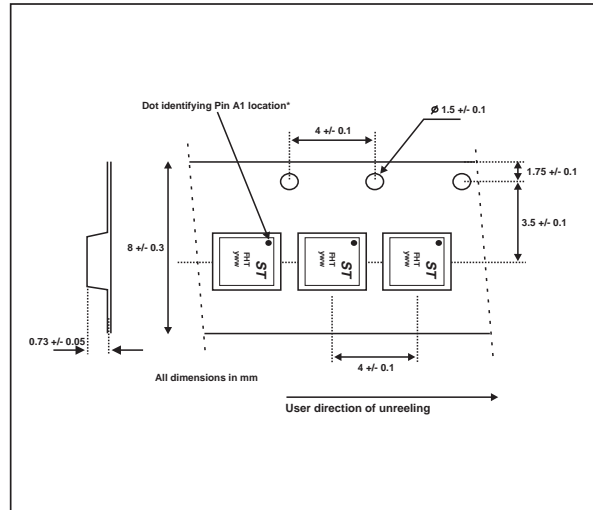
# EMIF04-MMC02F1

## MARKING



- yww: Date code

## PACKING



## OTHER INFORMATION

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF04-MMC02F1	FHT	Flip-Chip	4.5 mg	5000	Tape & reel (7")

**Note:** More packing informations are available in the application note AN1235: "Flip-Chip: Package description and recommendations for use"

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