EMIF04-MMC02F3

4 LINES EMI FILTER AND ESD PROTECTION FOR MULTIMEDIA CARD

Main product characteristics:

Where EMI filtering in ESD sensitive equipment is required :

■ MultiMedia Card for mobile phones, Personal Digital Assistant, Digital Camera, MP3 players...

Description

The EMIF04-MMC02F3 is a highly integrated device designed to suppress EMI/RFI noise for MultiMedia Card ports. The EMIF04 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 subjected to ESD surges up to 15kV.

Benefits

■ EMI symmetrical (I/O) low-pass filter

■ High efficiency in EMI filtering

■ Lead free package

■ 400µm pitch

■ Compatible with high speed data rate

■ Very low PCB space consuming: < 2 mm^2

■ Very thin package: 0.60 mm

■ High efficiency in ESD suppression

■ High reliability offered by monolithic integration

■ High reducing of parasitic elements through integration and wafer level packaging
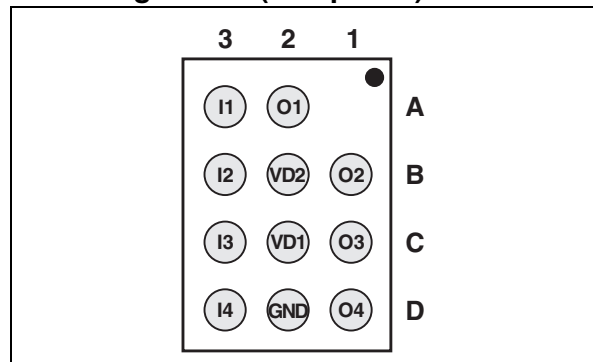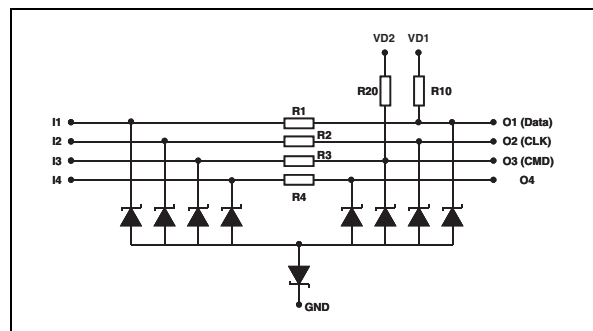
Complies with the following standards:

IEC61000-4-2:

Level 4   15kV   (air discharge)

            8kV   (contact discharge)

**Flip-Chip
(11 bumps)**
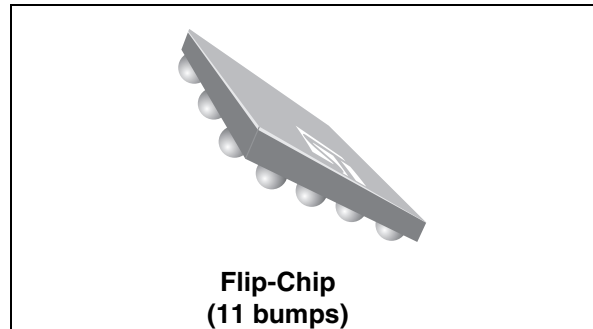
Pin configuration (bump side)

Schematic

Order codes

Part number	Marking
EMIF04-MMC02F3	GP

Table 1.   Absolute maximum rating (limiting values)

Symbol	Parameter	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	°C
T_{op}	Operating temperature range	-40 to + 85	°C
T_{stg}	Storage temperature range	-55 to +150	°C

1   ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C)

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

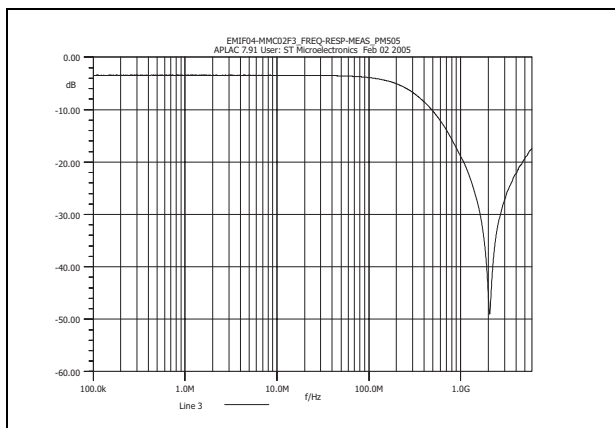| Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	6			V
I_{RM}	V_{RM} = +3V		100	250	nA
Cline	V_{LINE} = 0 V, V_{OSC} = 30 mV, F = 1MHz			20	pF
R_1, R_2, R_3, R_4	Tolerance ± 10%		47		Ω
R_{10}	Tolerance ± 10%		13		kΩ
R_{20}	Tolerance ± 10%		56		kΩ

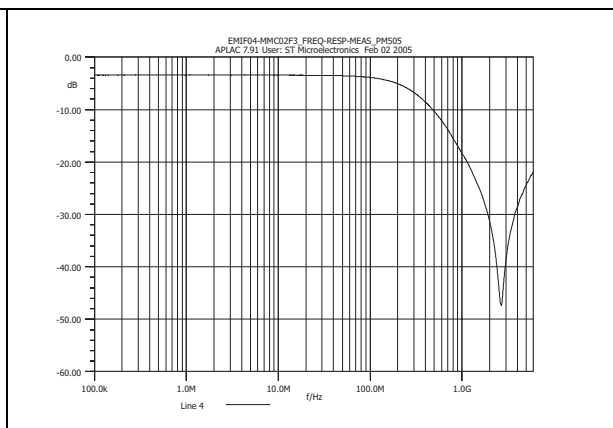**Figure 1. S21 attentuation measurements A2 - A3 line**
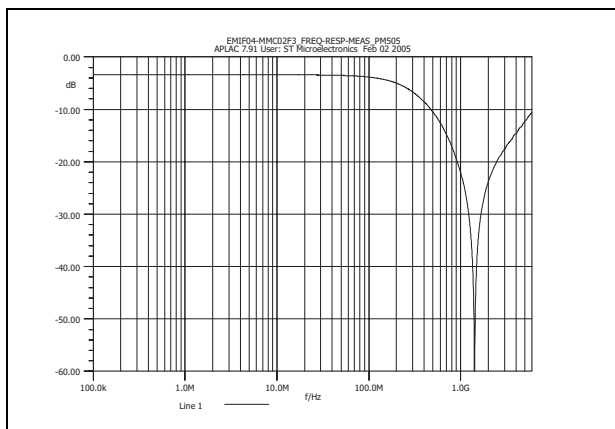
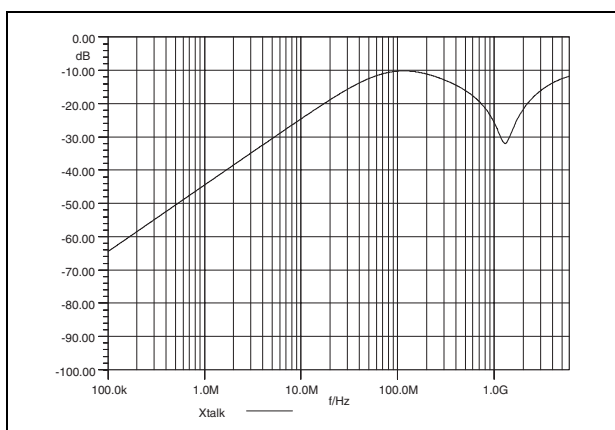**Figure 2. S21 attentuation measurements B1 -B3 line**
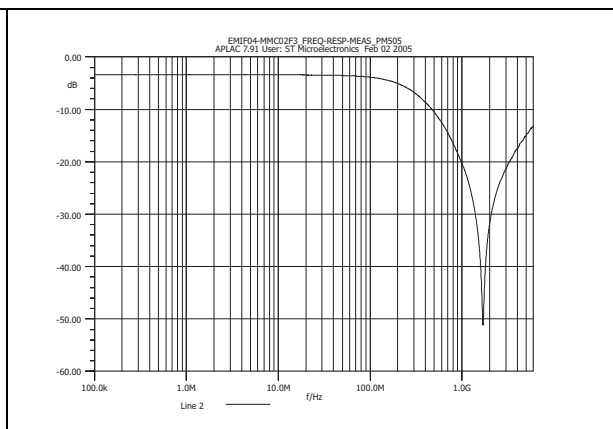
Figure 3. S21 attentuation measurements C1 - C3 line
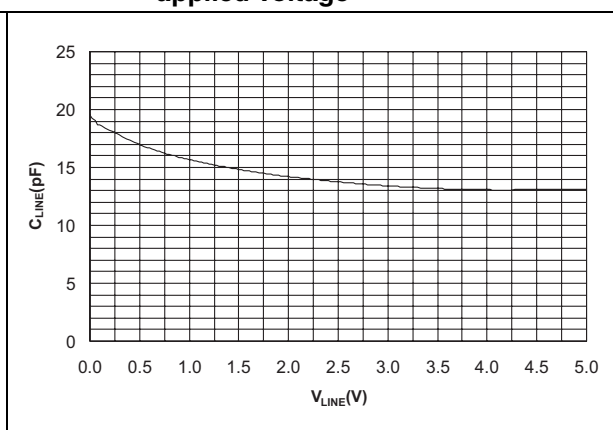

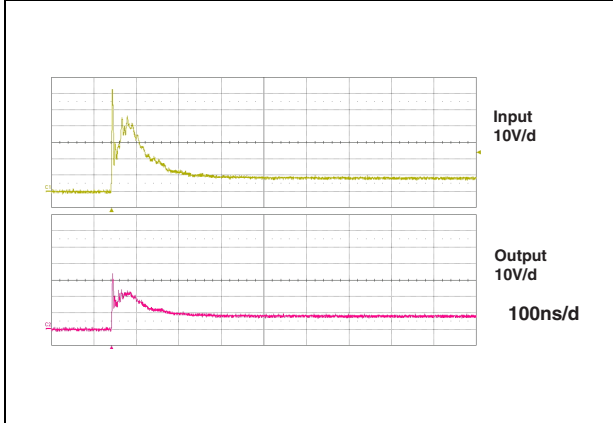**Figure 4. S21 attentuation measurements D1 - D3 line**
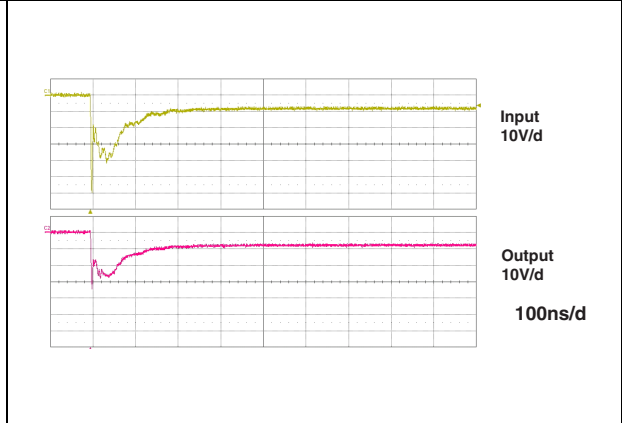

Figure 5. Crosstalk behaviour (A2 - B3 line)

Figure 6. Line capacitance versus reverse applied voltage

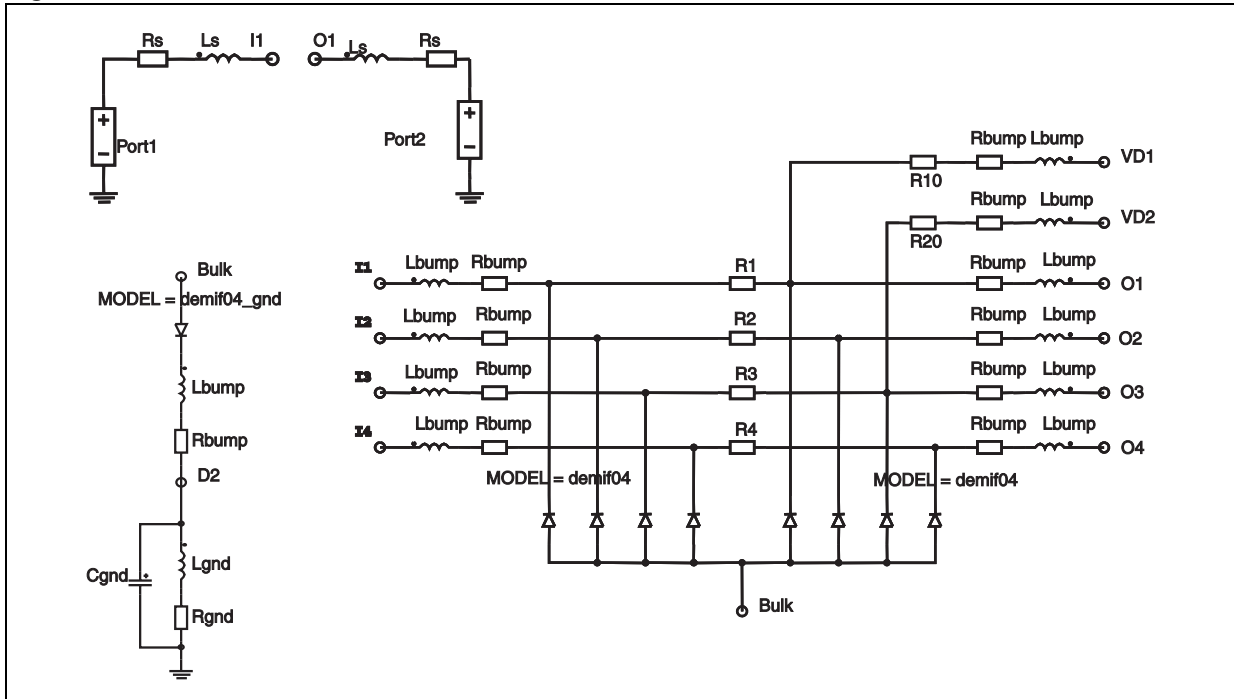**Figure 7.** **ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and on one output (Vout).**

Figure 8. **ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and on one output (Vout)**
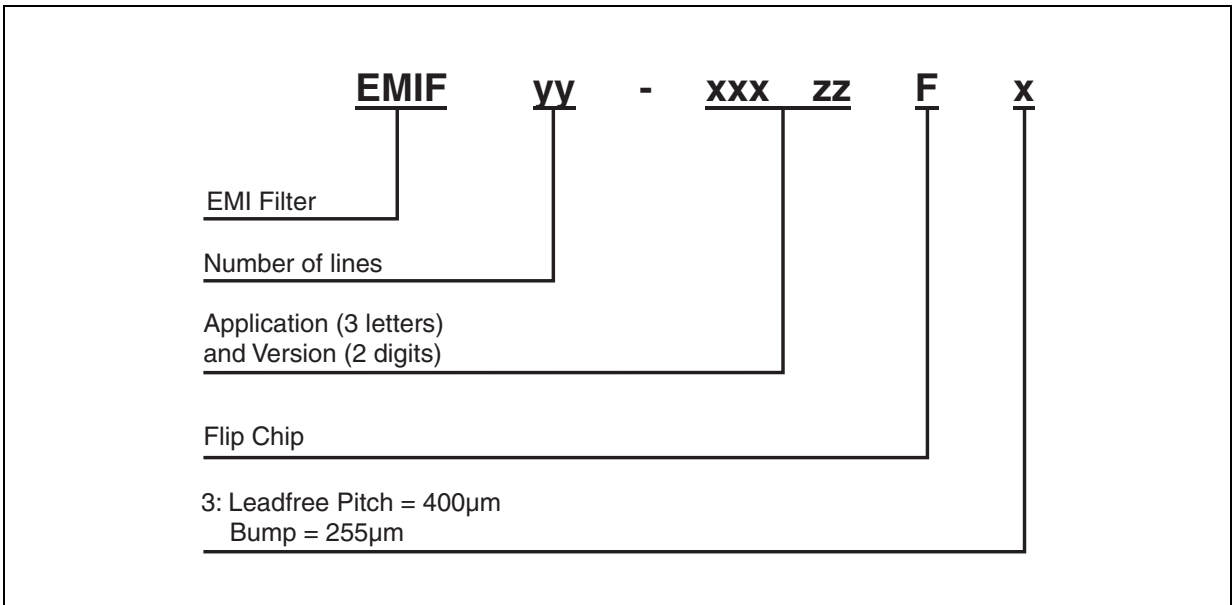

2 Aplac model

Figure 9. **Device structure**

Figure 10. Aplac model variables

```
aplacvar R1 47
aplacvar R2 47
aplacvar R3 47
aplacvar R4 47
aplacvar R10 13k
aplacvar R20 56k                    Diode Demif04              Diode Demif04_gnd
aplacvar Rsub 120m                  BV=7                       BV=7
aplacvar Cz 16.65pF                 IBV=1m                     IBV=1m
aplacvar Cz_gnd 49.95pF             CJO=Cz                     CJO=Cz_gnd
aplacvar RS_gnd 480m                M=0.31                     M=0.31
aplacvar Ls 950pH                   RS=1                       RS=RS_gnd
aplacvar Rs 150m                    VJ=0.6                     VJ=0.6
aplacvar Rbump 20m                  TT=100n                    TT=100n
aplacvar Lbump 50pH
aplacvar Lgnd 250pH
aplacvar Rgnd 200m
aplacvar Cgnd 0.6pF
```

3 Order code

```
EMIF    yy   -   xxx   zz   F   x
```

EMI Filter

Number of lines

Application (3 letters)
and Version (2 digits)

Flip Chip

3: Leadfree Pitch = 400µm
    Bump = 255µm
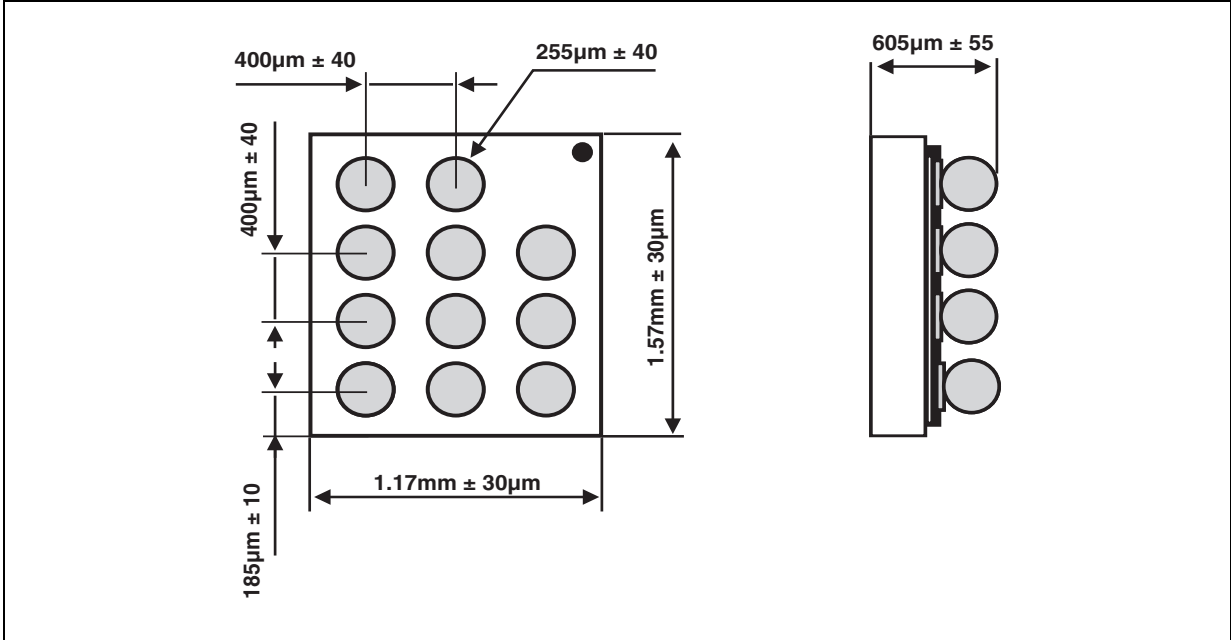
4   Package information

Figure 11.   Mechanical data

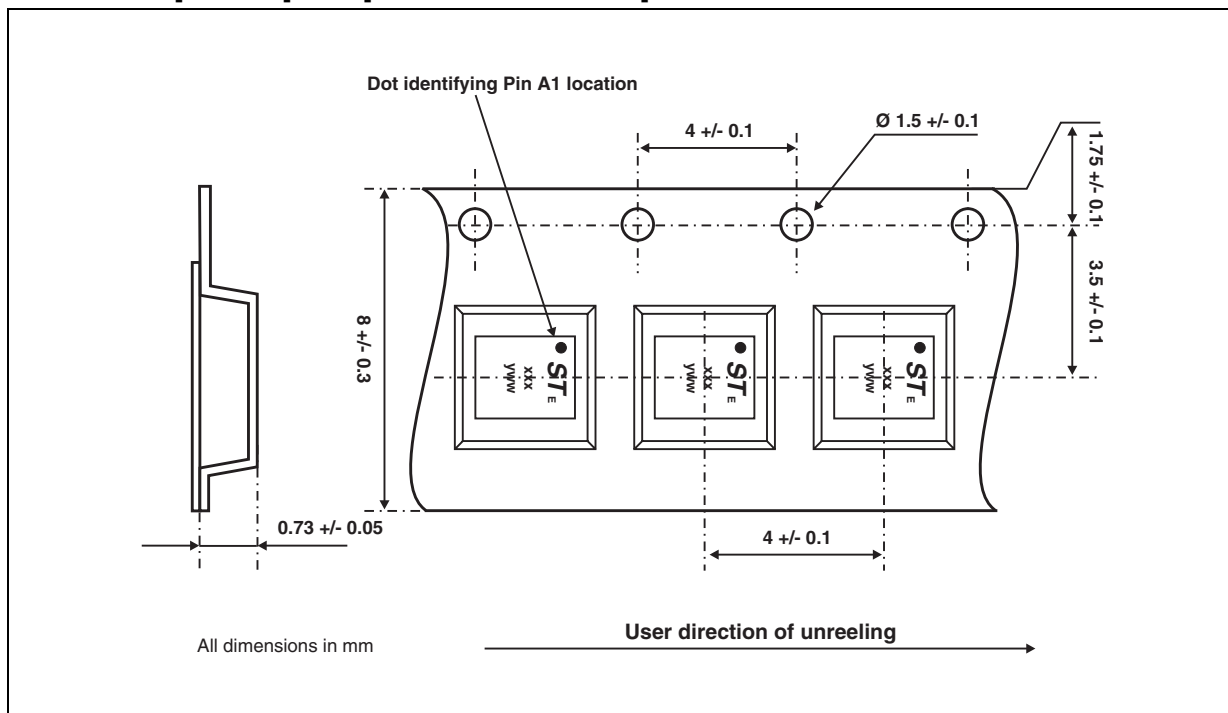**Figure 12.   Foot print recommendations**
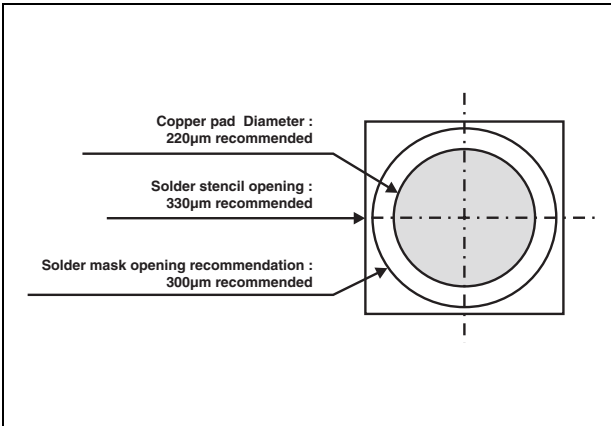
Figure 13.   Marking
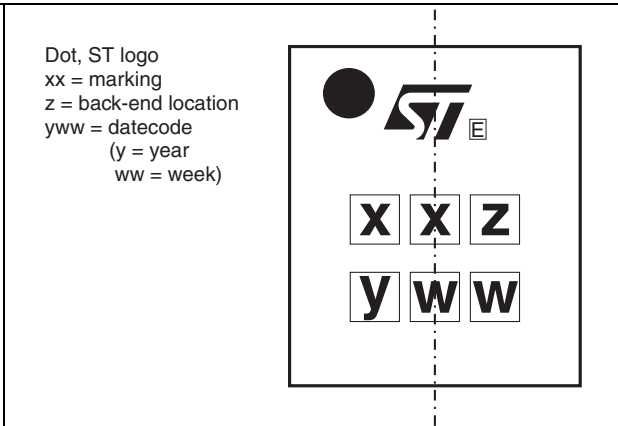
5 Flip-chip tape and reel specification

All dimensions in mm

6 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
EMIF04-MMC02F3	GP	Flip-Chip	2.4 mg	5000	Tape and reel 7"

Note: *More information is available in the applicatioin notes:*

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

- AN1751: "EMI Filters: Recommendations and measurements"

7 Revision history

Date	Revision	Description of Changes
16-Jun-2005	1	First issue

www.bdtic.com/ST

www.bdtic.com/ST