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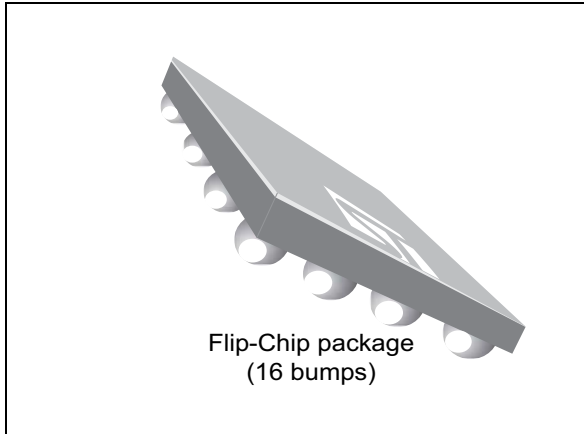
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## 6-line IPAD™, EMI filter including ESD protection

Datasheet - production data



### Description

The EMIF06-HMC02F2 is a highly integrated array designed to suppress EMI / RFI noise for High Speed MultiMediaCard™ port filtering. The EMIF06-HMC02F2 Flip-Chip packaging means the package size is equal to the die size.

Additionally, this filter includes an ESD protection circuitry which prevents the protected device from destruction when subjected to ESD surges up to 15 kV. Compared to EMIF06-HMC01F2, the EMIF06-HMC02F2 has its ground balls connected together internally.

### Features

- 6 lines low-pass-filter
- High efficiency in EMI filtering
- Very low PCB space consuming: < 4 mm<sup>2</sup>
- Lead-free package
- Very thin package: 0.65 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

- IEC 61000-4-2 level 4 on external pins
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883E - Method 3015-6 Class 3

### Applications

- High Speed MultiMediaCard™

Figure 1. Pin configuration (ball side)

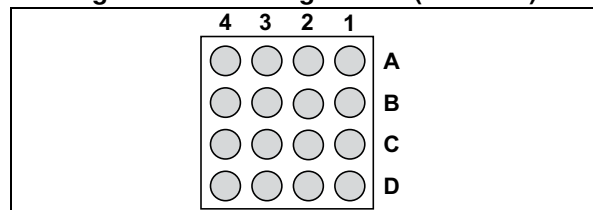


Figure 2. Basic cell configuration

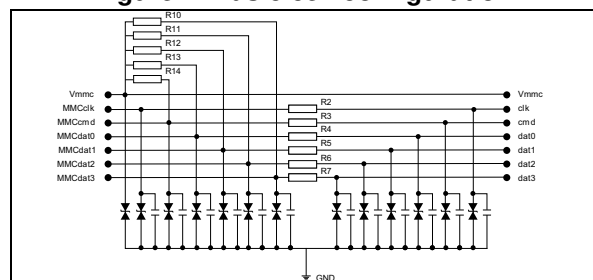


Table 1. Ball configuration

<b>A1</b>	cmd	<b>C1</b>	dat2
<b>A2</b>	clk	<b>C2</b>	gnd
<b>A3</b>	Vmmc/Vdd	<b>C3</b>	MMCdat1
<b>A4</b>	MMCclk	<b>C4</b>	MMCdat0
<b>B1</b>	dat1	<b>D1</b>	dat3
<b>B2</b>	dat0	<b>D2</b>	gnd
<b>B3</b>	gnd	<b>D3</b>	MMCdat3
<b>B4</b>	MMCcmd	<b>D4</b>	MMCdat2

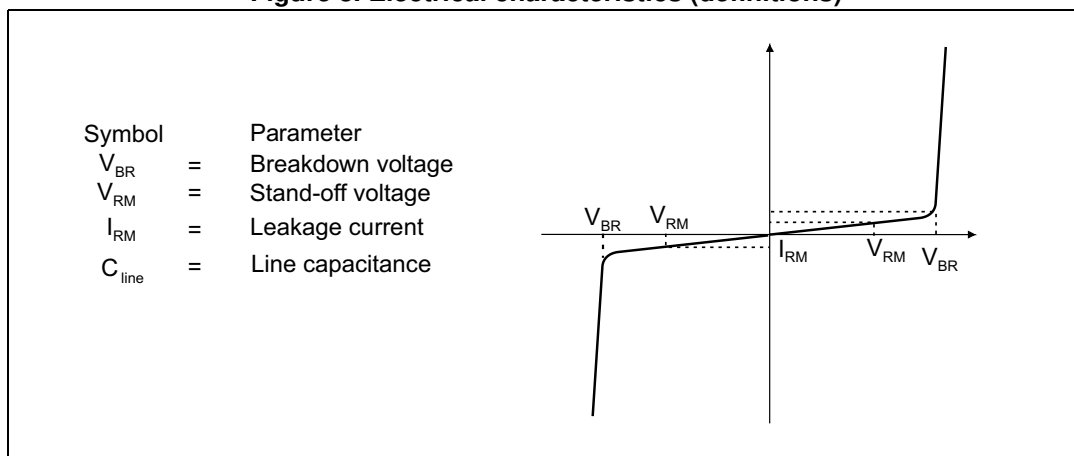
TM: IPAD is a trademark of STMicroelectronics.

# 1 Electrical characteristics

**Table 2. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter and test conditions	Value	Unit
$V_{PP}$	<b>Internal pins (A4, B4, C3, C4, D3, D4):</b>		
	ESD discharge IEC61000-4-2, air discharge	2	kV
	ESD discharge IEC61000-4-2, contact discharge	2	
	<b>External pins (A1, A2, A3, B1, B2, C1, D1):</b>		
ESD discharge IEC61000-4-2, air discharge	15		
	ESD discharge IEC61000-4-2, contact discharge	8	
$T_j$	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	$^{\circ}\text{C}$

**Figure 3. Electrical characteristics (definitions)**



**Table 3. Electrical characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Test conditions	Tolerance	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1\text{ mA}$		6			V
$I_{RM}$	$V_{RM} = 3\text{ V}$				0.1	$\mu\text{A}$
$C_{line}$	$V_{BIAS} = 0\text{ V}$ , $V_{OSC} = 30\text{ mV}$ , $f = 1\text{ MHz}$				20	pF
$R_2, R_3, R_4,$ $R_5, R_6, R_7$	$I = 50\text{ mA}$	$\pm 20\%$		50		$\Omega$
$R_{10}, R_{11},$ $R_{12}, R_{13}$	$I = 50\text{ }\mu\text{A}$	$\pm 30\%$		75		k $\Omega$
$R_{14}$	$I = 200\text{ }\mu\text{A}$	$\pm 30\%$		7		k $\Omega$

Figure 4. Attenuation versus frequency

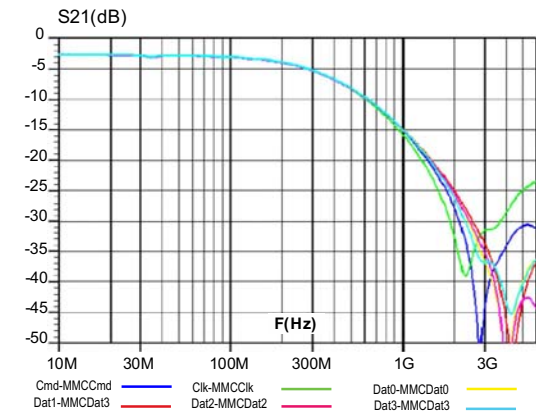


Figure 5. Analog crosstalk versus frequency

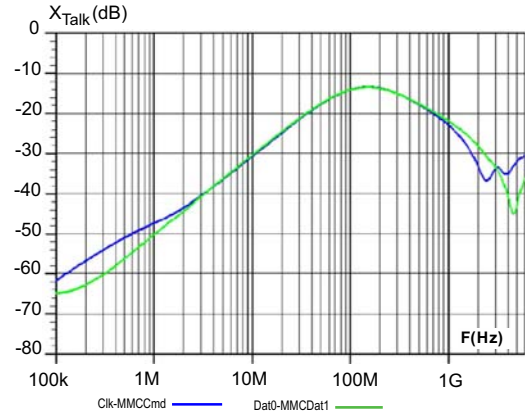


Figure 6. ESD response to IEC61000-4-2 (+8 kV contact discharge)

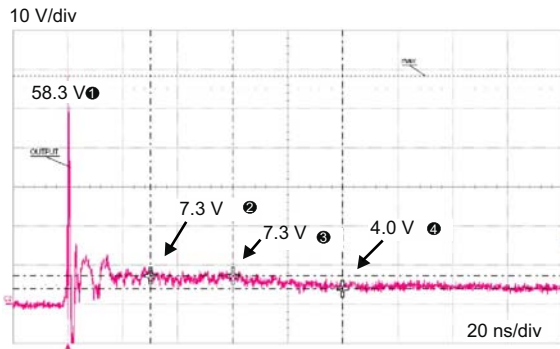


Figure 7. ESD response to IEC61000-4-2 (-8 kV contact discharge)

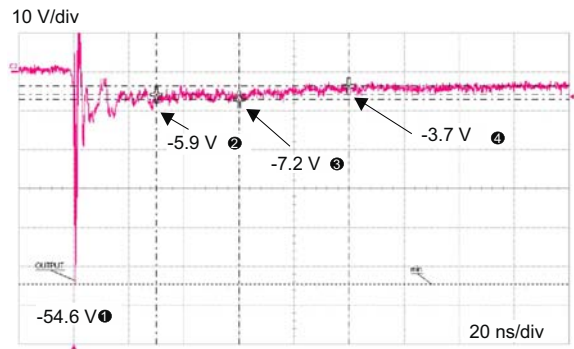
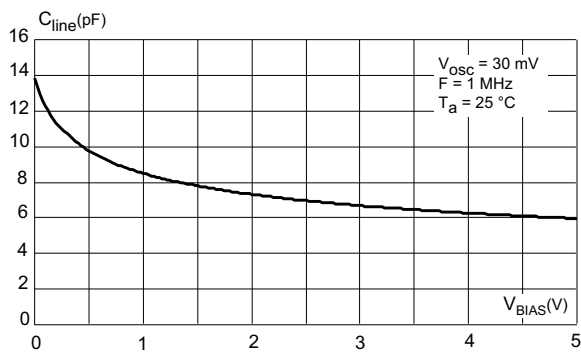


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

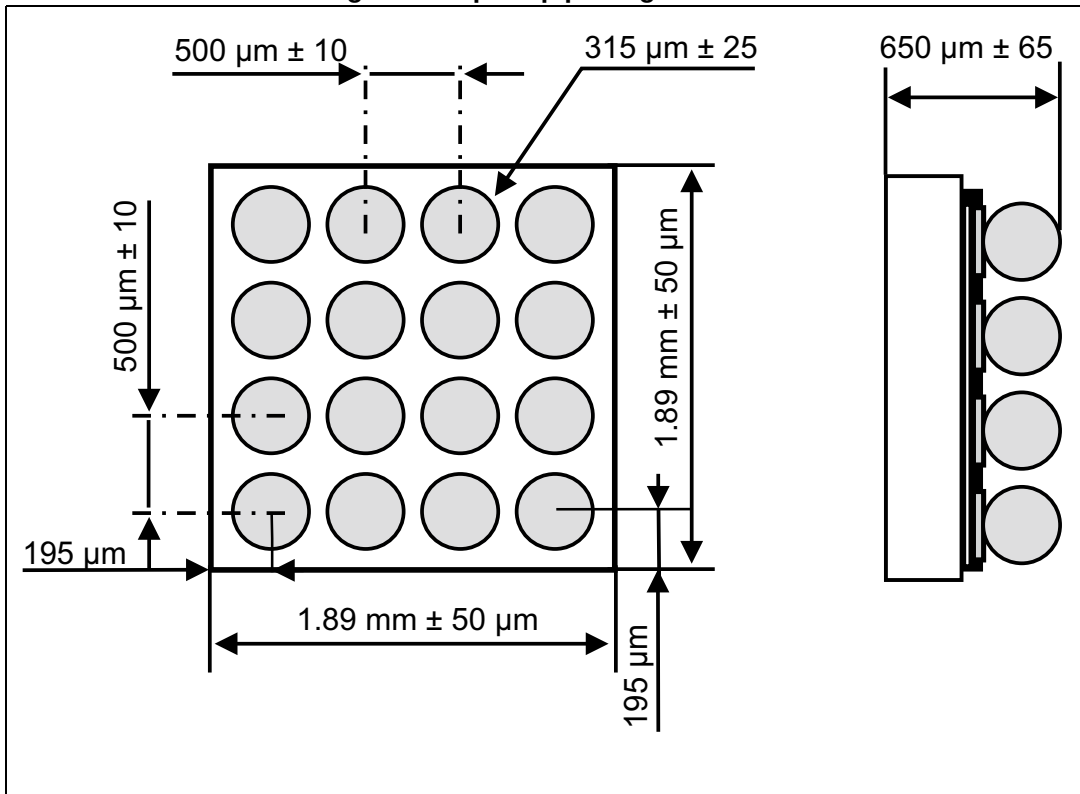


## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 Flip-Chip package information

Figure 9. Flip-Chip package outline



## 2.2 Packing information

Figure 10. Tape and reel outline

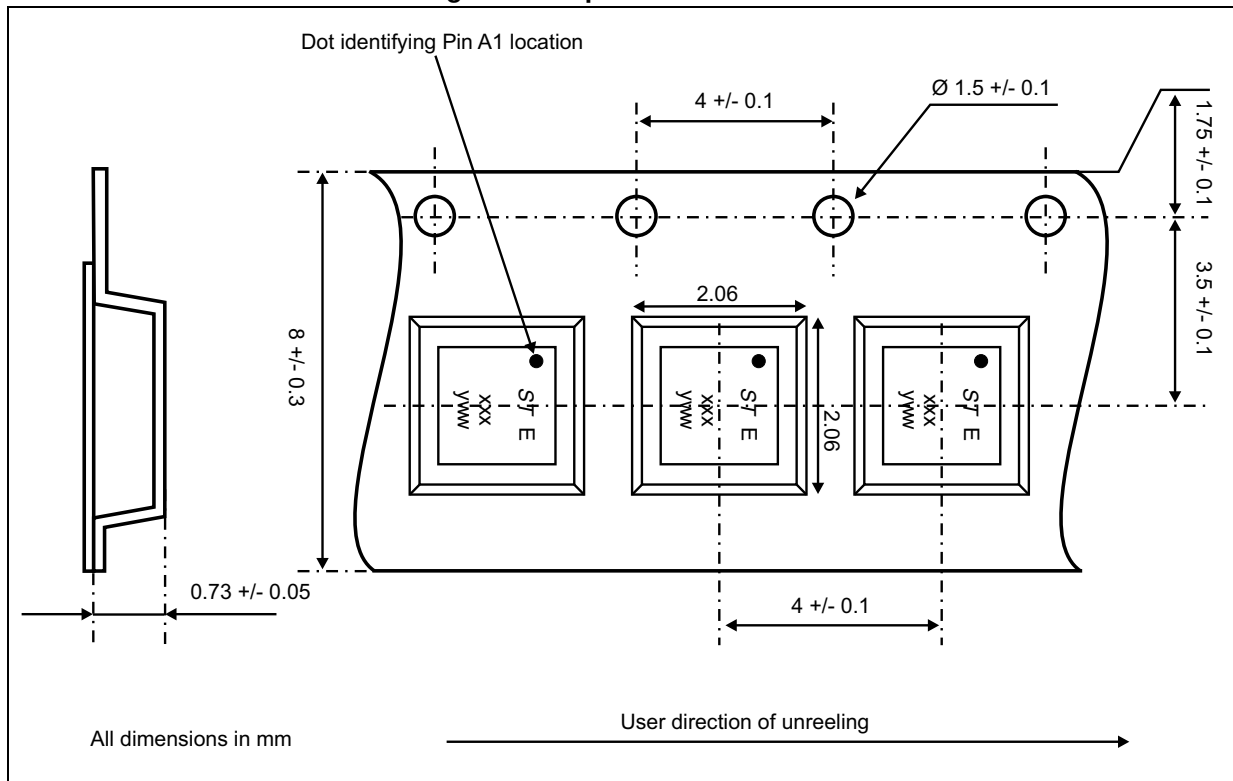


Figure 11. Footprint

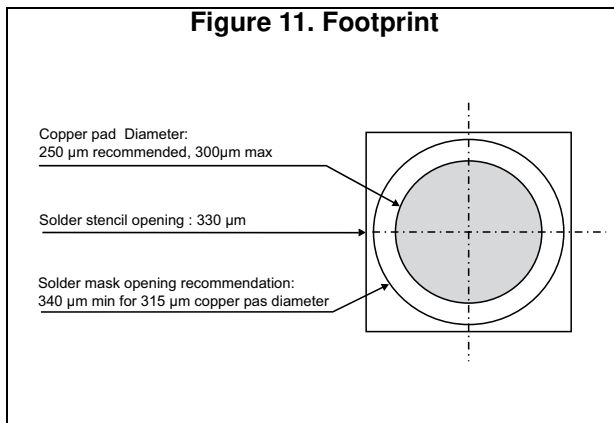
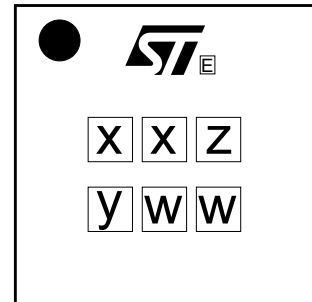


Figure 12. Marking

Dot, ST logo  
 xx = marking  
 z = packaging location  
 yww = datecode  
 (y = year  
 ww = week)



### 3 Ordering information

Figure 13. Ordering information scheme

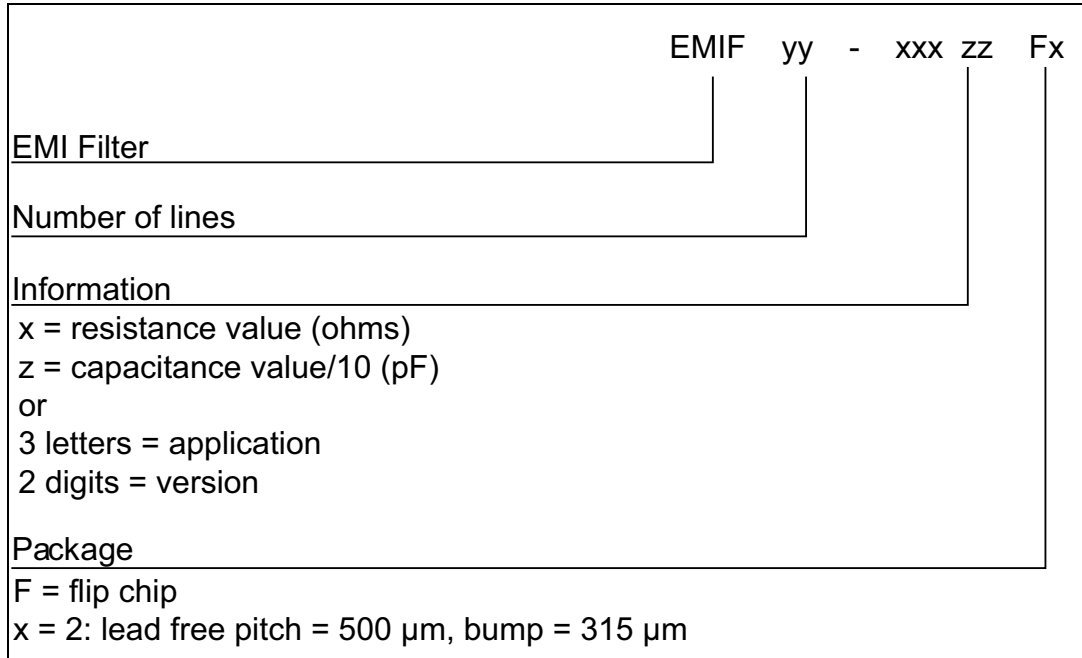


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF06-HMC02F2	LK	Flip chip	5.3 mg	5000	Tape and reel 7"

Note: More information are available in the application notes:  
 AN1235: "Flip chip: Package description and recommendations for use"

### 4 Revision history

Table 5. Document revision history

Date	Revision	Changes
02-Mar-2016	1	Initial release.

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