

## 2-line IPAD™, EMI filter and ESD protection

Datasheet - production data

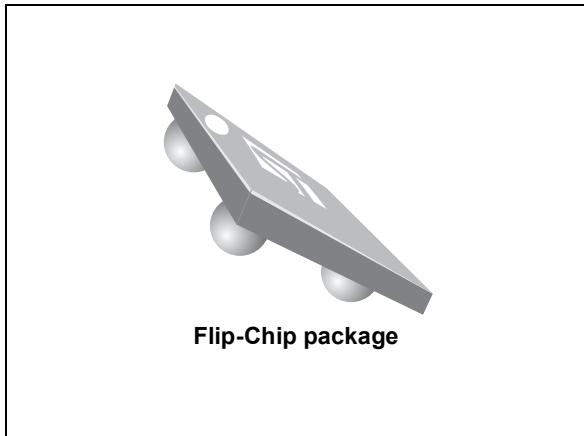
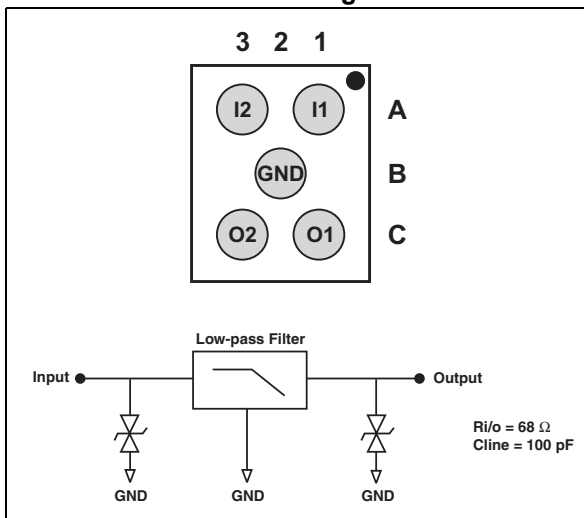


Figure 1. Pin configuration (bump side) and basic cell configuration



### Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming:  
1.07 mm x 1.47 mm
- 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 input pins
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- IEC 61000-4-2 Level 1, on output pins
  - 2 kV (air discharge)
  - 2 kV (contact discharge)
- MIL STD 883E - Method 3015-6 Class 3

### Application

- Mobile phones (differential microphone filtering and ESD protection).

### Description

The EMIF02-MIC03F2 is a highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF02 Flip-Chip packaging means the package size is equal to the die size.

This filter includes an ESD protection circuitry which prevents damage to the application when subjected to ESD surges up 15 kV.

TM: IPAD is a trademark of STMicroelectronics.

# 1 Electrical characteristics

**Table 1. Absolute maximum ratings (T<sub>AMB</sub> = 25 °C)**

Symbol	Parameter	Value	Unit
T <sub>j</sub>	Maximum junction temperature	125	°C
Top	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +150	°C

**Table 2. Electrical characteristics (T<sub>amb</sub> = 25 °C)**

Symbol	Parameters
V <sub>BR</sub>	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
R <sub>d</sub>	Dynamic impedance
I <sub>PP</sub>	Peak pulse current
R <sub>I/O</sub>	Series resistance between Input & Output
C <sub>line</sub>	Input capacitance per line

**Table 3.**

Symbol	Test condition	Min	Typ	Max	Unit
V <sub>BR</sub>	I <sub>R</sub> = 1 mA	6	8		V
I <sub>RM</sub>	V <sub>RM</sub> = 3 V per line			500	nA
R <sub>I/O</sub>	Tolerance ± 20%		68		Ω
C <sub>line</sub>	V <sub>R</sub> = 0 V		100		pF

Figure 2. Attenuation simulation with 1 kΩ input and 10 kΩ output

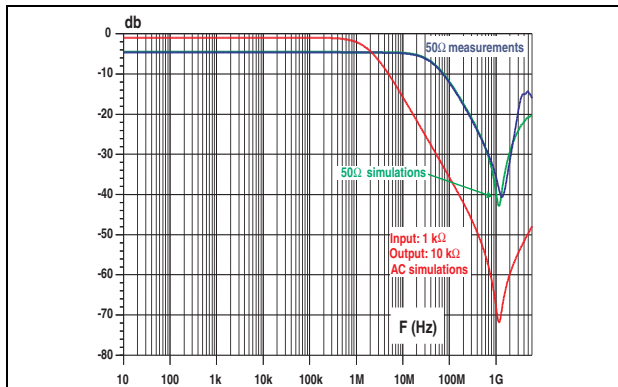


Figure 3. Analog crosstalk measurements

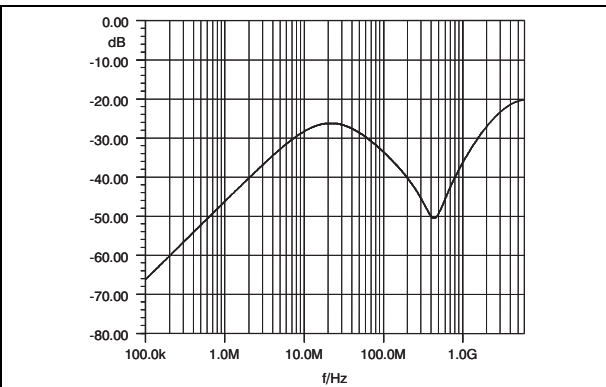


Figure 4. ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and one output V(out)

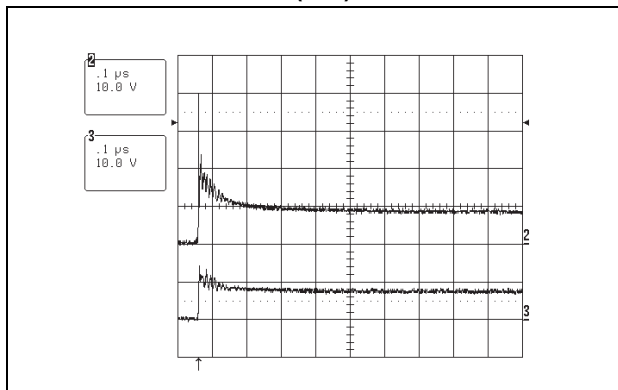


Figure 5. ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and one output V(out)

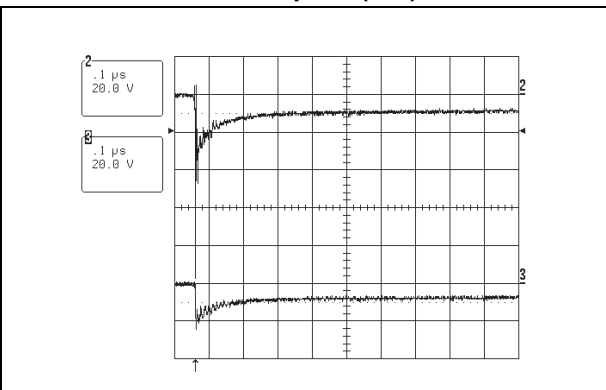


Figure 6. Line capacitance versus applied voltage.

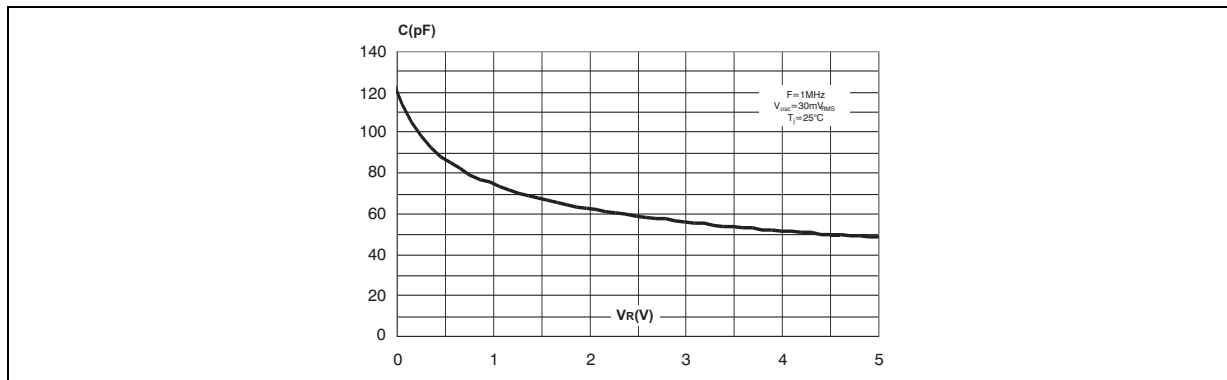


Figure 7. Aplac mode

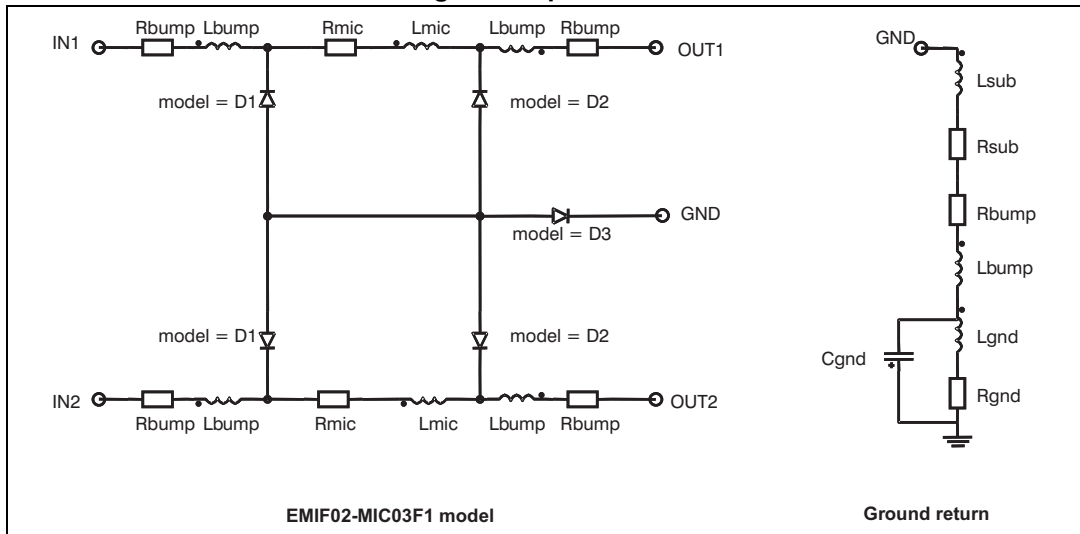
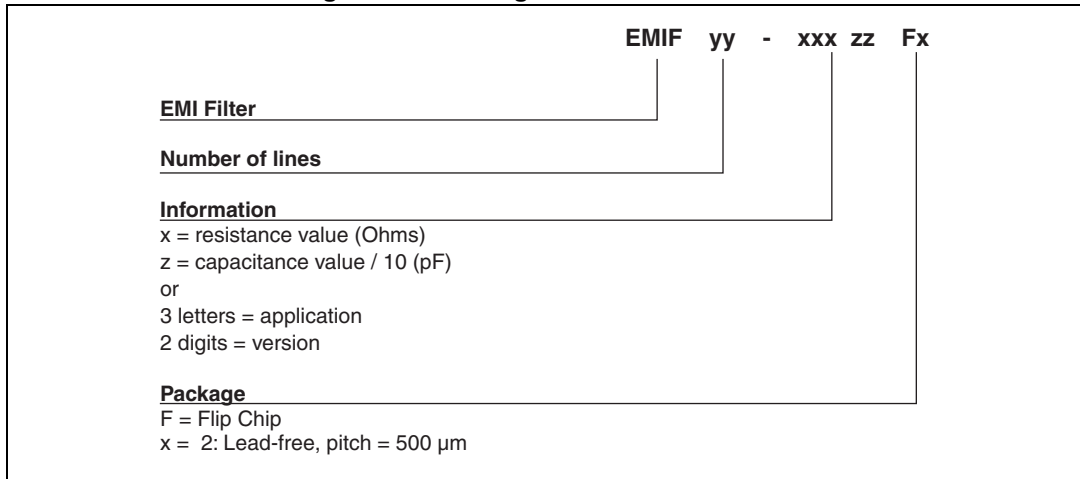


Figure 8. Aplac parameters

Model D1	Model D3	Model D2	aplacvar Rmic 68
CJO=Cdiode1	CJO=Cdiode3	CJO=Cdiode2	aplacvar Lmic 10p
BV=7	BV=7	BV=7	aplacvar Cdiode1 100pF
IBV=1u	IBV=1u	IBV=1u	aplacvar Cdiode2 3.6pF
IKF=1000	IKF=1000	IKF=1000	aplacvar Cdiode3
IS=10f	IS=10f	IS=10f	1.17nF
ISR=100p	ISR=100p	ISR=100p	aplacvar Lbump 50pH
N=1	N=1	N=1	aplacvar Rbump 20m
M=0.3333	M=0.3333	M=0.3333	aplacvar Rsub 0.5m
RS=0.7	RS=0.12	RS=0.3	aplacvar Rgnd 10m
VJ=0.6	VJ=0.6	VJ=0.6	aplacvar Lgnd 50pH
TT=50n	TT=50n	TT=50n	aplacvar Cgnd 0.15pF
			aplacvar Lsub 10pH

## 2 Ordering information scheme

Figure 9. Ordering information scheme



## 3 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.

Figure 10. Flip Chip dimensions

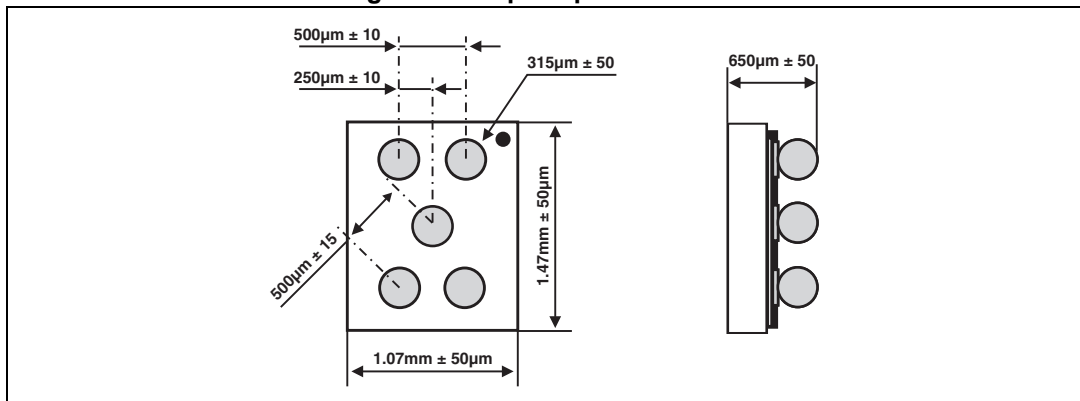


Figure 11. Footprint

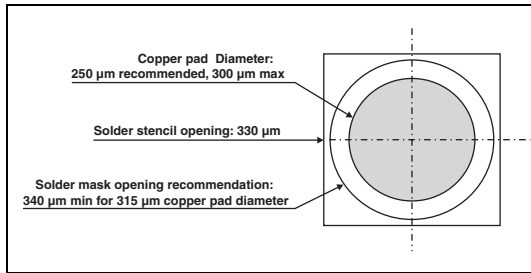


Figure 12. Marking

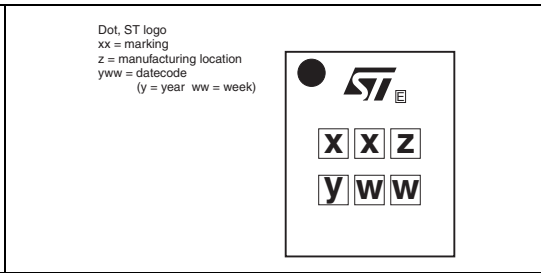
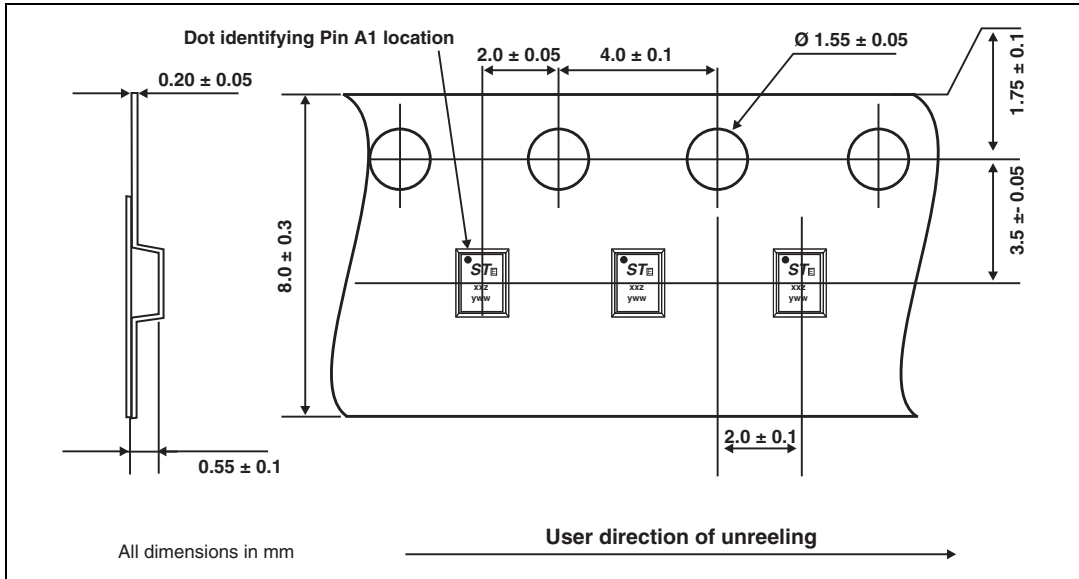


Figure 13. Flip Chip tape and reel specification



## 4 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC03F2	FW	Flip Chip	2.1 mg	5000	Tape and reel (7")

Note: More packing information is available in the applications note:  
 AN1235: "Flip Chip: package description and recommendations for use"  
 AN 1751: "EMI filters: Recommendations and measurements"

## 5 Revision history

Table 5. Document revision history

Date	Revision	Changes
14-Oct-2006	1	Initial release
31-Mar-2014	2	Reformatted to current standards. Added ECOPACK statement. Updated <a href="#">Figure 2</a> and <a href="#">Figure 13</a> .
18/07/2014	3	Updated typo error on <a href="#">Features</a> .

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