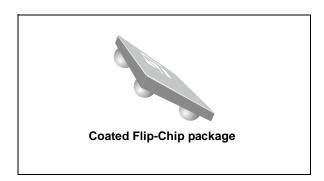


### EMIF02-SPK01C2

## 2 line IPAD™, EMI filter including ESD protection

Datasheet - production data



#### **Features**

- EMI symmetrical (I/O) low-pass filter
- High efficiency EMI filter (-33 dB @ 900 MHz)
- Very low PCB space consumption: 1.07 mm x 1.47 mm
- Very thin package: 0.670 mm
- Coating resin on back side and lead free package
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reduction 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 883G Method 3015-7 Class 3

#### **Applications**

Where EMI filtering in ESD sensitive equipment is required:

- Mobile phones and communication systems
- Computers and printers and MCU Boards

#### **Description**

The EMIF02-SPK01C2 is a highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference. The 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 it is subjected to ESD surges up to 15 kV.

Figure 1. Pin configuration (bump side)

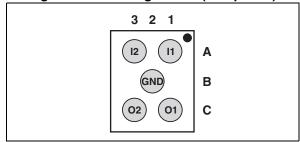
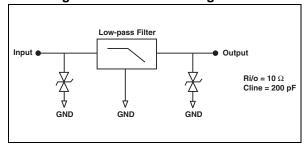


Figure 2. Basic cell configuration



TM: IPAD is a trademark of STMicroelectronics

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Characteristics EMIF02-SPK01C2

### 1 Characteristics

Table 1. Absolute ratings (limiting values)

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

Figure 3. Electrical characteristics (definitions)

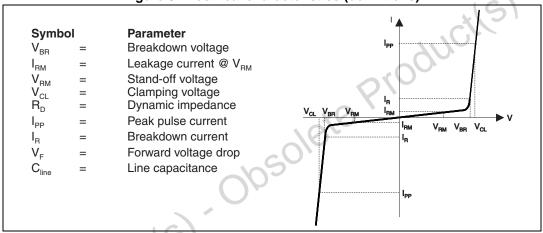


Table 2. Electrical characteristics (T<sub>amb</sub> = 25 °C)

	Symbol	Test conditions	Min.	Тур.	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
16	R <sub>I/O</sub>	Tolerance ± 20%		10		Ω
1250,	C <sub>line</sub>	$V_R = 0 V$		200		pF
Ob						



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EMIF02-SPK01C2 Characteristics

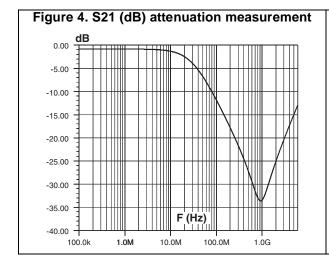


Figure 5. Analog crosstalk measurement

dB

-10.00

-20.00

-30.00

-40.00

-50.00

100.0k

1.0M

100.0M

1.0G

Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input V<sub>in</sub> and one output V<sub>out</sub>

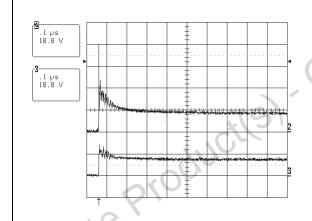


Figure 7. ESD response to IEC 61000-4-2 (- 15 kV air discharge) on one input V<sub>in</sub> and one output V<sub>out</sub>

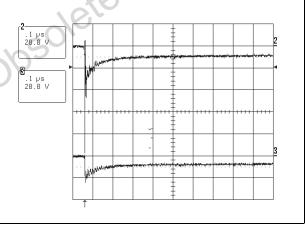
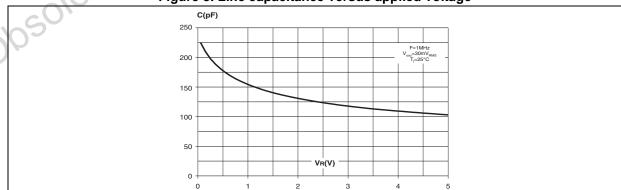


Figure 8. Line capacitance versus applied voltage



Characteristics EMIF02-SPK01C2

Figure 9. Aplac model

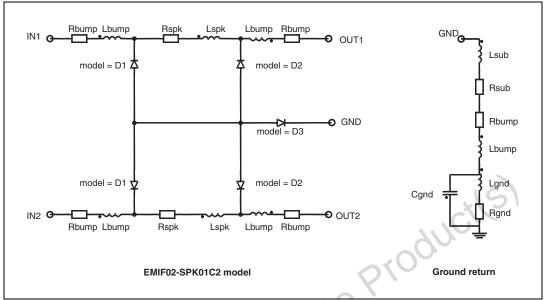


Figure 10. Aplac parameters

			1250	
	Model D1	Model D3	Model D2	aplacvar Ls 1nH
	CJO=Cdiode1	CJO=Cdiode3	CJO=Cdiode2	aplacvar Rs 150m
	BV=7	BV=7	BV=7	aplacvar Rspk 10
	IBV=1u	IBV=1u	IBV=1u	aplacvar Lspk 10p
	IKF=1000	IKF=1000	IKF=1000	aplacvar Cdiode1 234pF
	IS=10f	IS=10f	IS=10f	aplacvar Cdiode2 3.5ppF
	ISR=100p	ISR=100p	ISR=100p	aplacvar Cdiode3 1nF
	N=1	N=1	N=1	aplacvar Lbump 50pH
	M=0.3333	M=0.3333	M=0.3333	aplacvar Rbump 10m
	RS=0.7	RS=0.12	RS=0.3	aplacvar Rsub 0.5m
	VJ=0.6	VJ=0.6	VJ=0.6	aplacvar Lsub 10pH
	TT=50n	TT=50n	TT=50n	aplacvar Rgnd 1m
cO,				aplacvar Lgnd 50pH
202				aplacvar Cgnd 0.15pF
Ob				



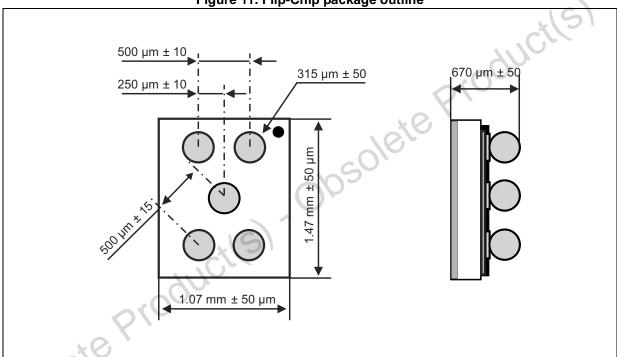
EMIF02-SPK01C2 Package information

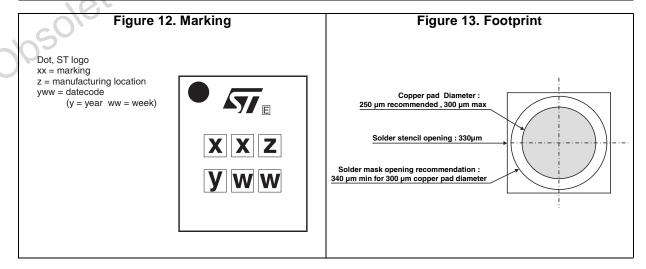
## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="https://www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

#### 2.1 Flip-Chip package information

Figure 11. Flip-Chip package outline





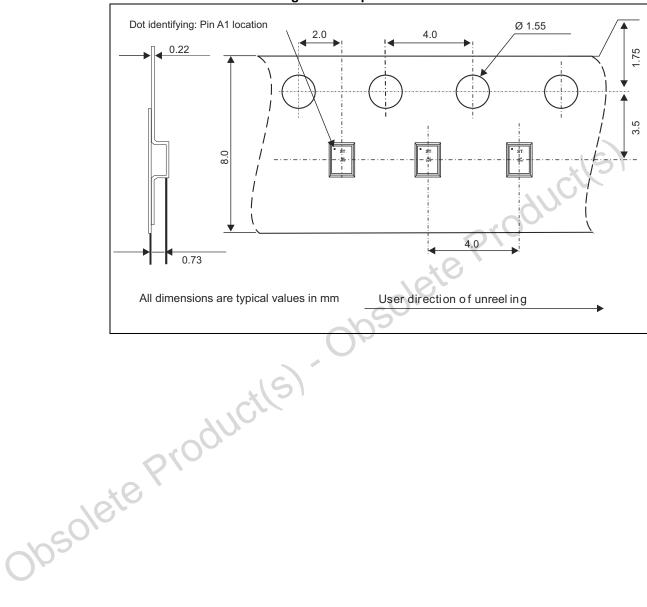
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Package information EMIF02-SPK01C2

## 2.2 Packing information

Figure 14. Tape and reel outline

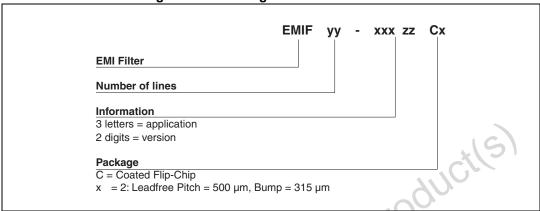


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## 3 Ordering information

Figure 15. Ordering information scheme



**Table 3. Ordering information** 

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-SPK01C2	FX	Flip Chip	2.3 mg	5000	Tape and reel 7"

# 4 Revision history

**Table 4. Document revision history** 

Date	Revision	Changes
26-Jan-2006	1	Initial release.
22-May-2013	2	Updated Figure 13.
02-Nov-2015	3	Updated Features and Flip-Chip package outline.



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