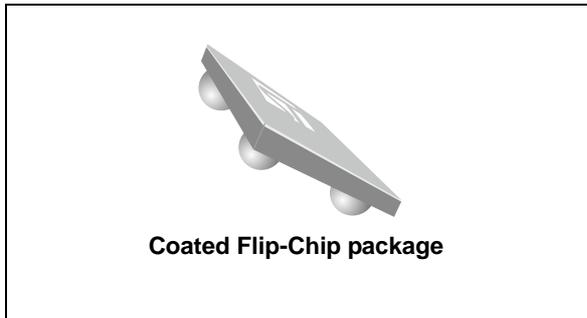


2 line IPAD™, EMI filter including ESD protection

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: 0.695 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)

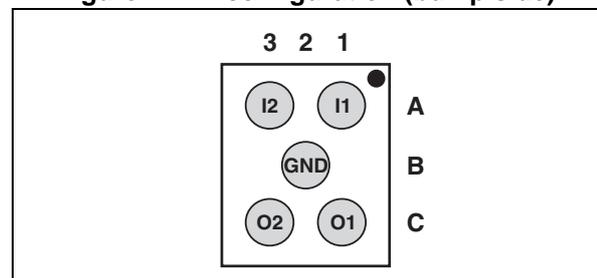
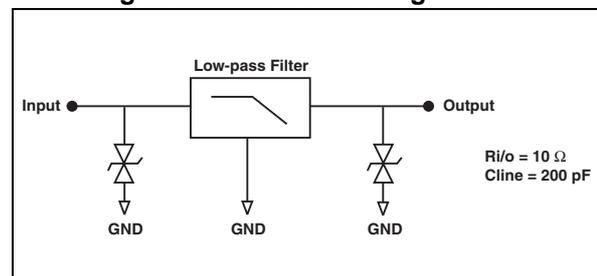


Figure 2. Basic cell configuration



TM: IPAD is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit
T_j	Maximum junction temperature	125	°C
T_{op}	Operating temperature range	-40 to +85	°C
T_{stg}	Storage temperature range	-55 to +150	°C

Figure 3. Electrical characteristics (definitions)

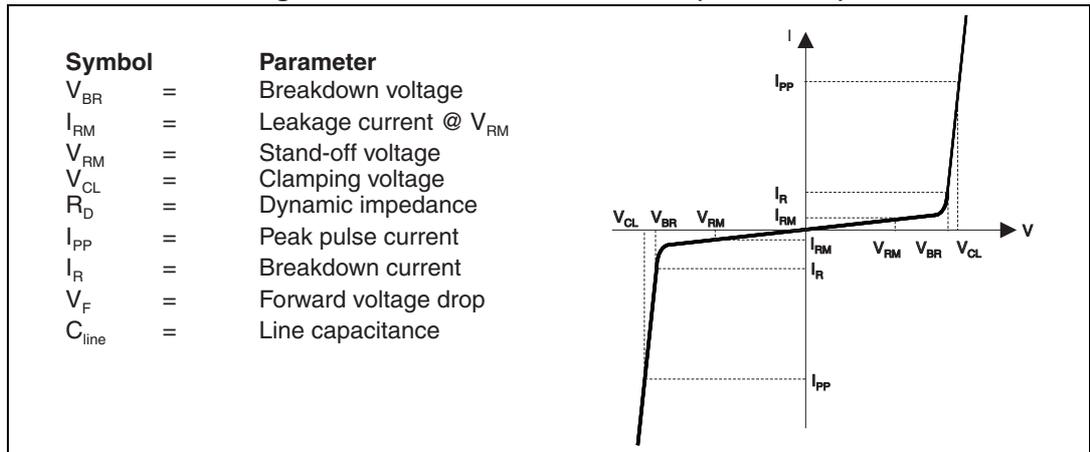


Table 2. Electrical characteristics ($T_{amb} = 25\text{ °C}$)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	$I_R = 1\text{ mA}$	6	8		V
I_{RM}	$V_{RM} = 3\text{ V per line}$			500	nA
$R_{I/O}$	Tolerance $\pm 20\%$		10		Ω
C_{line}	$V_R = 0\text{ V}$		200		pF

Figure 4. S21 (dB) attenuation measurement

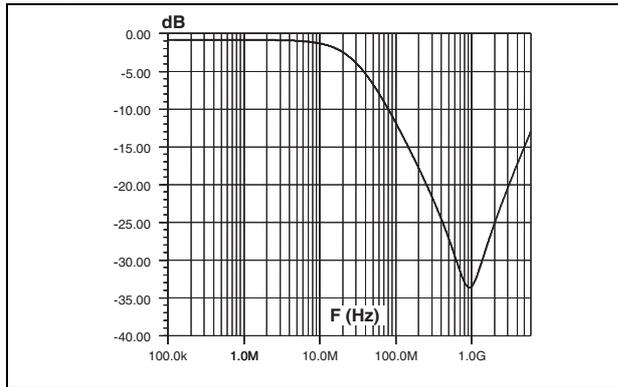


Figure 5. Analog crosstalk measurement

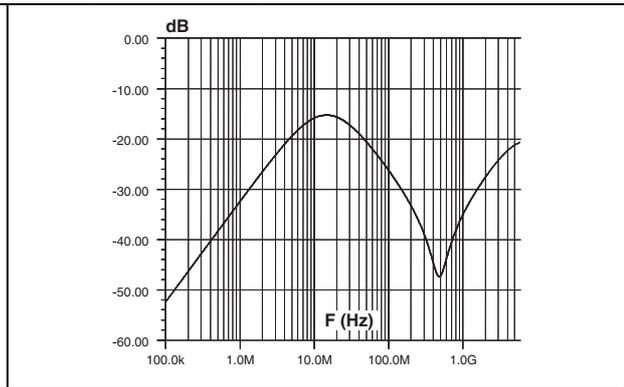


Figure 6. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input V_{in} and one output V_{out}

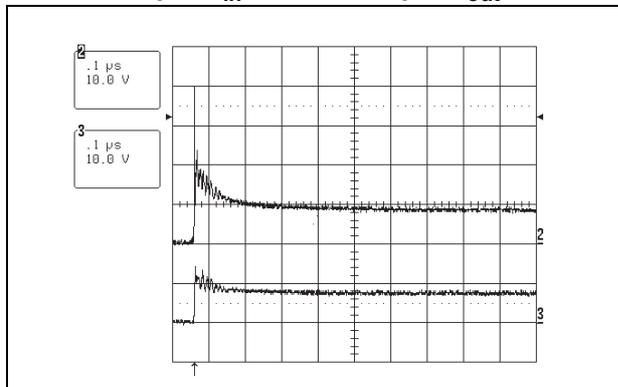


Figure 7. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input V_{in} and one output V_{out}

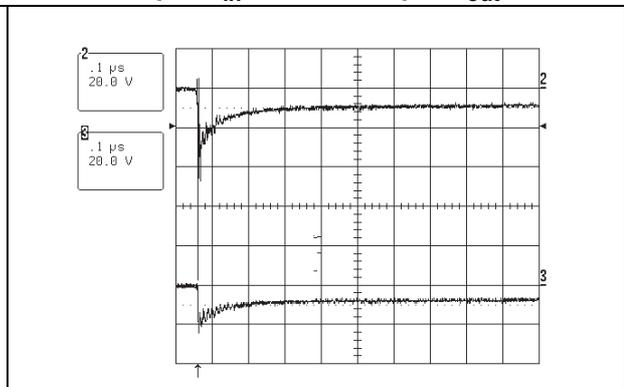


Figure 8. Line capacitance versus applied voltage

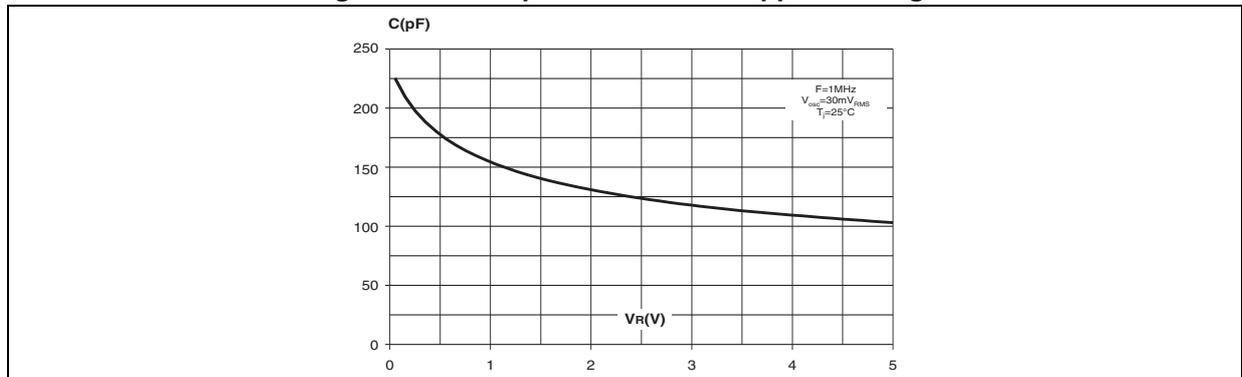


Figure 9. Aplac model

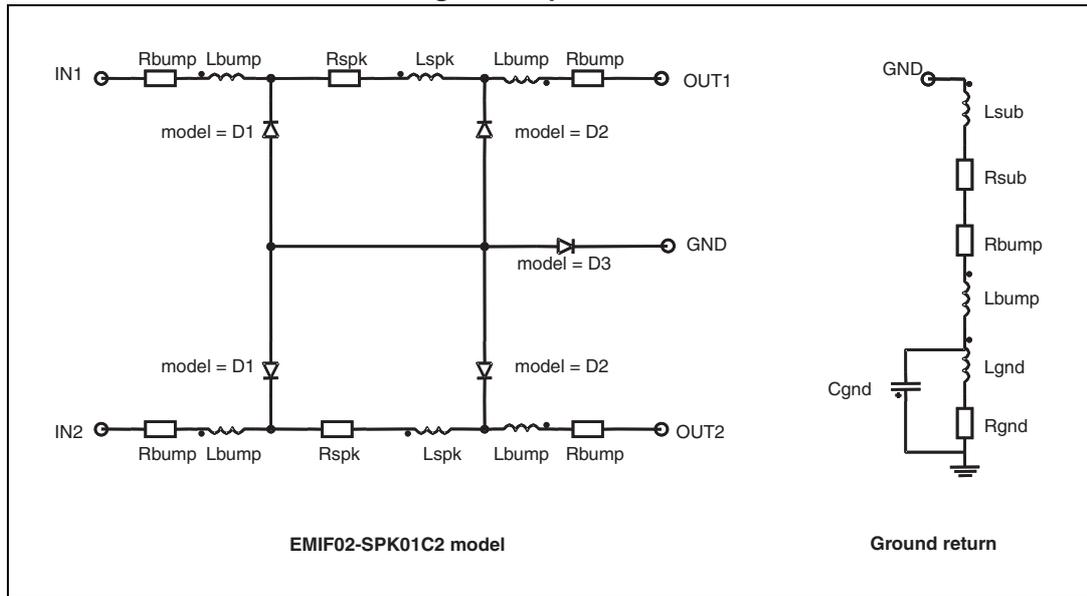


Figure 10. Aplac parameters

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
			aplacvar Lgnd 50pH
			aplacvar Cgnd 0.15pF

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. ECOPACK® is an ST trademark.

Figure 11. Flip-Chip dimensions

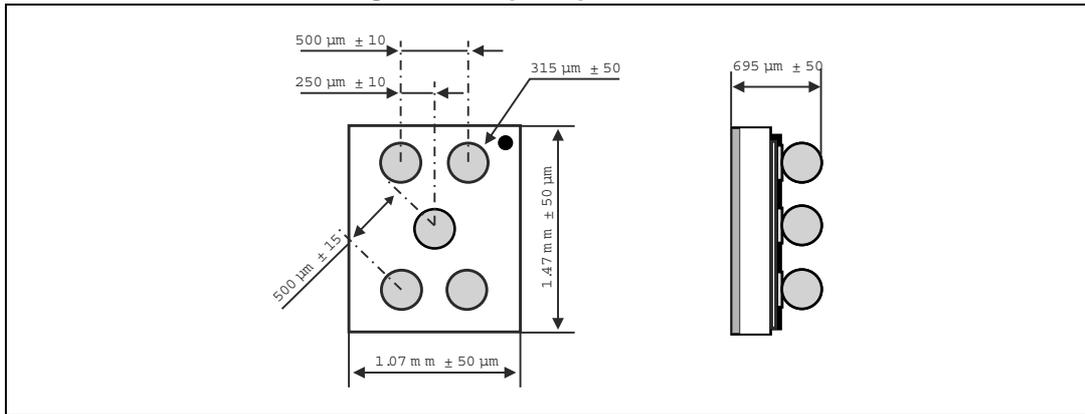


Figure 12. Marking

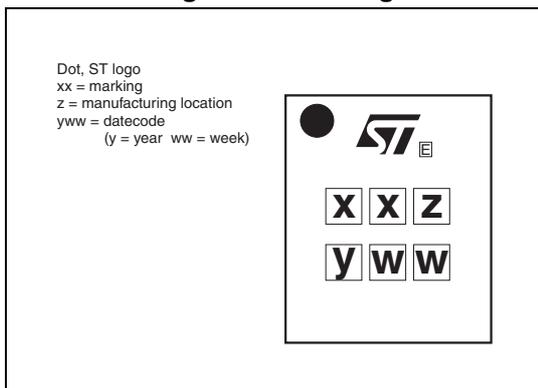


Figure 13. Footprint

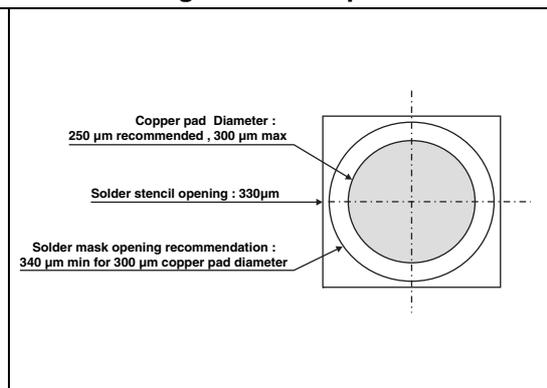
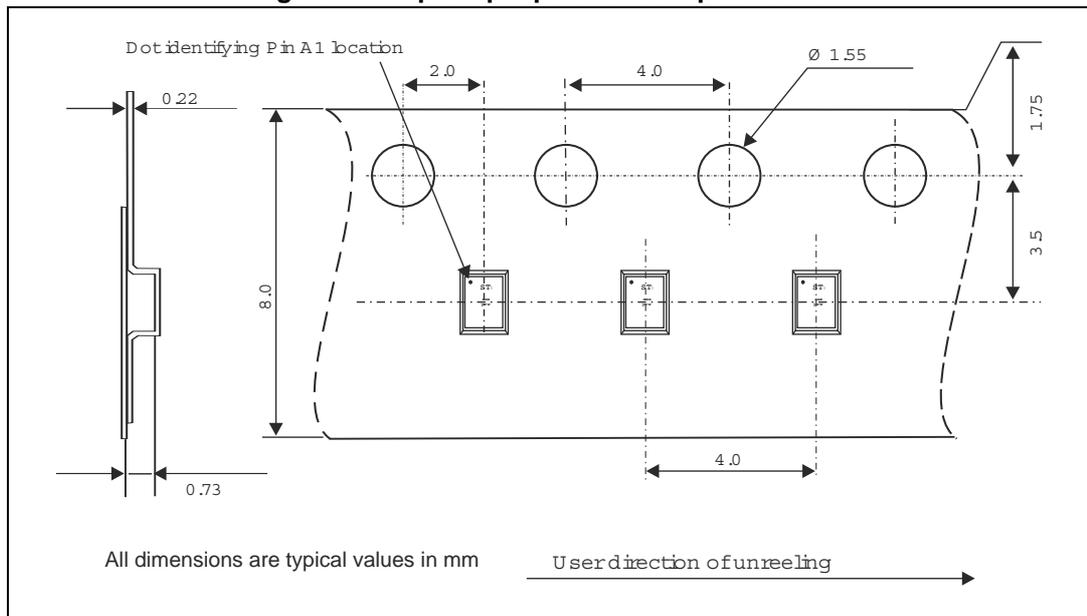


Figure 14. Flip-Chip tape and reel specification



3 Ordering information

Figure 15. Ordering information scheme

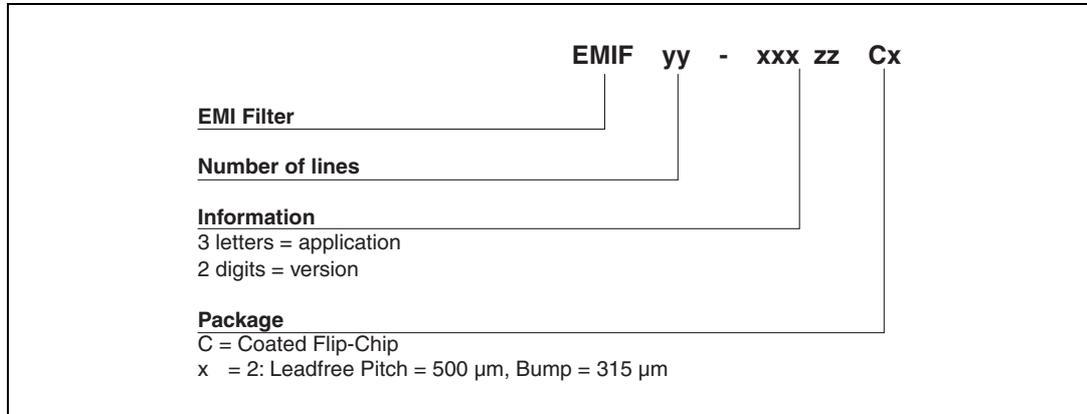


Table 3. Ordering information

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 .

EMIF02-SPK01C2

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT AUTHORIZED FOR USE IN WEAPONS. NOR ARE ST PRODUCTS DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2013 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com