



# EMIF02-MIC03C2

## 2 line EMI filter and ESD protection

### Main product characteristics

Where EMI filtering in ESD sensitive equipment is required:

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

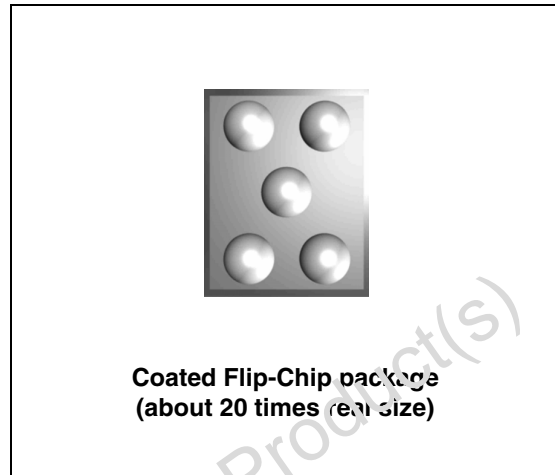
### Description

The EMIF02-MIC03C2 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.

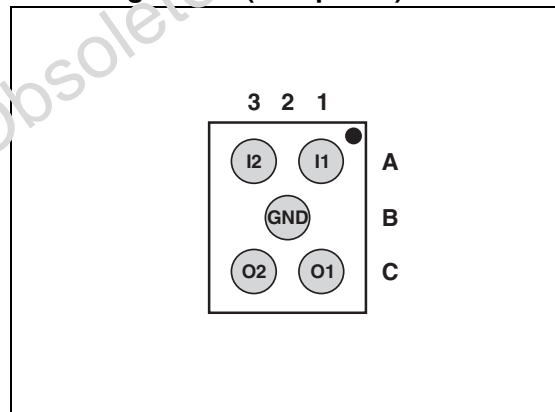
This filter includes ESD protection circuitry, which prevents damage to the application when it is subjected to ESD surges up to 15 kV.

### Benefits

- EMI symmetrical (I/O) low-pass filter
- High efficiency EMI filter (-35 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.



### Pin configuration (Bump side)



### Complies with following standards:

- IEC 61000-4-2
  - level 4 input pins 15 kV (air discharge)
  - 8 kV (contact discharge)
  - level 1 output pins 2 kV (air discharge)
  - 2 kV (contact discharge)
- MIL STD 883G - Method 3015-7 Class 3

# 1 Characteristics

Figure 1. Basic cell configuration

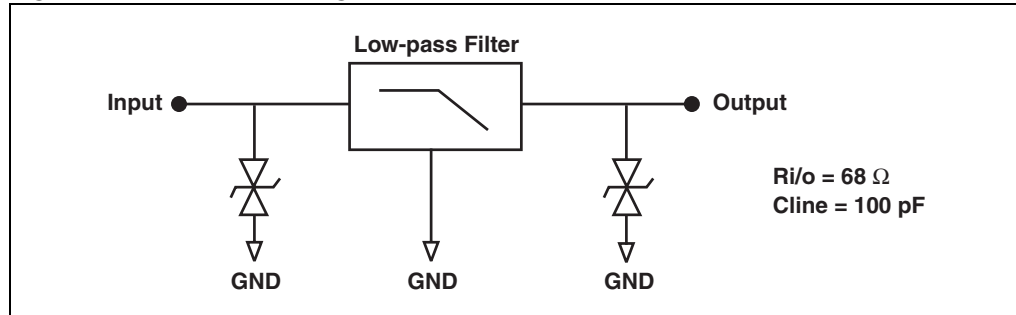
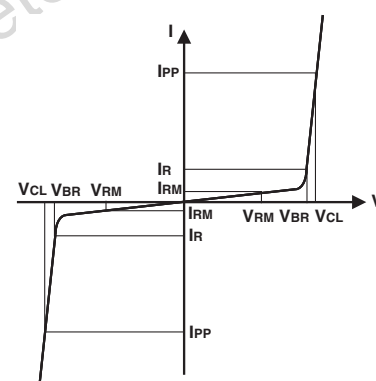


Table 1. Absolute ratings (limiting values)

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

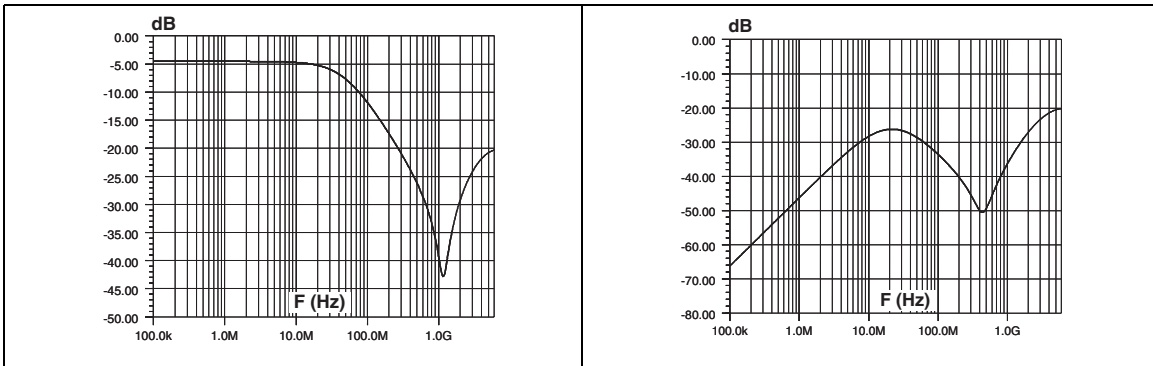
Table 2. Electrical characteristics ( $T_{amb} = 25^\circ C$ )

Symbol	Parameters
$V_{BR}$	Breakdown voltage
$I_{RM}$	Leakage current @ $V_{RM}$
$V_{RM}$	Stand-off voltage
$V_{CL}$	Clamping voltage
$R_d$	Dynamic impedance
$I_{PP}$	Peak pulse current
$R_{I/O}$	Series resistance between input and output
$C_{line}$	Input capacitance per line

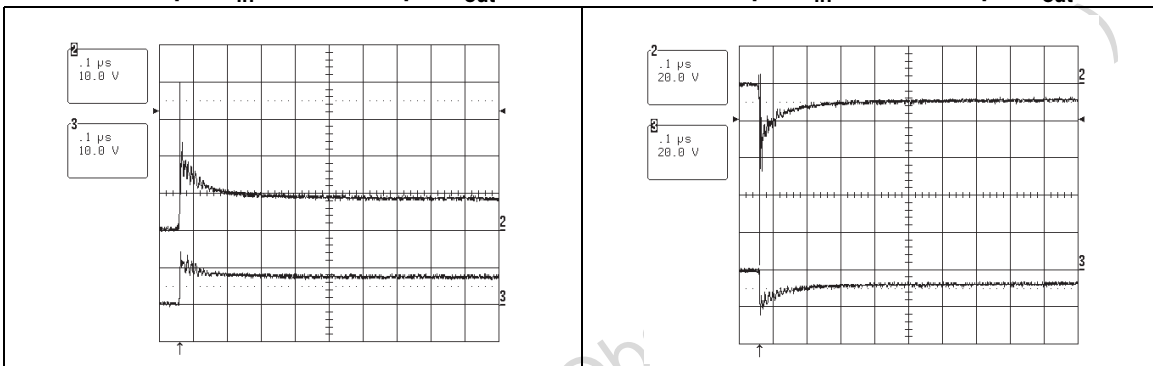


Symbol	Test conditions	Min	Typ	Max	Unit
$V_{BR}$	$I_R = 1 \text{ mA}$	6	8		V
$I_{RM}$	$V_{RM} = 3 \text{ V per line}$			500	nA
$R_{I/O}$	Tolerance		68		$\Omega$
$C_{line}$	$V_R = 0 \text{ V}$		100		pF

**Figure 2. S21 (dB) attenuation measurement** **Figure 3. Analog crosstalk measurement**



**Figure 4. ESD response to IEC 61000-4-2 (+15 kV air discharge) on one input  $V_{in}$  and one output  $V_{out}$**  **Figure 5. ESD response to IEC 61000-4-2 (-15 kV air discharge) on one input  $V_{in}$  and one output  $V_{out}$**



**Figure 6. Line capacitance versus applied voltage**

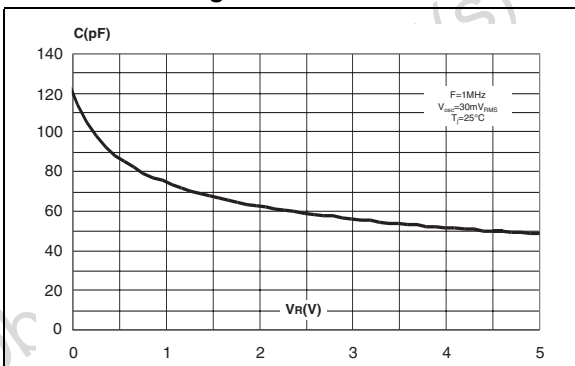


Figure 7. Aplac model

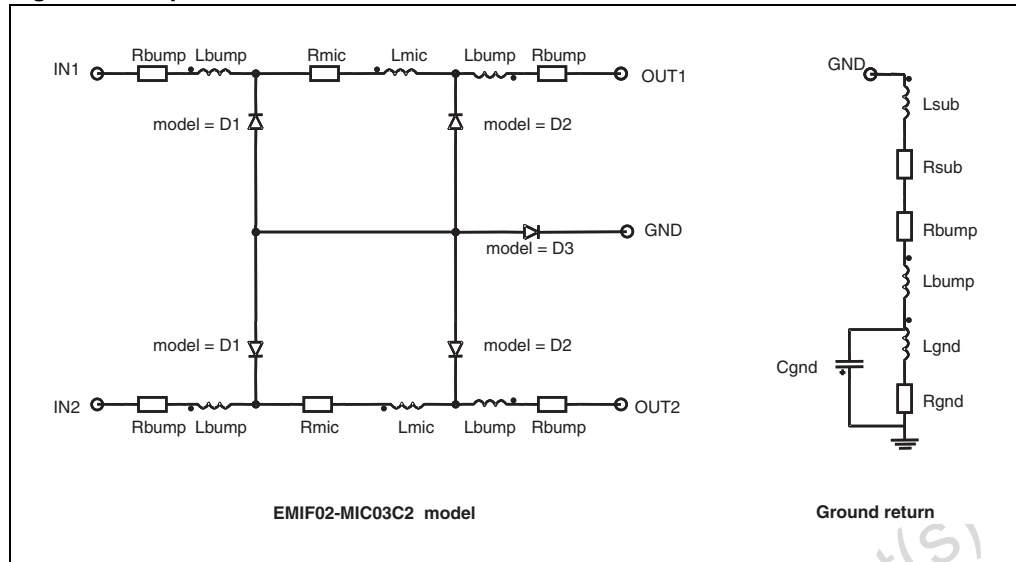
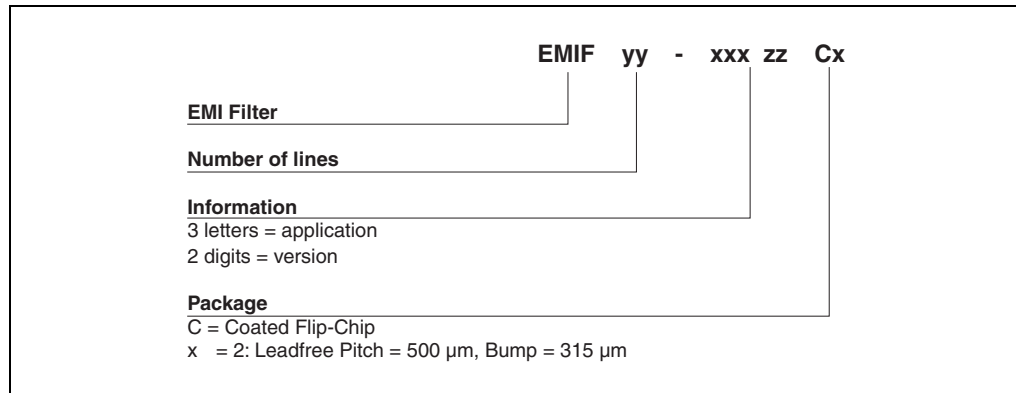


Figure 8. Aplac parameters

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 1.17nF
IS=10f	IS=10f	IS=10f	aplacvar Lbump 50pH
ISR=100p	ISR=100p	ISR=100p	aplacvar Rbump 20m
N=1	N=1	N=1	aplacvar Rsub 0.5m
M=0.3333	M=0.3333	M=0.3333	aplacvar Rgnd 10m
RS=0.7	RS=0.12	RS=0.3	aplacvar Lgnd 50pH
VJ=0.6	VJ=0.6	VJ=0.6	aplacvar Cgnd 0.15pF
TT=50n	TT=50n	TT=50n	aplacvar Lsub 10pH

## 2 Ordering information scheme



## 3 Package information

Figure 9. Flip-Chip Dimensions

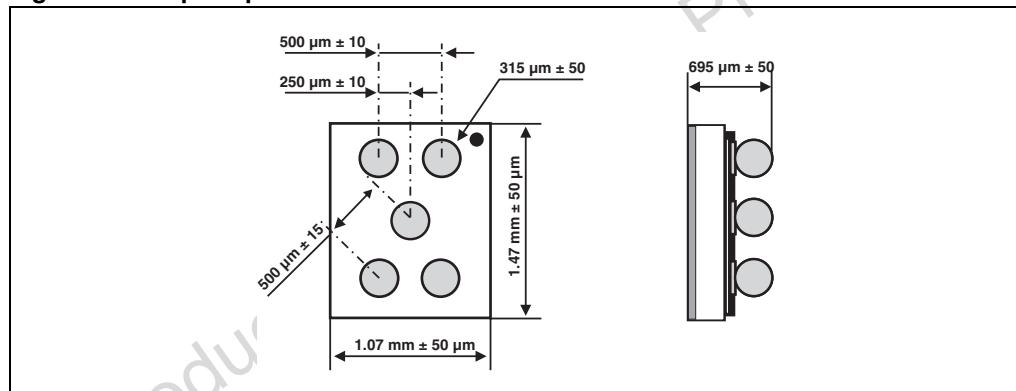


Figure 10. Marking

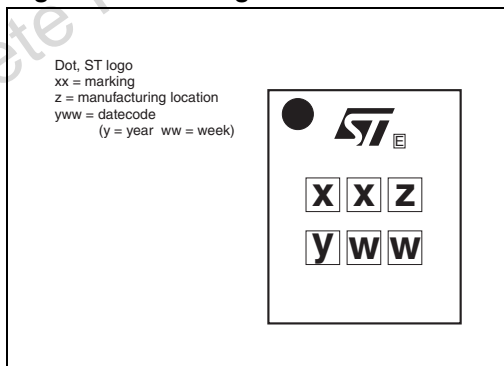


Figure 11. Footprint recommendation

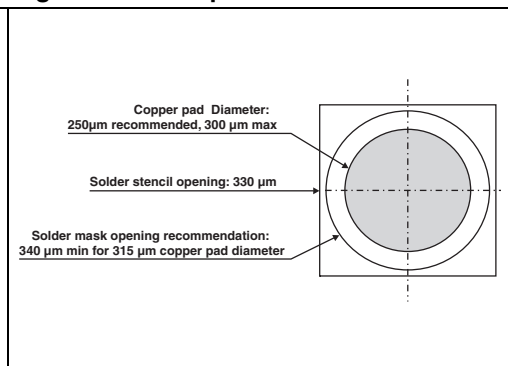
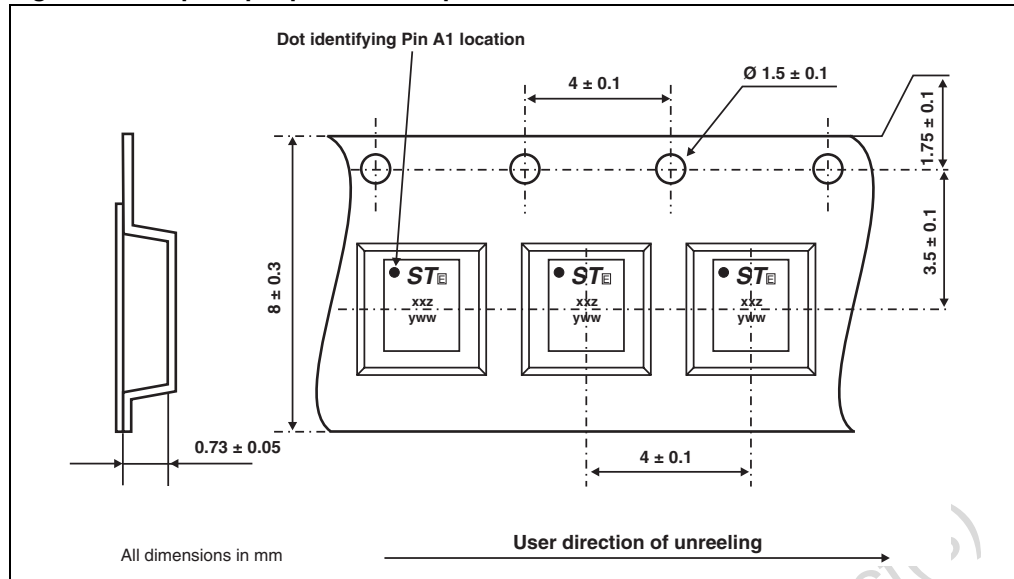


Figure 12. Flip-Chip tape and reel specification



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

## 4 Ordering information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC03C2	FW	Flip-Chip	2.3 mg	5000	7" Tape and reel

## 5 Revision history

Date	Revision	Changes
28-Nov-2006	1	Initial release.

**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.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

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.



© 2006 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 - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)

