



# EMIF03-SIM02F2

IPAD™

## 3 LINES EMI FILTER INCLUDING ESD PROTECTION

### MAIN PRODUCT APPLICATIONS:

EMI filtering and ESD protection for:

- SIM Interface (Subscriber Identify Module)
- UIM Interface (Universal Identify Module)

### DESCRIPTION

The EMIF03-SIM02F2 is a highly integrated devices designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF03 flip chip packaging means the package size is equal to the die size.

This filter includes an ESD protection circuitry which prevents the device from destruction when subjected to ESD surges up 15kV.

### BENEFITS

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead free package
- Very low PCB space consuming: 1.42mm x 1.42mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration & wafer level packaging.

### COMPLIES WITH THE FOLLOWING STANDARDS:

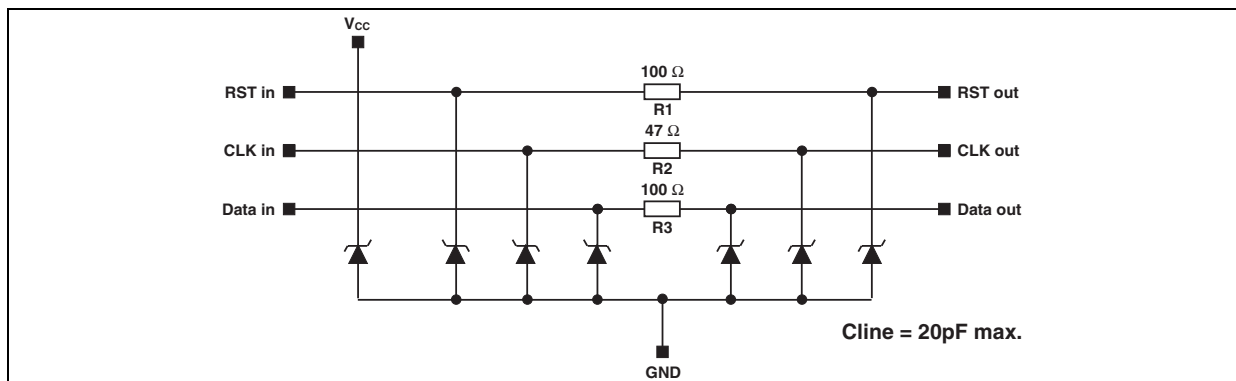
#### IEC61000-4-2

Level 4 on input pins 15kV (air discharge)  
8kV (contact discharge)

Level 1 on output pins 2kV (air discharge)  
2kV (contact discharge)

### MIL STD 883E - Method 3015-6 Class 3

Figure 2: Configuration



TM: IPAD is a trademark of STMicroelectronics.

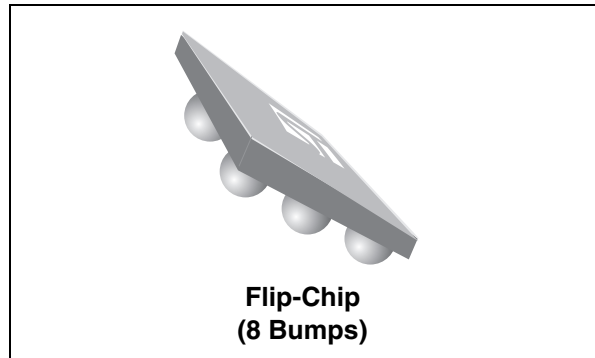
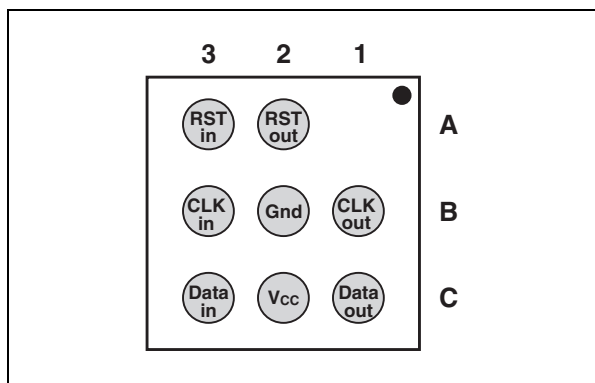


Table 1: Order Code

Part Number	Marking
EMIF03-SIM02F2	GJ

Figure 1: Pin Configuration (Ball side)

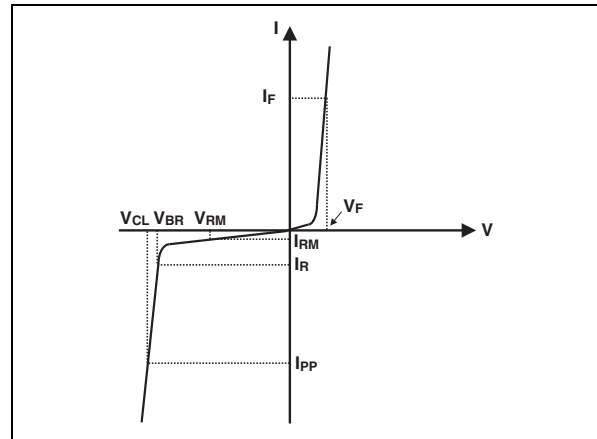


**Table 2: Absolute Ratings** (limiting values)

Symbol	Parameter and test conditions	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 3: Electrical Characteristics** ( $T_{amb} = 25^\circ\text{C}$ )

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



Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{BR}$	$I_R = 1 \text{ mA}$	6		20	V
$I_{RM}$	$V_{RM} = 3\text{V}$			0.2	$\mu\text{A}$
$R_d$			1.5		$\Omega$
$R_1, R_3$	Tolerance $\pm 20\%$		100		$\Omega$
$R_2$	Tolerance $\pm 20\%$		47		$\Omega$
$C_{line}$	@ 0V			20	pF

Figure 3: S21 (dB) attenuation measurement (A2-A3 line)

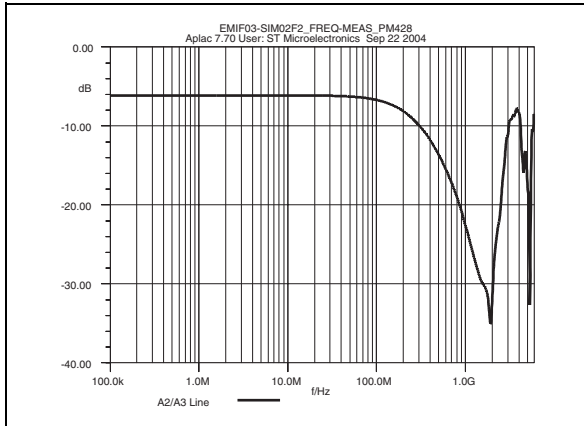


Figure 4: S21 (dB) attenuation measurement (B1-B3 line)

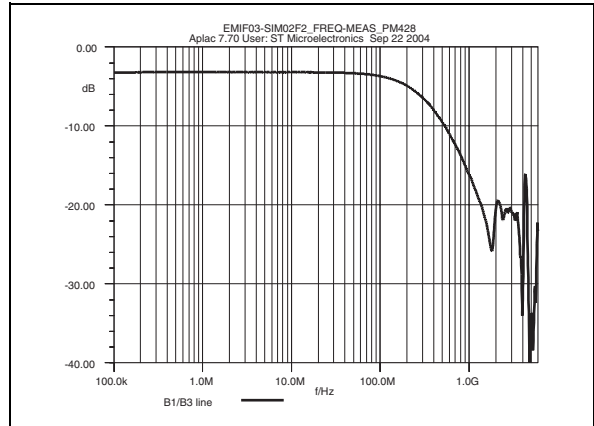


Figure 5: S21 (dB) attenuation measurement (C1-C3 line)

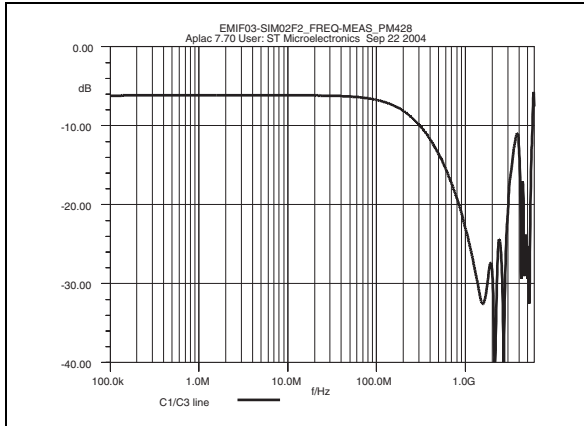


Figure 6: Analog crosstalk measurements

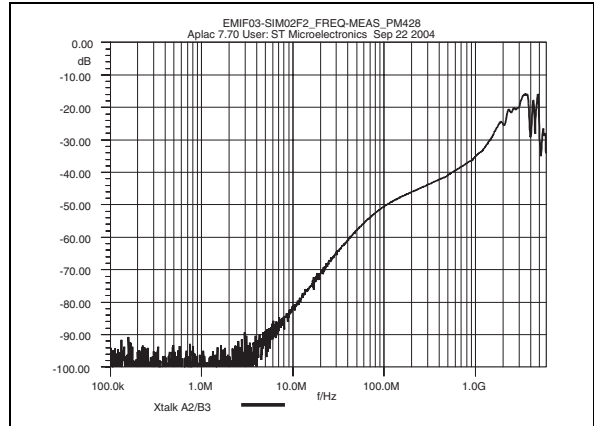


Figure 7: ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and on one output (Vout)

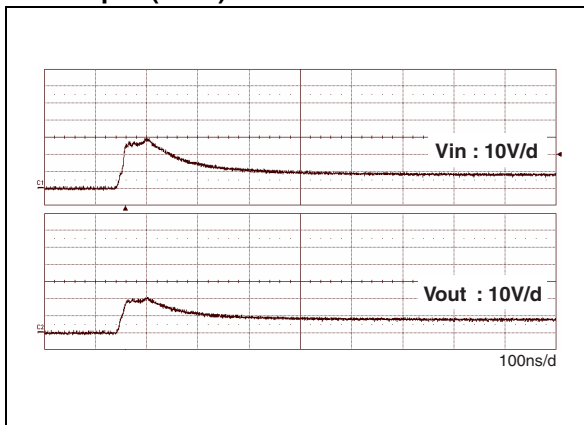


Figure 8: ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and on one output (Vout)

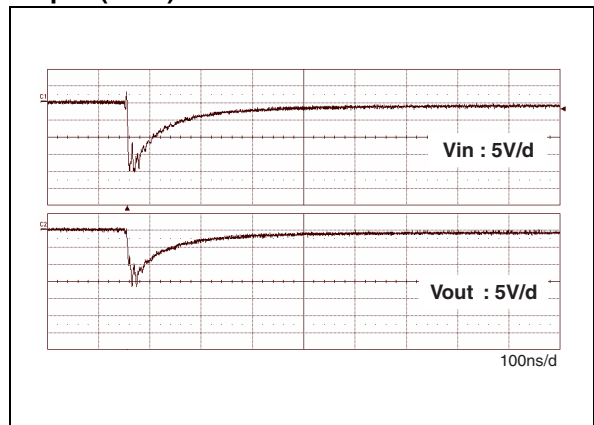


Figure 9: Line capacitance versus reverse applied voltage (typical)

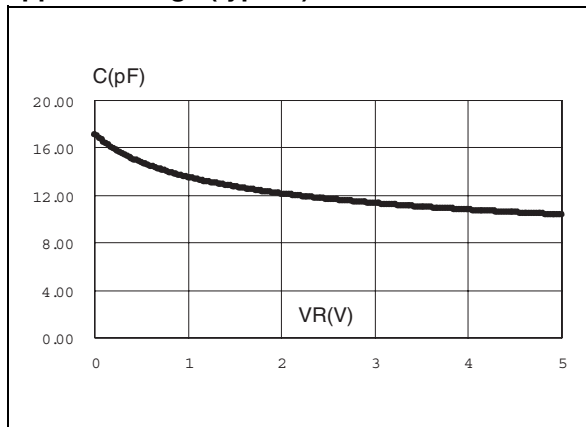


Figure 10: Aplac model

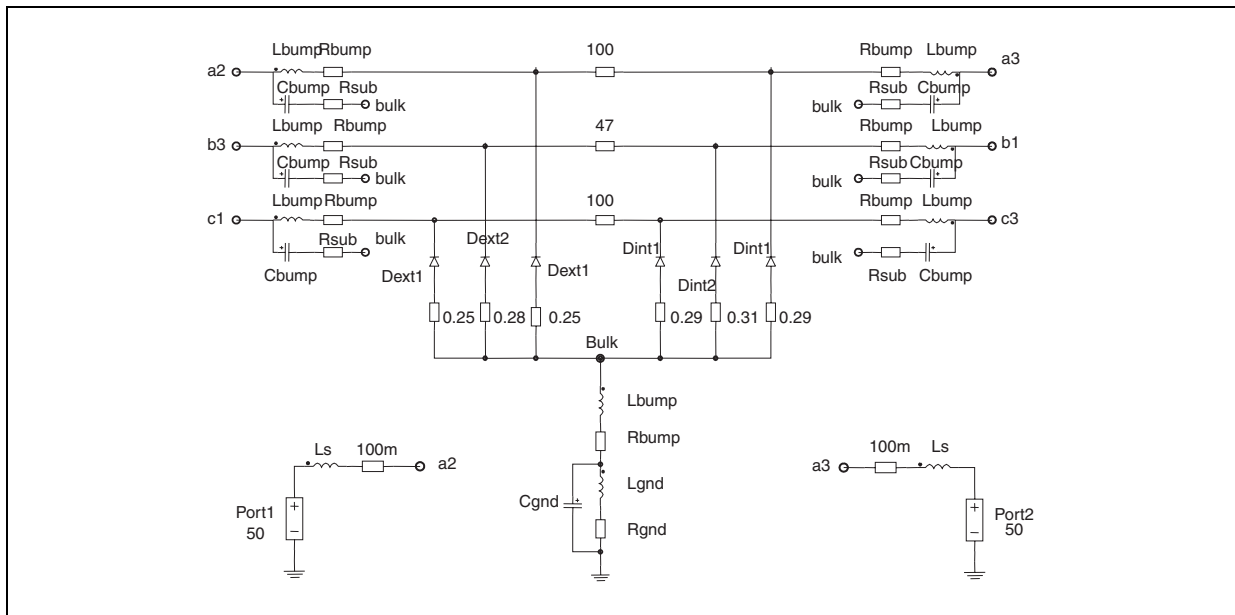


Figure 11: Aplac parameters

Ls 950pH				
Rs 150m	<u>Model Dint1</u>	<u>Model Dext1</u>	<u>Model Dint2</u>	<u>Model Dext2</u>
Cext1 15pF	BV=15	BV=15	BV=15	BV=15
Cint1 4.5pF	CJO=Cint1	CJO=Cext1	CJO=Cint2	CJO=Cext2
Cext2 14pF	IBV=1u	IBV=1u	IBV=1u	IBV=1u
Cint2 4pF	IKF=1000	IKF=1000	IKF=1000	IKF=1000
Rbump 20m	IS=10f	IS=10f	IS=10f	IS=10f
Lbump 50pH	ISR=100p	ISR=100p	ISR=100p	ISR=100p
Cbump 0.15pF	N=1	N=1	N=1	N=1
Rgnd 500m	M=0.3333	M=0.3333	M=0.3333	M=0.3333
Lgnd 50pH	RS=0.001m	RS=0.001m	RS=0.001m	RS=0.001m
Cgnd 0.15pF	VJ=0.6	VJ=0.6	VJ=0.6	VJ=0.6
Rsub 100m	TT=50n	TT=50n	TT=50n	TT=50n

Figure 12: Ordering Information Scheme

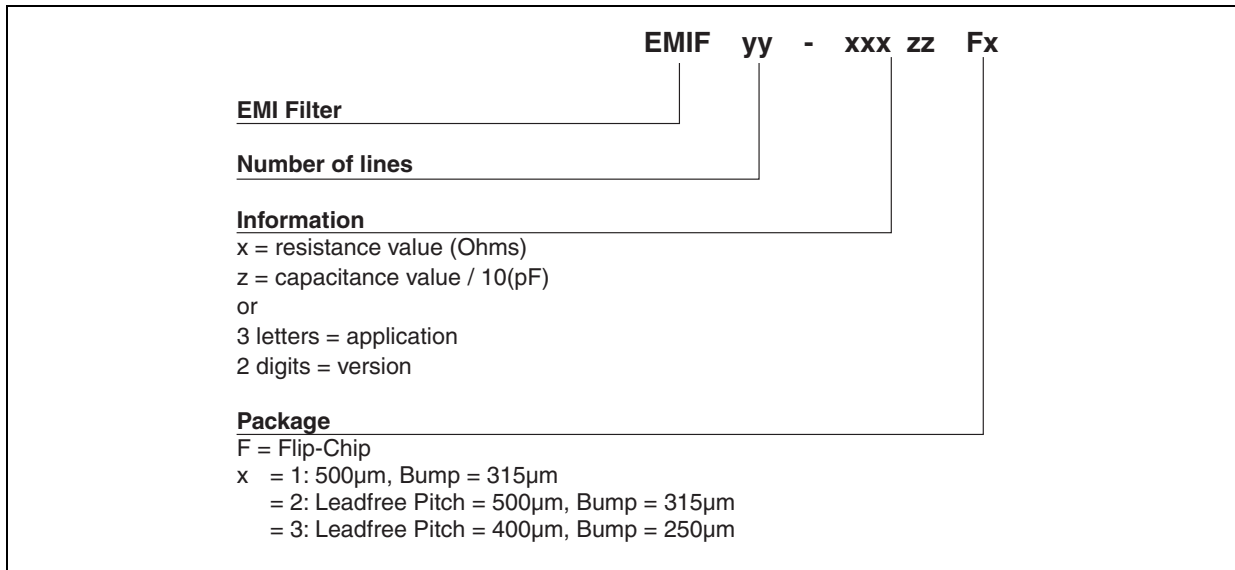


Figure 13: FLIP-CHIP Package Mechanical Data

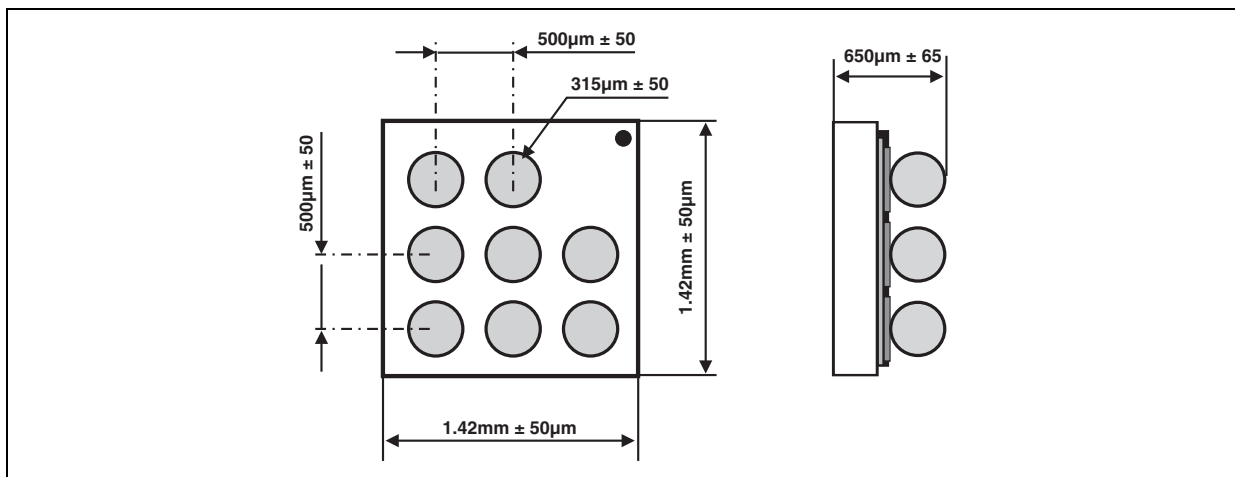


Figure 14: Foot print recommendations

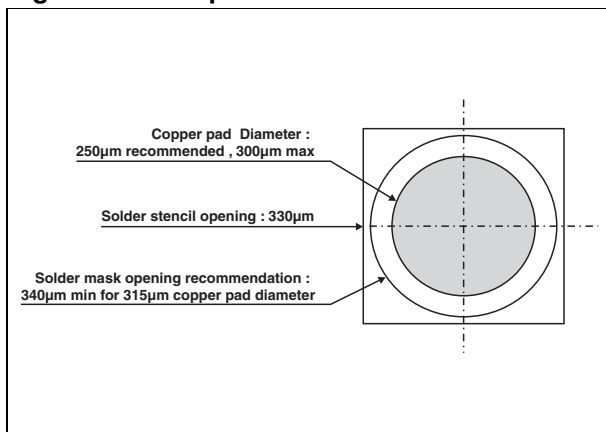


Figure 15: Marking

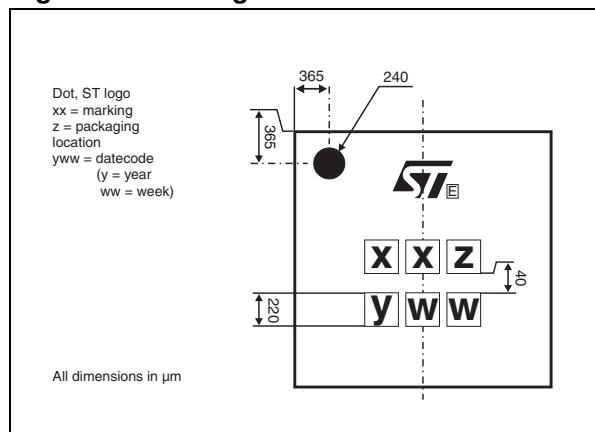


Figure 16: FLIP-CHIP Tape and Reel Specification

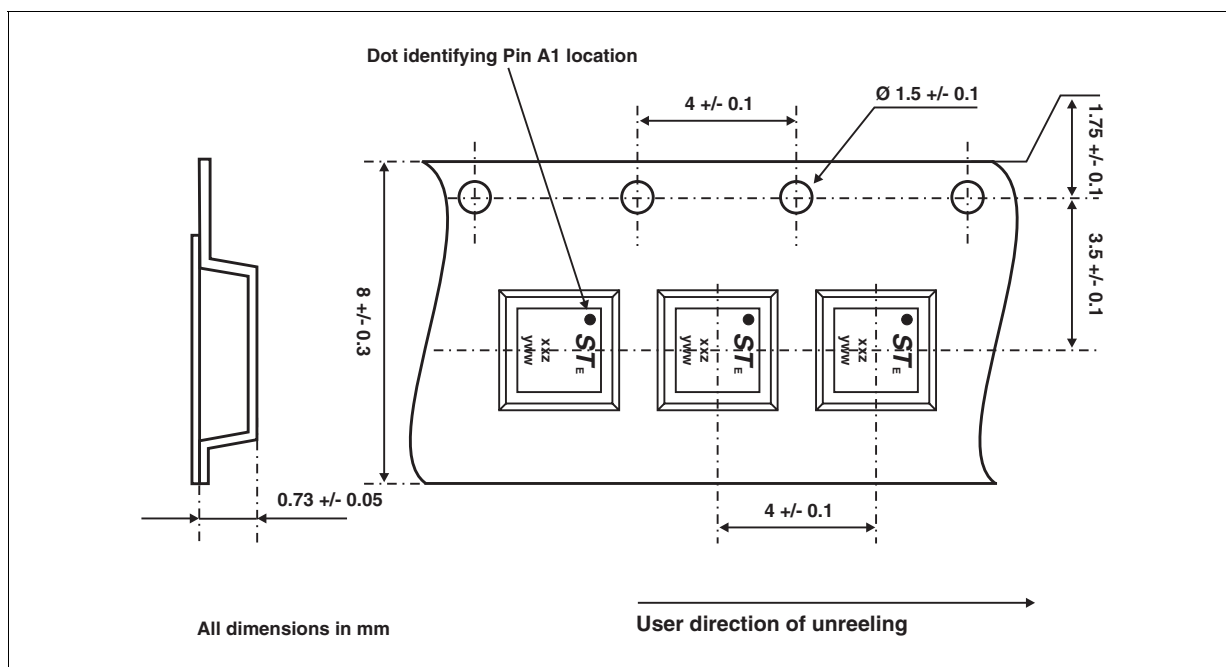


Table 4: Ordering Information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
EMIF03-SIM02F2	GJ	Flip-Chip	2.9 mg	5000	Tape & reel 7"

Note: More informations are available in the application notes:  
 AN1235: "Flip-Chip: Package description and recommendations for use"  
 AN1751: "EMI Filters: Recommendations and measurements"

Table 5: Revision History

Date	Revision	Description of Changes
08-Oct-2004	1	First issue.
20-Oct-2004	2	Minor layout update.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

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

© 2004 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)

