

## EMI filter with SWP protection for SIM interface

Datasheet – production data

### Features

- Lead-free package
- Very low PCB space consumption
- Very thin package: < 0.55 mm after reflow
- High efficiency in ESD suppression IEC6 1000-4-2 level 4
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and WLCSP packaging

### Complies with the following standards:

- IEC 61000-4-2 level 4
  - ± 15 kV (air discharge)
  - ± 8 kV (contact discharge)

### Application

- Mobile phones

### Description

The EMIF03-SIM05F3 is a highly integrated device designed to protect SIM interface and SWP line against ESD transients and EMI emission.

The device is the ideal fit for applications using NFC.

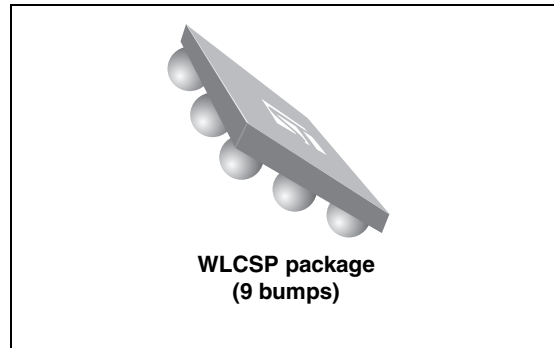


Figure 1. Pin configuration (bump side)

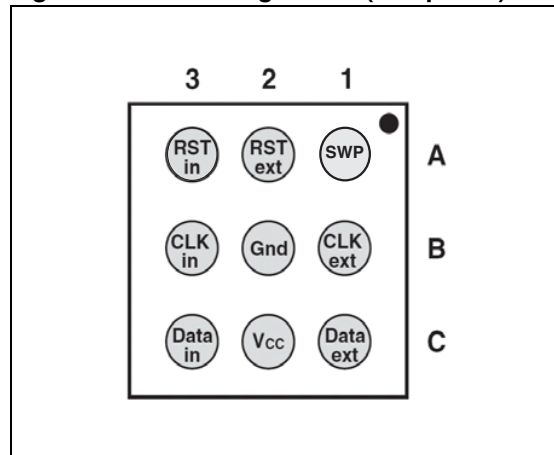
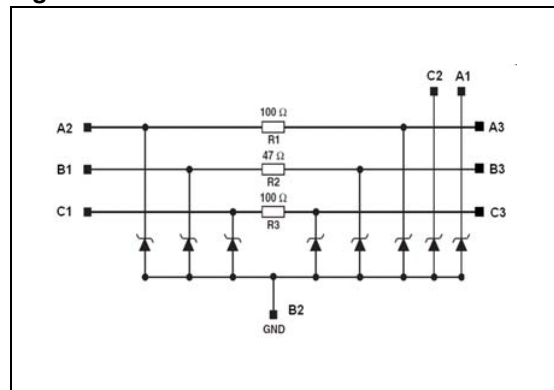


Figure 2. Functional schematic



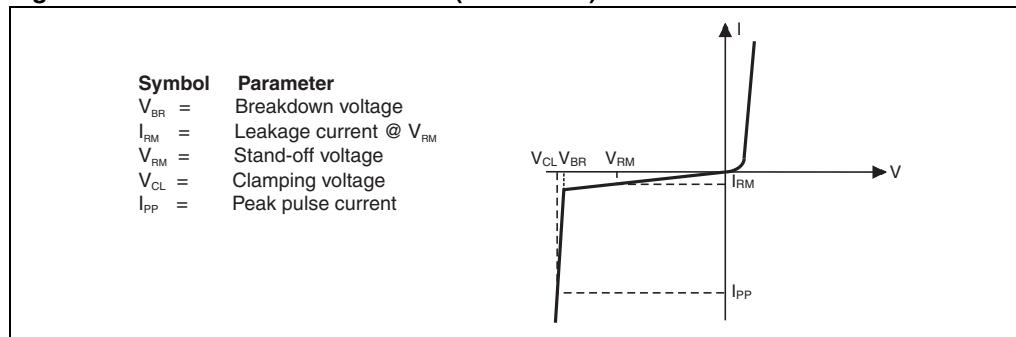
# 1 Characteristics

**Table 1. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter	Value	Unit	
$V_{PP}$	<b>Internal pins (A3, B3, C3):</b>			
	ESD discharge IEC 61000-4-2 <sup>(1)</sup> , level 1			
	Air discharge	2	kV	
	Contact discharge	2		
	<b>External pins (A1, A2, B1, C1, C2):</b>			
	ESD discharge IEC 61000-4-2, level 4			
Air discharge	16			
Contact discharge	16			
$T_j$	Maximum junction temperature	150	$^{\circ}\text{C}$	
$T_{op}$	Operating temperature range	- 30 to + 85		
$T_{stg}$	Storage temperature range	- 55 to 150		

1. Measurements done on IEC 61000-4-2 test bench. For further details see Application note AN3353, "IEC 61000-4-2 standard testing".

**Figure 3. Electrical characteristics (definitions)**



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

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$I_{RM}$	$V_{RM} = 3\text{ V}$			100	nA
$V_{BR}$	$I_R = 1\text{ mA}$	6			V
R1, R3	RST, DATA serial resistor		100		$\Omega$
R2	CLK serial resistor		47		
$C_{line}$	Line capacitance on RST, DATA, CLK lines $V_{line} = 0\text{ V}$ , $V_{osc} = 30\text{ mV}$ , $F = 1\text{ MHz}$ (measured under zero light conditions)		12		pF
$C_{SWP}$	Line capacitance on SWP line $V_{line} = 0\text{ V}$ , $V_{osc} = 30\text{ mV}$ , $F = 1\text{ MHz}$ (measured under zero light conditions)		2	3	pF

Figure 4. Attenuation measurements C1-C3, Figure 5. Attenuation measurements A1-C2  
A2-A3, B1-B3

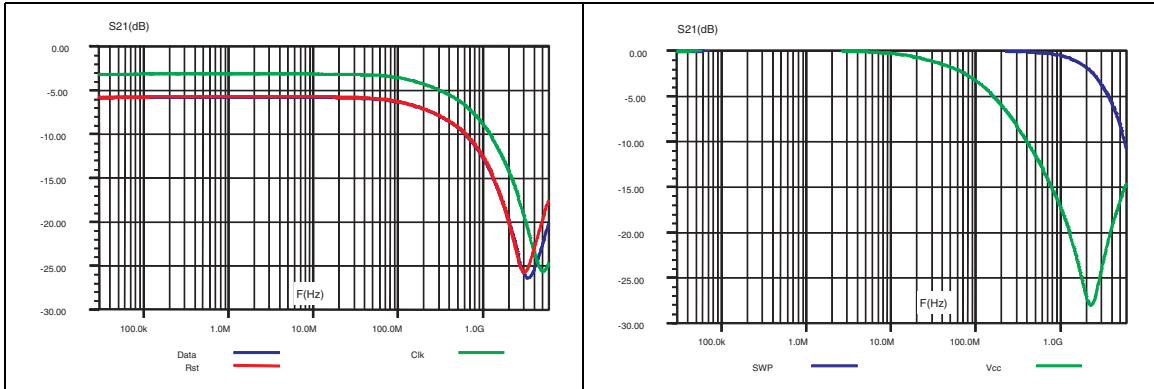


Figure 6. Analog Xtalk measurements

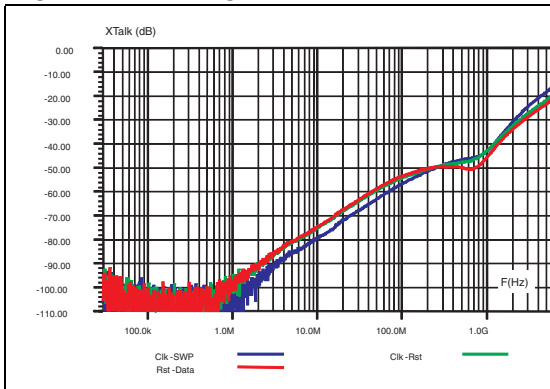


Figure 7. Digital crosstalk measurements

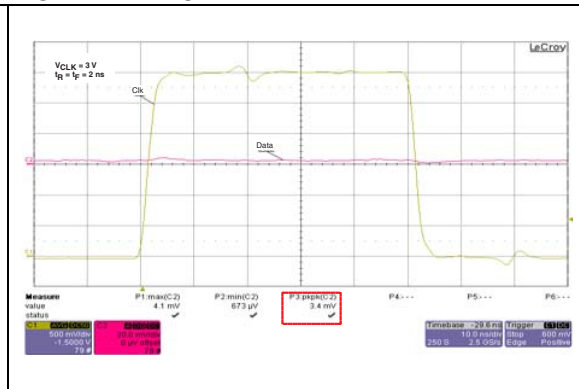


Figure 8. Dynamic characteristic (SWP)

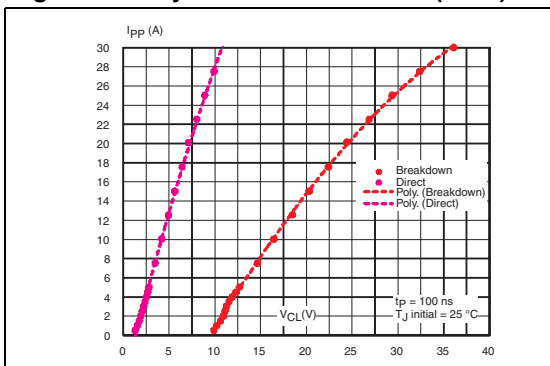


Figure 9. Dynamic characteristic (VCC)

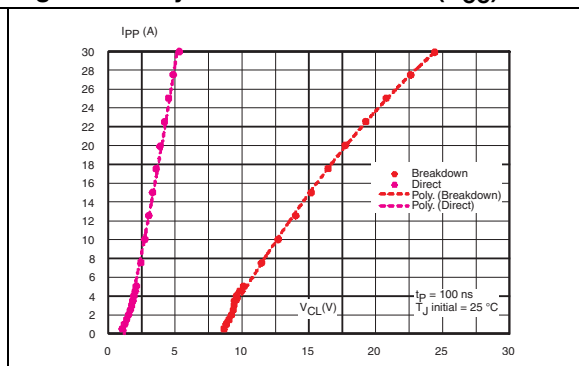


Figure 10. ESD response to IEC 61000-4-2 (+8 kV contact discharge) CLK line

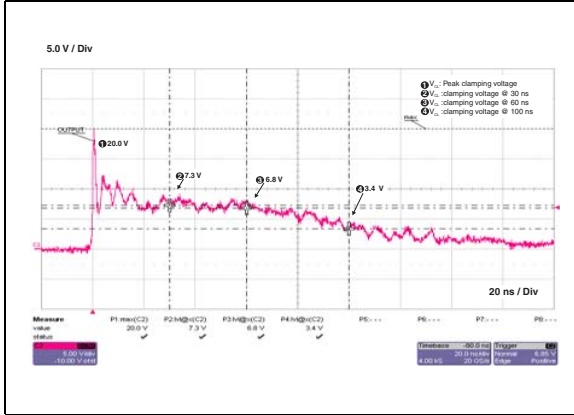


Figure 11. ESD response to IEC 61000-4-2 (-8 kV contact discharge) CLK line

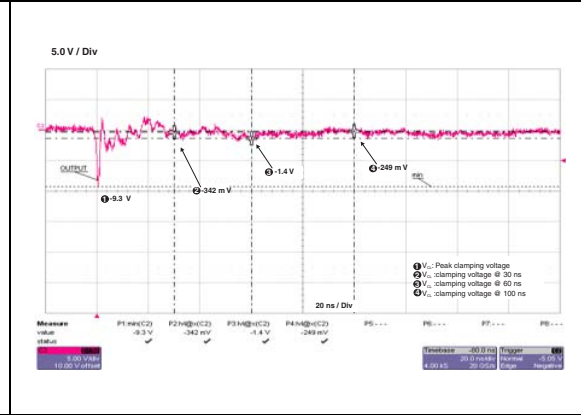


Figure 12. ESD response to IEC 61000-4-2 (+8 kV contact discharge) DATA line

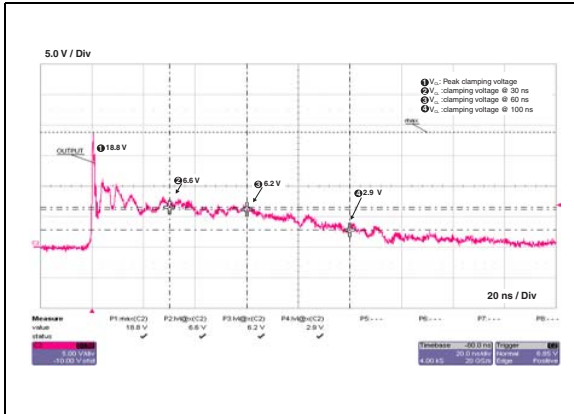


Figure 13. ESD response to IEC 61000-4-2 (-8 kV contact discharge) DATA line

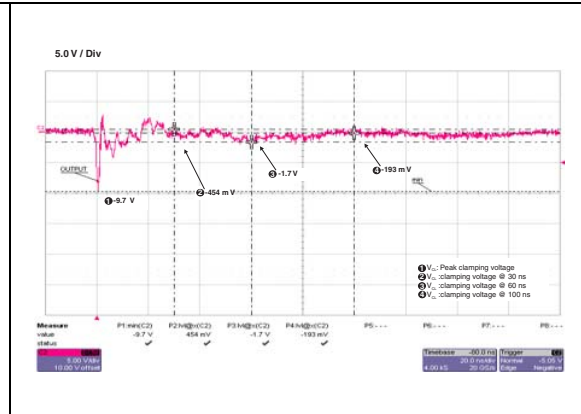


Figure 14. ESD response to IEC 61000-4-2 (+8 kV contact discharge) SWP line

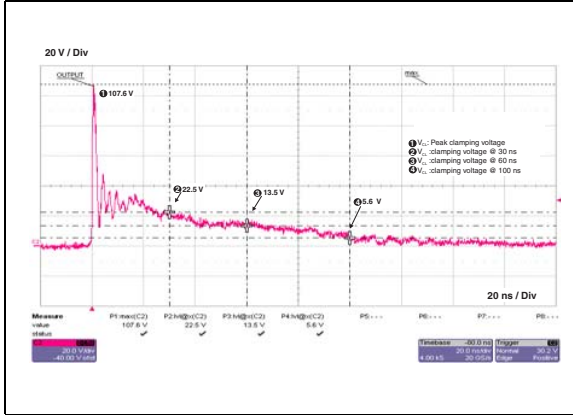


Figure 15. ESD response to IEC 61000-4-2 (-8 kV contact discharge) SWP line

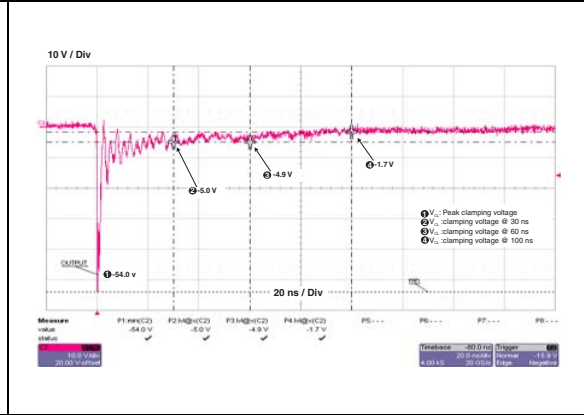


Figure 16. ESD response to IEC 61000-4-2 (+8 kV contact discharge) V<sub>CC</sub> line

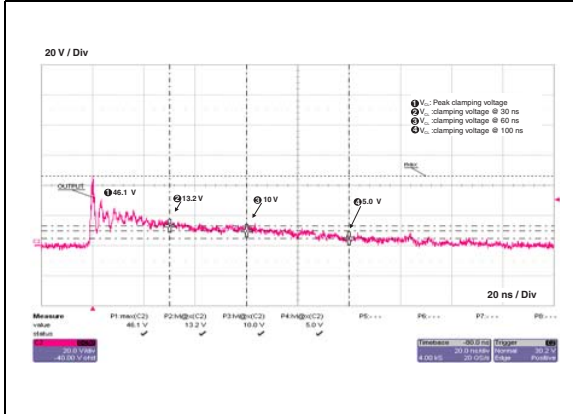
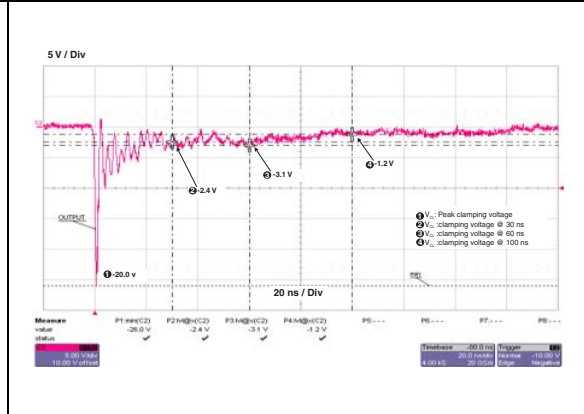
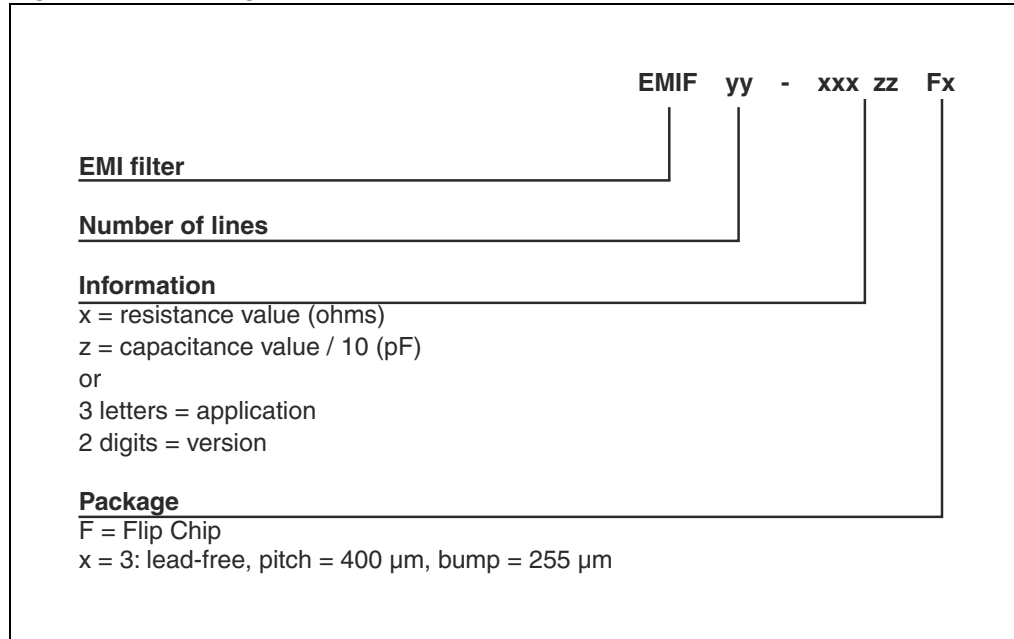


Figure 17. ESD response to IEC 61000-4-2 (-8 kV contact discharge) V<sub>CC</sub> line



## 2 Ordering information scheme

Figure 18. 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 19. WLCSP package dimensions

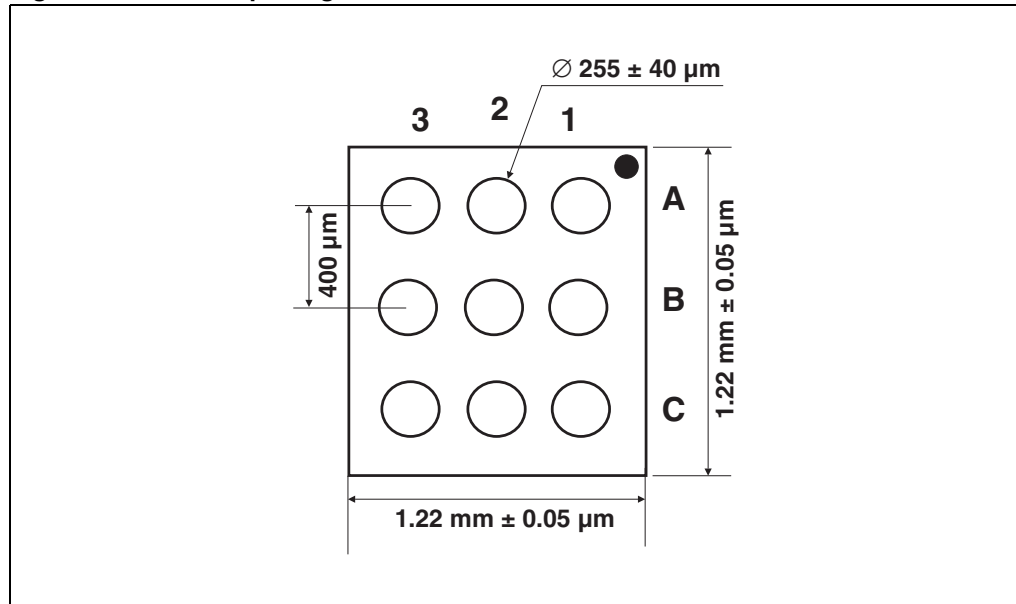
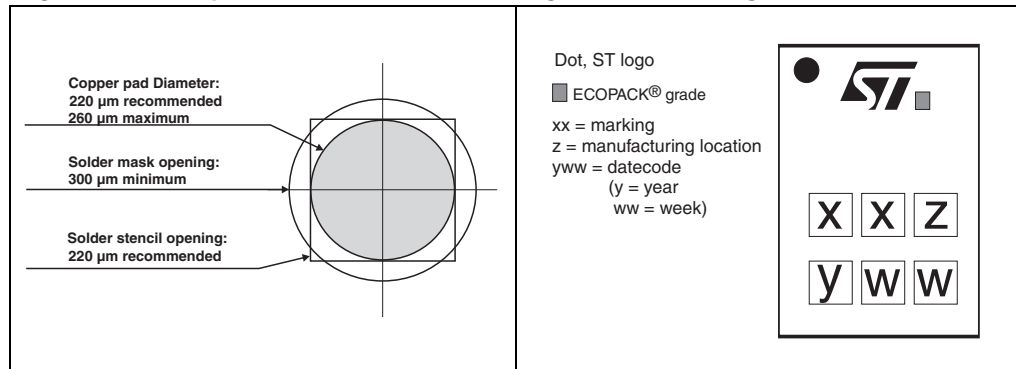
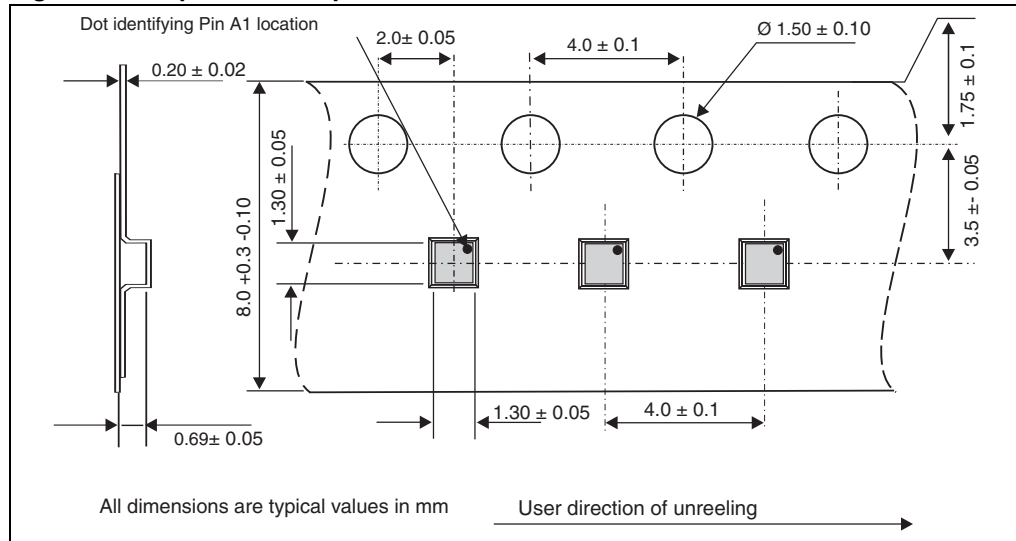


Figure 20. Footprint recommendations      Figure 21. Marking



**Figure 22. Tape and reel specification**



Note: *More information is available in the application notes:  
 AN2348, "IPAD™ 400 µm Flip Chip: package description and recommendations for use"  
 AN1751, "EMI filters: recommendations and measurements"*

## 4 Ordering information

**Table 3. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF03-SIM05F3	LB	WLCSP	1.9 mg	5000	Tape and reel (7")

## 5 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
12-Nov-2012	1	Initial release.



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