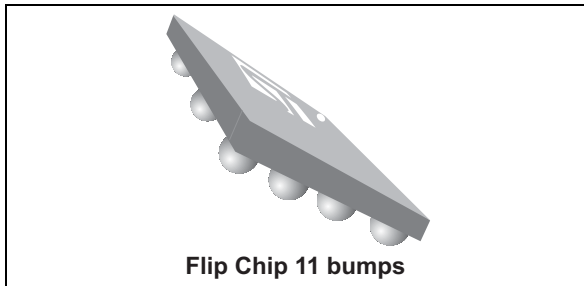


## 5 line IPAD™, EMI filter including ESD protection

Datasheet – production data



### Description

The EMIF05-SK01F3 chip is a highly integrated filter device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference.

This filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up to 15 kV.

### Features

- EMI (I/O) low-pass filter
- High efficiency in EMI/ESD protection
- Very thin package
- Lead-free package
- 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:
  - ±15 kV (air discharge)
  - ±8 kV (contact discharge)
- IEC 61000-4-2 level 1:
  - ±2 kV (air discharge)
  - ±2 kV (contact discharge)

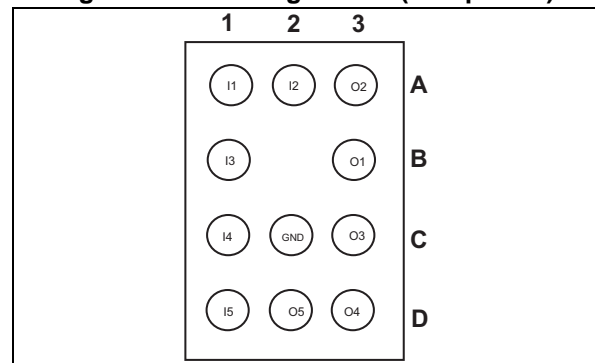
### Applications

Where EMI filtering in ESD sensitive equipment is required:

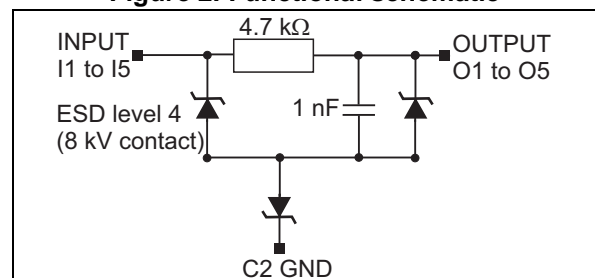
- Mobile phones and communication systems
- Computers, printers and MCU boards.

**TM:** IPAD is a trademark of STMicroelectronics

**Figure 1. Pin configuration (bump view)**



**Figure 2. Functional schematic**



**Table 1. Pin name**

INPUT	OUTPUT
I1 (A1)	O1 (B3)
I2 (A2)	O2 (A3)
I3 (B1)	O3(C3)
I4 (C1)	O4 (D3)
I5 (D1)	O5 (D2)

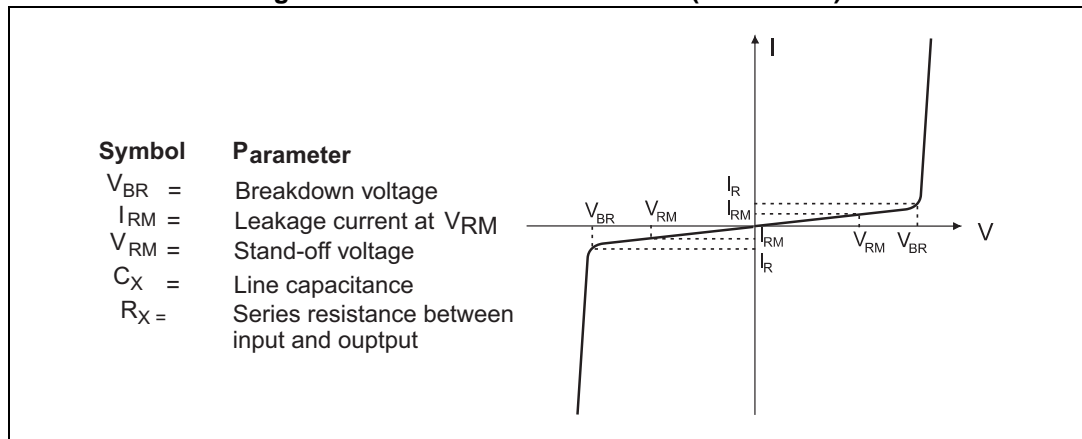
# 1 Characteristics

**Table 2. Absolute maximum ratings ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Parameter	Value	Unit
$V_{PP}$	External pins (A1, A2, B1, C1, D1): ESD discharge IEC 61000-4-2, level 4 Air discharge	15	kV
	Contact discharge	8	
	Internal pins (A3, B3, C3, D3, D2): ESD discharge IEC 61000-4-2 <sup>(1)</sup> , level 1 Air discharge	2	
	Contact discharge	2	
$T_{op}$	Operating temperature range	- 40 to + 85	$^{\circ}\text{C}$
$T_{stg}$	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 3. Electrical characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ )**

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$I_{RM}$	$V_{RM} = 3\text{ V}$			200	nA
$V_{BR}$	$I_R = 1\text{ mA}$	6		10	V
R1, R2, R3, R4, R5	$V_{line} = 0\text{ V}$ , $V_{osc} = 30\text{ mV}$ , $F = 1\text{ MHz}$	4.23	4.7	5.17	$\kappa\Omega$
C1, C2, C3, C4, C5	$V_{line} = 0\text{ V}$ , $V_{osc} = 30\text{ mV}$ , $F = 1\text{ MHz}$ (measured under zero light conditions)	0.8	1	1.2	nF

Figure 4. Attenuation versus frequency

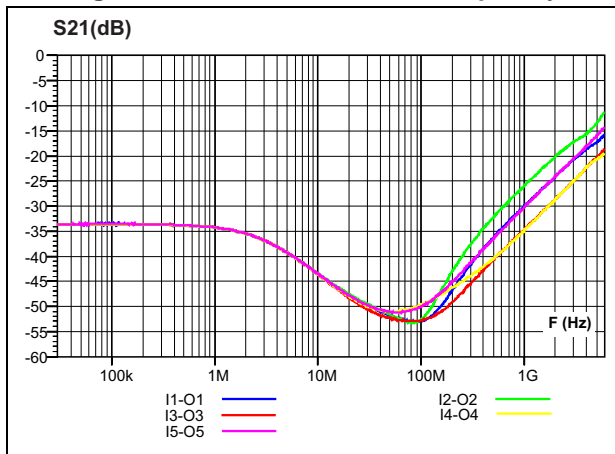


Figure 5. Analog crosstalk versus frequency

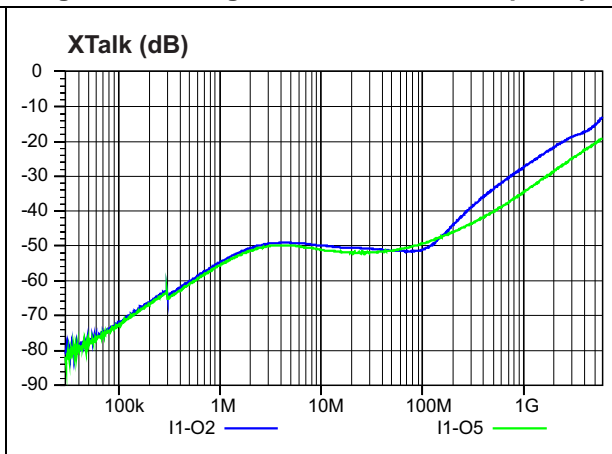


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

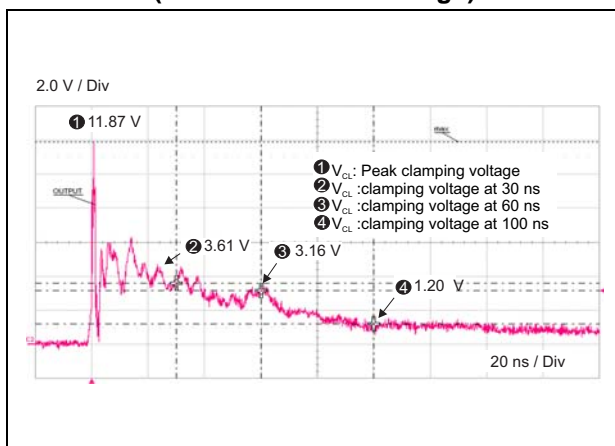


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

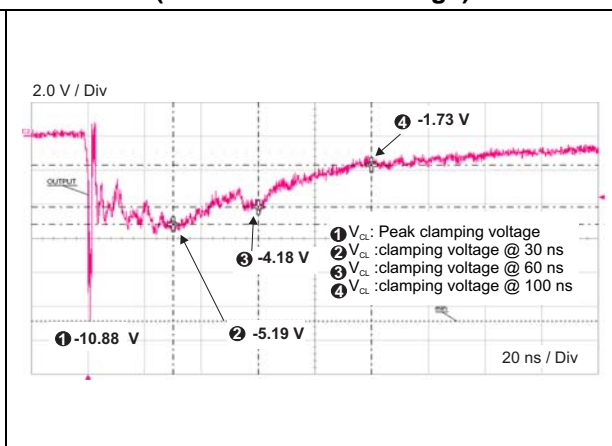
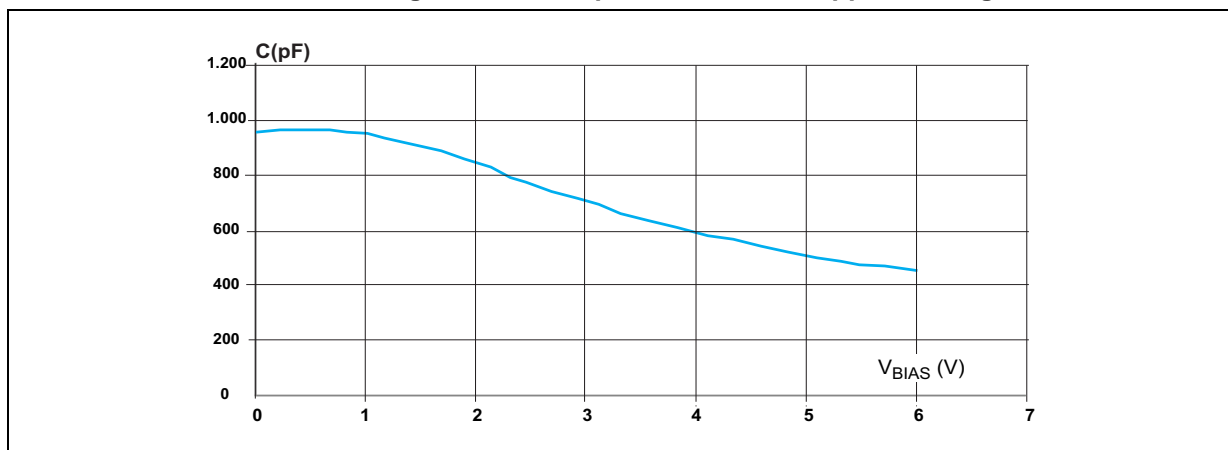


Figure 8. Line capacitance versus applied voltage



## 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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 9. Package dimensions

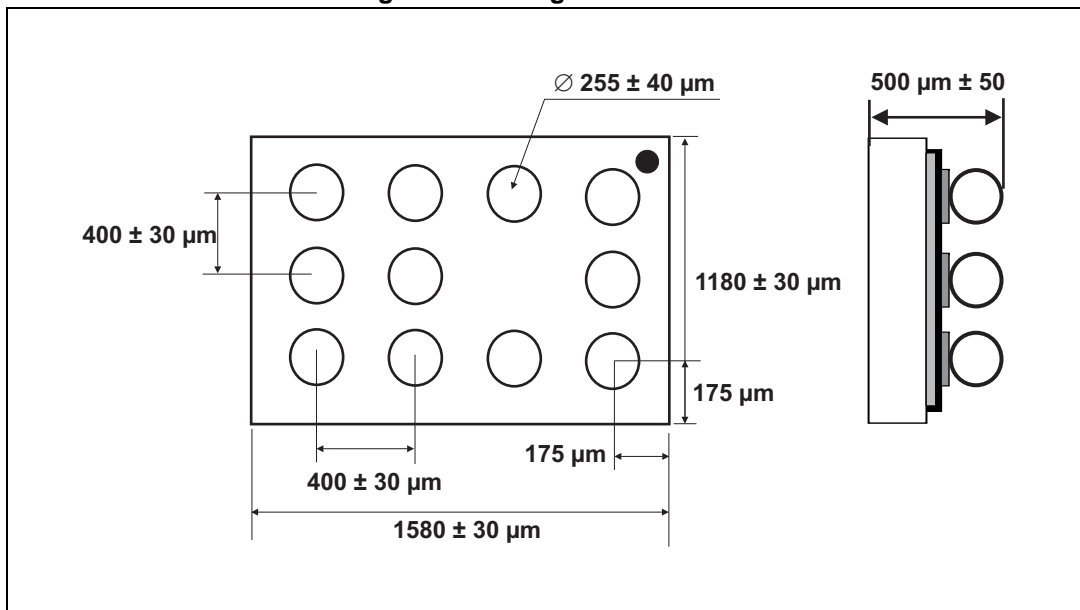


Figure 10. Footprint

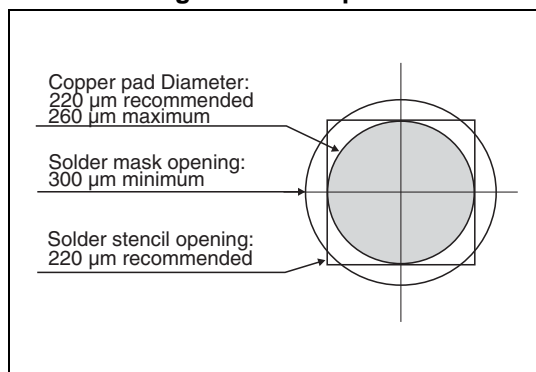


Figure 11. Marking

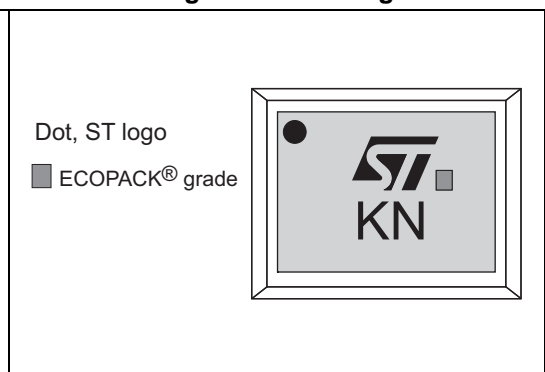
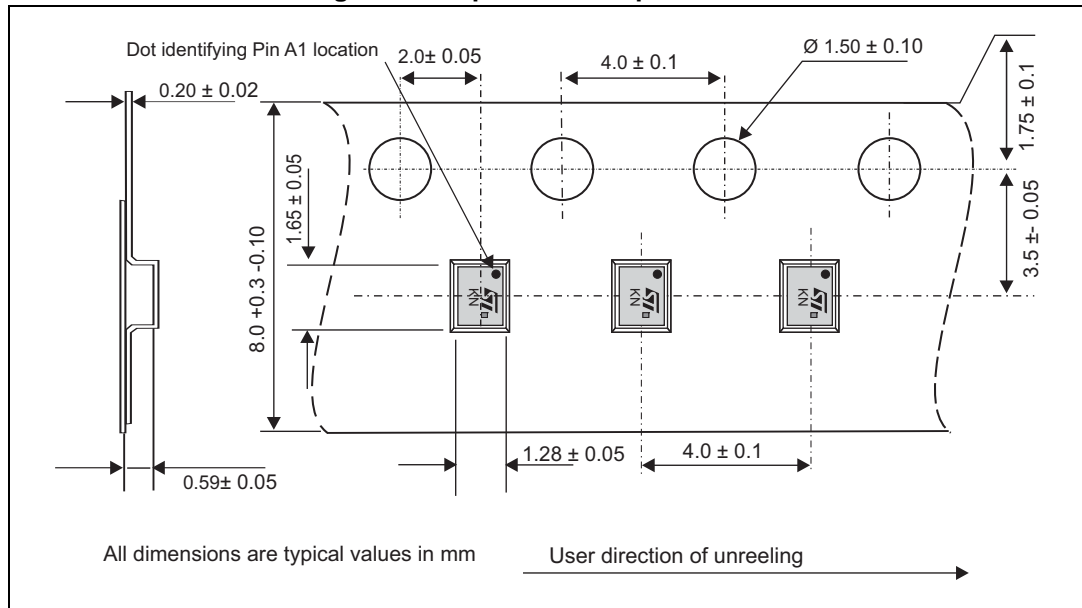


Figure 12. Tape and reel specification



### 3 Ordering information

Figure 13. Ordering information scheme

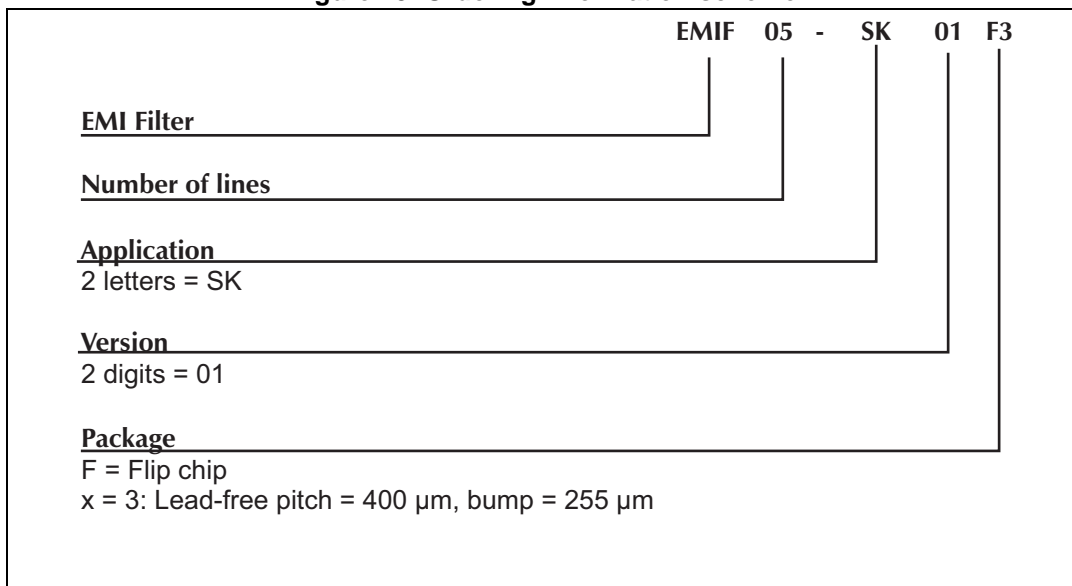


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF05-SK01F3	KN	Flip Chip	2.0 mg	5000	Tape and reel 7"

Note: More information is available in the STMicroelectronics Application notes:  
 AN2348: "Flip Chip: Package description and recommendations for use"  
 AN1751: "EMI Filters: Recommendations and measurements"

### 4 Revision history

Table 5. Document revision history

Date	Revision	Changes
07-Jul-2014	1	First issue.

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