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EMIF02-SPK03F2

2-channel EMI filter and ESD protection for speaker phone

Datasheet – production data

Features

- 2-channel EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering:
  - S21 attenuation, -40 dB at 900 MHz
  - Xtalk, in audio band, -60 dB
- Very low PCB space consumption: 0.89 x 1.26 mm
- Very thin package: 0.6 mm after reflow
- High efficiency in ESD suppression on input pins (IEC 61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging
- Packaged in lead-free Flip Chip

Complies with the following standards

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

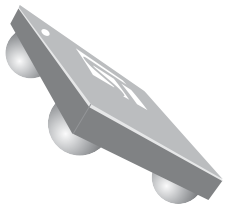
Application

- Mobile phones
- Portable devices
- Connectivity devices

Description

The EMIF02-SPK03F2 chip is a highly integrated device designed to suppress EMI/RFI noise for interface line filtering.

The EMIF02-SPK03F2 is 2-channel, ultra compact, high attenuation filter available in 0.5 mm pitch WLCSP package. Additionally, this filter includes ESD protection circuitry, which prevents damage to the protected device when subjected to ESD surges up 30 kV.



Flip Chip (5 bumps)

Figure 1. Pin configuration (bump side)

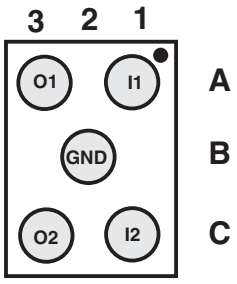
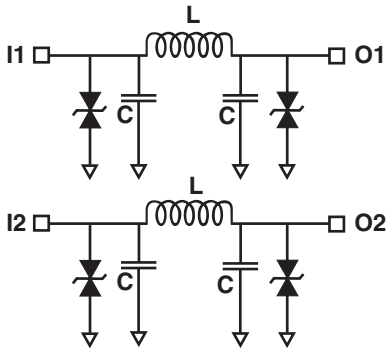


Figure 2. Functional schematic



1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
V_{PP}	ESD discharge IEC 61000-4-2(1) Air discharge Contact discharge	30	kV
I_{SPK}	Maximum rms currrent per channel	800	mA
T_j	Maximum junction temperature	125	°C
T_{op}	Operating temperature range	-30 to 85	°C
T_{stg}	Storage temperature range	-55 to + 150	°C

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

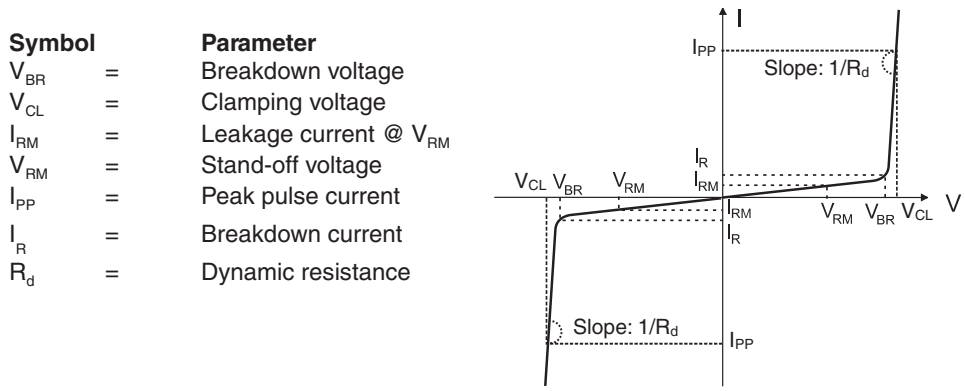


Table 2. Electrical characteristics - values (Tamb = 25 °C)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	6			V
R_d	tp = 100 ns		0.2		Ω
I_{RM}	V_{RM} = 3 V per line			0.3	µA
R_{DC_L}	DC resistance of the inductor		0.07	0.1	Ω
C_{line}	Vline = 0 V, V_{OSC} = 30 mV, F = 1 MHz		250		pF

Figure 4. Insertion losses versus frequency

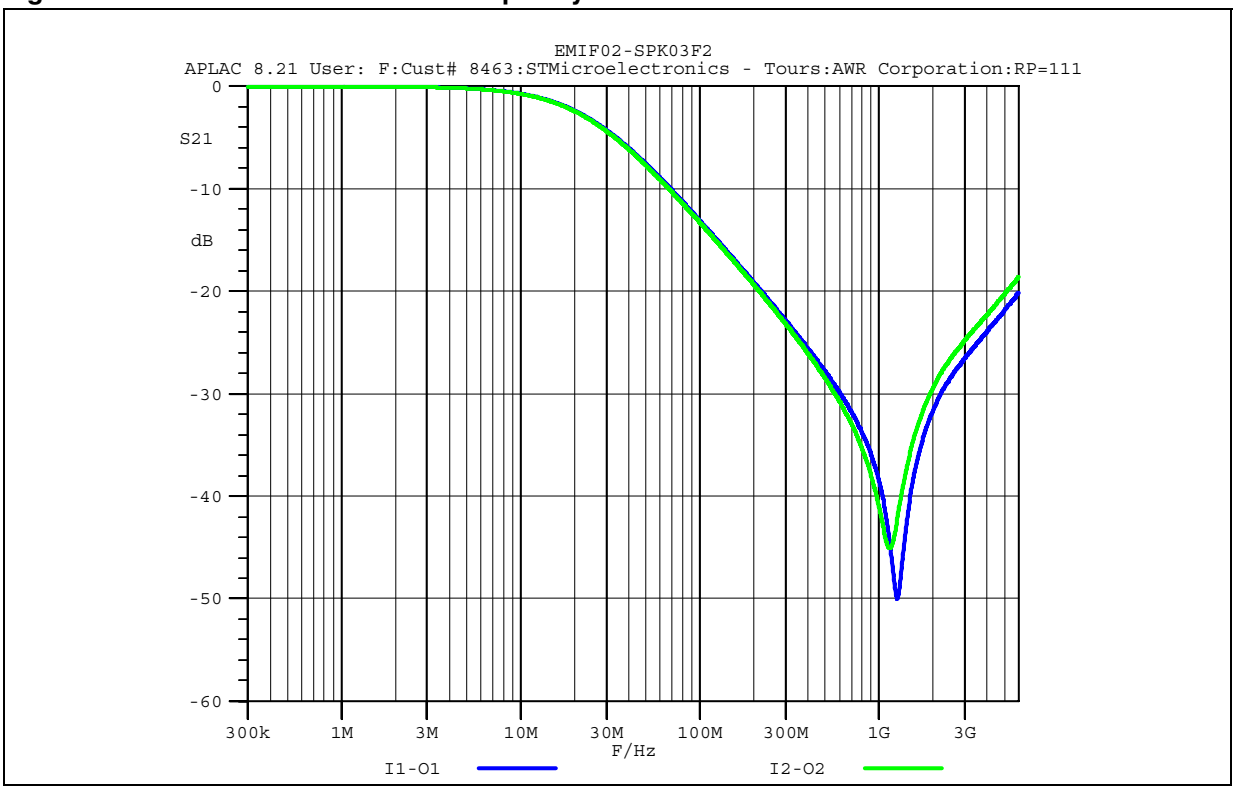


Figure 5. Analog crosstalk versus frequency

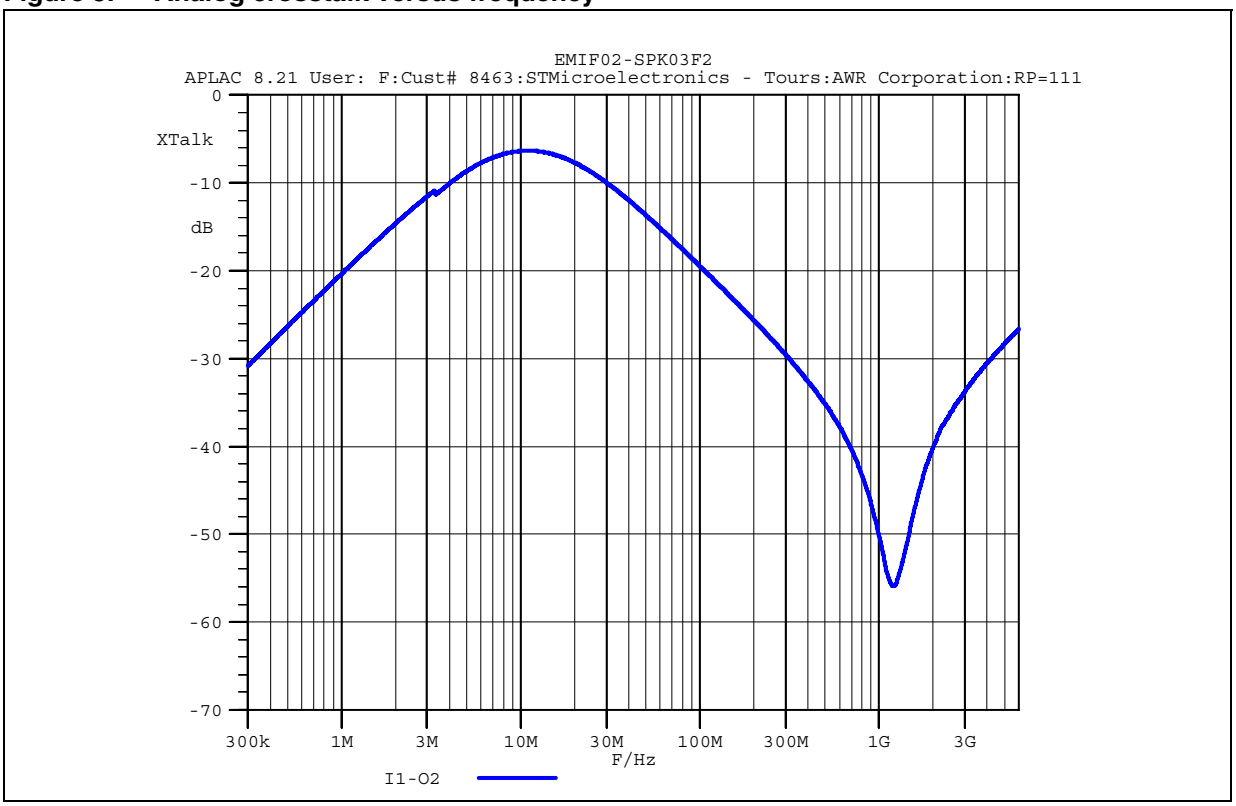


Figure 6. Audio band analog crosstalk

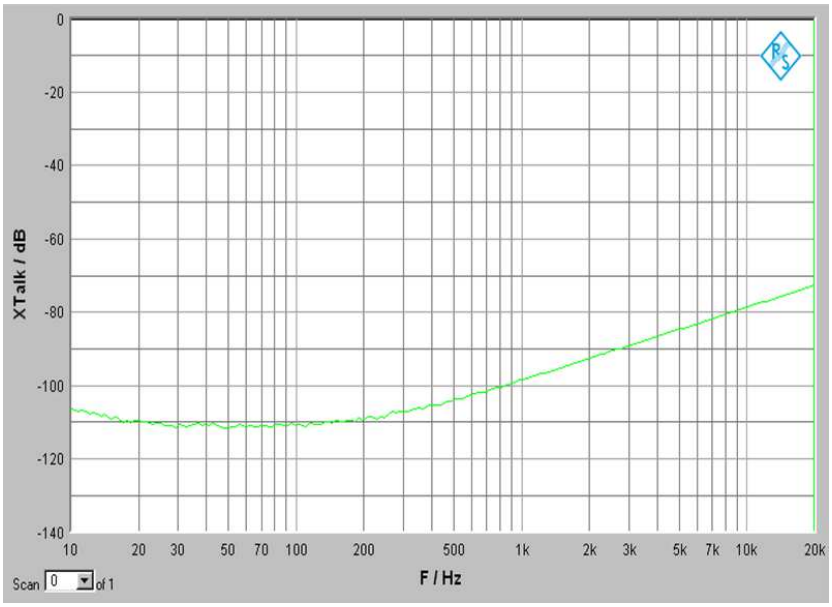
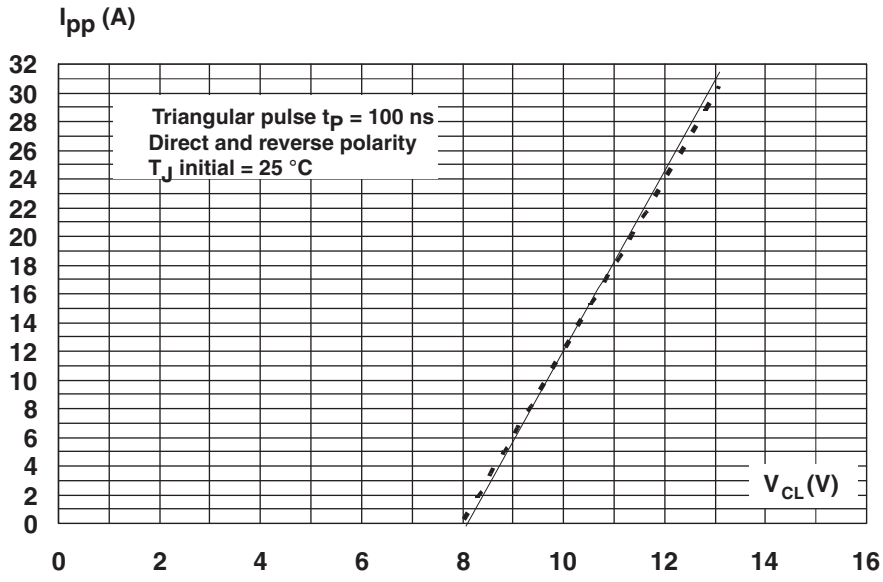


Figure 7. Clamping voltage V_{CL} versus peak pulse current I_{PP} for short pulse duration such as ESD surges



Note: For further information on the dynamic characteristic see the STMicroelectronics' application note AN4022, "TVS short pulse R_d measurement and correlation with TVS clamping voltage during ESD".

Figure 8. ESD test conditions

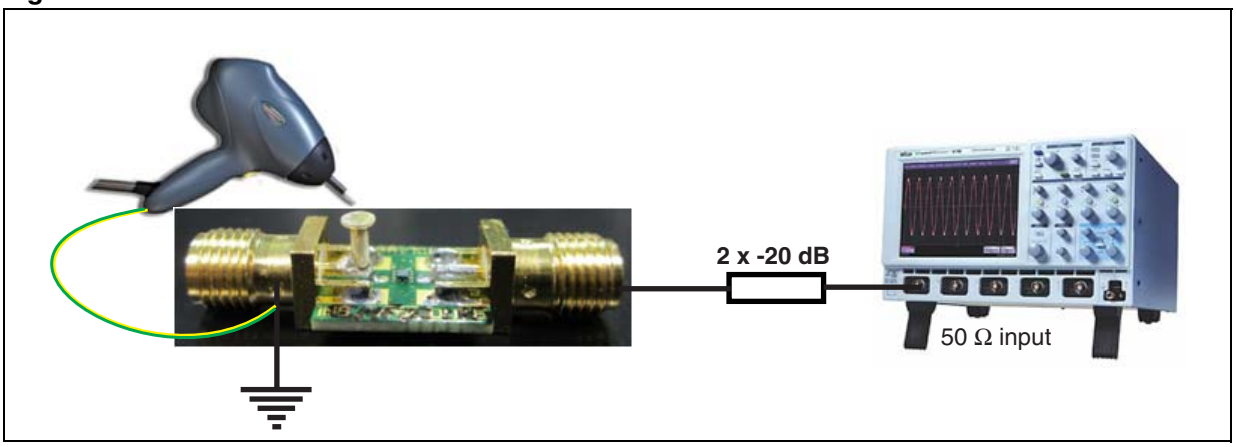


Figure 9. Output filter ESD response to IEC 61000-4-2 (+30 kV contact discharge) Ix to Ox

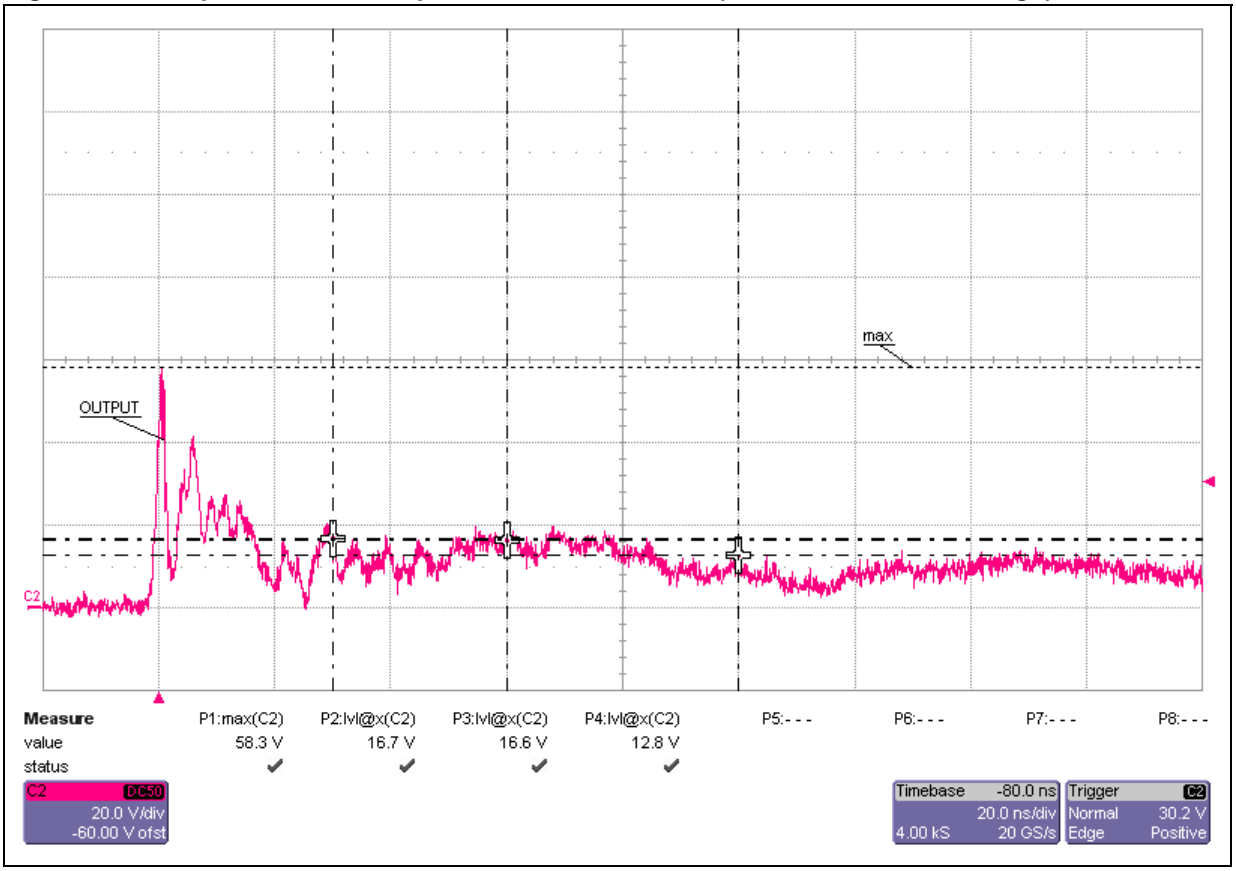


Figure 10. Output filter ESD response to IEC 61000-4-2 (-30 kV contact discharge) Ix to Ox

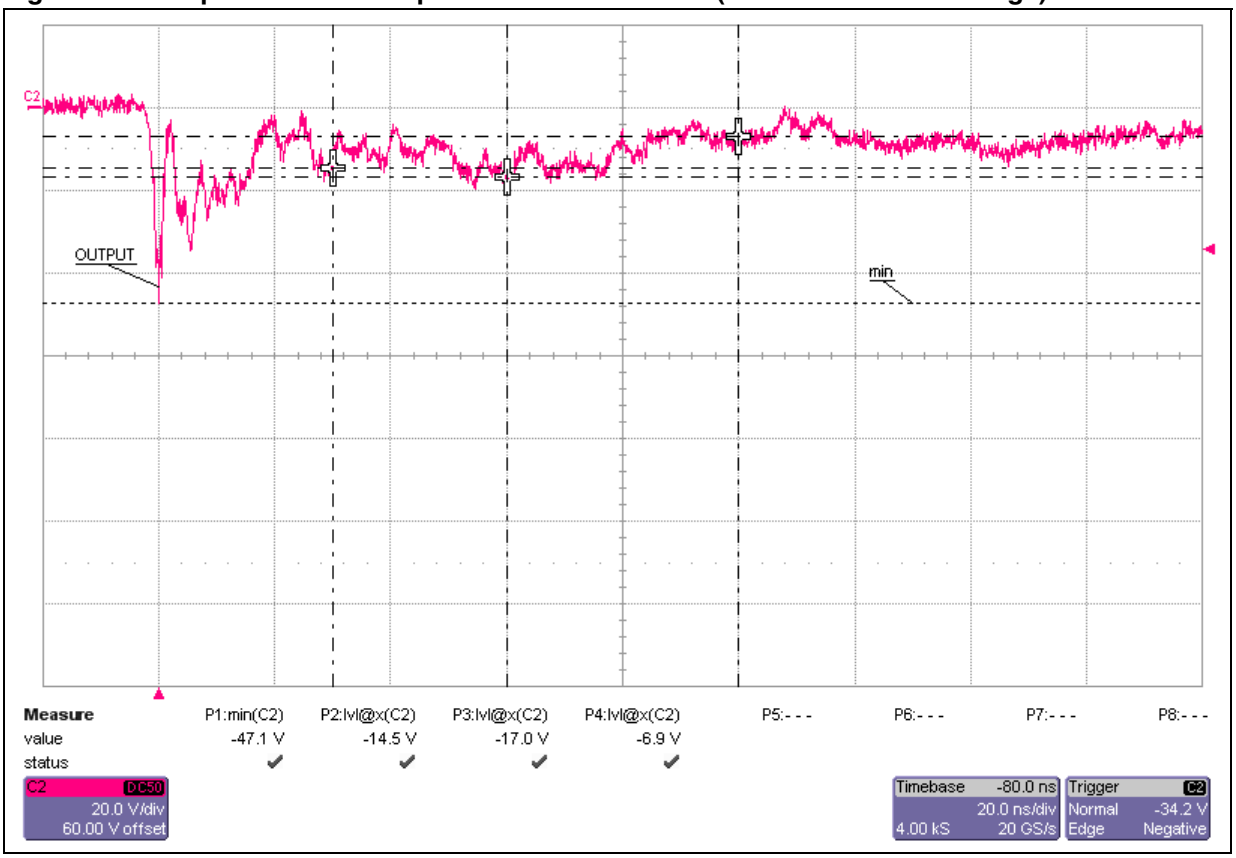
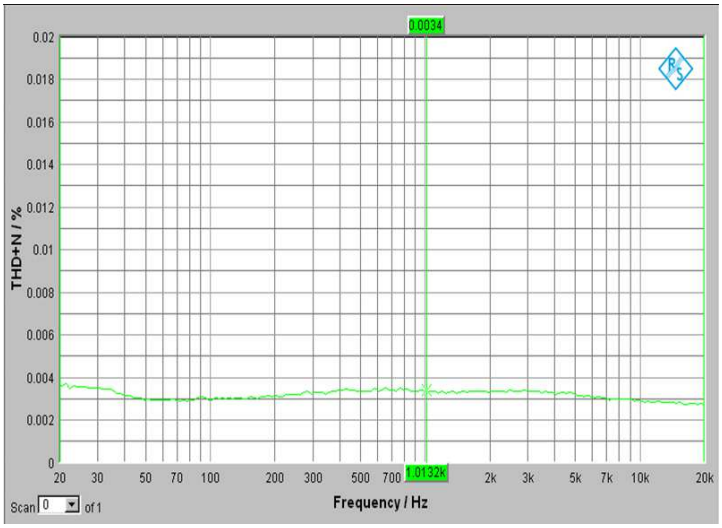
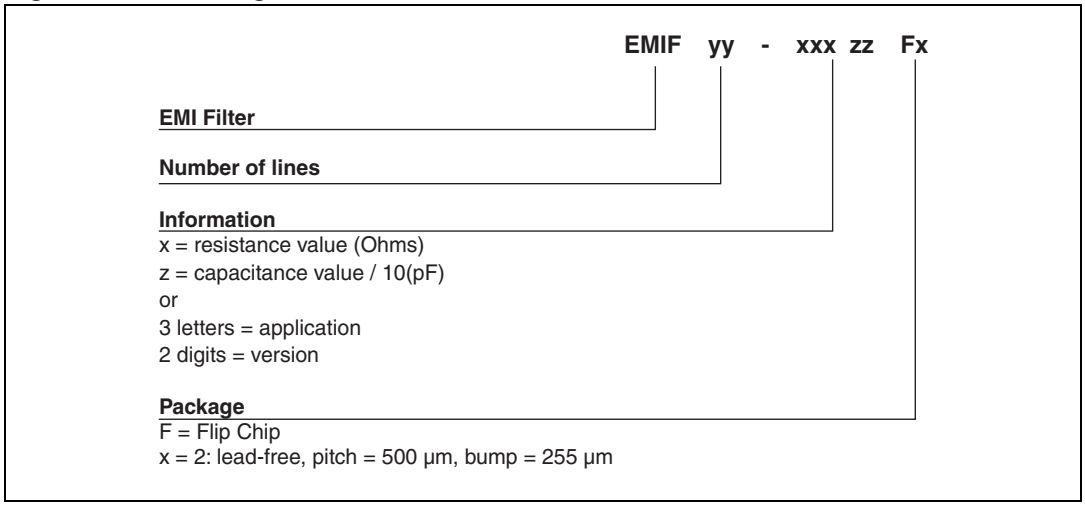


Figure 11. Total harmonic distortion plus noise



2 Ordering information scheme

Figure 12. 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. ECOPACK® is an ST trademark.

Figure 13. Package dimensions

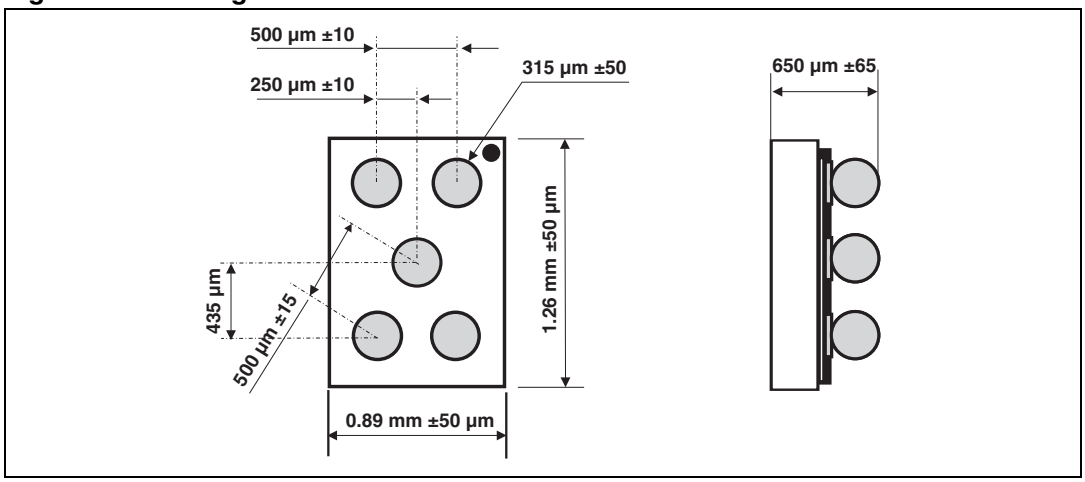


Figure 14. Footprint

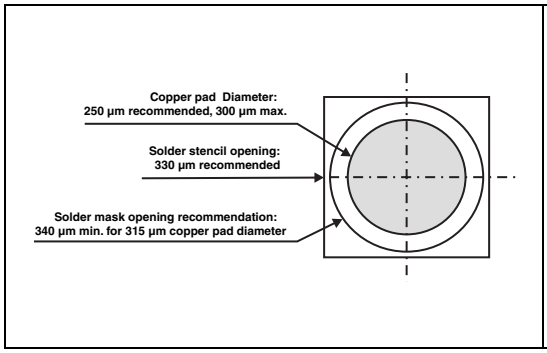


Figure 15. Marking

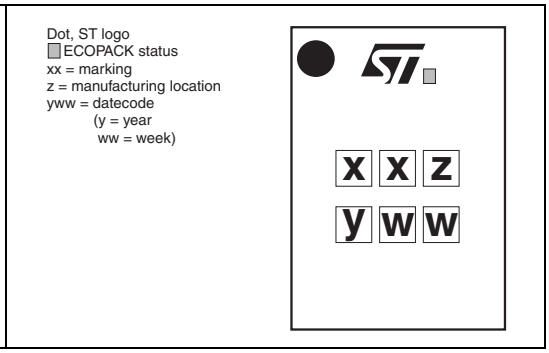
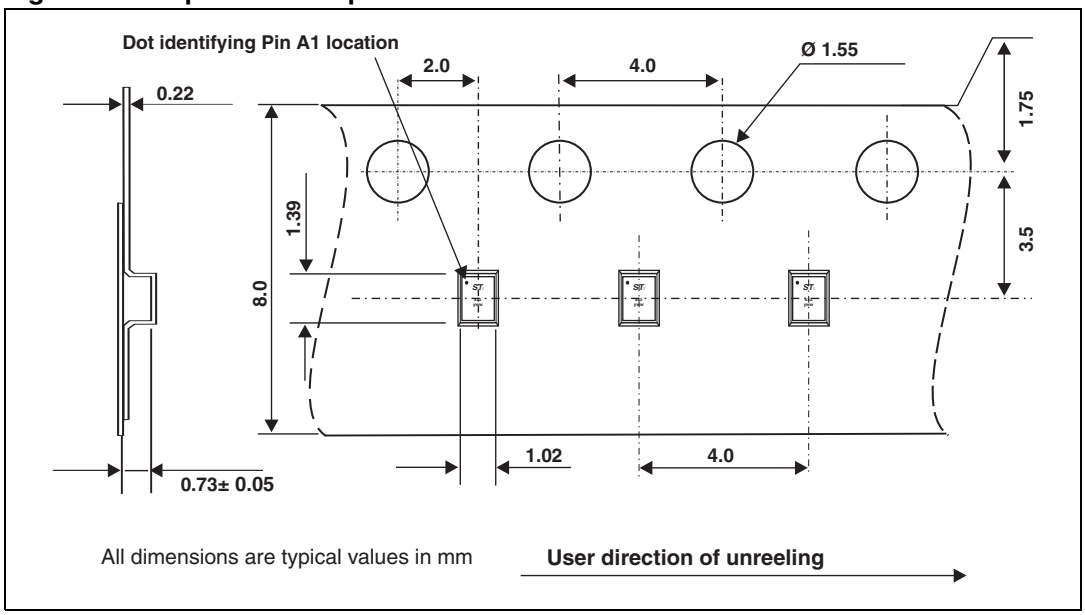


Figure 16. Tape and reel specification



Note: More information is available in the application notes:
AN1235,"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
EMIF02-SPK03F2	JX	Flip Chip	1.8 mg	5000	Tape and reel 7"

5 Revision history

Table 4. Document revision history

Date	Revision	Changes
19-Jun-2012	1	Initial release.

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