EMIF02-MIC07F3

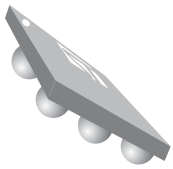
EMI filter and ESD protection

Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI/ESD protection
- Lead-free package
- Very thin package
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging

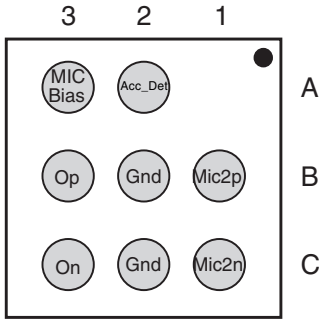
Complies with the following standards

- IEC 61000-4-2 level 4
  (on external pins B1 and C1):
  - ±15 kV (air discharge)
  - ±8 kV (contact discharge)
- IEC 61000-4-2 level 1
  (on external pins):
  - ±2 kV (air discharge)
  - ±2 kV (contact discharge)



Lead-free Flip-Chip package
(8 bumps)

Figure 1. Pin configuration (bump side)



Applications

Where EMI filtering in ESD sensitive equipment is required:

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

Description

The EMIF02-MIC07F3 chip is a highly integrated audio 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.

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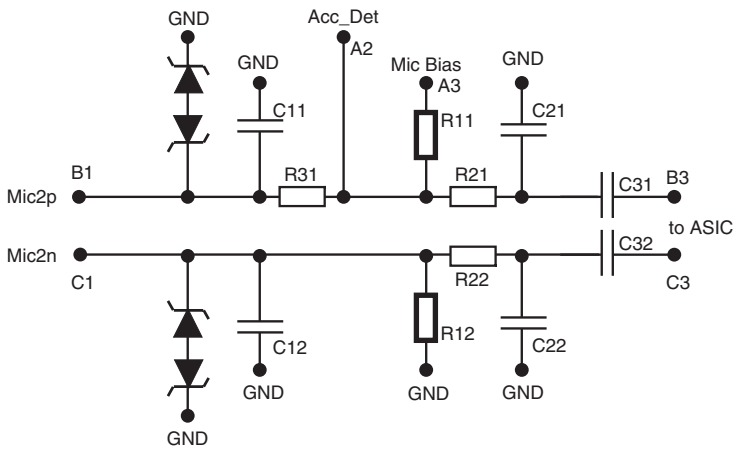
1 Characteristics

Figure 2. Configuration



B2 and C2 are ground bumps and must be connected together

Acc_Det pin connection

The Acc_Det pin (accessory detection) is an input pin for the audio pre-amplifier chip which detects the voltage of the microphone line MIC2P in case the user presses the on-hook/off-hook button on the headset. When the user selects off-hook using the headset button, the MIC2P is shorted to MIC2N which is grounded. If your design does not support the Acc_Det feature, the Acc_Det pin must be left open (not connected).

Table 1. Absolute ratings (limiting values)

Symbol	Parameter and test conditions	Value	Unit
V_{PP}	**Pins B1 and C1, ESD discharge IEC 61000-4-2, level 4:** air discharge contact discharge **Pins A2, A3, B3, C3, ESD discharge IEC 61000-4-2, level 1** air discharge contact discharge	 15 8 2 2	kV
P_D	Power dissipation at T_{amb} = 25 °C	60	mW
T_{op}	Operating temperature range	- 40 to + 85	°C
T_{stg}	Storage temperature range	- 55 to + 150	°C

Figure 3. Electrical characteristics (definitions)

Symbol		Parameter
V_{BR}	=	Breakdown voltage
V_{CL}	=	Clamping voltage
I_{RM}	=	Leakage current @ V_{RM}
V_{RM}	=	Stand-off voltage
I_F	=	Forward current
I_{PP}	=	Peak pulse current
I_R	=	Breakdown current
V_F	=	Forward voltage drop
R_d	=	Dynamic impedance
αT	=	Voltage temperature

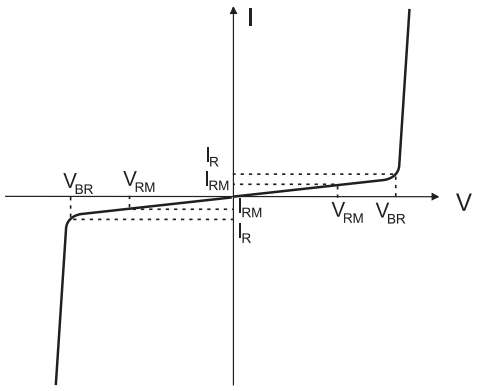


Table 2. Electrical characteristics - values (T_{amb} = 25 °C)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	7			V
I_{RM}	V_{RM} = 3 V per line		50	200	nA
R_{11}		1900	2000	2100	Ω
R_{12}		800	1000	1200	
R_{21}, R_{22}		1760	2200	2640	
R_{31}		20	25	30	
C_{11}, C_{12}	V_{line} = 0 V, V_{osc} = 30 mV, F = 1 MHz (measured under zero light conditions and with bumps B2 and C2 connected together)	0.66	0.83	1	nF
C_{21}, C_{22}		1	1.25	1.5	
C_{31}, C_{32}		7	8.75	10.5	

Table 3. Dynamics characteristics (T_{amb} = 25° C)(1)

Symbol	Condition	Max. Value	Unit
Ripple	Between 5 Khz and 20 kHz	2	dB
THD+N	-21dBV fully differential between MICn and MICp 1kHz	0.009	%

1. Dynamics characteristics are guaranteed by design and not production tested

Figure 4. Attenuation versus frequency

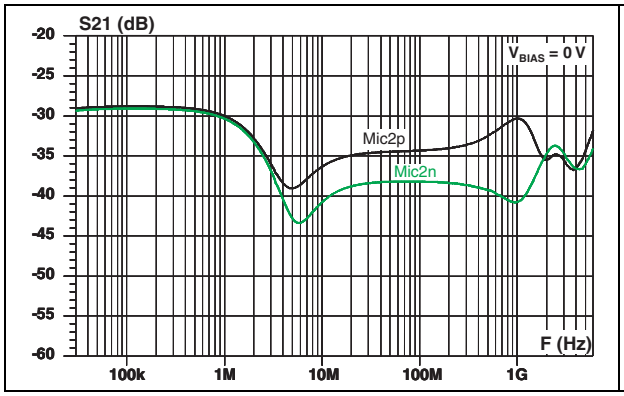


Figure 5. Attenuation simulation with2 kΩ input and 47 kΩ output

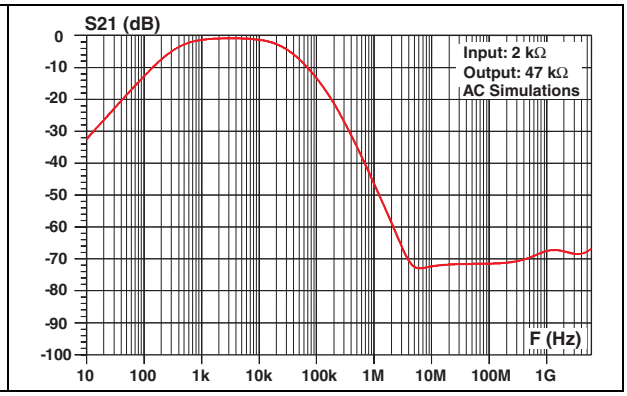


Figure 6. Analog crosstalk measurement

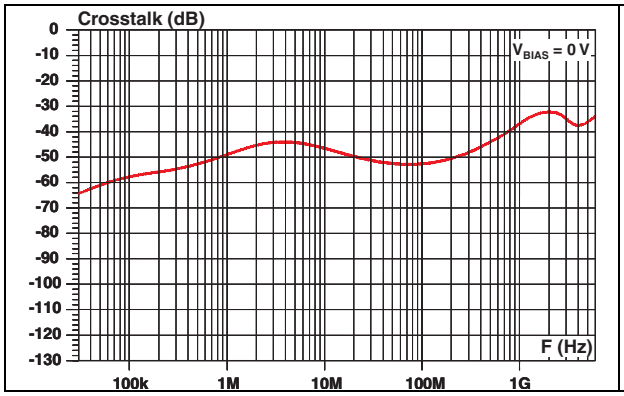


Figure 7. ESD response to IEC 61000-4-2 on one input $V_{(in)}$ and on one output $V_{(out)}$

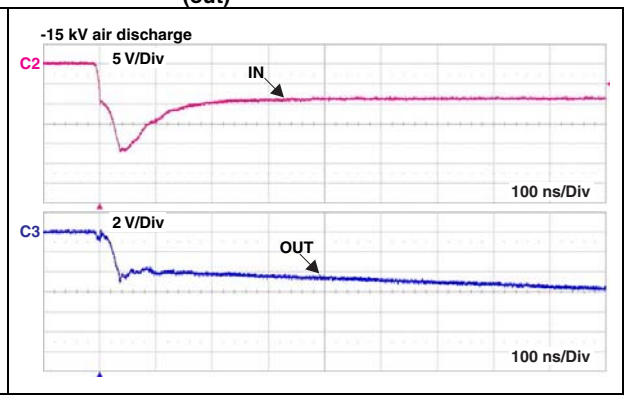


Figure 8. ESD response to IEC 61000-4-2 on one input $V_{(in)}$ and on one output $V_{(out)}$

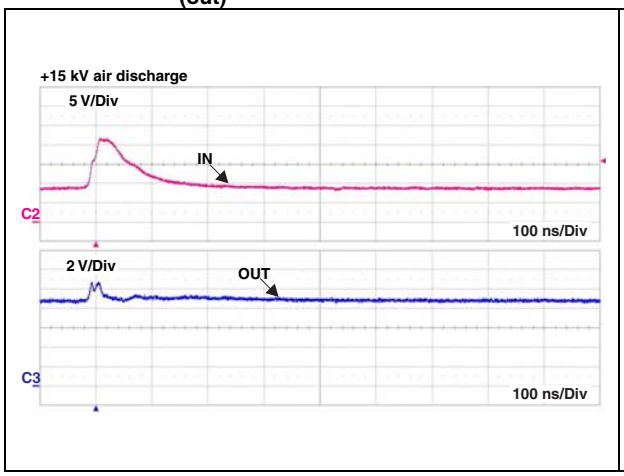
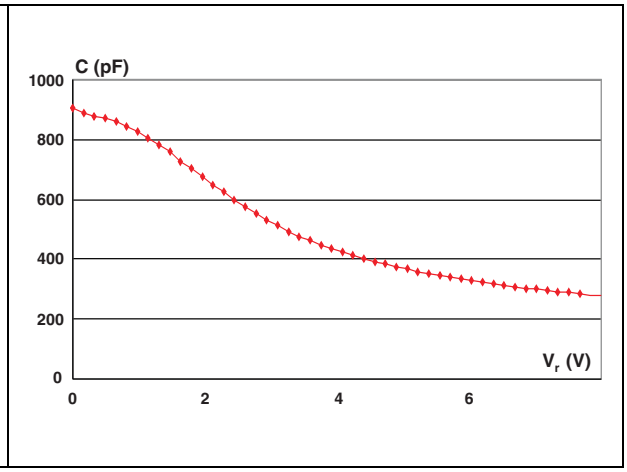
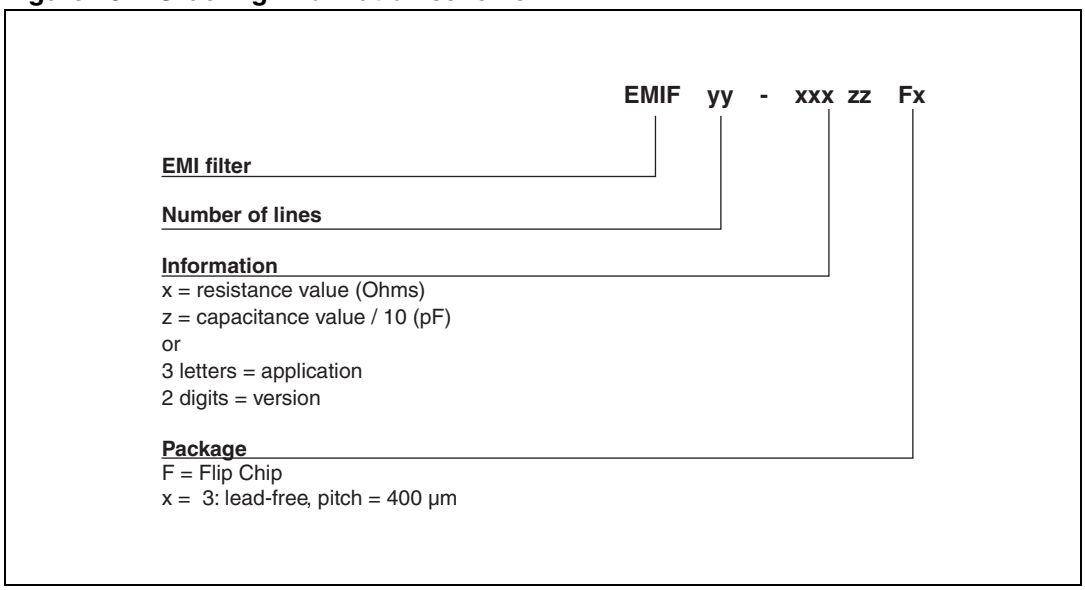


Figure 9. Line capacitance versus applied voltage (C11)



2 Ordering information scheme

Figure 10. 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 11. Flip-Chip package dimensions

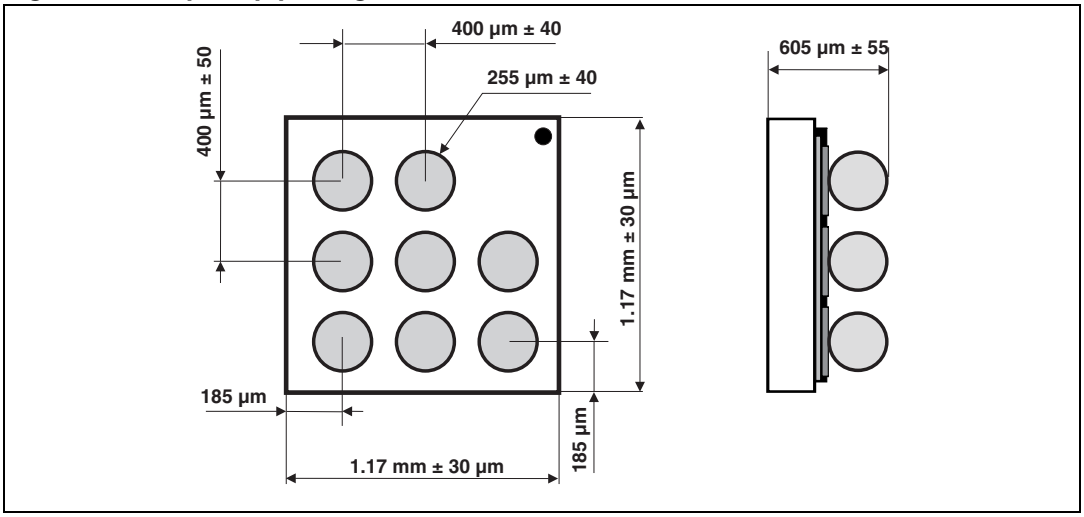


Figure 12. Footprint recommendations

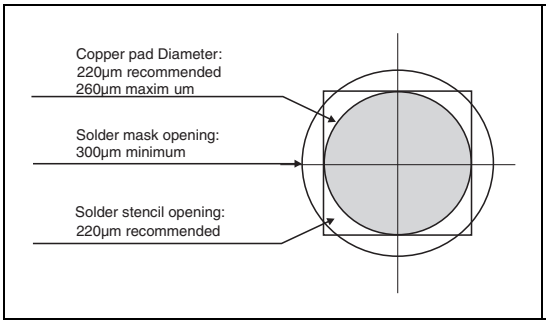


Figure 13. Marking

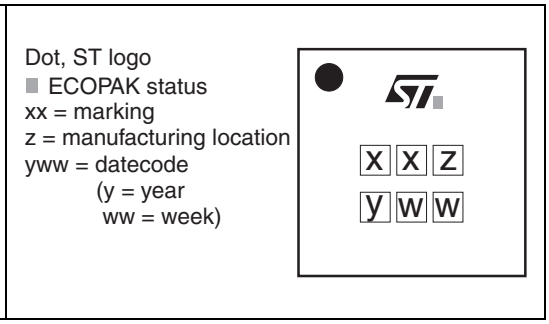
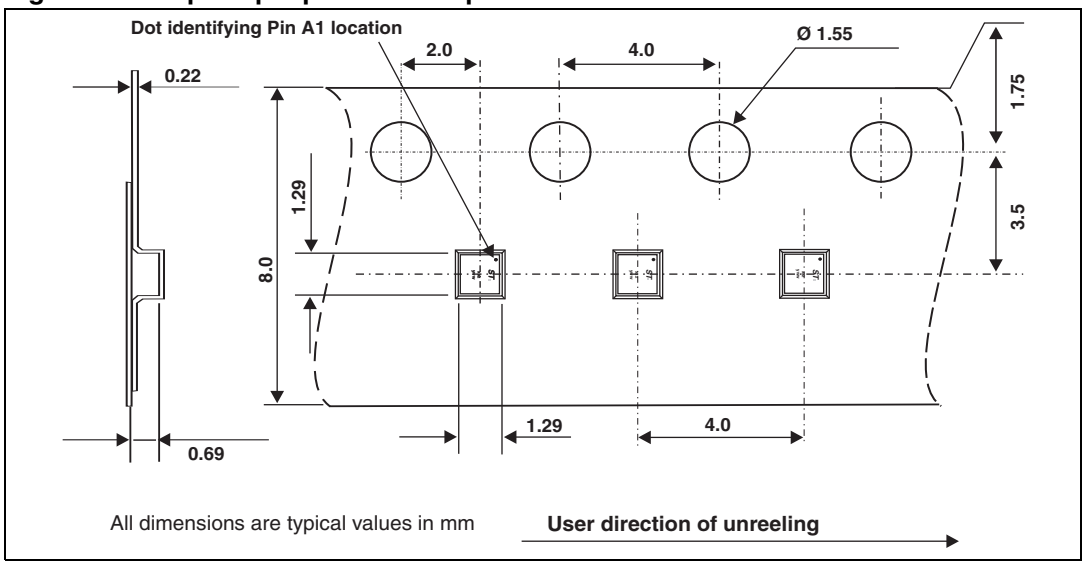


Figure 14. Flip-Chip tape and reel specification



4 Ordering information

Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC07F3	JE	Flip Chip	1.8 mg	5000	Tape and reel 7”

Note: More information is available in the application notes
AN2348: “Flip Chip: Package description and recommendations for use”
AN1751: “EMI Filters: Recommendations and measurements”

5 Revision history

Table 5. Document revision history

Date	Revision	Changes
16-Mar-2010	1	Initial release.
12-Oct-2010	2	Added *Table 3.*
23-Sep-2011	3	Added *Acc_Det pin connection on page 2*.

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