EMIF02-MIC01F2

2-line IPAD™, EMI filter including ESD protection

Features

- 2-line symetrical low-pass filter
- Lead-free package
- High-density capacitor
- High-efficiency EMI filtering
- Very small PCB footprint: 1.42 mm x 1.92 mm
- Very thin package: 0.65 mm
- High-efficiency ESD suppression (IEC 61000-4-2 level 4)
- High reliability offered by monolithic integration

Complies with the standards:

- IEC61000-4-2 Level 4 on inputs and outputs
  - 15 kV (air discharge)
  - 8 kV (contact discharge)

Application

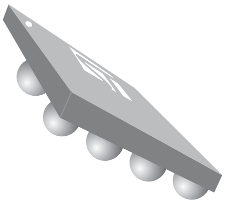
- Mobile phones (differential microphone filtering and ESD protection).

Description

The EMIF02-MIC01F2 is a highly integrated device designed to suppress EMI / RFI noise for microphone line filtering.

The EMIF02-MIC01F2 Flip Chip packaging means the package size is equal to the die size. This is why the EMIF02-MIC01F2 is a very small device.

Additionally, the filter includes an ESD protection circuit to prevent damage to the protected device when subjected to ESD surges up to 15 kV.



Flip Chip
11 bumps

Figure 1. Pin configuration (bump side view)

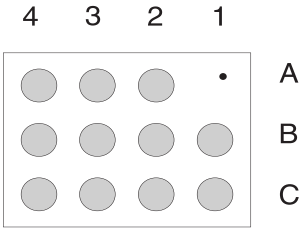
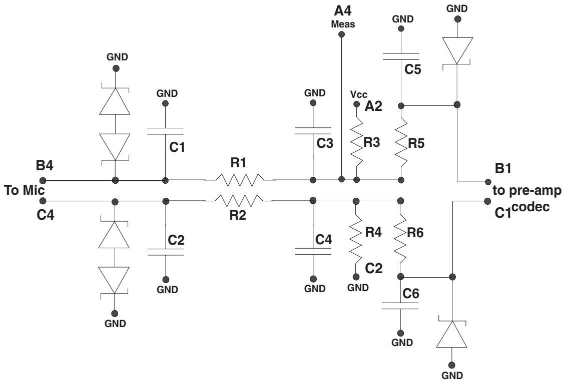


Figure 2. Schematic



A3,B2,B3,C3 are ground pins

TM: IPAD is a trademark of STMicroelectronics.

1 Electrical characteristics

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

Symbol	Parameter	Value	Unit
V_{PP}	ESD IEC 61000-4-2, input and output pins - air discharge ESD IEC 61000-4-2, in put and output pins - contact discharge	15 8	kV
T_j	Junction temperature	125	°C
T_{op}	Operating temperature range	-40 to +85	°C
T_{stg}	Storage temperature range	-55 to +150	°C

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

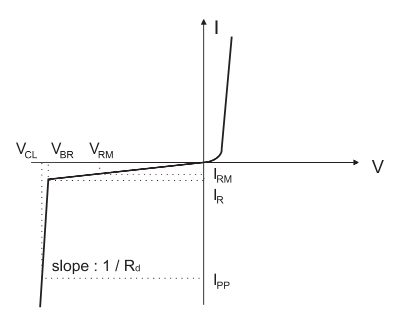
<table>
<tr><th>Symbol</th><th></th><td colspan="4" rowspan="7">
</td></tr>
<tr><td>V_{BR}</td><td>Breakdown voltage</td></tr>
<tr><td>I_{RM}</td><td>Leakage current @ V_{RM}</td></tr>
<tr><td>V_{RM}</td><td>Stand-off voltage</td></tr>
<tr><td>V_{CL}</td><td>Clamping voltage</td></tr>
<tr><td>R_d</td><td>Dynamic impedance</td></tr>
<tr><td>I_{PP}</td><td>Peak pulse current</td></tr>
<tr><th>Symbol</th><th>Test condition</th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>V_{BR}</td><td>I_R = 1 mA per line</td><td>14</td><td></td><td>18</td><td>V</td></tr>
<tr><td>I_{RM}</td><td>V_{RM} = 3 V per line</td><td></td><td></td><td>0.5</td><td>µA</td></tr>
<tr><td>C1, C2, C3
C4, C5, C6</td><td>V_{LINE} = 0 V, V_{OSC} = 30 mV, F = 1 MHz</td><td>0.8</td><td>1.0</td><td>1.2</td><td>nF</td></tr>
<tr><td>R1, R2</td><td>Tolerance ± 5 %</td><td></td><td>50</td><td></td><td>Ω</td></tr>
<tr><td>R3, R4</td><td>Tolerance ± 5 %</td><td></td><td>1.00</td><td></td><td>kΩ</td></tr>
<tr><td>R5, R6</td><td>Tolerance ± 5 %</td><td></td><td>2.20</td><td></td><td>kΩ</td></tr>
</table>

Figure 3. Filter response

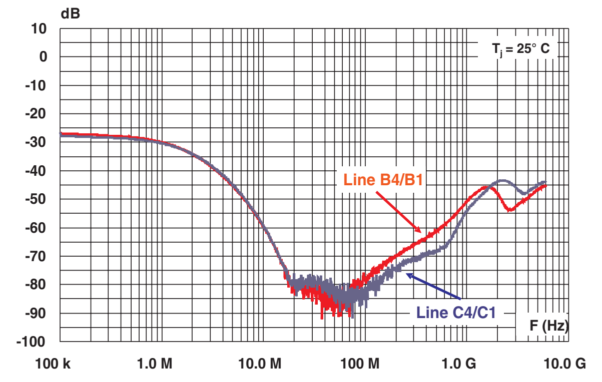


Figure 4. Analog crosstalk

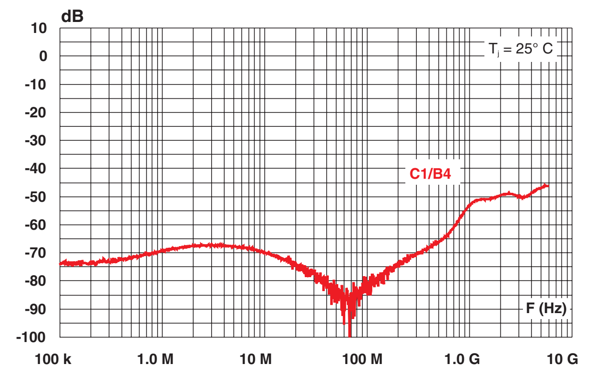


Figure 5. ESD response to IEC 61000-4-2 (+15 kV air discharge) on output (V_{OUT})

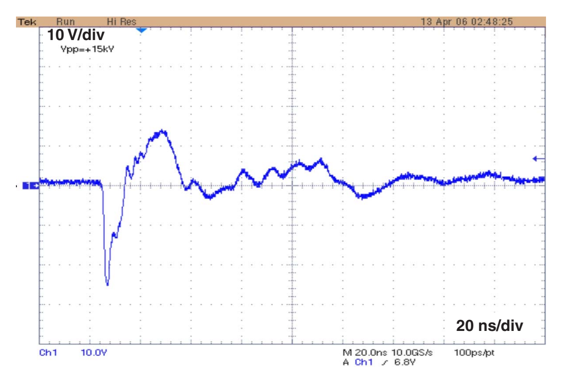
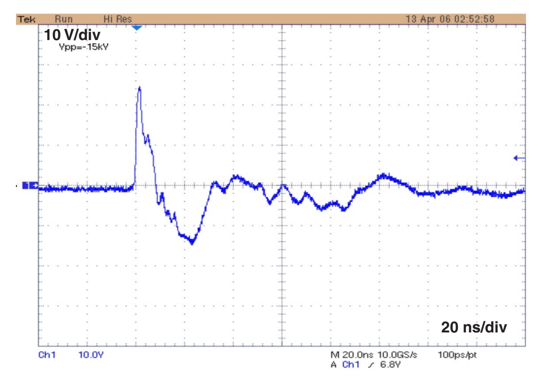
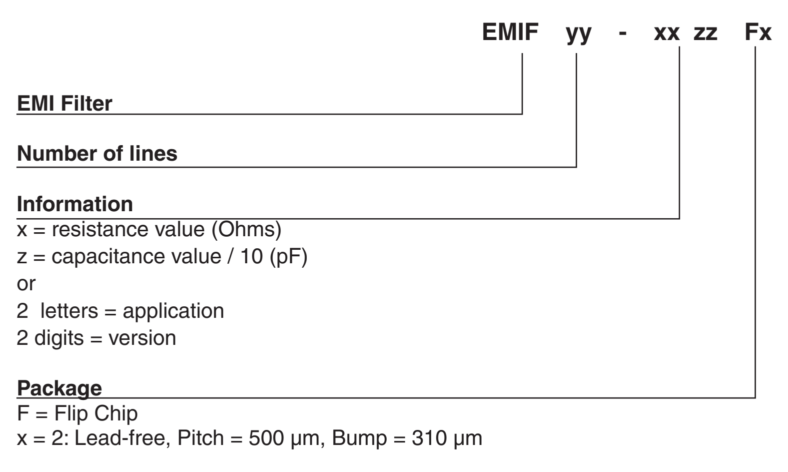


Figure 6. ESD response to IEC 61000-4-2 (-15 kV air discharge) on output (V_{OUT})



2 Ordering information scheme

Figure 7. Ordering information scheme


EMIF yy - xx zz Fx

EMI Filter

Number of lines

Information
x = resistance value (Ohms)
z = capacitance value / 10 (pF)
or
2 letters = application
2 digits = version

Package
F = Flip Chip
x = 2: Lead-free, Pitch = 500 µm, Bump = 310 µm

3 Package information

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

Figure 8. Flip Chip dimensions

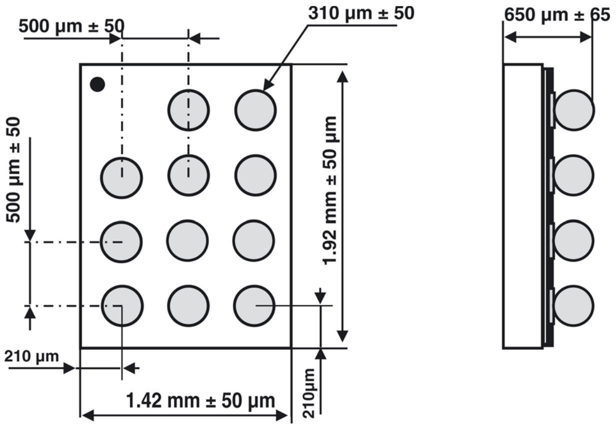


Figure 9. Footprint

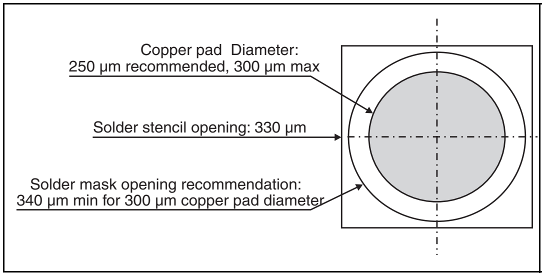


Figure 10. Marking

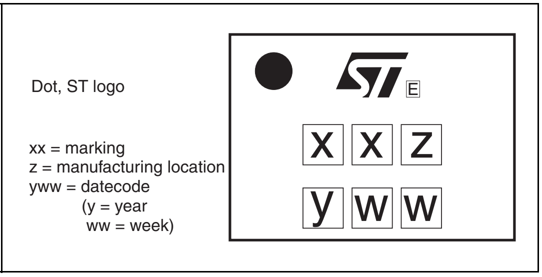
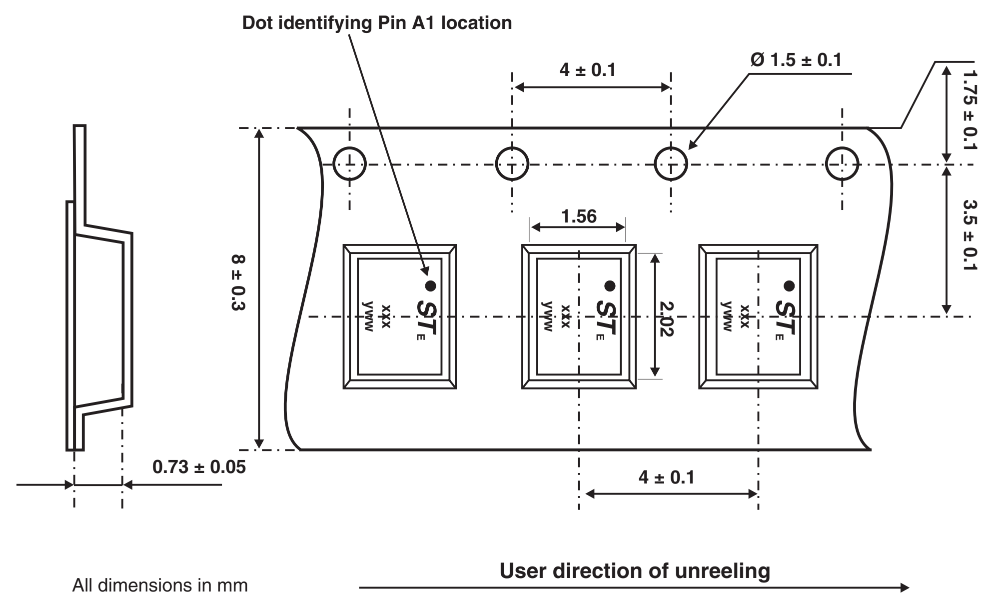


Figure 11. Flip Chip tape and reel specification



4 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC01F2	GB	Flip Chip	3.8 mg	5000	Tape and reel (7”)

Note: *More packing information is available in the application notes:*
AN1235: “Flip Chip: package description and recommendations for use”
AN 1751: “EMI filters: Recomendations and measurements”

5 Revision history

Table 4. Document revision history

Date	Revision	Changes
Sep-2004	3	Previous issue.
09-Feb-2006	4	Added ECOPACK statement. Updated graphics to current standards.
06-Oct-2006	5	Reformatted to current standards. Updated characteristic curves, removed Aplac information and updated tape and reel pocket dimensions.
17-Apr-2008	6	Updated ECOPACK statement. Updated *Figure 7*, *Figure 8* and *Figure 11.* Reformatted to current standards.

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