

2-line IPAD™, EMI filter and ESD protection

Datasheet - production data

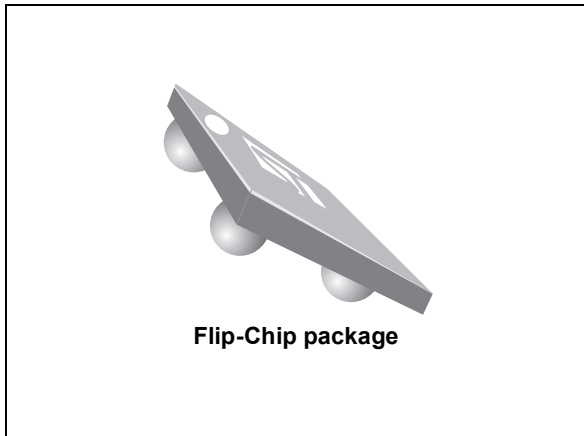
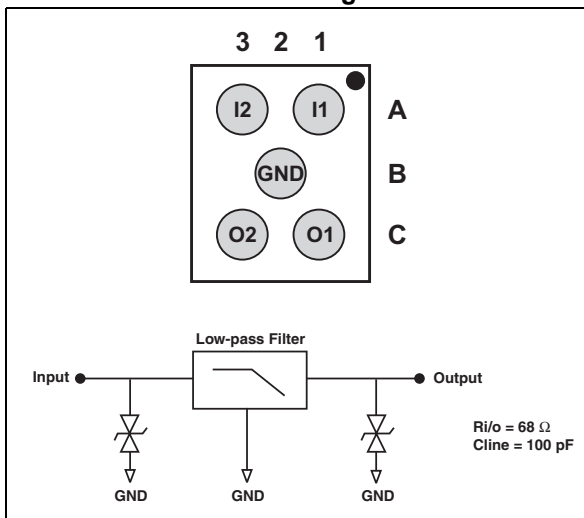


Figure 1. Pin configuration (bump side) and basic cell configuration



Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming:
1.07 mm x 1.47 mm
- Very thin package: 0.65 mm
- High efficiency in ESD suppression

- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging

Complies with the following standards:

- IEC 61000-4-2 level 4, on input pins
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- IEC 61000-4-2 Level 1, on output pins
 - 2 kV (air discharge)
 - 2 kV (contact discharge)
- MIL STD 883E - Method 3015-6 Class 3

Application

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

Description

The EMIF02-MIC03F2 is a highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF02 Flip-Chip packaging means the package size is equal to the die size.

This filter includes an ESD protection circuitry which prevents damage to the application when subjected to ESD surges up 15 kV.

TM: IPAD is a trademark of STMicroelectronics.

1 Electrical characteristics

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

| Symbol | Parameter | Value | Unit |
|----------------|------------------------------|-------------|------|
| T _j | Maximum junction temperature | 125 | °C |
| Top | Operating temperature range | -40 to +85 | °C |
| Tstg | Storage temperature range | -55 to +150 | °C |

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

| Symbol | Parameters |
|-------------------|--|
| V _{BR} | Breakdown voltage |
| I _{RM} | Leakage current @ V _{RM} |
| V _{RM} | Stand-off voltage |
| V _{CL} | Clamping voltage |
| R _d | Dynamic impedance |
| I _{PP} | Peak pulse current |
| R _{I/O} | Series resistance between Input & Output |
| C _{line} | Input capacitance per line |

Table 3.

| Symbol | Test condition | Min | Typ | Max | Unit |
|-------------------|--------------------------------|-----|-----|-----|------|
| V _{BR} | I _R = 1 mA | 6 | 8 | | V |
| I _{RM} | V _{RM} = 3 V per line | | | 500 | nA |
| R _{I/O} | Tolerance ± 20% | | 68 | | Ω |
| C _{line} | V _R = 0 V | | 100 | | pF |

Figure 2. Attenuation simulation with 1 kΩ input and 10 kΩ output

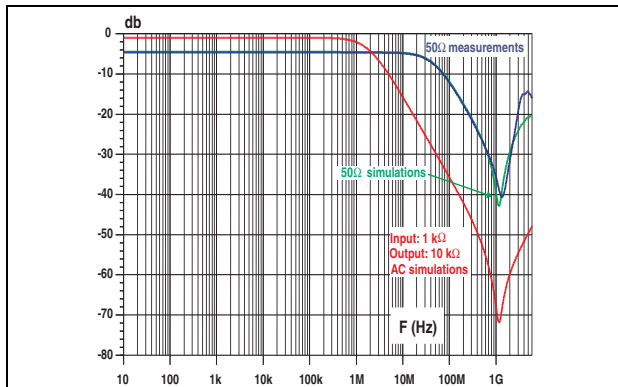


Figure 3. Analog crosstalk measurements

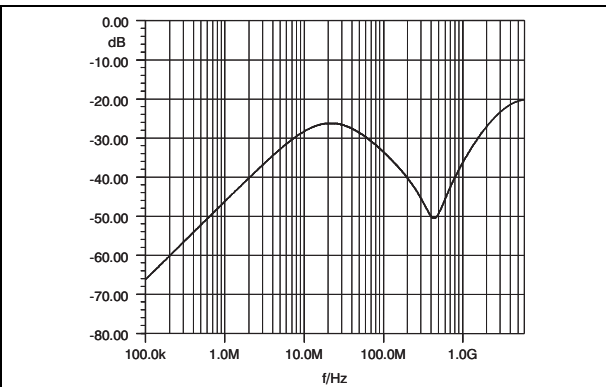


Figure 4. ESD response to IEC61000-4-2 (+15kV air discharge) on one input V(in) and one output V(out)

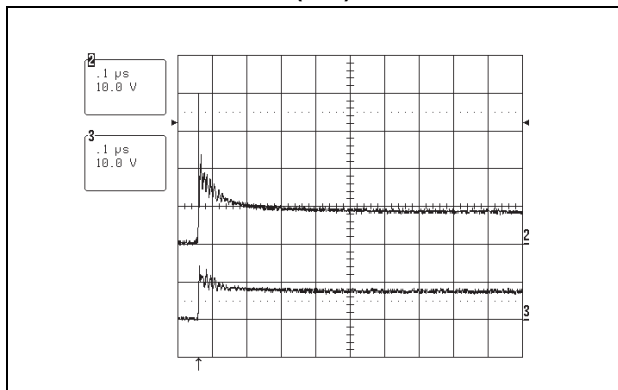


Figure 5. ESD response to IEC61000-4-2 (-15kV air discharge) on one input V(in) and one output V(out)

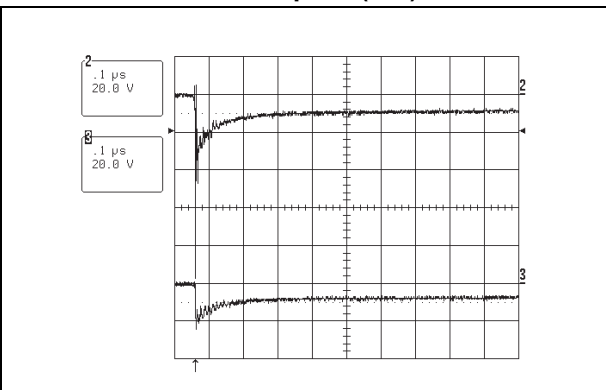


Figure 6. Line capacitance versus applied voltage.

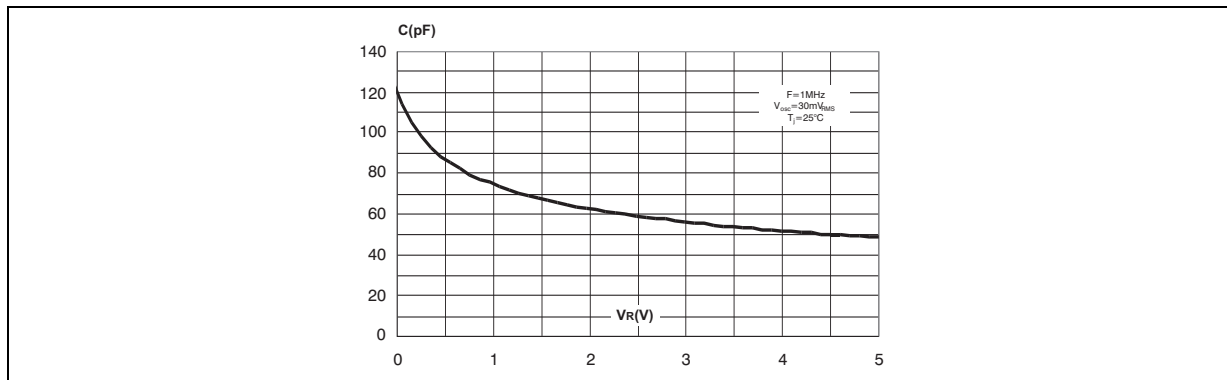


Figure 7. Aplac mode

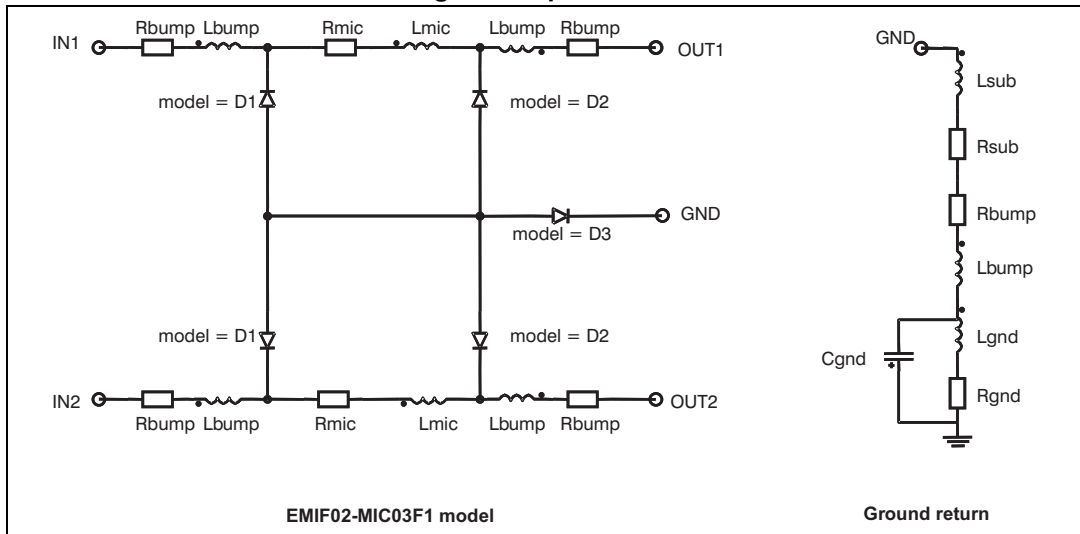
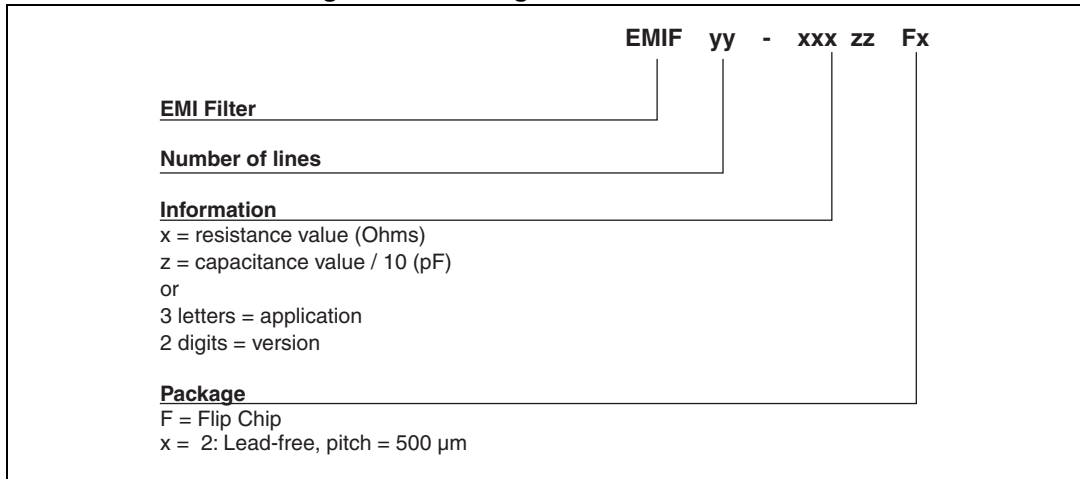


Figure 8. Aplac parameters

| | | | |
|-------------|-------------|-------------|------------------------|
| Model D1 | Model D3 | Model D2 | aplacvar Rmic 68 |
| CJO=Cdiode1 | CJO=Cdiode3 | CJO=Cdiode2 | aplacvar Lmic 10p |
| BV=7 | BV=7 | BV=7 | aplacvar Cdiode1 100pF |
| IBV=1u | IBV=1u | IBV=1u | aplacvar Cdiode2 3.6pF |
| IKF=1000 | IKF=1000 | IKF=1000 | aplacvar Cdiode3 |
| IS=10f | IS=10f | IS=10f | 1.17nF |
| ISR=100p | ISR=100p | ISR=100p | aplacvar Lbump 50pH |
| N=1 | N=1 | N=1 | aplacvar Rbump 20m |
| M=0.3333 | M=0.3333 | M=0.3333 | aplacvar Rsub 0.5m |
| RS=0.7 | RS=0.12 | RS=0.3 | aplacvar Rgnd 10m |
| VJ=0.6 | VJ=0.6 | VJ=0.6 | aplacvar Lgnd 50pH |
| TT=50n | TT=50n | TT=50n | aplacvar Cgnd 0.15pF |
| | | | aplacvar Lsub 10pH |

2 Ordering information scheme

Figure 9. 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 10. Flip Chip dimensions

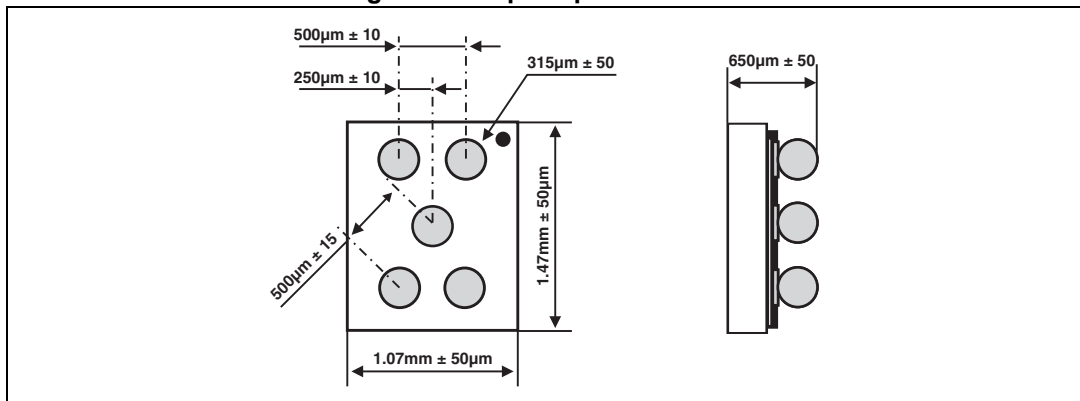


Figure 11. Footprint

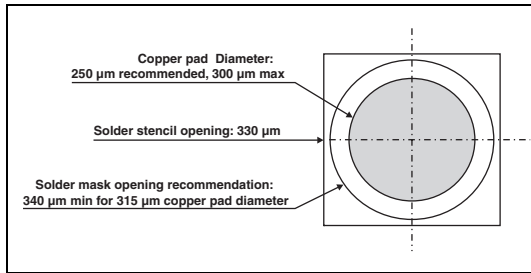


Figure 12. Marking

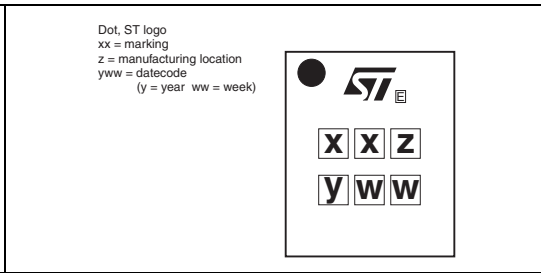
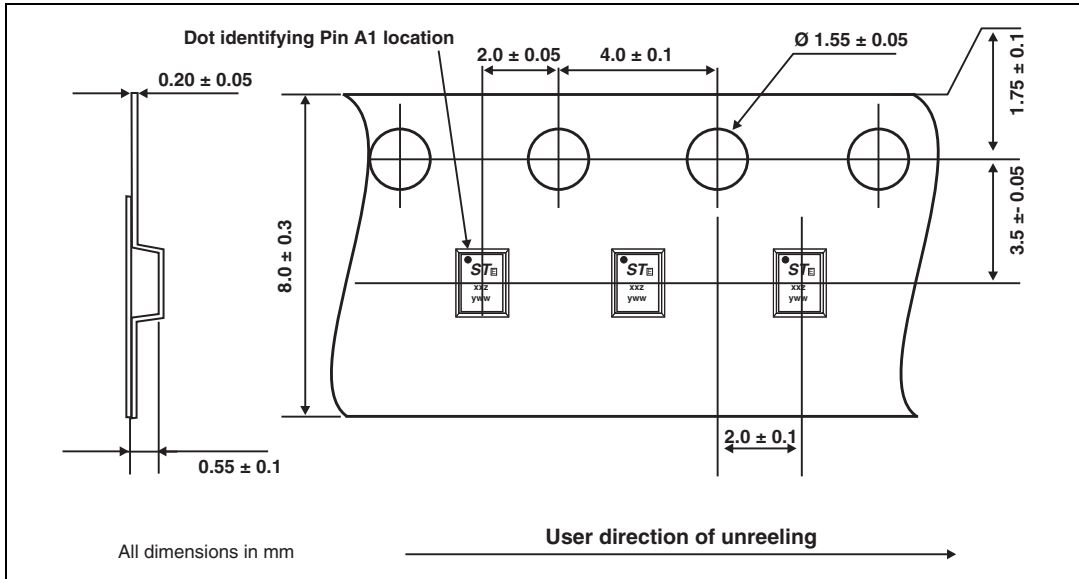


Figure 13. Flip Chip tape and reel specification



4 Ordering information

Table 4. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|---------|-----------|--------|----------|--------------------|
| EMIF02-MIC03F2 | FW | Flip Chip | 2.1 mg | 5000 | Tape and reel (7") |

Note: More packing information is available in the applications note:
 AN1235: "Flip Chip: package description and recommendations for use"
 AN 1751: "EMI filters: Recommendations and measurements"

5 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 14-Oct-2006 | 1 | Initial release |
| 31-Mar-2014 | 2 | Reformatted to current standards. Added ECOPACK statement. Updated Figure 2 and Figure 13 . |
| 18/07/2014 | 3 | Updated typo error on Features . |

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