EMIF02-MIC02F2

2-line IPAD™, EMI filter and ESD protection

Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead-free package
- Very low PCB space occupation: 1.42 mm x 0.92 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 input pins
  - 2 kV (air discharge)
  - 2 kV (contact discharge)

Applications

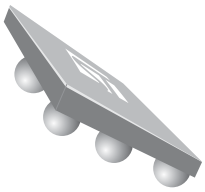
Where EMI filtering in ESD sensitive equipment is required:

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

Description

The EMIF02-MIC02 is a highly integrated device designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interference. 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.



Flip Chip (6 bumps)

Figure 1. Pin configuration (bump side)

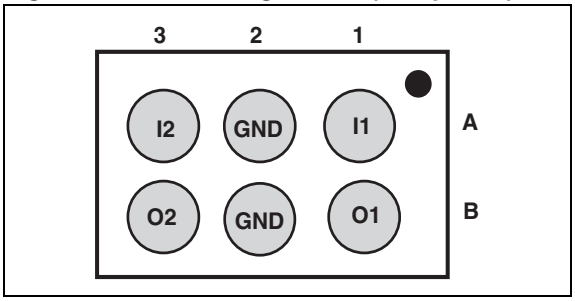
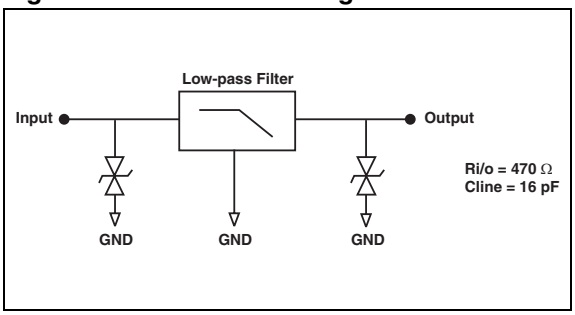


Figure 2. Basic cell configuration



TM: IPAD is a trademark of STMicroelectronics.

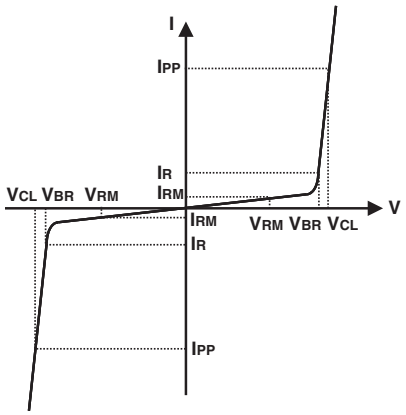
1 Electrical characteristics

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

Symbol	Parameter	Value	Unit
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)

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 and output
C_{line}	Input capacitance per line



Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	14	16		V
I_{RM}	V_{RM} = 12 V per line			500	nA
$R_{I/O}$		423	470	517	Ω
C_{line}	@ 0 V		16	20	pF

Figure 3. Attenuation measurement and Aplac simulation

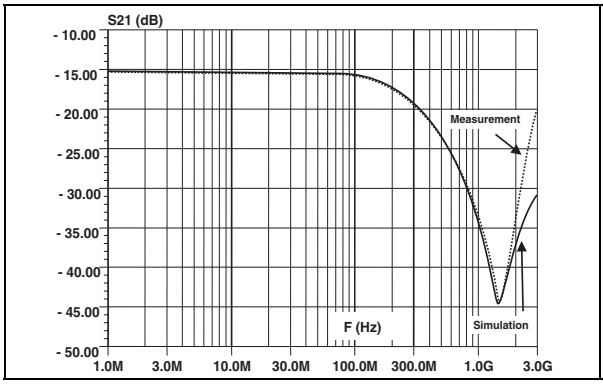


Figure 4. Analog crosstalk measurements

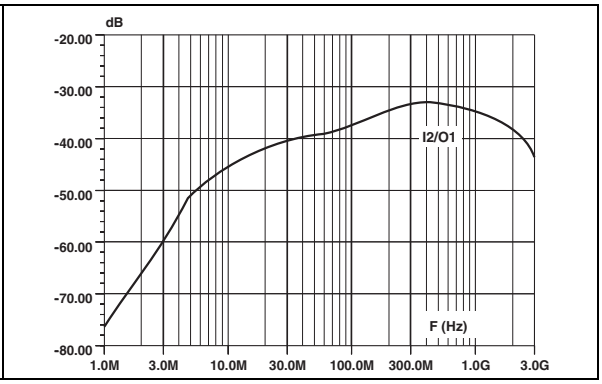


Figure 5. Digital crosstalk measurement

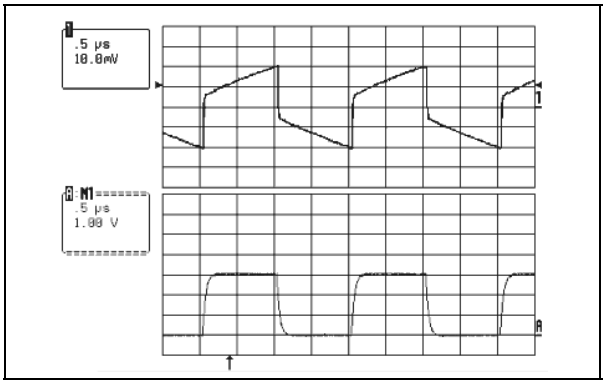


Figure 6. ESD response to IEC61000-4-2 (-15 kV air discharge) on one input V(in) and on one output V(out)

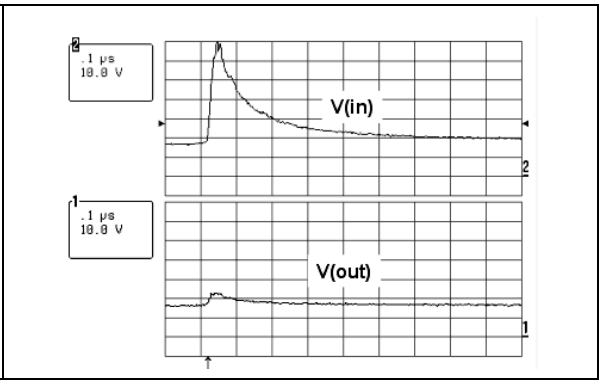


Figure 7. ESD response to IEC61000-4-2 (+15 kV air discharge) on one input V(in) and on one output V(out)

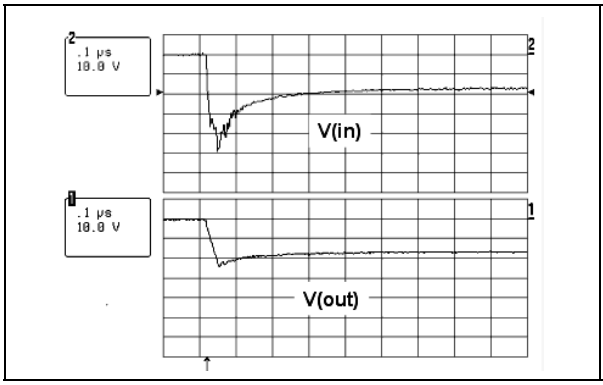
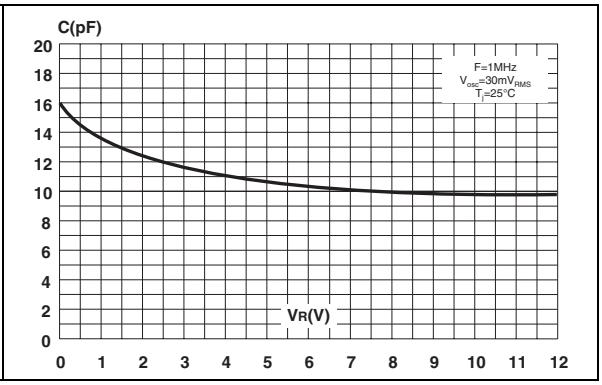


Figure 8. Line capacitance versus applied voltage



2 Application information

Figure 9. Aplac model

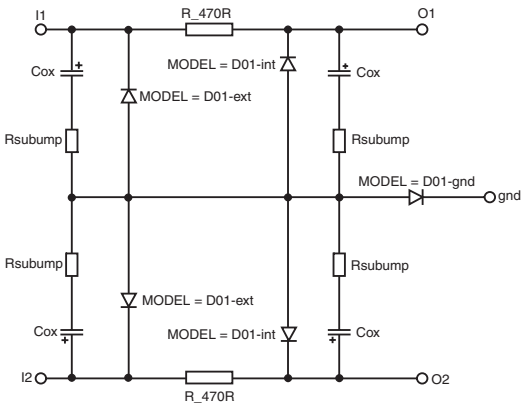
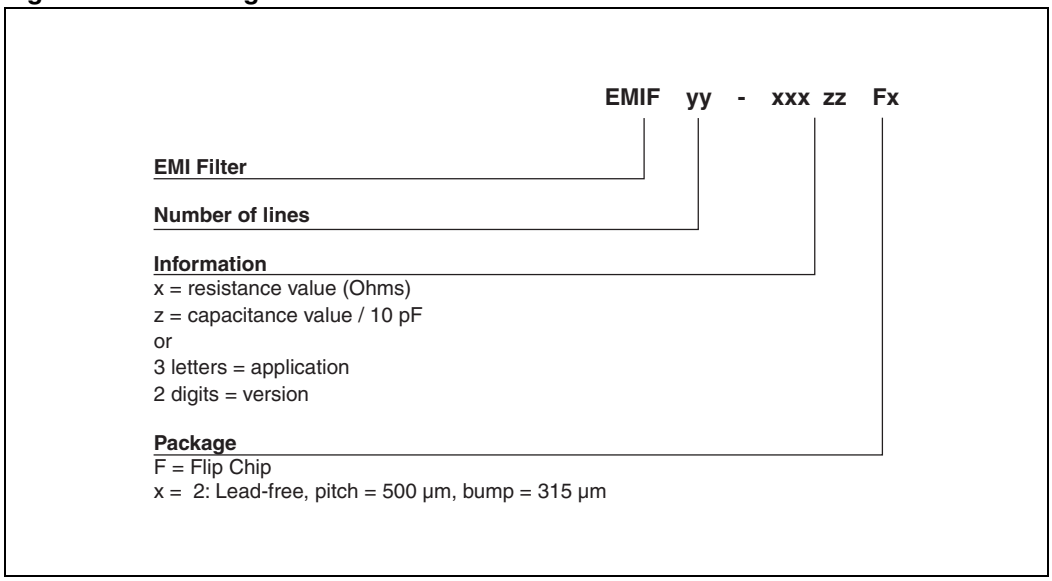


Figure 10. Aplac parameters

Model D01-ext BV = 7 CJO = Cz_ext IBV = 1u IKF = 1000 IS = 10f ISR = 100p N = 1 M = 0.3333 RS = Rs_ext VJ = 0.6 TT = 50n	Model D01-int BV = 7 CJO = Cz_int IBV = 1u IKF = 1000 IS = 10f ISR = 100p N = 1 M = 0.3333 RS = Rs_int VJ = 0.6 TT = 50n	Model D01-gnd BV = 7 CJO = Cz_gnd IBV = 1u IKF = 1000 IS = 10f ISR = 100p N = 1 M = 0.3333 RS = Rs_gnd VJ = 0.6 TT = 50n	Ls 400pH Rs 100m R_470R 482.6 Cz_ext 8.73pF Rs_ext 850m Cz_int 2.9pF Rs_int 850m Cz_gnd 215.61pF Rs_gnd 470m Rgnd 10m Lgnd 48pH Cgnd 0.15pF Cox 3.05pF Rsubump 200m

3 Ordering information scheme

Figure 11. Ordering information scheme



4 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 12. Package dimensions

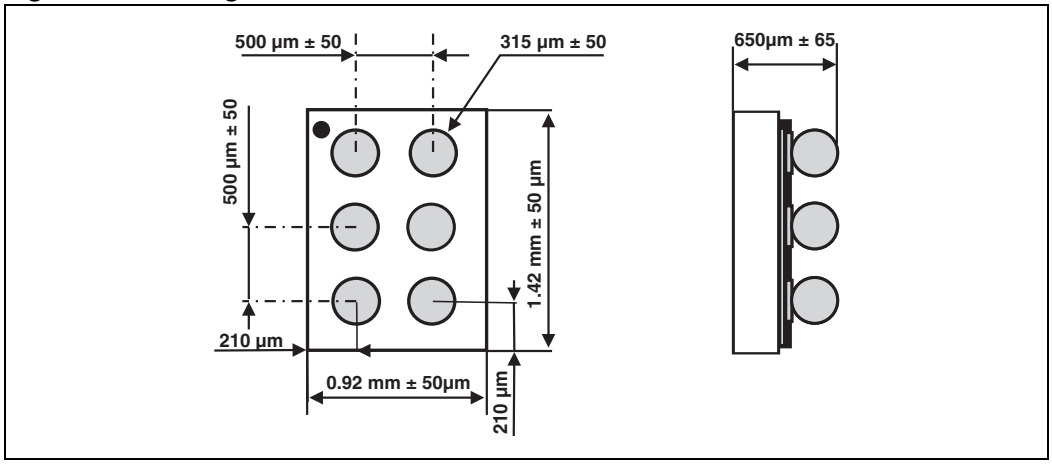


Figure 13. Footprint

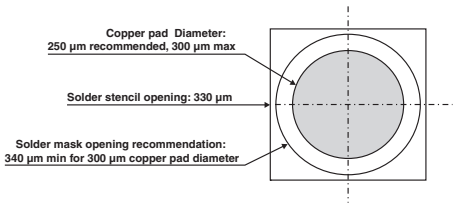


Figure 14. Marking

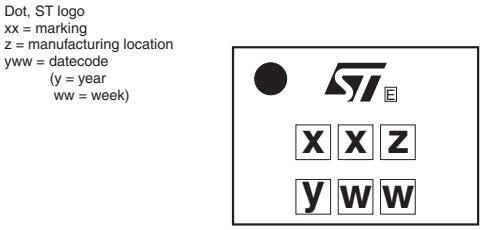
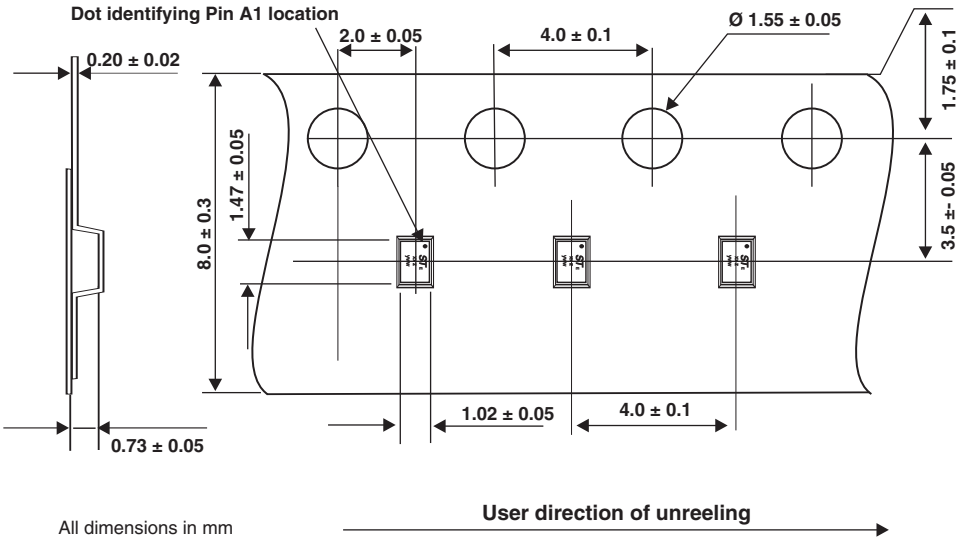


Figure 15. Flip Chip tape and reel specification



5 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF02-MIC02F2	FJ	Flip Chip	2.3 mg	5000	Tape and reel 7”

Note: More information is available in the application notes:
AN1235:"Flip Chip: Package description and recommendations for use"
AN1751: “EMI filters: Recommendations and measurements”

6 Revision history

Table 4. Document revision history

Date	Revision	Changes
12-Oct-2004	1	Initial release.
11-Jan-2006	2	ECOPACK statement added. Die dimensions modified in *Figure 12.* and first page. Typographical errors corrected.
17-Apr-2008	3	Updated ECOPACK statement. Updated *Figure 11*, *Figure 12* and *Figure 15.* Reformatted to current standards.
26-May-2011	4	Updated C_{line} values in *Table 2*.

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