

3-line IPAD™, EMI filter including ESD protection

Features

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Lead-free package
- Very low PCB space occupation: 1.2 mm²
- Very thin package: 0.60 mm
- High efficiency in ESD suppression
- 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 and V_{cc} pins:
 - 15 kV (air discharge)
 - 8 kV (contact discharge)
- Level 1 on internal pins:
 - 2 kV (air discharge)
 - 2 kV (contact discharge)
- MIL STD 883E - Method 3015-6 Class 3

Applications

EMI filtering and ESD protection for:

- SIM interface (subscriber identity module)
- UIM interface (universal identity module)

Description

The EMIF03-SIM02F3 is a highly integrated 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.

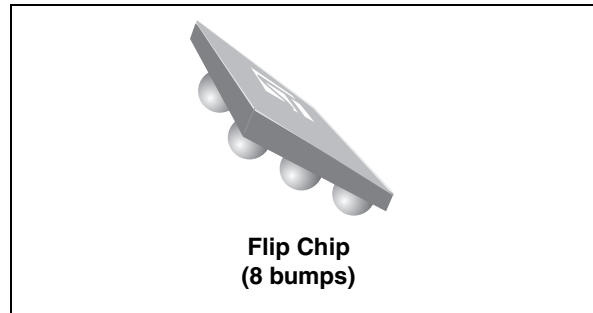


Figure 1. Pin layout (bump side)

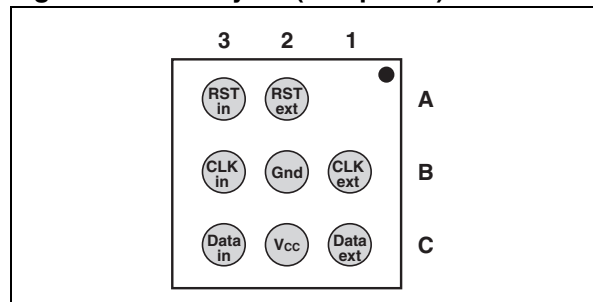
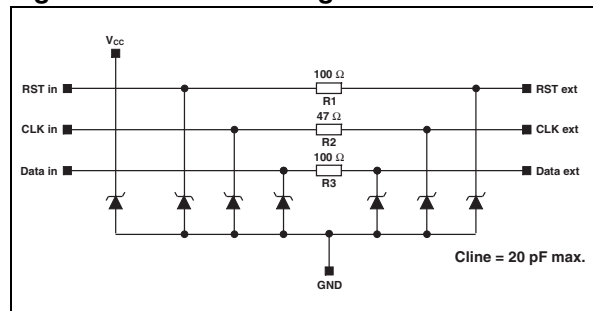


Figure 2. Device configuration



TM: IPAD is a trademark of STMicroelectronics.

1 Characteristics

Table 1. Absolute maximum ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter and test conditions	Value	Unit
V_{PP}	Internal pins (A3, B3, C3):		
	ESD discharge IEC61000-4-2, air discharge	2	
	ESD discharge IEC61000-4-2, contact discharge	2	
	External pins (A2, B1, C2, C1):		
	ESD discharge IEC61000-4-2, air discharge	15	
	ESD discharge IEC61000-4-2, contact discharge	8	
T_j	Maximum junction temperature	125	$^{\circ}\text{C}$
T_{op}	Operating temperature range	-40 to +85	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-55 to 150	$^{\circ}\text{C}$

Table 2. Electrical characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

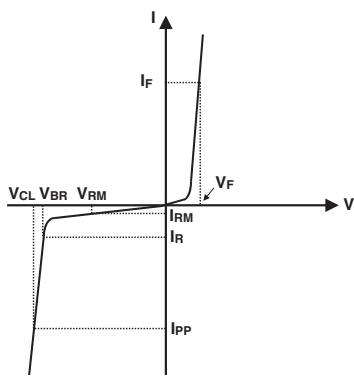
Symbol	Parameters					
V _{BR}	Breakdown voltage					
I _{RM}	Leakage current @ V _{RM}					
V _{RM}	Stand-off voltage					
V _{CL}	Clamping voltage					
I _{PP}	Peak pulse current					
R _{I/O}	Series resistance between input and output					
C _{line}	Input capacitance per line					
Symbol	Test conditions	Min	Typ	Max	Unit	
V _{BR}	I _R = 1 mA	6		20	V	
I _{RM}	V _{RM} = 3 V			0.2	μA	
R _d			1.5		Ω	
R ₁ , R ₃	Tolerance ± 20%		100		Ω	
R ₂	Tolerance ± 20%		47		Ω	
C _{line}	V _{line} = 0 V, V _{osc} = 30 mV, F = 1 MHz			20	pF	

Figure 3. S21 (dB) attenuation measurement (A2-A3 line)

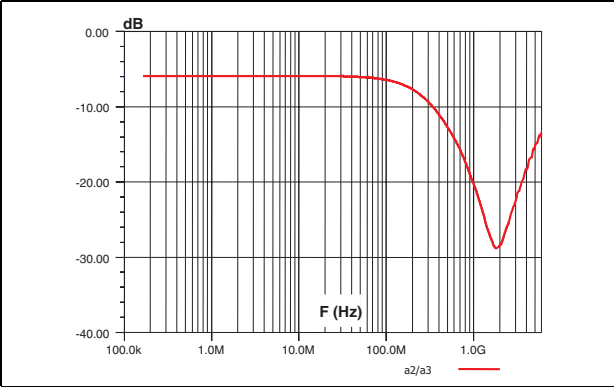


Figure 4. S21 (dB) attenuation measurement (B1-B3 line)

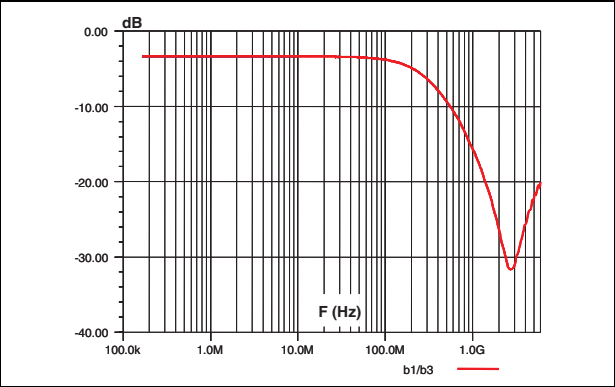


Figure 5. S21 (dB) attenuation measurement (C1-C3 line)

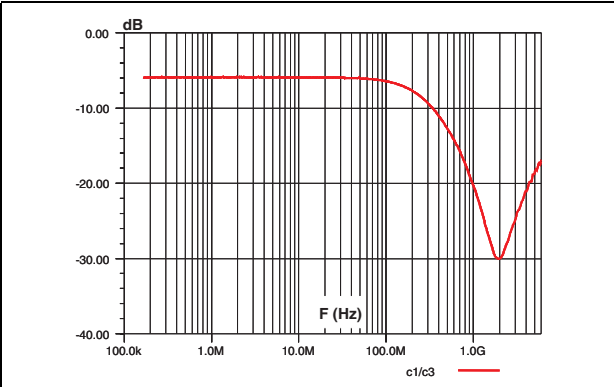


Figure 6. Analog crosstalk measurement

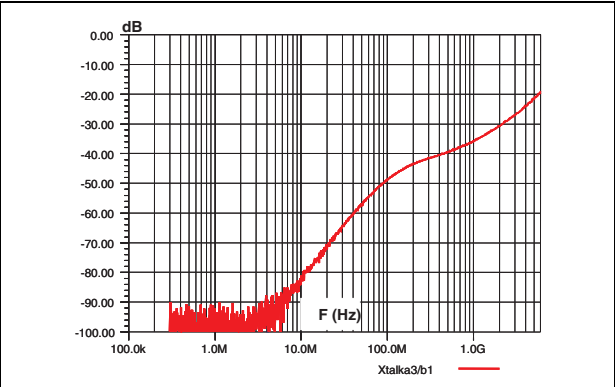


Figure 7. Digital crosstalk measurement

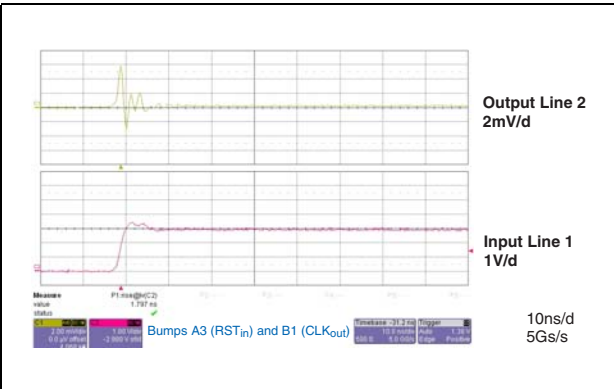


Figure 8. Line capacitance versus reverse applied voltage (typical)

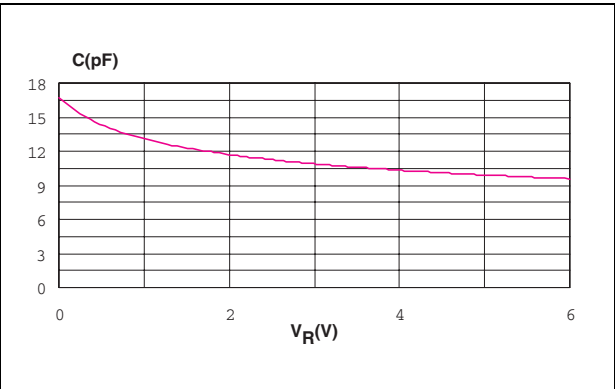


Figure 9. Voltages when IEC 61000-4-2 (+15 kV air discharge) applied to external pin

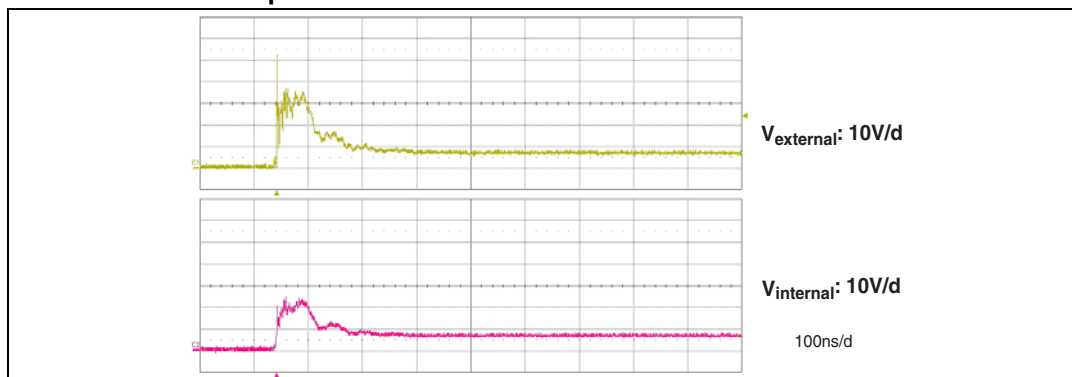
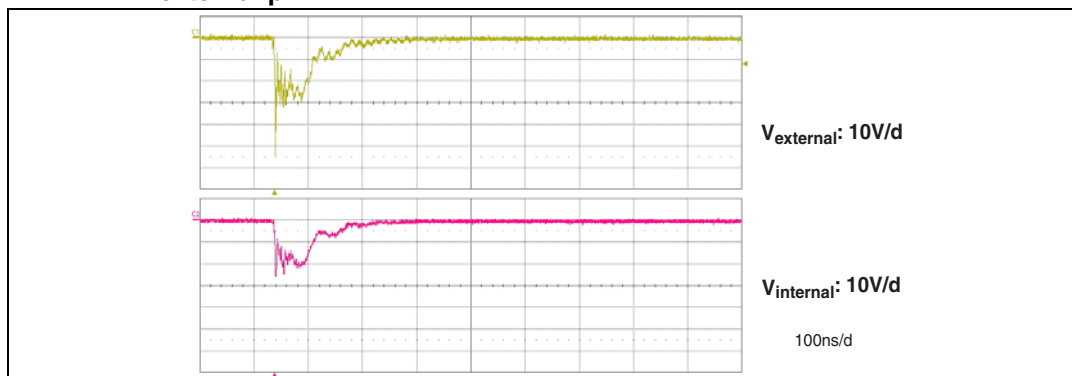


Figure 10. Voltages when IEC 61000-4-2 (- 15 kV air discharge) applied to external pin



2 Application information

Figure 11. Aplac model

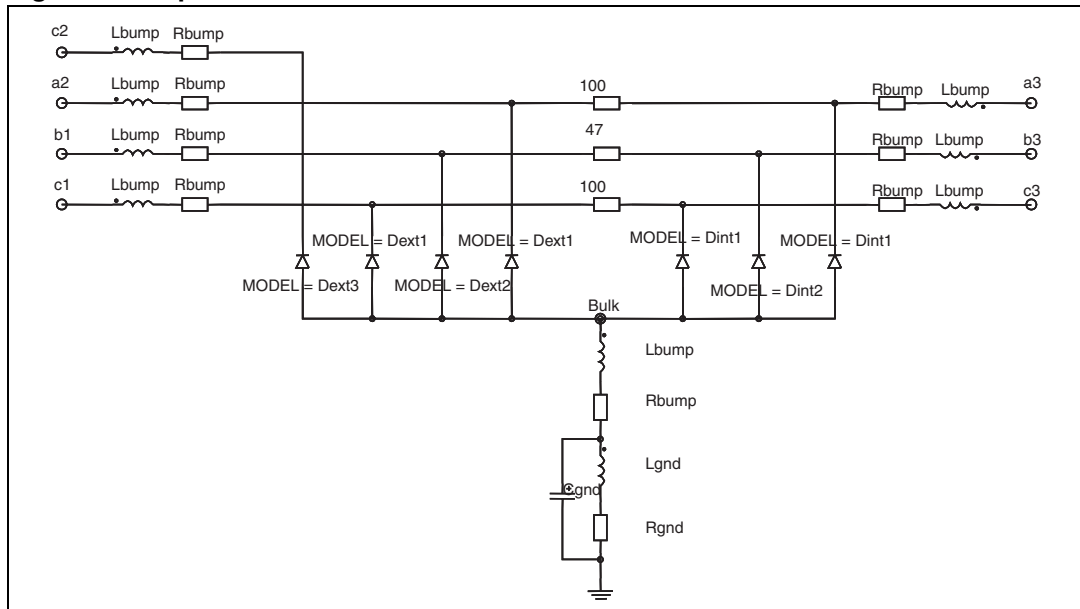
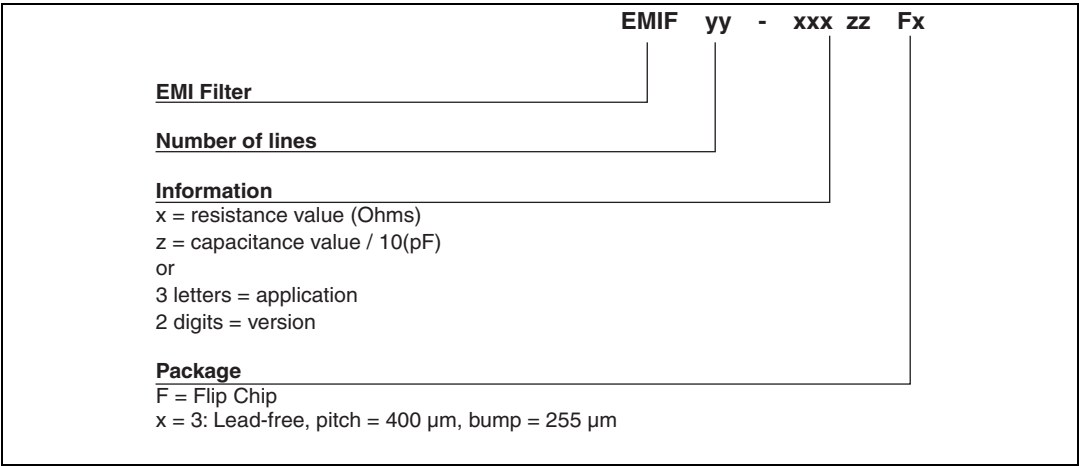


Figure 12. Aplac parameters

aplacvar Ls 950pH					
aplacvar Rs 150m	Dint1	Dext1	Dint2	Dext2	Dext3
aplacvar Cext1 12pF	BV=15	BV=15	BV=15	BV=15	BV=15
aplacvar Cext2 14pF	CJO=Cint1	CJO=Cext1	CJO=Cint2	CJO=Cext2	CJO=Cext3
aplacvar Cext3 18pF	IBV=1u	IBV=1u	IBV=1u	IBV=1u	IBV=1u
aplacvar Cint1 4.5pF	IKF=1000	IKF=1000	IKF=1000	IKF=1000	IKF=1000
aplacvar Cint2 4pF	IS=10f	IS=10f	IS=10f	IS=10f	IS=10f
aplacvar Rbump 17m	ISR=100p	ISR=100p	ISR=100p	ISR=100p	ISR=100p
aplacvar Lbump 43pH	N=1	N=1	N=1	N=1	N=1
aplacvar Rgnd 500m	M=0.3333	M=0.3333	M=0.3333	M=0.3333	M=0.3333
aplacvar Lgnd 50pH	RS=0.29	RS=0.25	RS=0.31	RS=0.28	RS=0.25
aplacvar Cgnd 0.15pF	VJ=0.6	VJ=0.6	VJ=0.6	VJ=0.6	VJ=0.6
aplacvar Rsub 100m	TT=50n	TT=50n	TT=50n	TT=50n	TT=50n

3 Ordering information scheme

Figure 13. Ordering information scheme



4 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 14. Package dimensions

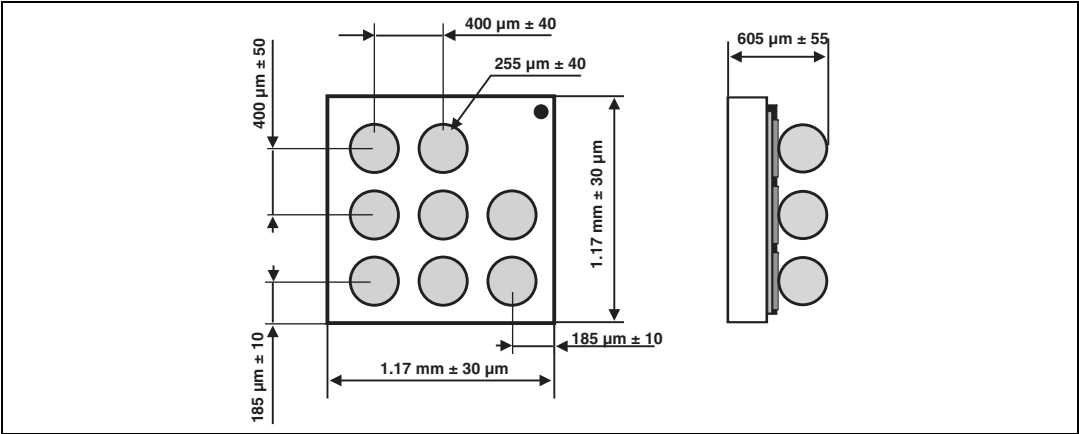


Figure 15. Footprint

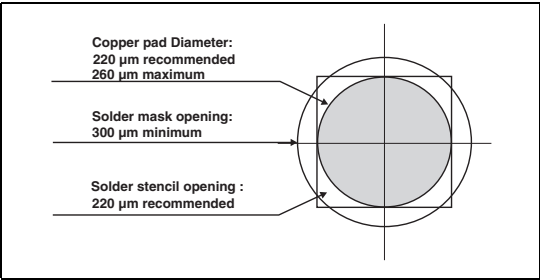


Figure 16. Marking

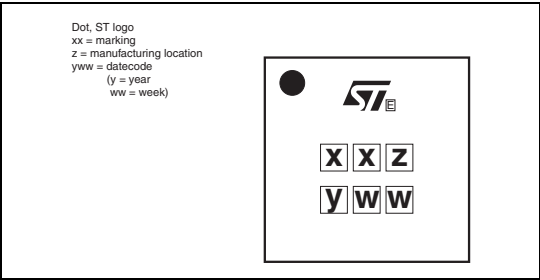
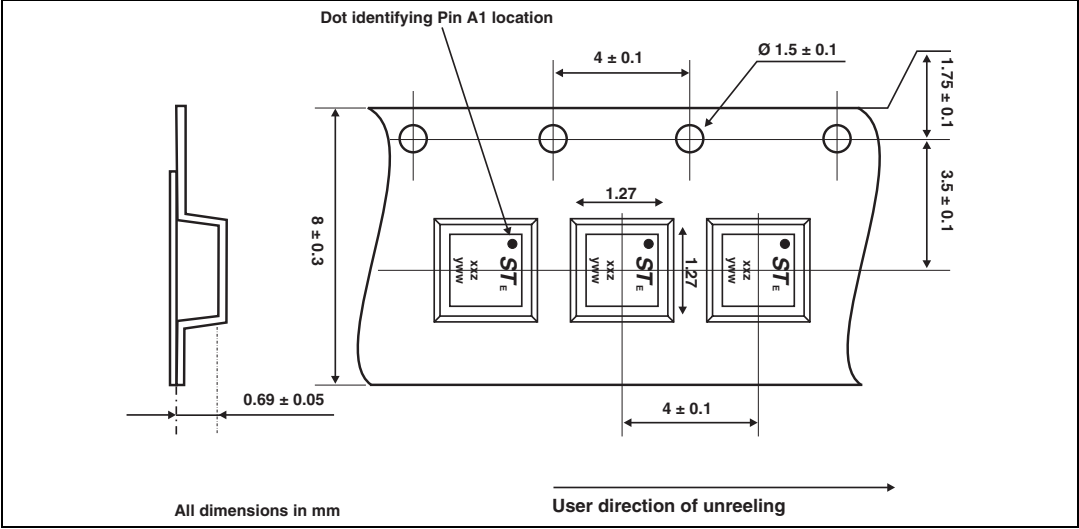


Figure 17. Flip Chip tape and reel specification



Note:

More information is available in the application notes:

AN2348: "STMicroelectronics 400 micro-metre Flip Chip: Package description and recommendation for use"

AN1751: "EMI Filters: Recommendations and measurements"

5 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
EMIF03-SIM02F3	HA	Flip Chip	1.74 mg	5000	Tape and reel 7"

6 Revision history

Table 4. Document revision history

Date	Revision	Changes
19-Jul-2005	1	Initial release.
26-Feb-2007	2	Changed out to ext in Configuration diagram on page 1. Added Ecopack statement. Reformatted to current layout standard. Updated Application note AN2348 reference and description.
28-Apr-2008	3	Updated ECOPACK statement. Updated Figure 13 , Figure 14 , and Figure 17 . Reformatted to current standards.

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