NUF4107FC

Four Channel EMI Pi-Filter Array with Full USB Filter

This device is a four−channel EMI filter array for data lines. Greater than −35 dB attenuation is obtained at frequencies from 800 MHz to 2.2 GHz. It also offers USB filtering circuitry with speed detection. This includes the inline resistors for impedance matching and EMI filtering. ESD protection is provided across all capacitors.

Features

- EMI Filtering and ESD Protection for Data Lines
- USB 1.1 Filtering Provided with Speed Detection
- Integration of 27 Discretes Offers Cost and Space Savings
- 350 μm Solder Spheres
- All TVS Protected Inputs Comply with IEC61000−4−2 (Level 4)
  30 kV (Contact)
  30 kV (Air)
- Low Profile Flip−Chip Packaging
- MSL 1
- All Pins Exceed 2000 V Human Body Model (Note 1)
- Pb−Free Package is Available*

Typical Applications

- EMI and USB Filtering and ESD Protection for Data Lines
- Cell Phones
- Handheld Portables
- Notebook Computers
- MP3 Players

MAXIMUM RATINGS (T_A = 25°C)

Rating	Symbol	Value	Unit
ESD Discharge IEC61000−4−2 (Note 1) − Air Discharge, Contact Discharge Human Body Model Machine Model	V_{PP}	 30 16 0.4	kV
DC Power per Resistor	P_R	100	mW
DC Power per Package	P_T	600	mW
Junction Temperature	T_J	150	°C
Operating Temperature Range	T_{op}	−40 to +85	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. This does not include Pins B1, C1 and C2

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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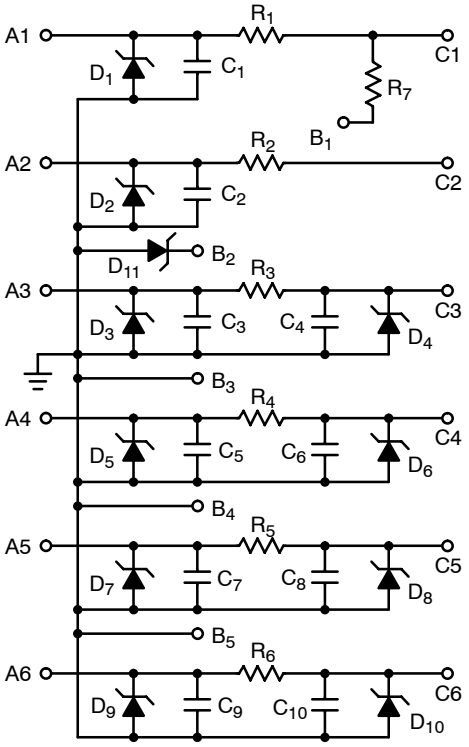
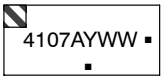
CIRCUIT DESCRIPTION





FLIP−CHIP−17
CASE 499AD

MARKING DIAGRAM



4107 = Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NUF4107FCT1	Flip−Chip	3000 Tape & Reel
NUF4107FCT1G	Flip−Chip (Pb−Free)	3000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit
V_{BR}	I_R = 1.0 mA	6.0	6.8	8.0	V
I_R	V_{RM} = 3.3 V per line	–	–	0.1	μA
R_3 – R_6	EMI Filter Resistors	80	100	120	Ω
R_1, R_2	USB Resistors; Impedance Matching	18	22	26	Ω
R_7	USB Pull−up; Speed Detection Resistor	1250	1500	1750	Ω
C_{line}	At 2.5 V Bias	48	60	72	pF
C1, C2	At Pins A1 and A2; At 2.5 V Bias	29	36	43	pF
C_{power}	At Pins B2; At 2.5 V Bias	54	68	82	pF

TYPICAL CHARACTERISTICS

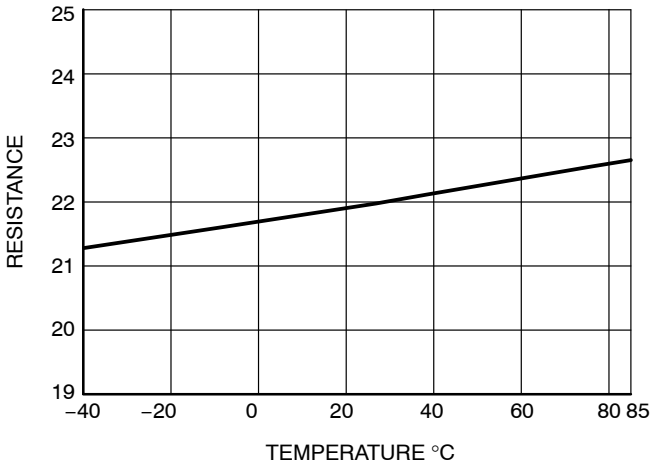


Figure 1. USB 1.1 Resistors (R1, R2) vs. Temperature

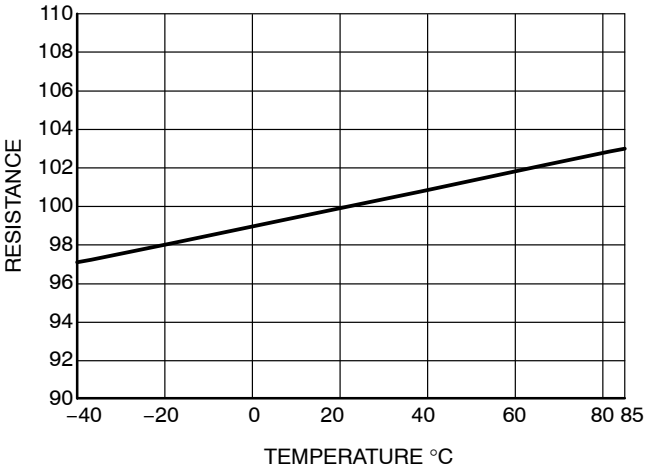


Figure 2. Data Resistors (R3, R4, R5, R6) vs. Temperature

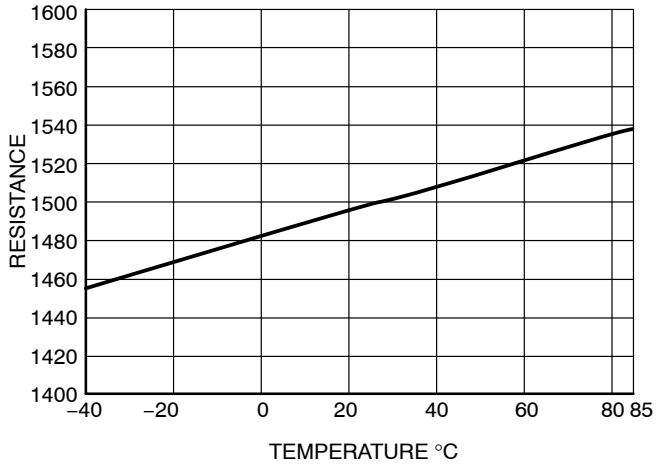


Figure 3. Pull−up Resistor (R7) vs. Temperature

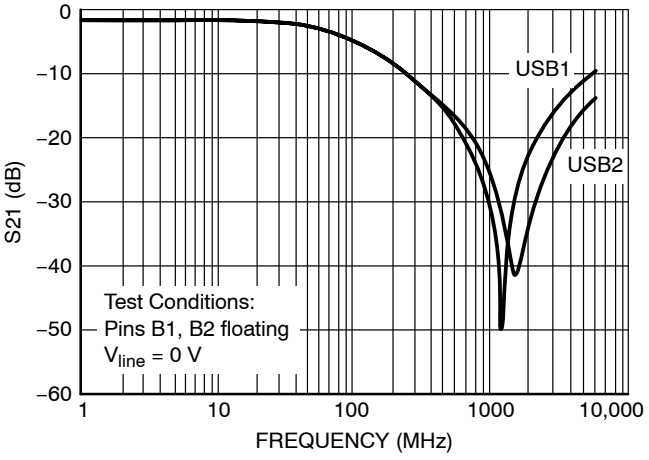


Figure 4. Insertion Loss Characteristic USB1, USB2

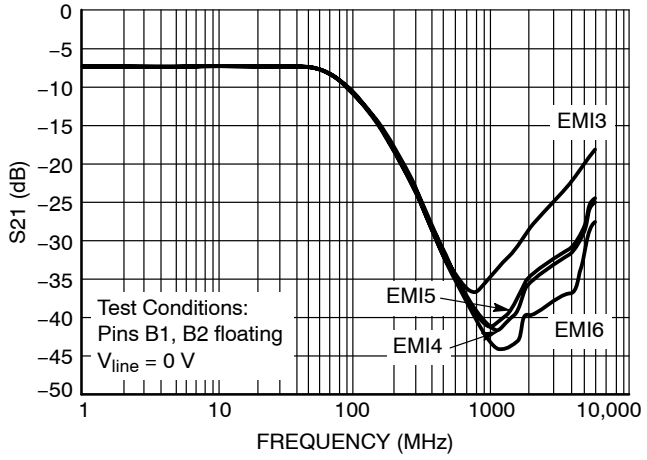


Figure 5. Insertion Loss Characteristic EMI3, EMI4, EMI5, EMI6

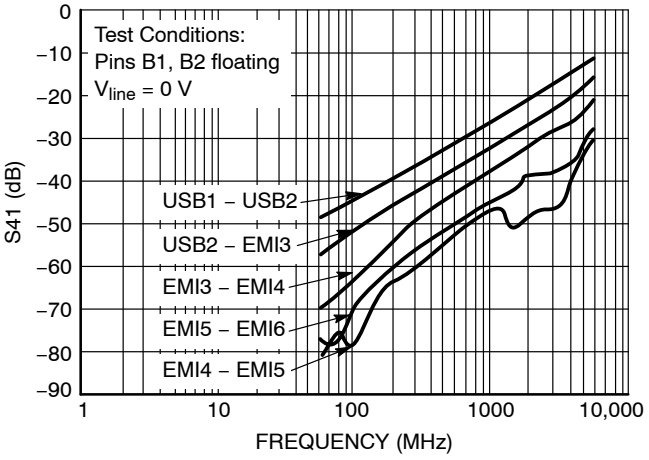


Figure 6. Analog Crosstalk Curve EMI Filter

Printed Circuit Board Recommendations

Parameter	500 μm Pitch 300 μm Solder Ball
PCB Pad Size	250 μm +25 −0
Pad Shape	Round
Pad Type	NSMD
Solder Mask Opening	350 μm ±25
Solder Stencil Thickness	125 μm
Stencil Aperture	250 x 250 μm sq.
Solder Flux Ratio	50/50
Solder Paste Type	No Clean Type 3 or Finer
Trace Finish	OSP Cu
Trace Width	150 μm Max

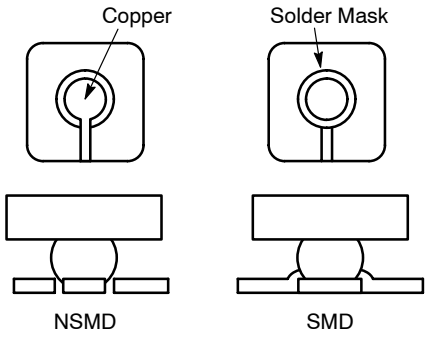


Figure 7. Solder Mask versus Non−Solder Mask Definition

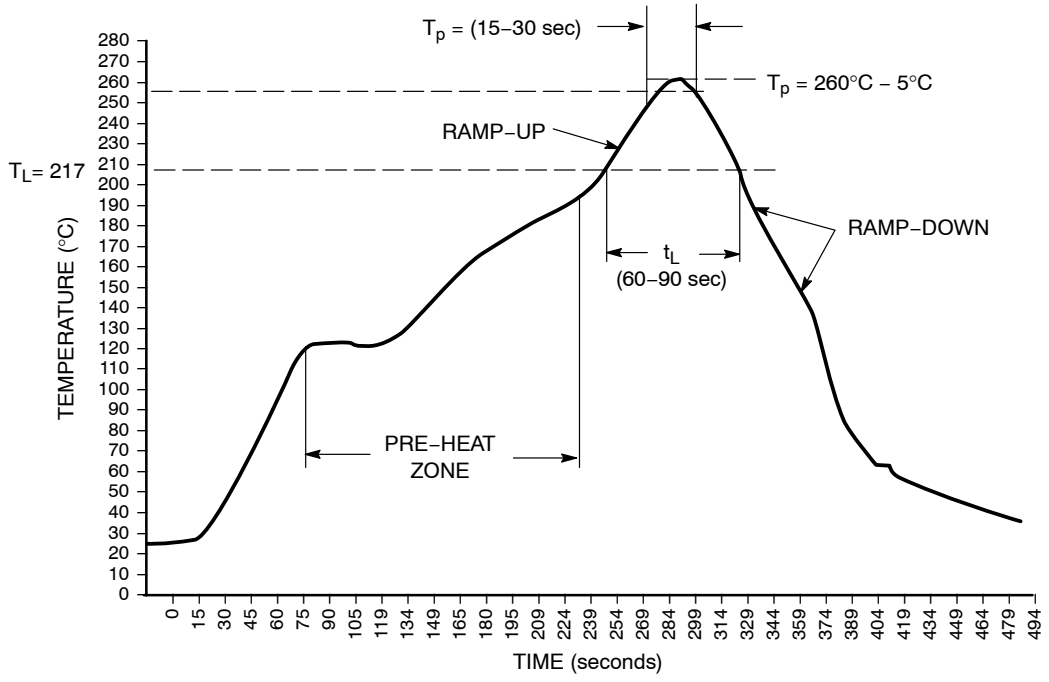


Figure 8. Typical Pb−Free Solder Heating Profile

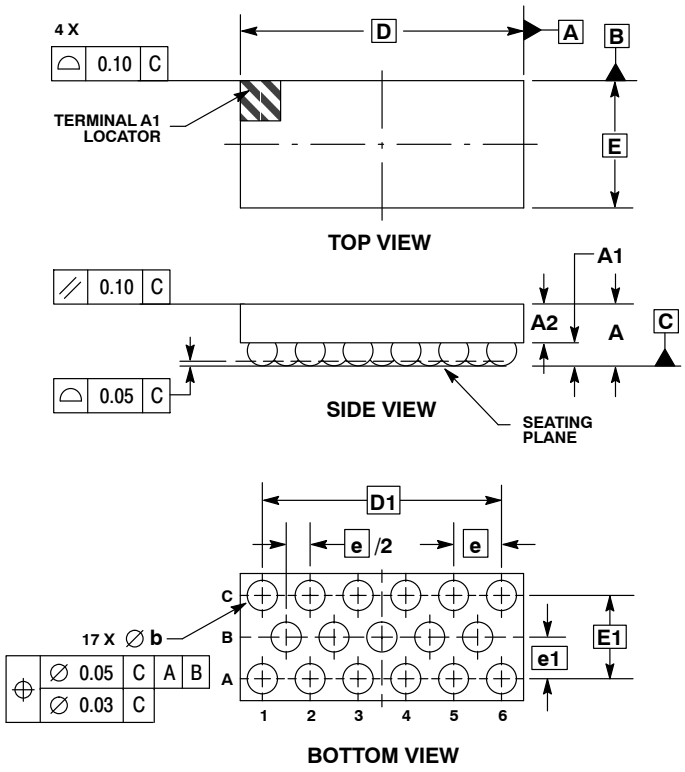


A1

SCALE 4:1

FLIP−CHIP−17 CSP
CASE 499AD
ISSUE A

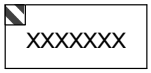
DATE 08 DEC 2005



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

	MILLIMETERS	
DIM	MIN	MAX
A	−−−	0.740
A1	0.250	0.310
A2	0.380	0.430
D	2.960 BSC	
E	1.330 BSC	
b	0.350	0.410
e	0.500 BSC	
e1	0.435 BSC	
D1	2.500 BSC	
E1	0.870 BSC	

GENERIC MARKING DIAGRAM*



XXXXXXXX = Specific Device Code

*This information is generic. Please refer to device data sheet for actual part marking.

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DESCRIPTION:	**FLIP−CHIP−17 CSP, 2.96x1.3 MM, 350 μm SPHERE**	**PAGE 1 OF 1**

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