

# NUF9001FC

## 10 Line EMI Filter

This device is a ten-line EMI filter array for wireless applications. Greater than -35 dB attenuation is obtained at frequencies from 800 MHz to 3.0 GHz. ESD protection is provided across all capacitors.

### Features

- EMI Filtering and ESD Protection
- Integration of 30 Discretes
- Provides Protection for IEC61000-4-2 (Level 4)
  - ◆ 8.0 kV (Contact)
- Flip-Chip Package
- Moisture Sensitivity Level 1
- ESD Rating: Machine Model = C; Human Body Model = 3B
- Pb-Free Package is Available\*

### Benefits

- Reduces EMI/RFI Emissions on a Data Line
- Integrated Solution Offers Cost and Space Savings
- Reduces Parasitic Inductances Which Offer a More “Ideal” Low Pass Filter Response
- Integrated Solution Improves System Reliability

### Applications

- EMI Filtering and ESD Protection for Data Lines
- Cell Phones
- Handheld Products
- MP3 Players

### MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Rating		Symbol	Value	Unit
ESD Discharge IEC61000-4-2	Contact Discharge	V <sub>PP</sub>	8.0	kV
Steady-State Power per Resistor		P <sub>R</sub>	100	mW
Steady-State Power per Package		P <sub>T</sub>	200	mW
Operating Temperature Range		T <sub>OP</sub>	-40 to +85	°C
Storage Temperature Range		T <sub>STG</sub>	-55 to +150	°C
Junction Temperature		T <sub>J</sub>	+125	°C

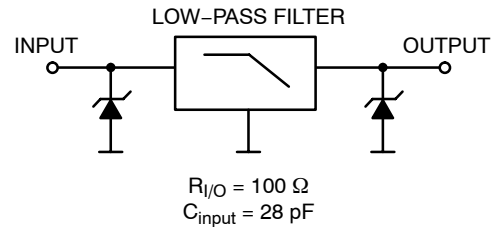
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

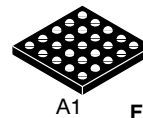


**ON Semiconductor®**

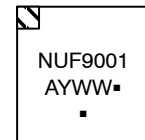
<http://onsemi.com>



### MARKING DIAGRAM



**Flip-Chip  
CASE 499G**

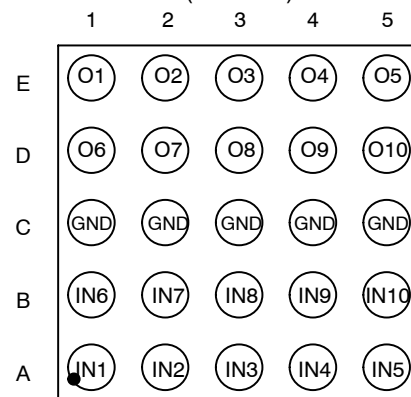


NUF9001 = Specific Device Code  
 A = Assembly Location  
 Y = Year  
 WW = Work Week  
 ▪ = Pb-Free Package

(Note: Microdot may be in either location)

### PIN CONFIGURATION

(Ball Side)



### ORDERING INFORMATION

Device	Package	Shipping†
NUF9001FCT1	Flip-Chip	3000 Tape & Reel
NUF9001FCT1G	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.

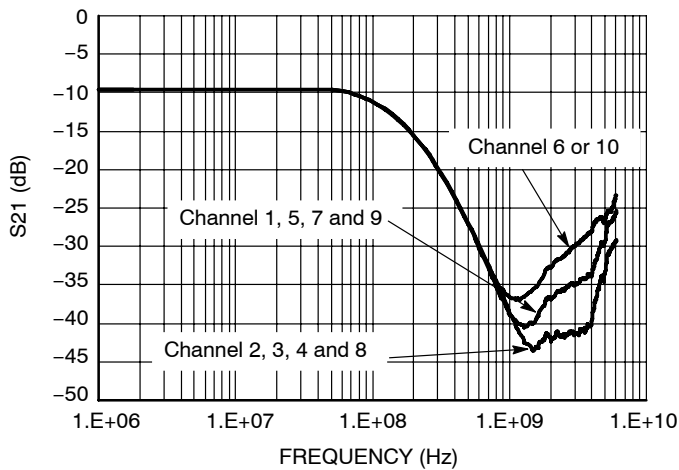
# NUF9001FC

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

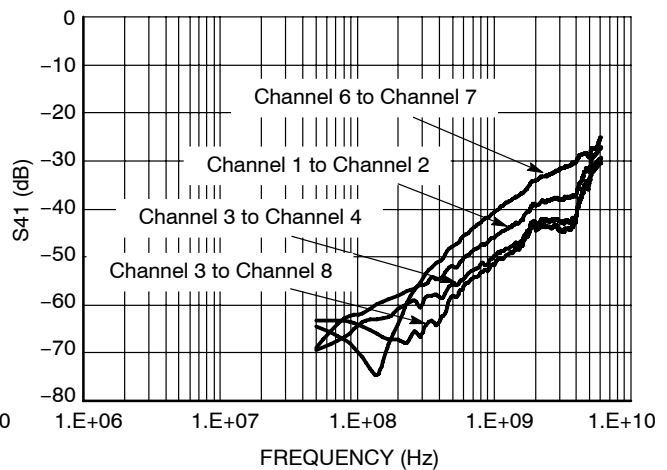
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Reverse Working Voltage	$V_{RWM}$	-	-	-	5.0	V
Breakdown Voltage	$V_{BR}$	$I_R = 1.0 \text{ mA}$	6.0	7.0	8.0	V
Leakage Current	$I_R$	$V_{RM} = 3.0 \text{ V}$	-	-	0.1	$\mu\text{A}$
Series Resistance	$R_A$	-	170	200	230	$\Omega$
Capacitance	$C_{LINE 1}$	$f = 1.0 \text{ MHz}, 0 \text{ Vdc}$	-	45	50	pF
Cut-Off Frequency	$f_{3dB}$	(Above this frequency, appreciable attenuation occurs)	-	100	-	MHz

## TYPICAL PERFORMANCE CURVES

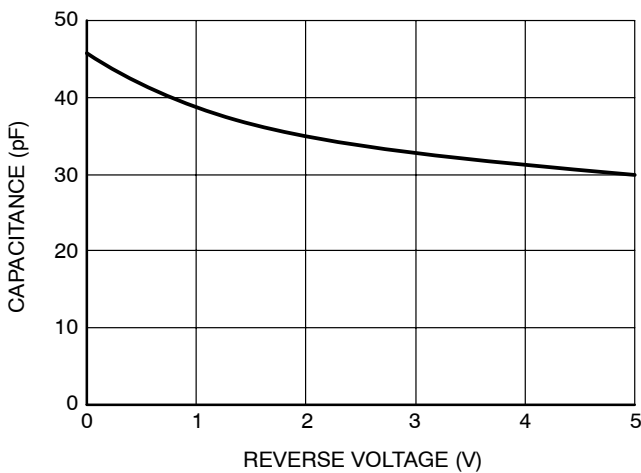
( $T_A = 25^\circ\text{C}$  unless otherwise specified)



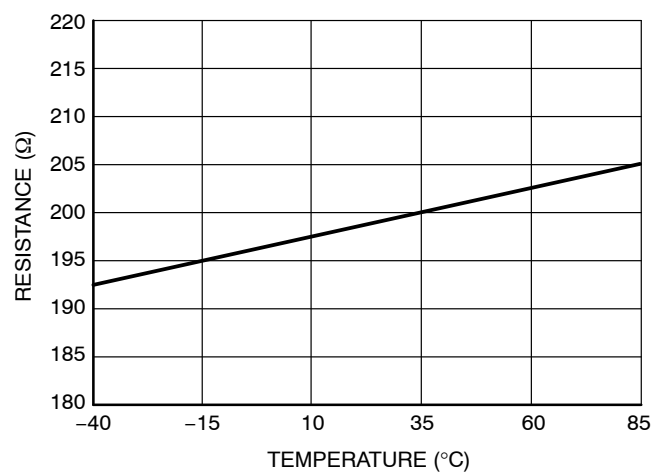
**Figure 1. Insertion Loss Characteristics (S21 Measurement)**



**Figure 2. Analog Crosstalk Curve (S41 Measurement)**



**Figure 3. Typical Line Capacitance vs. Reverse Bias Voltage**



**Figure 4. Typical Resistance Over Temperature**

PRINTED CIRCUIT BOARD RECOMMENDATIONS

Parameter	500 $\mu\text{m}$ Pitch 300 or 350 $\mu\text{m}$ Solder Ball
PCB Pad Size	250 $\mu\text{m}$ +25 -0
Pad Shape	Round
Pad Type	NSMD
Solder Mask Opening	350 $\mu\text{m}$ $\pm$ 25
Solder Stencil Thickness	125 $\mu\text{m}$
Stencil Aperture	250 x 250 $\mu\text{m}$ sq.
Solder Flux Ratio	50/50
Solder Paste Type	No Clean Type 3 or Finer
Trace Finish	OSP Cu
Trace Width	150 $\mu\text{m}$ Max

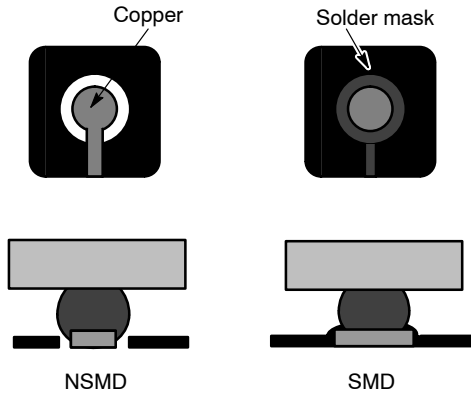


Figure 5. NSMD vs. SMD

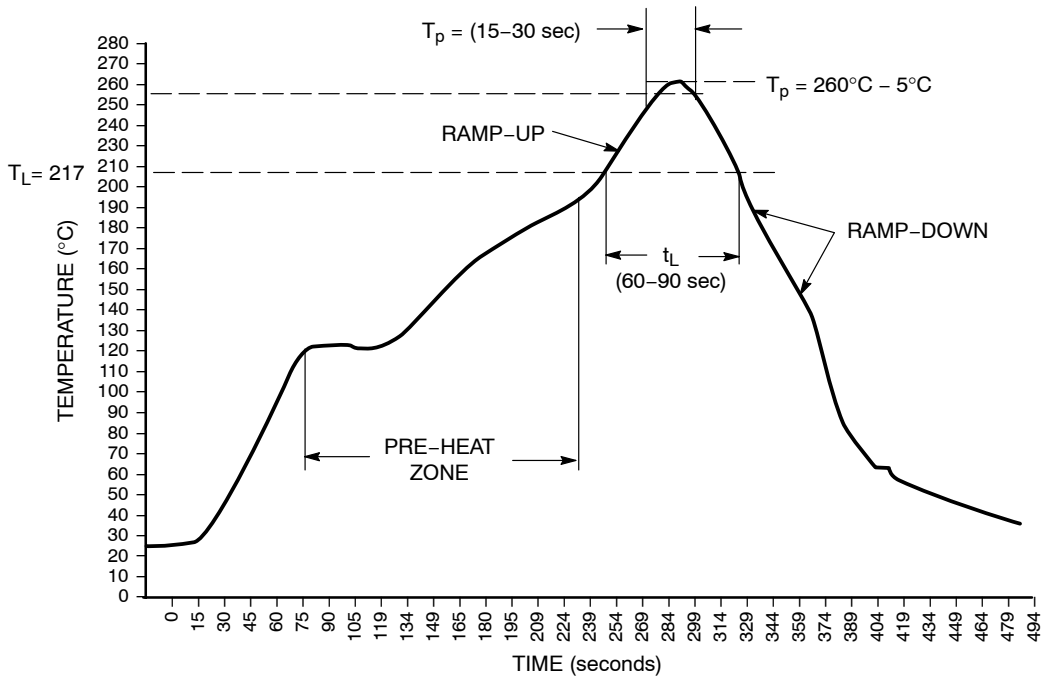


Figure 6. Typical Pb-Free Solder Heating Profile

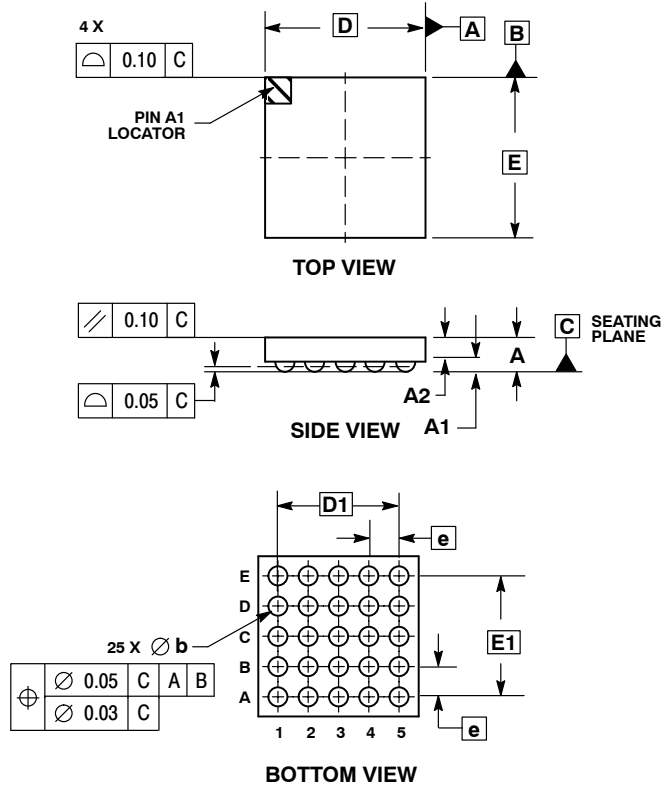


A1

SCALE 4:1

FLIP-CHIP-25 CSP  
CASE 499G  
ISSUE B

DATE 03 MAY 2005

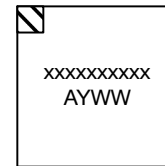


NOTES:

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

DIM	MILLIMETERS	
	MIN	MAX
A	---	0.700
A1	0.210	0.270
A2	0.380	0.430
D	2.650 BSC	
E	2.650 BSC	
b	0.290	0.340
e	0.500 BSC	
D1	2.000 BSC	
E1	2.000 BSC	

GENERIC  
MARKING DIAGRAM\*



- xxxxxx = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "μ", may or may not be present.

DOCUMENT NUMBER:	98AON13902D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	FLIP-CHIP-25 CSP, 0.265 *0.265 MM, 0.500 PITCH	PAGE 1 OF 1

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)