

# NUF4220MN

## 4 Line Audio EMI Filter with ESD Protection

NUF4220MN is a 4 line LC EMI filter array designed for audio applications. It offers greater than -30 dB attenuation at frequencies from 800 MHz to 5.0 GHz, with no line loss. This part is a single chip solution for audio interface applications, 2 speaker lines with a microphone line. This device also offers ESD protection—clamping transients from static discharges and ESD protection is provided across all capacitors.

### Features

- Provides EMI Filtering and ESD Protection
- Integration of 20 Discretes
- Compliance with IEC61000-4-2 (Level 4) 18 kV (Contact)
- DFN8, 2x2 mm Package
- Moisture Sensitivity Level 1
- ESD Ratings: Machine Model = C  
Human Body Model = 3B
- Excellent Line Efficiency with Low Line Resistance < 1.1 Ω max
- This is a Pb-Free Device\*

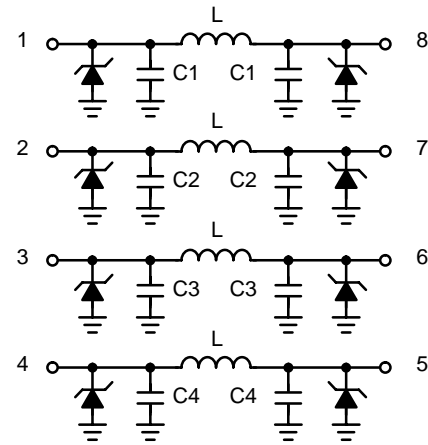
### Applications

- Headset
- MP3s
- PDAs
- Digital Cameras
- Portable DVDs
- Handfree Interface

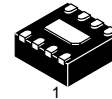


**ON Semiconductor®**

<http://onsemi.com>

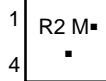


(Top View)

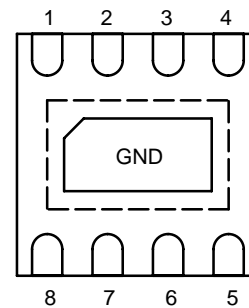


**DFN8  
CASE 506AA  
PLASTIC**

### MARKING DIAGRAM



- R2 = Specific Device Code
- M = Date Code
- = Pb-Free Package



(Bottom View)

### ORDERING INFORMATION

Device	Package	Shipping†
NUF4220MNT1G	DFN8 (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 Specification Brochure, BRD8011/D.

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

# NUF4220MN

## MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
ESD Discharge IEC61000-4-2 Contact Discharge	$V_{PP}$	18	kV
Steady-State Power per Inductor	$P_L$	90	mW
Steady-State Power per Package	$P_T$	360	mW
Operating Temperature Range	$T_{OP}$	-40 to 85	°C
Storage Temperature Range	$T_{stg}$	-55 to 150	°C
Maximum Lead Temperature for Soldering Purposes (1.8 in from case for 10 s)	$T_L$	260	°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.

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

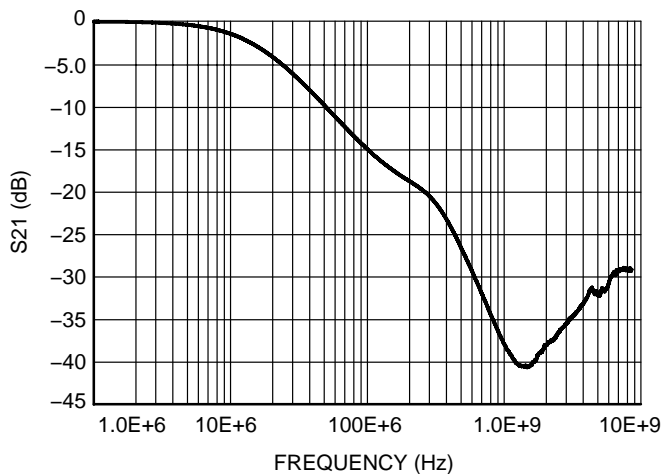
Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Maximum Reverse Working Voltage		$V_{RWM}$			5.0	V
Breakdown Voltage	$I_R = 1.0 \text{ mA}$	$V_{BR}$	6.0	7.0	8.0	V
Leakage Current	$V_{RWM} = 3.3 \text{ V}$	$I_R$			0.1	$\mu\text{A}$
Inductance		$L$		4.9		nH
Series Resistance		$R_S$	0.6	0.85	1.1	$\Omega$
Capacitance (Note 1, 3)		$C_d$		205		pF
Cut-Off Frequency (Note 2)	Above this frequency, appreciable attenuation occurs	$f_{3dB}$		16		MHz

1. Measured at  $25^\circ\text{C}$ ,  $V_R = 0 \text{ V}$ ,  $f = 1.0 \text{ MHz}$ .
2.  $50 \Omega$  source and  $50 \Omega$  load termination.
3. Total line capacitance is 2 times the diode capacitance ( $C_d$ ).

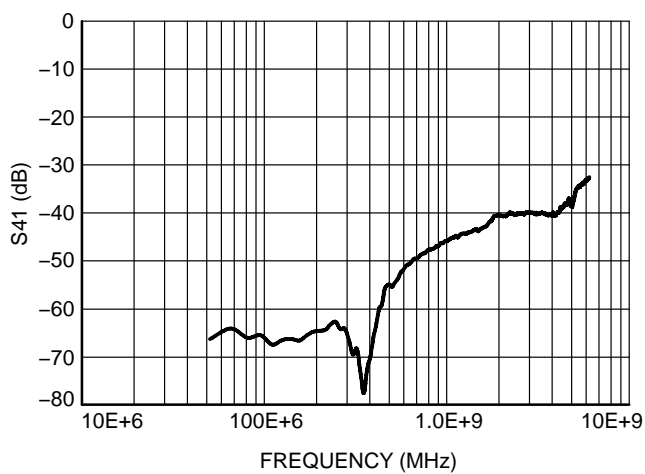
# NUF4220MN

## TYPICAL PERFORMANCE CURVES

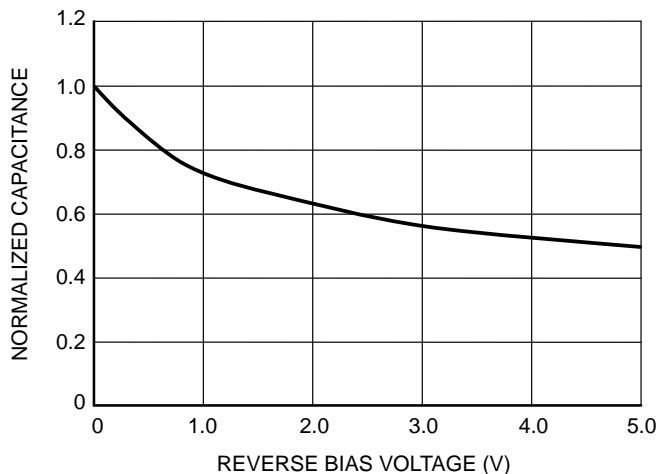
( $T_A = 25^\circ\text{C}$  unless otherwise specified)



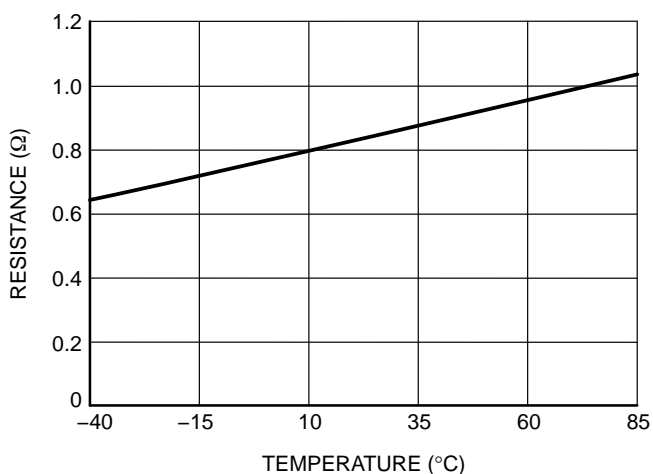
**Figure 1. Typical Insertion Loss Characteristics**



**Figure 2. Typical Analog Crosstalk**



**Figure 3. Typical Line Capacitance vs. Reverse Bias Voltage (Normalized to Capacitance @ 0 V)**

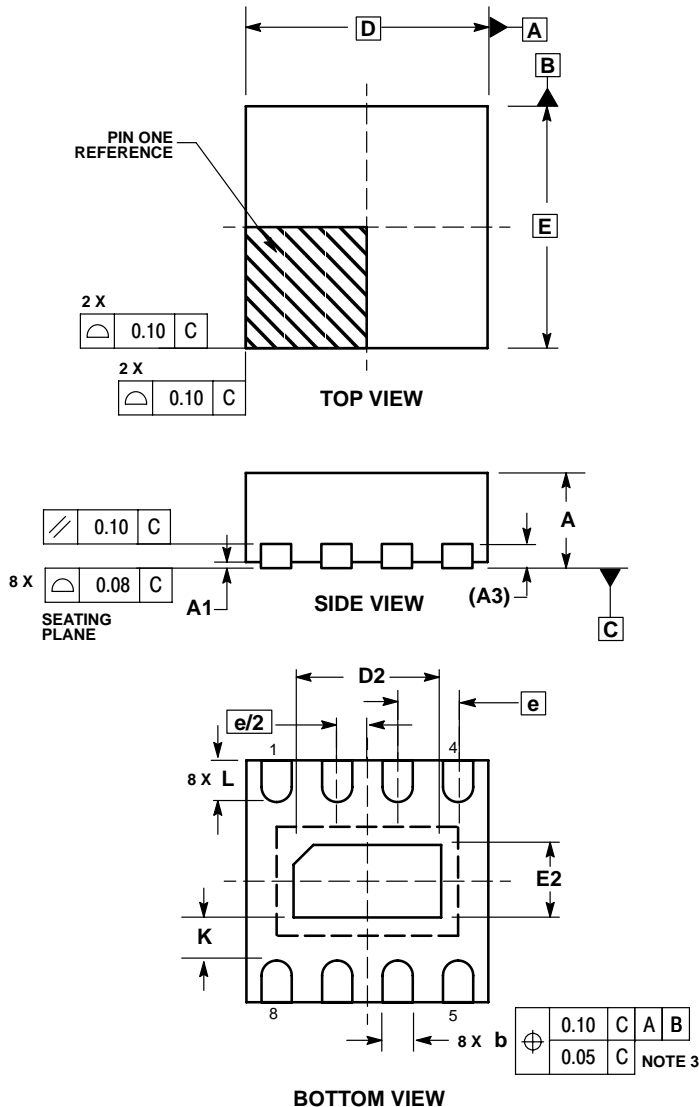


**Figure 4. Typical Resistance Over Temperature**

# NUF4220MN

## PACKAGE DIMENSIONS

DFN8  
CASE 506AA-01  
ISSUE C



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.20	REF
b	0.20	0.30
D	2.00	BSC
D2	1.10	1.30
E	2.00	BSC
E2	0.70	0.90
e	0.50	BSC
K	0.20	---
L	0.25	0.35

**ON Semiconductor** and **ON** are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

#### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5773-3850

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

**NUF4220MN/D**