

# NUF4403MN

## 4 Line EMI Filter with ESD Protection

This device is a 4 line EMI filter array for wireless applications. The NUF4403MN provides greater than -35 dB attenuation at frequencies from 800 MHz to 2.2 GHz. It also offers ESD protection—clamping transients from static discharges. ESD protection is provided across all capacitors.

### Features

- EMI Filtering and ESD Protection
- Integration of 20 Discrete Components
- Compliance with IEC61000-4-2 (Level 4)
  - 18 kV (Contact)
  - 30 kV (Air)
- DFN Package, 1.6 x 1.6 mm
- Moisture Sensitivity Level 1
- ESD Ratings: Machine Model = C  
Human Body Model = 3B
- This is a Pb-Free Device\*

### Benefits

- Reduces EMI/RFI Emmissions 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

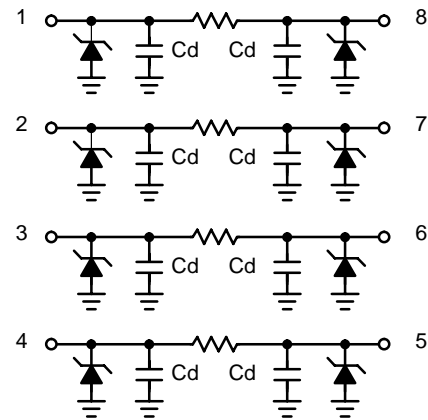
### Applications

- EMI Filtering and ESD Protection for Data Lines
- Wireless Phones
- Handheld Products
- Notebook Computers
- LCD Displays

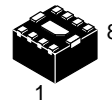


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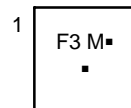


(Top View)



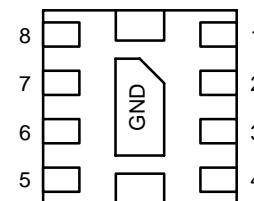
**DFN8  
CASE 506AK**

### MARKING DIAGRAM



F3 = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

### PIN CONNECTIONS



(Bottom View)

### ORDERING INFORMATION

| Device       | Package           | Shipping†          |
|--------------|-------------------|--------------------|
| NUF4403MNT1G | DFN8<br>(Pb-Free) | 3000 / Tape & Reel |

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

†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.

# NUF4403MN

## MAXIMUM RATINGS

| Parameter   | Symbol    | Value      | Unit |
|---|-----------|------------|------|
| ESD Discharge IEC61000-4-2<br>Air Discharge<br>Contact Discharge                  | $V_{PP}$  | 30         | kV   |
|   |           | 18         |      |
| 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 seconds) | $T_L$     | 260        | °C   |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

| Parameter                       | 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                 | $I_R$     | $V_{RWM} = 3.3 \text{ V}$                               |     |     | 100 | nA       |
| Resistance                      | $R_A$     |   | 85  | 100 | 115 | $\Omega$ |
| Capacitance (Notes 1 and 2)     | $C_d$     |   | 15  | 17  | 20  | pF       |
| Cut-Off Frequency (Note 3)      | $f_{3dB}$ | Above this frequency,<br>appreciable attenuation occurs |     | 105 |     | MHz      |

1. Measured at  $25^\circ\text{C}$ ,  $V_R = 2.5 \text{ V}$ ,  $f = 1.0 \text{ MHz}$ .
2. Total Line Capacitance is 2 times the Diode Capacitance ( $C_d$ ).
3.  $50 \Omega$  source and  $50 \Omega$  load termination.

# NUF4403MN

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

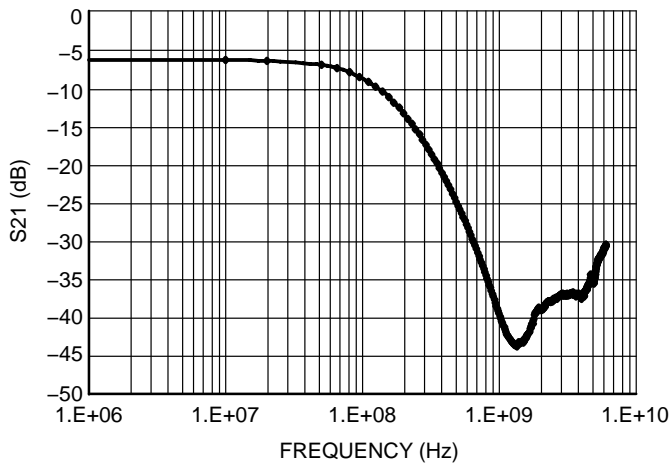


Figure 1. Insertion Loss Characteristic (S21 Measurement)

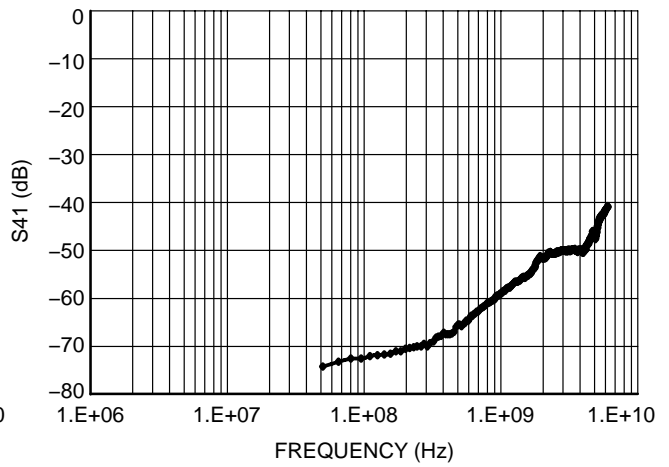


Figure 2. Analog Crosstalk Curve (S41 Measurement)

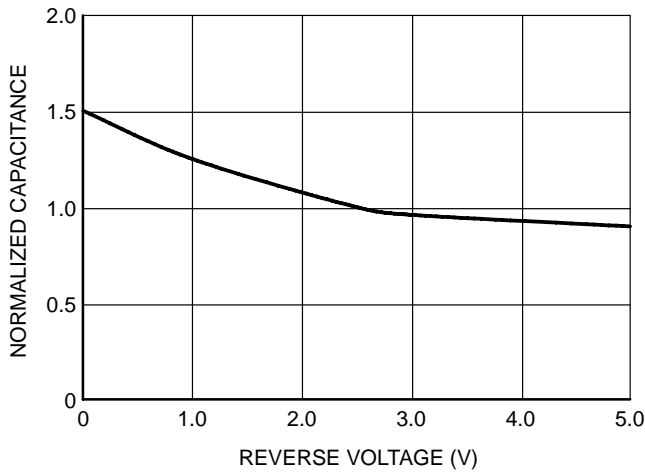


Figure 3. Typical Capacitance vs. Reverse Biased Voltage (Normalized Capacitance  $C_d$  at 2.5 V)

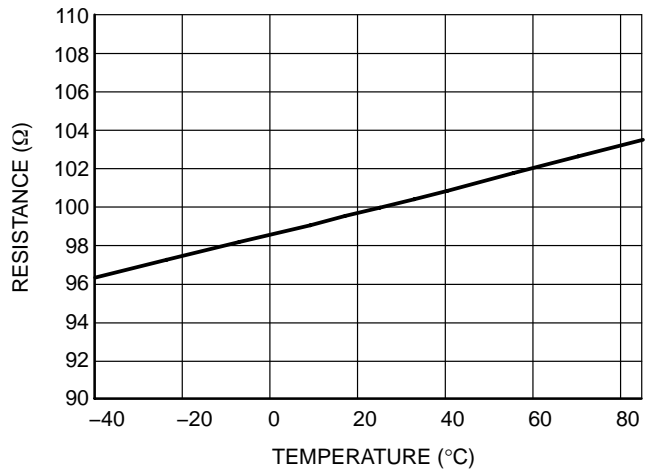
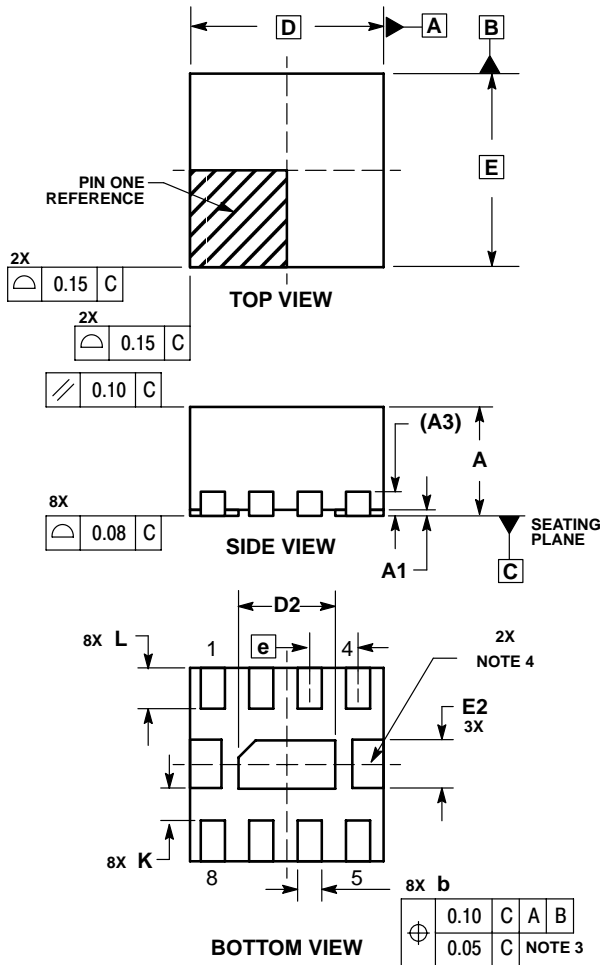


Figure 4. Typical Resistance over Temperature

# NUF4403MN

## PACKAGE DIMENSIONS

DFN8  
CASE 506AK-01  
ISSUE C

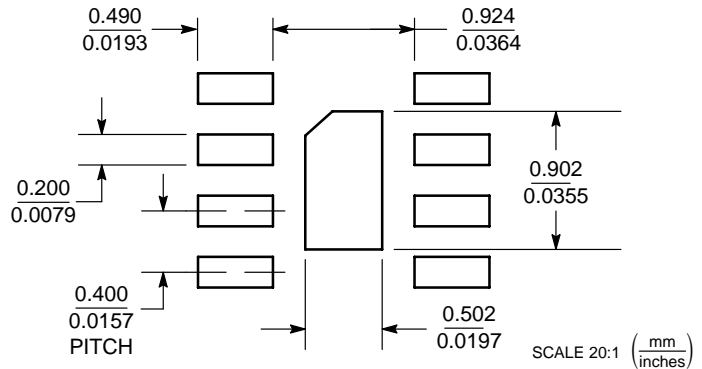


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
4. EXPOSED PADS CONNECTED TO DIE FLAG, USED AS TEST CONTACTS.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.80        | 1.00 |
| A1  | 0.00        | 0.05 |
| A3  | 0.20 REF    |      |
| b   | 0.15        | 0.25 |
| D   | 1.60 BSC    |      |
| D2  | 0.70        | 0.90 |
| E   | 1.60 BSC    |      |
| E2  | 0.30        | 0.50 |
| e   | 0.40 BSC    |      |
| K   | 0.20        | ---  |
| L   | 0.20        | 0.40 |

**SOLDERING FOOTPRINT\***



\*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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