

# NUF2101M

## USB Filter with ESD Protection

This device is designed for applications requiring **Line Termination**, **EMI Filtering** and **ESD Protection**. It is intended for use in downstream USB 1.1 ports, Cellular phones, Wireless equipment and computer applications. This device offers an integrated solution in a small package (TSOP-6, Case 318G) reducing PCB space and cost.

### Features:

- Provides USB Line Termination, Filtering and ESD Protection
- Single IC Offers Cost Savings by Replacing 4 Resistors, 2 Capacitors, and 5 TVs diodes
- EMI Filtering Prevents Noise from Entering/Leaving the System
- IEC61000-4-2 (Level 4)
  - 8 kV (Contact)
  - 15 kV (Air)
- ESD Ratings: Machine Model = C
  - Human Body Model = 3B
- Pb-Free Package is Available

### Benefits:

- TSOP-6 Package Minimizes PCB Space
- Integrated Circuit Increases System Reliability versus Discrete Component Implementation
- TVs Devices Provide ESD Protection That is Better than a Discrete Implementation because the Small IC minimizes Parasitic Inductances

### Typical Applications:

- USB Hubs
- Computer Motherboards

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Rating	Symbol	Value	Unit
Steady State Power	$P_D$	225	mW
Maximum Junction Temperature	$T_{J(max)}$	125	$^\circ\text{C}$
Operating Temperature Range	$T_J$	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +125	$^\circ\text{C}$
Lead Solder Temperature (10 second duration)	$T_L$	260	$^\circ\text{C}$

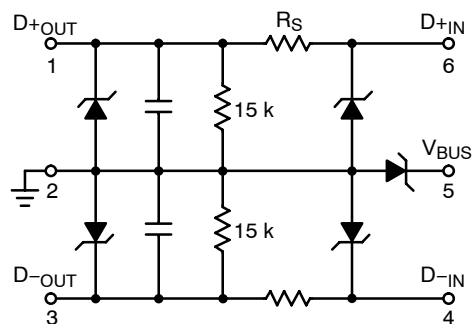
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



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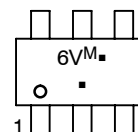
<http://onsemi.com>

### SCHEMATIC



TSOP-6  
CASE 318G  
STYLE 10

### MARKING DIAGRAM



6V = Specific Device Code  
M = Date Code  
■ = Pb-Free Package  
(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
NUF2101MT1	TSOP-6	3000/Tape & Reel
NUF2101MT1G	TSOP-6 (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.

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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

Device	Device Marking	V <sub>RWM</sub> (Volts)	V <sub>BR</sub> @ 1 mA (Volts)		Max I <sub>R</sub> @ V <sub>RWM</sub> = 5.25 V V <sub>BUS</sub> to GND (μA)	Max I <sub>R</sub> @ V <sub>RWM</sub> = 3.3 V V <sub>BUS</sub> Pin (μA)	Typical Line Capacitance (pF) (Notes 2, 3)	Series Resistor R <sub>S</sub> (Ω) (Note 1)			Pulldown Resistor R <sub>pd</sub> (kΩ)		
			Min	Max				Min	Nom	Max	Min	Nom	Max
NUF2101MT1	6V	5.25	6.0	8.0	1.0	0.1	55	26.3	30	33.7	13	15	17
NUF2101MT1G	6V	5.25	6.0	8.0	1.0	0.1	55	26.3	30	33.7	13	15	17

1. For other R<sub>S</sub> values (i.e. R<sub>S</sub> = 30 Ω) contact your local ON Semiconductor sales representative.
2. Measured at 25°C, V<sub>R</sub> = 0 V, f = 1 MHz, Pins 2, 3, 4 or 5 to GND with Pin 1 also grounded.
3. For other capacitance values contact your local ON Semiconductor sales representative.

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## TYPICAL CHARACTERISTICS

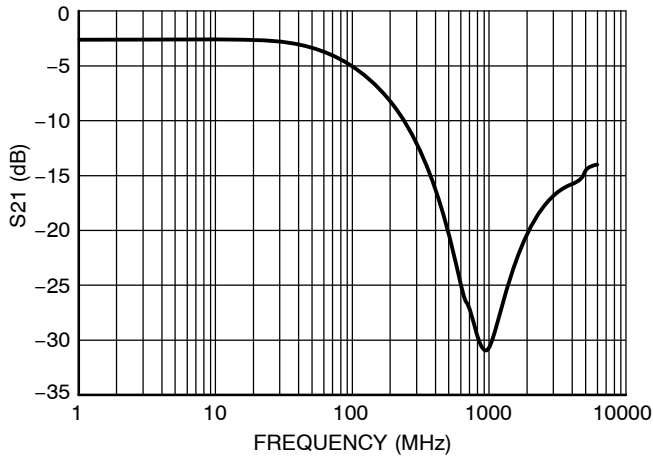


Figure 1. Insertion Loss Characteristics

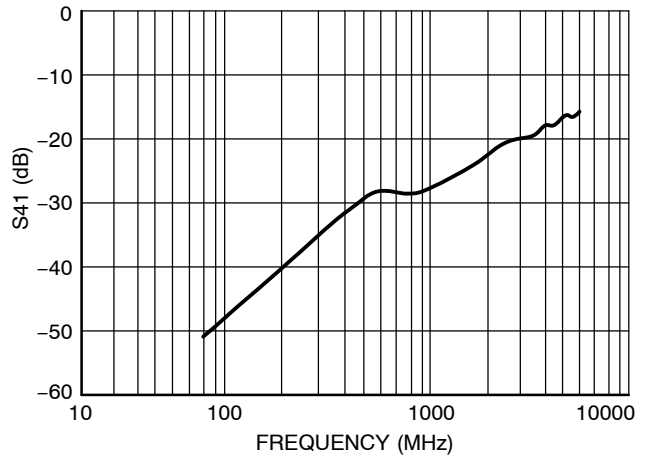


Figure 2. Analog Cross-Talk

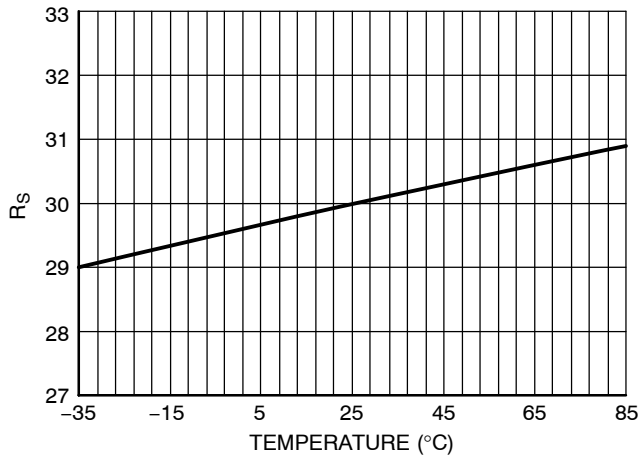


Figure 3. R<sub>S</sub> vs. Temperature

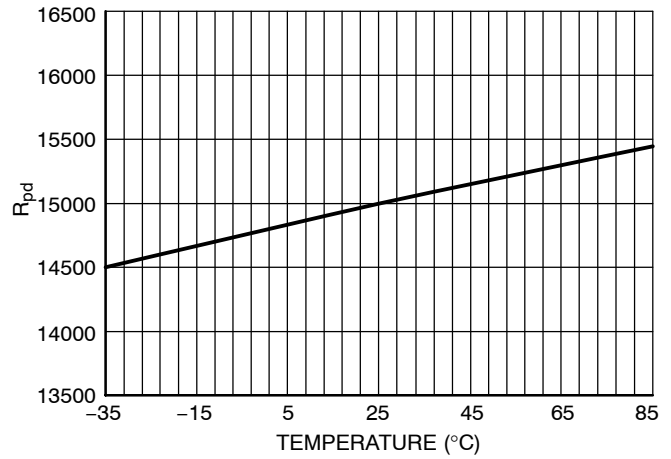


Figure 4. R<sub>pd</sub> vs. Temperature

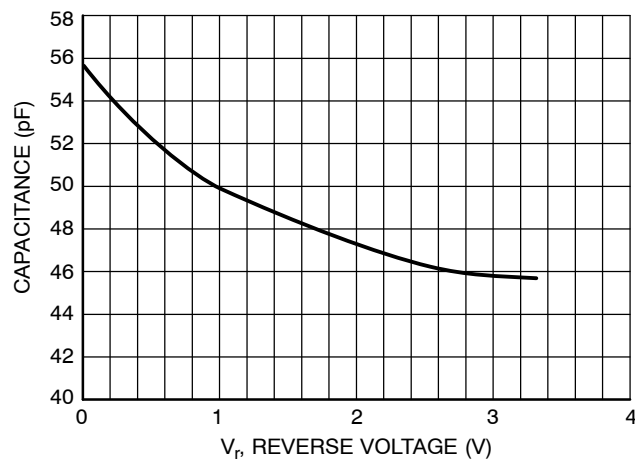
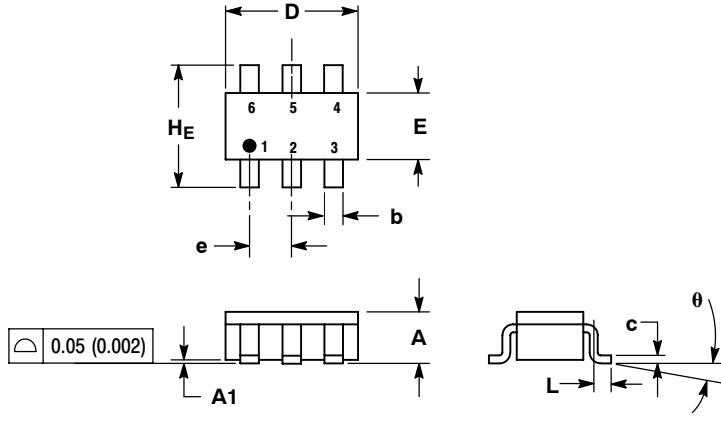


Figure 5. Typical Capacitance

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## PACKAGE DIMENSIONS

TSOP-6  
CASE 318G-02  
ISSUE P



### NOTES:

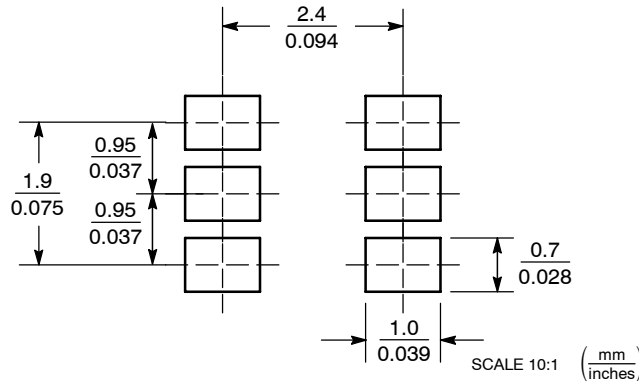
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

### STYLE 10:

1. D(OUT)+
2. GND
3. D(OUT)-
4. D(IN)-
5. VBUS
6. D(IN)+

### 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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