NUC2401MN

Integrated Common Mode Choke with Integrated ESD Protection

ON Semiconductor®

http://onsemi.com

Description

The NUC2401MN is an Integrated Common Mode Filter for the elimination of common mode noise in high speed data line applications such as IEEE1394, USB2.0 and other LVDS type applications. ESD protection is integrated into the Common mode filter for superior protection and significant part count reduction.

Features

- Common mode EMI Filtering and ESD Protection
- Integration of 5 Discrete components
- ±12 kV ESD Protection per IEC61000−4−2 (Contact Discharge)
- DFN: 2.0 x 2.2 mm Package
- Moisture Sensitivity Level 1
- ESD Rating: Machine Model (MM) = 1.6 kV; Human Body Model (HBM) = 16 kV
- This is a Pb−Free Device

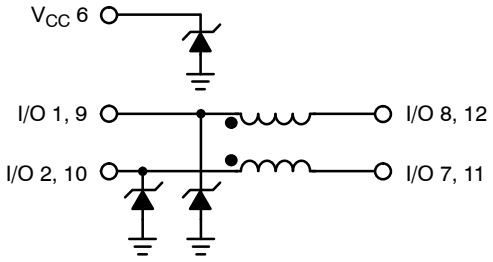
Benefits

- Reduces EMI/RFI Emissions on a Data Line
- Integrated Solution offers Cost and Space Savings
- Reduces Parasitic Inductances Which Offer a More “Ideal” Common Mode Filtering
- Integrated Solution Improves System Reliability

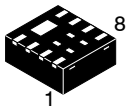
Applications

- High Speed Differential Data Lines
- USB2.0
- IEEE1394
- LVDS
- MIPI
- MDDI

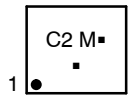
SIMPLIFIED SCHEMATIC



MARKING DIAGRAM

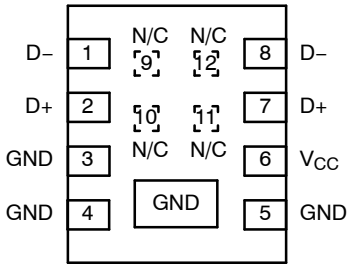


DFN8
CASE 506BL



C2 = Specific Device Code
M = Date Code
▪ = Pb−Free Device
(Note: Microdot may be in either location)

PIN CONNECTIONS*



(Top View)

***NOTE:** Pins 1 and 9, Pins 2 and 10, Pins 7 and 11, Pins 8 and 12 are internally connected in pairs. It is recommended not to solder to Pins 9, 10, 11, 12.

ORDERING INFORMATION

Device	Package	Shipping†
NUC2401MNTAG	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.

MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

Parameter		Symbol	Value	Units
ESD Discharge IEC61000−4−2	Contact Discharge	V_{PP}	±12	kV
Operating Temperature Range		T_{OP}	−40 to 85	°C
Storage Temperature Range		T_{STG}	−55 to 125	°C
Maximum Lead Temperature for Soldering Purposes (1/8” from Case for 10 Seconds)		T_L	260	°C
DC Current per Line		I_{LINE}	100	mA

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_A = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Reverse Working Voltage	V_{RWM}				5.0	V
Breakdown Voltage	V_{BR}	I_R = 1 mA	6.0	7.6	8.6	V
Leakage Current	I_R	V_{RWM} = 5.5 V			2.0	μA
Maximum Peak Pulse Current	I_{PP}	8x20 μs Waveform			12	A
Clamping Voltage	V_C	I_{PP} = 5 A			10	V
Resistance Pin 1 to Pin 8	R_A			2.2	5.0	Ω
Resistance Pin 2 to Pin 7	R_B			2.2	5.0	Ω
Capacitance (Note 1)	C_{LINE} 1			0.8	1.0	pF
Capacitance (Note 2)	C_{LINE} 2			0.8	1.0	pF
Common Mode Cut−Off Frequency (Note 3)	f_{3dB}	(Above this Frequency, Appreciable Common Mode Attenuation Occurs)		40		MHz
Common Mode Impedance	Z_C	@ 100 MHz		90		Ω

1. Measured at 25°C, V_R = 0 V, f = 1 MHz, Pins 1 or 4 to GND.
2. Measured at 25°C, V_R = 0 V, f = 1 MHz, Pins 8 or 5 to GND.
3. 50 Ω source and 50 Ω load termination.

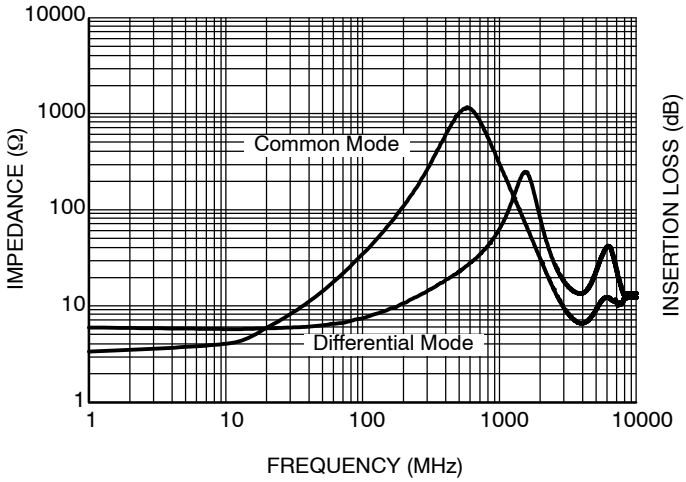


Figure 1. Impedance Characteristics vs. Frequency

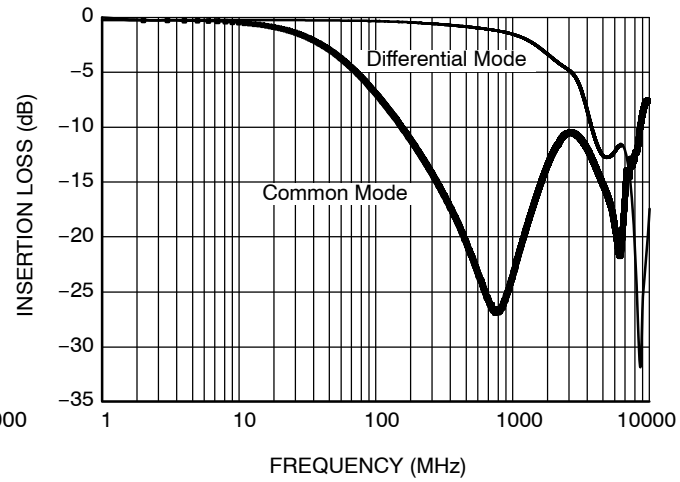
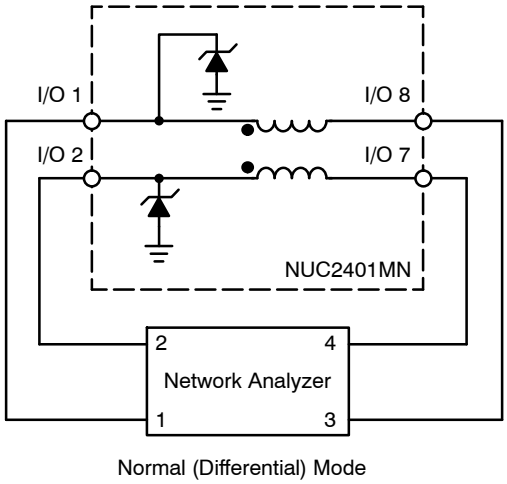


Figure 2. Insertion Loss Characteristics vs. Frequency



Normal (Differential) Mode

Figure 3. Normal (Differential) Mode Test Configuration

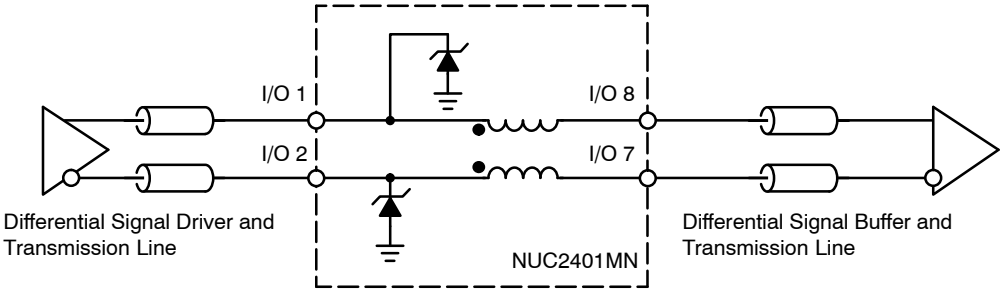
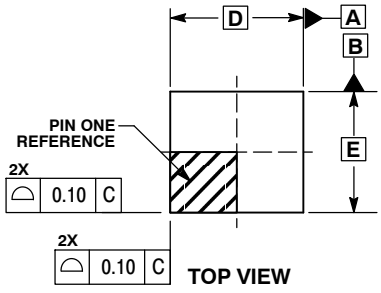


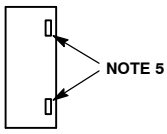
Figure 4. Application Circuit

PACKAGE DIMENSIONS

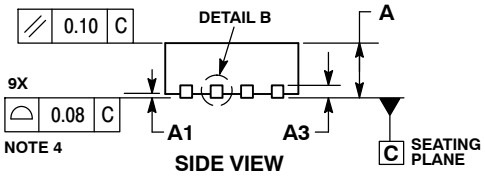
DFN8, 2.2x2, 0.5P
CASE 506BL−01
ISSUE O



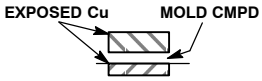
TOP VIEW



END VIEW



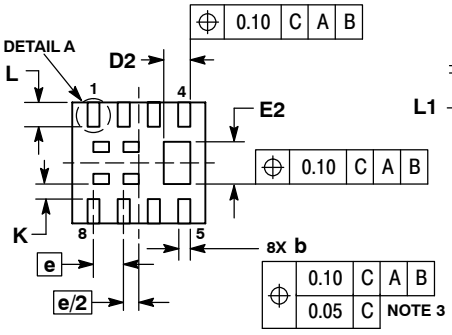
SIDE VIEW



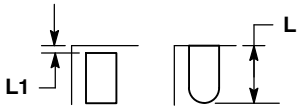
DETAIL B
OPTIONAL CONSTRUCTION

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 0.15 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. EXPOSED ENDS OF THE TERMINALS ARE ELECTRICALLY ACTIVE.

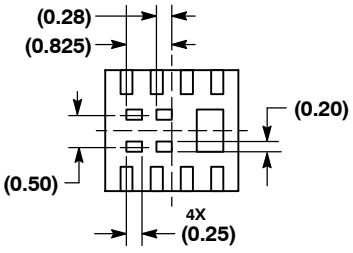
	MILLIMETERS	
DIM	MIN	MAX
A	0.85	0.95
A1	0.00	0.05
A3	0.20 REF	
b	0.15	0.25
D	2.20 BSC	
D2	0.34	0.54
E	2.00 BSC	
E2	0.60	0.80
e	0.50 BSC	
K	0.20	−−−
L	0.30	0.50
L1	−−−	0.15



BOTTOM VIEW

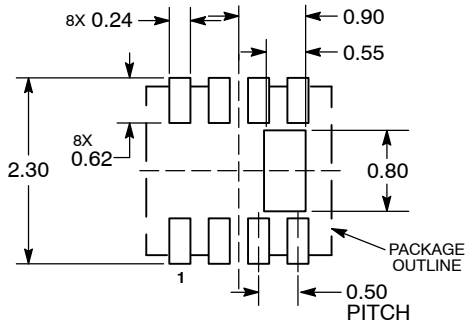


DETAIL A
OPTIONAL CONSTRUCTIONS



AUXILIARY BOTTOM VIEW
(FOR REFERENCE ONLY)

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

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**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative