NUC2401MN

Integrated Common Mode Choke with Integrated ESD Protection

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
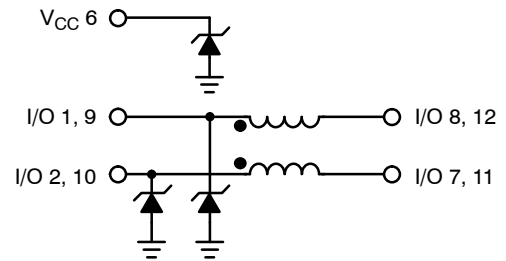- Integrated Solution Improves System Reliability

Applications

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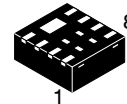- USB2.0
- IEEE1394
- LVDS
- MIPI
- MDDI

ON Semiconductor®
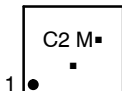
http://onsemi.com

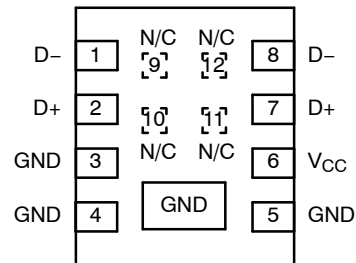### SIMPLIFIED SCHEMATIC

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.

January, 2010 – Rev. 2

Publication Order Number:
NUC2401MN/D

NUC2401MN

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.
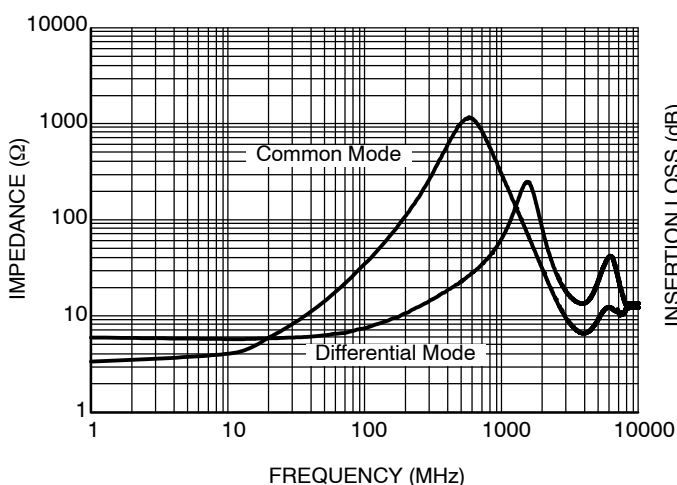3. 50 Ω source and 50 Ω load termination.

Figure 1. Impedance Characteristics vs. Frequency
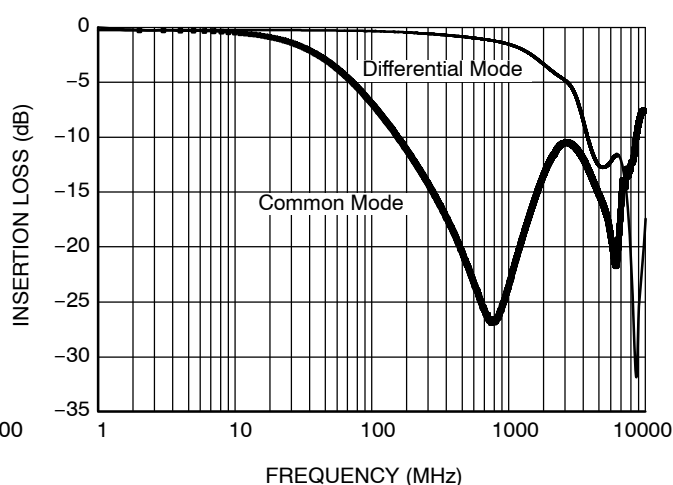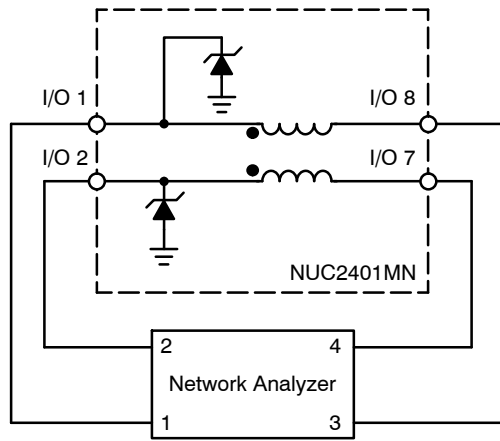

Figure 2. Insertion Loss Characteristics vs. Frequency

NUC2401MN

Normal (Differential) Mode
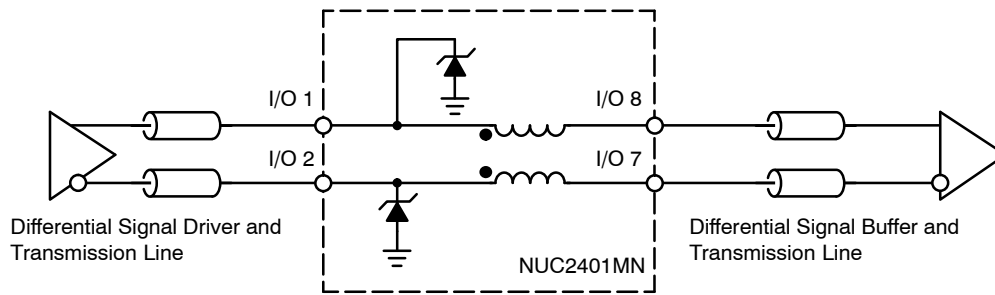
**Figure 3. Normal (Differential) Mode Test
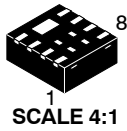Configuration**

Figure 4. Application Circuit

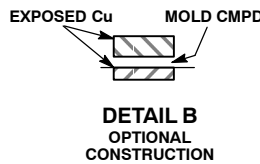**DFN8, 2.2x2, 0.5P**
CASE 506BL−01
ISSUE O

DATE 05 NOV 2008

8

SCALE 4:1

1

PIN ONE REFERENCE

2X

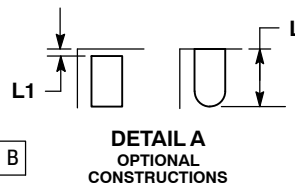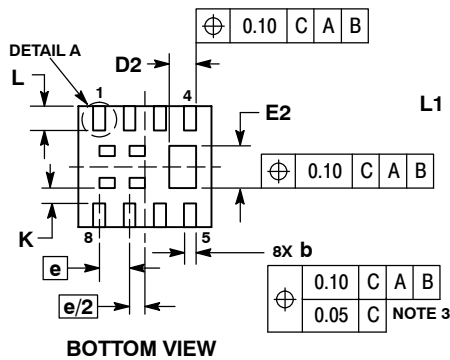△ | 0.10 | C

2X

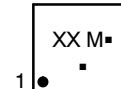△ | 0.10 | C

TOP VIEW

D | A
B
E

END VIEW

NOTE 5
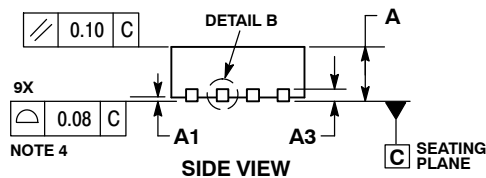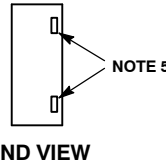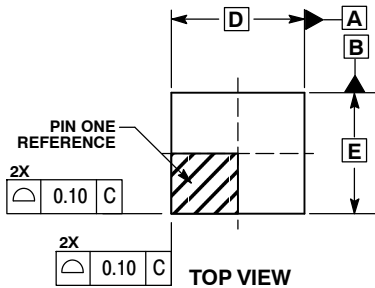
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. EXPOSED ENDS OF THE TERMINALS ARE ELECTRICALLY ACTIVE.

DIM	MILLIMETERS	
	MIN	MAX
A	0.80	1.00
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

// | 0.10 | C

DETAIL B

A

9X

△ | 0.08 | C

NOTE 4

A1   A3

▽ | C | **SEATING PLANE**

SIDE VIEW

EXPOSED Cu   **MOLD CMPD**

DETAIL B
OPTIONAL CONSTRUCTION

DETAIL A

⊕ | 0.10 | C | A | B

L   D2

1   4

E2

⊕ | 0.10 | C | A | B

K   8   5

8X b

e

e/2

⊕ | 0.10 | C | A | B
| 0.05 | C | NOTE 3

BOTTOM VIEW

L

L1

DETAIL A
OPTIONAL CONSTRUCTIONS

GENERIC MARKING DIAGRAM*

XX M■

1 ●   ■

XX = Specific Device Code
M = Date Code
■ = Pb−Free Device

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

(0.28)
(0.825)

(0.20)

(0.50)

4X
(0.25)

AUXILIARY BOTTOM VIEW
(FOR REFERENCE ONLY)

SOLDERING FOOTPRINT*

8X 0.24   0.90
0.55

8X
0.62

2.30   0.80

1   **PACKAGE OUTLINE**

0.50
PITCH
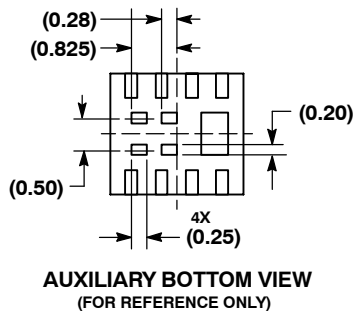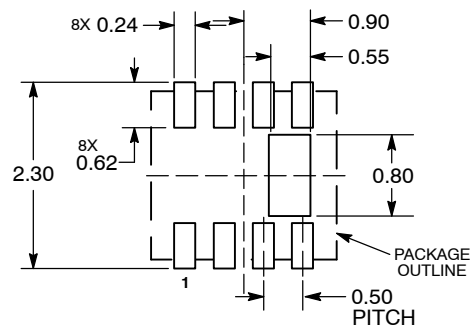
DIMENSIONS: MILLIMETERS

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

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STATUS:	ON SEMICONDUCTOR STANDARD	
NEW STANDARD:		
DESCRIPTION:	DFN8, 2.2X2.0, 0.5P	PAGE 1 OF 2

ISSUE	REVISION	DATE
O	RELEASED FOR PRODUCTION. REQ. BY A. TAM.	05 NOV 2008

PUBLICATION ORDERING INFORMATION

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