

LCD and Camera EMI Filter Array with ESD Protection

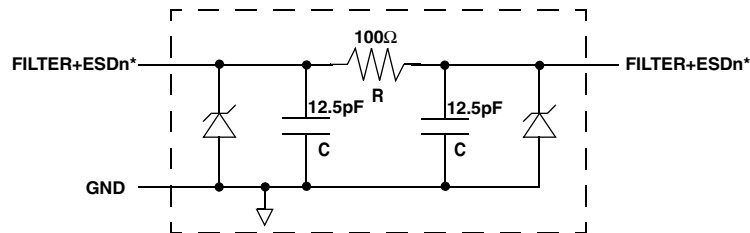
Features

- Eight channels of EMI filtering with integrated ESD protection
- Pi-style EMI filters in a capacitor-resistor-capacitor (C-R-C) network
- ±15kV ESD protection on each channel (IEC 61000-4-2 Level 4, contact discharge)
- ±30kV ESD protection on each channel (HBM)
- Greater than -35dB attenuation (typical) at 1GHz
- NuDFN package with 0.40mm lead pitch:
 - 16-lead: 3.5mm x 1.20mm x 0.50mm
- Lead-free finishing

Applications

- LCD and camera data lines in mobile handsets
- I/O port protection for mobile handsets, notebook computers, PDAs, etc.
- EMI filtering for data ports in cell phones, PDAs or notebook computers
- Wireless handsets
- Handheld PCs/PDAs

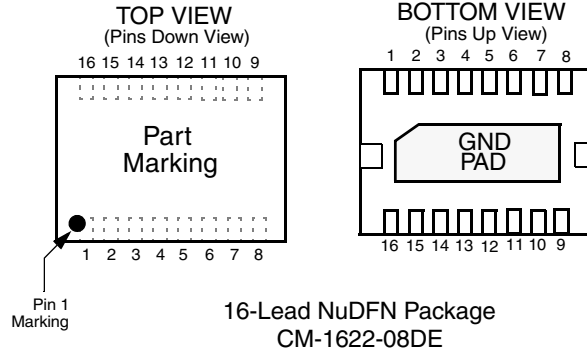
Electrical Schematic



* See Package/Pinout Diagram for expanded pin information.

1 of 8 EMI/RFI + ESD Channels

PACKAGE / PINOUT DIAGRAMS



Note: These drawings are not to scale.

16-PIN DESCRIPTIONS

DEVICE PIN(s)	NAME	DESCRIPTION	DEVICE PIN(s)	NAME	DESCRIPTION
1	FILTER1	Filter + ESD Channel 1	16	FILTER1	Filter + ESD Channel 1
2	FILTER2	Filter + ESD Channel 2	15	FILTER2	Filter + ESD Channel 2
3	FILTER3	Filter + ESD Channel 3	14	FILTER3	Filter + ESD Channel 3
4	FILTER4	Filter + ESD Channel 4	13	FILTER4	Filter + ESD Channel 4
5	FILTER5	Filter + ESD Channel 5	12	FILTER5	Filter + ESD Channel 5
6	FILTER6	Filter + ESD Channel 6	11	FILTER6	Filter + ESD Channel 6
7	FILTER7	Filter + ESD Channel 7	10	FILTER7	Filter + ESD Channel 7
8	FILTER8	Filter + ESD Channel 8	9	FILTER8	Filter + ESD Channel 8
GND PAD	GND	Device Ground			

Ordering Information

PART NUMBERING INFORMATION

Pins	Package	Lead-free Finish	
		Ordering Part Number ¹	Part Marking
16	NuDFN-16	CM1622-08DE	P22

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.

Specifications

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNITS
Storage Temperature Range	-65 to +150	°C
DC Power per Resistor	100	mW
DC Package Power Rating	500	mW

STANDARD OPERATING CONDITIONS

PARAMETER	RATING	UNITS
Operating Temperature Range	-40 to +85	°C

ELECTRICAL OPERATING CHARACTERISTICS (NOTE1)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
R	Resistance	$I_R = 20\text{mA}$	85	100	115	Ω
C_{TOTAL}	Total Channel Capacitance	At 2.5VDC Reverse Bias, 1MHz, 30mVAC	20	25	30	pF
C	Capacitance C	At 2.5VDC Reverse Bias, 1MHz, 30mVAC		12.5		pF
V_{DIODE}	Standoff Voltage	$I_{\text{DIODE}} = 10\mu\text{A}$		6.0		V
I_{LEAK}	Diode Leakage Current (reverse bias)	$V_{\text{DIODE}} = +3.3\text{V}$		0.01	0.2	μA
V_{SIG}	Signal Clamp Voltage	$I_{\text{LOAD}} = 1.0\text{mA}$	6.0	7.0	8.0	V
V_{ESD}	In-system ESD Withstand Voltage a) Human Body Model, MIL-STD-883, Method 3015 b) Contact Discharge per IEC 61000-4-2 Level 4	See notes 2 and 3.	± 30			kV kV
R_{DYN}	Dynamic Resistance Positive Negative			2.3 0.9		Ω Ω
f_c	Cut-off Frequency $Z_{\text{SOURCE}} = 50\Omega$, $Z_{\text{LOAD}} = 50\Omega$	Channel R = 100 Ω Channel C = 25pF		115		MHz
$A_{1\text{GHz}}$	Absolute Attenuation @ 1GHz from 0dB Level	$Z_{\text{SOURCE}} = 50\Omega$, $Z_{\text{LOAD}} = 50\Omega$ DC Bias = 0V; See notes 1, 4, 5.		-35		dB
$A_{800\text{MHz} - 6\text{GHz}}$	Absolute Attenuation @ 800MHz to 6GHz from 0dB Level	$Z_{\text{SOURCE}} = 50\Omega$, $Z_{\text{LOAD}} = 50\Omega$ DC Bias = 0V; See notes 1, 4, 5.		30		dB

Note 1: $T_A = 25^\circ\text{C}$ unless otherwise specified.

Note 2: ESD applied to input and output pins with respect to GND, one at a time.

Note 3: These parameters are guaranteed by design and characterization.

Note 4: Attenuation / RF curves characterized by a network analyzer using microprobes.

Note 5: These parameters are NOT guaranteed by design, characterization and production.

Performance Information

Typical Filter Performance ($T_A=25^\circ\text{C}$, DC Bias=0V, 50 Ohm Environment)

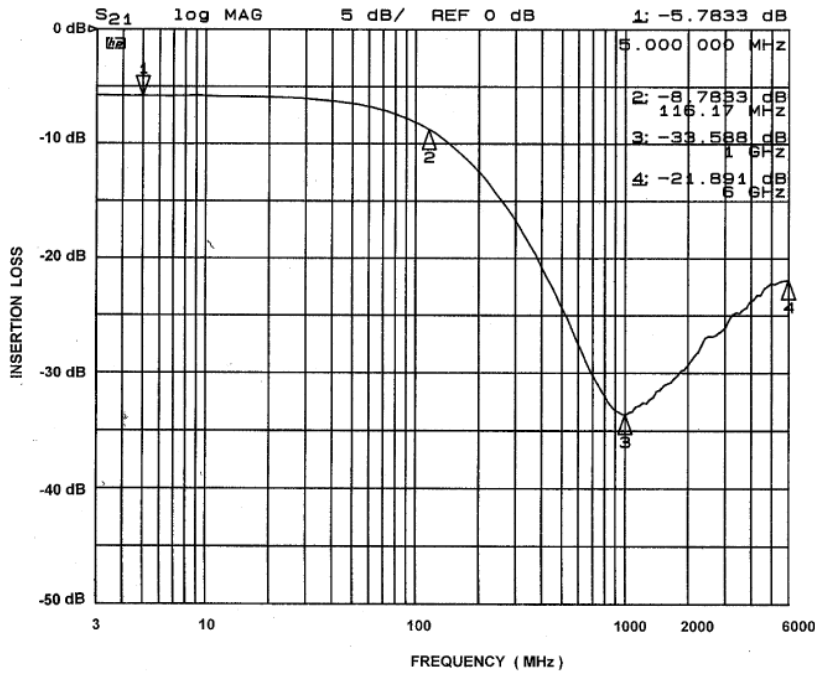


Figure 1. Insertion Loss vs. Frequency (FILTER1 Input to GND)

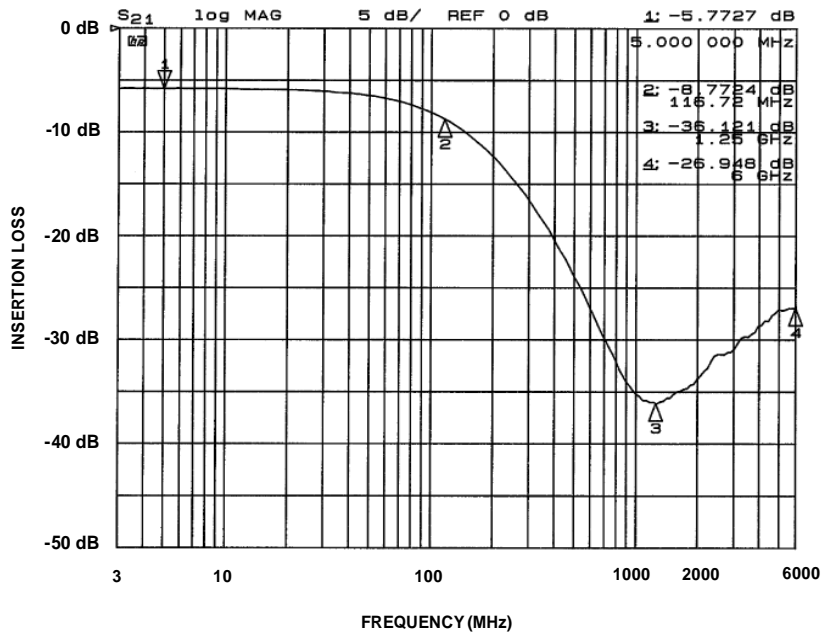


Figure 2. Insertion Loss vs. Frequency (FILTER2 Input to GND)

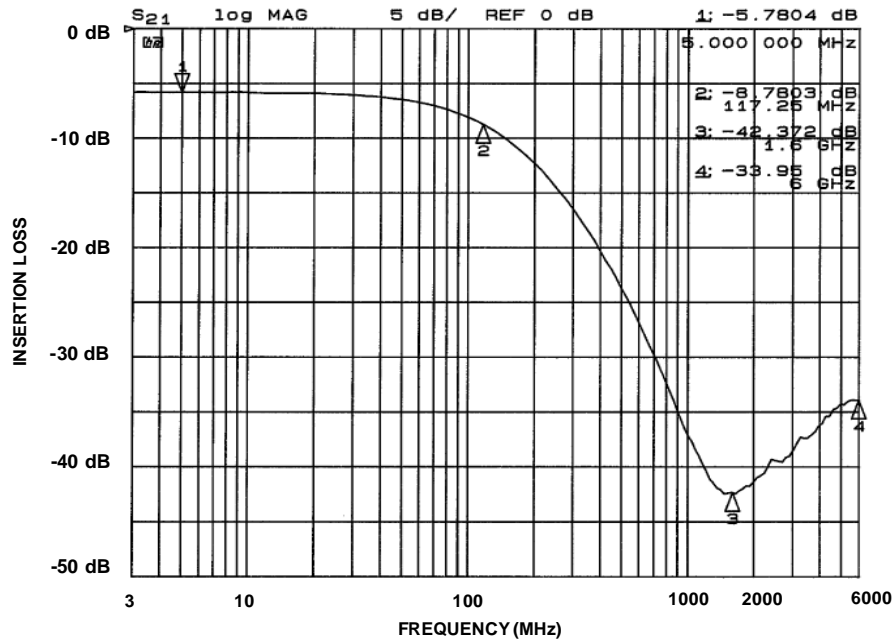


Figure 3. Insertion Loss vs. Frequency (FILTER3 Input to GND)

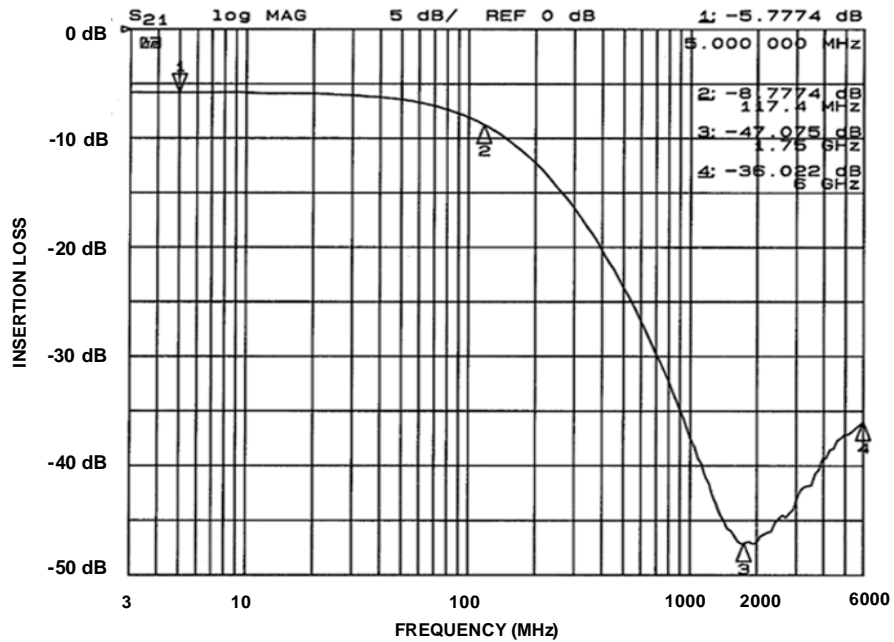


Figure 4. Insertion Loss vs. Frequency (FILTER4 Input to GND)

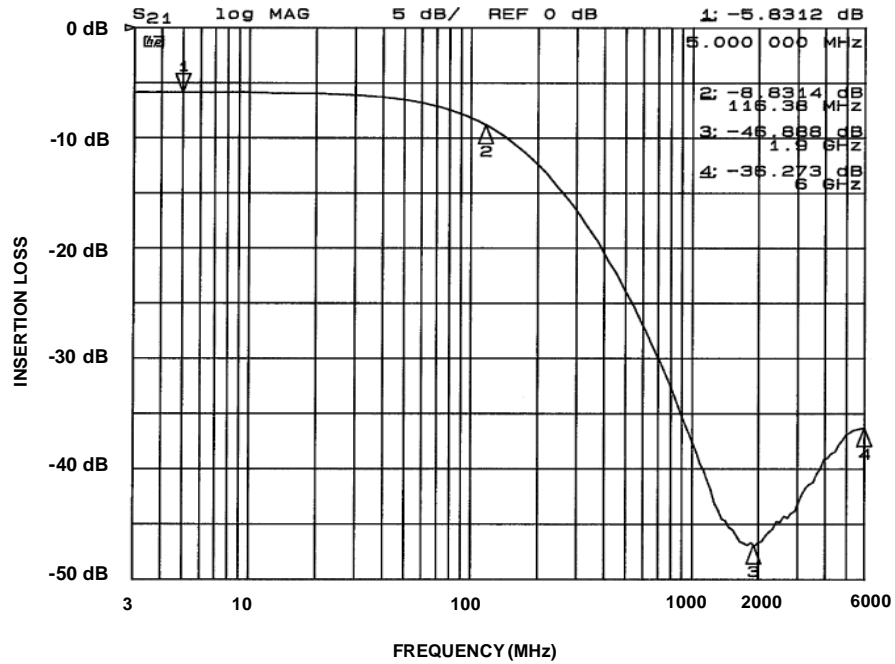


Figure 5. Insertion Loss vs. Frequency (FILTER5 Input to GND)

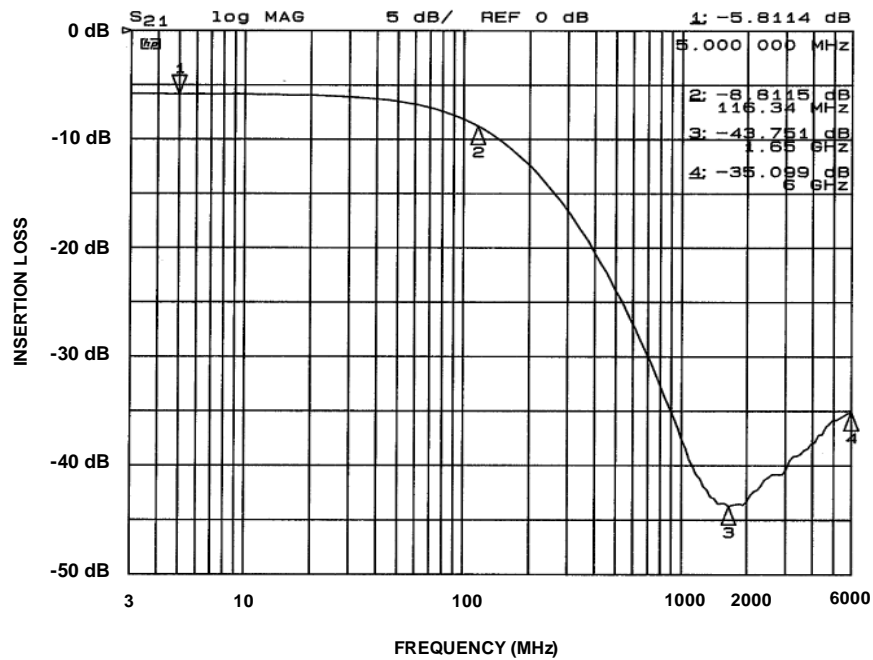


Figure 6. Insertion Loss vs. Frequency (FILTER6 Input to GND)

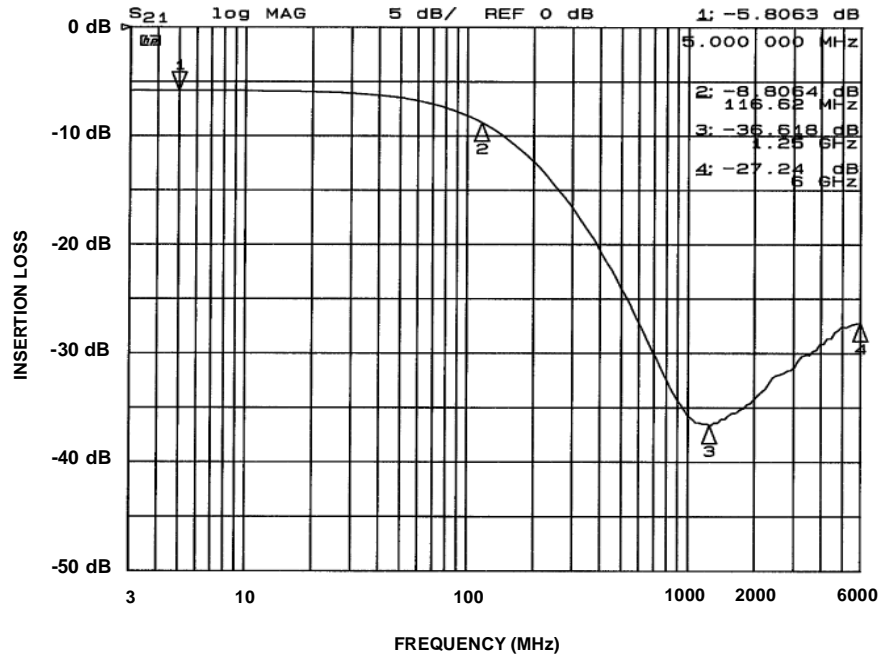


Figure 7. Insertion Loss vs. Frequency (FILTER7 Input to GND)

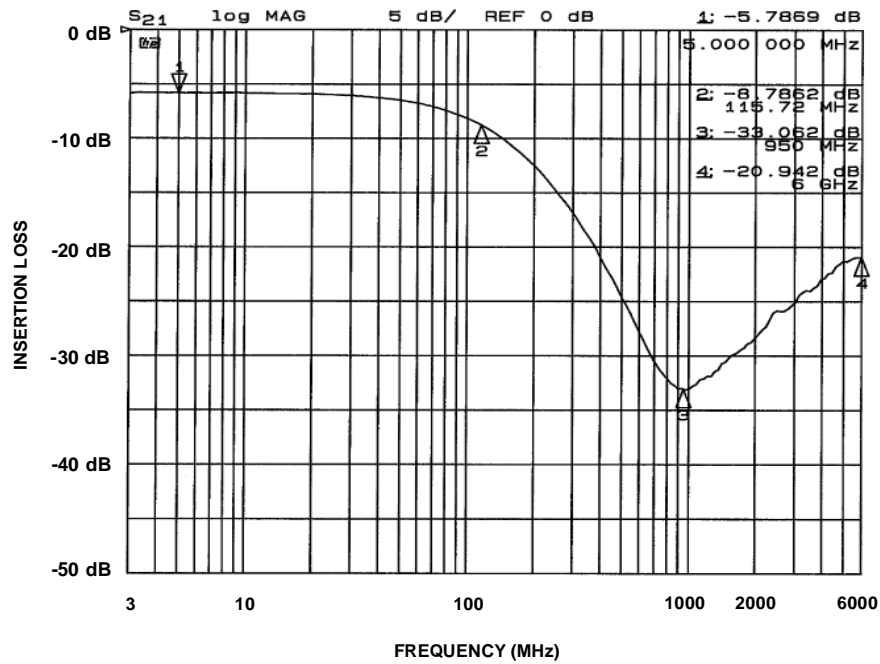
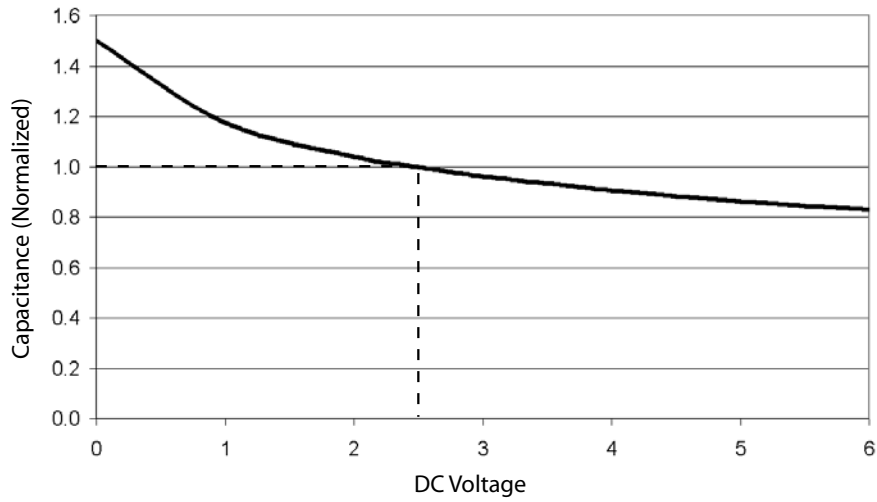


Figure 8. Insertion Loss vs. Frequency (FILTER8 Input to GND)

Typical Diode Capacitance vs. Input Voltage



**Figure 9. Filter Capacitance vs. Input Voltage
(normalized to capacitance at 2.5VDC and 25°C)**

Mechanical Details

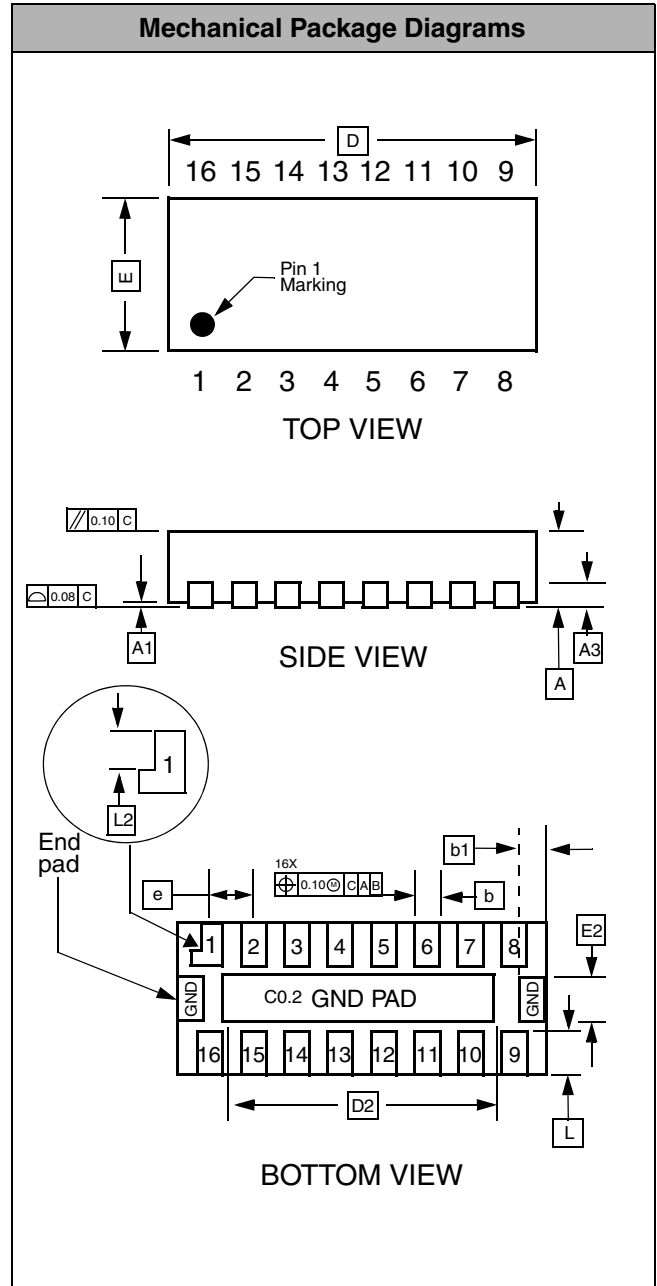
NuDFN-16 Mechanical Specifications, 0.4mm

Dimensions for the CM1622 supplied in a 16-lead, 0.4mm pitch NuDFN package are presented below.

For complete information on the NuDFN-16, see the California Micro Devices NuDFN Package Information document.

PACKAGE DIMENSIONS						
Package	NuDFN					
JEDEC No.	MO-229C*					
Leads	16					
Dim.	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.127 REF			0.005 REF		
b	0.15	0.20	0.25	0.006	0.008	0.010
b1	.20 BSC			0.008 BSC		
D	3.40	3.50	3.60	0.134	0.138	0.142
D2	2.70	2.80	2.90	0.106	0.110	0.114
E	1.10	1.20	1.30	0.043	0.047	0.051
E2	0.20	0.30	0.40	0.008	0.012	0.016
e	0.400 BSC			0.016 BSC		
L	0.20	0.25	0.30	0.008	0.010	0.012
L2	0.15 REF			0.006 REF		
# per tape and reel	3000 pieces					
Controlling dimension: millimeters						

* This package is compliant with JEDEC standard MO-229C with the exception of the D, D2, E, E2, K and L dimensions as called out in the table above.



Dimensions for 16-Lead, 0.4mm pitch NuDFN package