

# LCD and Camera EMI Filter Array with ESD Protection

CM1622

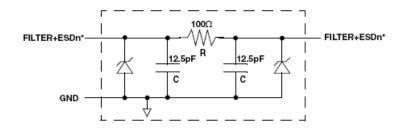
#### **Features**

- Eight channels of EMI filtering with integrated ESD protection
- Pi-style EMI filters in a capacitor-resistorcapacitor (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**

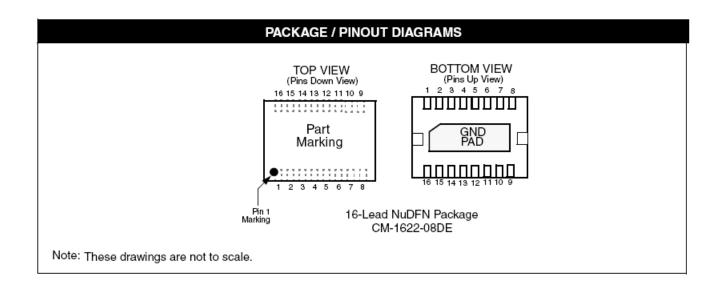
- LCD and camera data lines in mobile handsets
- I/O port protection for mobile handsets, notebook computers, PDAs, etc.
- EMI filtering for data ports in cell phones, PDAs or notebook computers
- Wireless handsets
- Handheld PCs/PDAs

#### **Electrical Schematic**



1 of 8 EMI/RFI + ESD Channels

 See Package/Pinout Diagram for expanded pin information.



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						

CM1622

# **Ordering Information**

PART NUMBERING INFORMATION							
		Lead-free Finish					
Pins	Package	Ordering Part Number <sup>1</sup>	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 <sub>R</sub> = 20mA	85	100	115	Ω			
C <sub>TOTAL</sub>	Total Channel Capacitance	At 2.5VDC Reverse Bias, 1MHz, 30mVAC	20	25	30	pF			
С	Capacitance C	At 2.5VDC Reverse Bias, 1MHz, 30mVAC		12.5		pF			
V <sub>DIODE</sub>	Standoff Voltage	$I_{\text{DIODE}} = 10 \mu A$		6.0		V			
I <sub>LEAK</sub>	Diode Leakage Current (reverse bias)	$V_{\text{DIODE}} = +3.3V$		0.01	0.2	μА			
V <sub>SIG</sub>	Signal Clamp Voltage	$I_{LOAD} = 1.0 \text{mA}$	6.0	7.0	8.0	V			
V <sub>ESD</sub>	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 Note 2	±30 ±15			kV kV			
R <sub>DYN</sub>	Dynamic Resistance Positive Negative			2.3 0.9		$\Omega$			
<b>f</b> <sub>c</sub>	Cut-off Frequency $Z_{\text{SOURCE}} = 50\Omega,  Z_{\text{LOAD}} = 50\Omega$	Channel R = $100\Omega$ , Channel C = $25pF$		115		MHz			
A <sub>1GHz</sub>	Absolute Attenuation @ 1GHz from 0dB Level	$Z_{\text{SOURCE}} = 50\Omega, \ Z_{\text{LOAD}} = 50\Omega,$ DC Bias = 0V; See Notes 1 and 3.		-35		dB			
A <sub>800MHz - 6GHz</sub>	Absolute Attenuation @ 800MHz to 6GHz from 0dB Level	$Z_{\text{SOURCE}} = 50\Omega, \ Z_{\text{LOAD}} = 50\Omega,$ DC Bias = 0V; See Notes 1 and 3.		30		dB			

Note 1: T<sub>A</sub>=25°C unless otherwise specified. Note 2: ESD applied to input and output pins with respect to GND, one at a time. Note 3: Attenuation / RF curves characterized by a network analyzer using microprobes.

## **Performance Information**

Typical Filter Performance (T<sub>A</sub>=25°C, DC Bias=0V, 50 Ohm Environment)

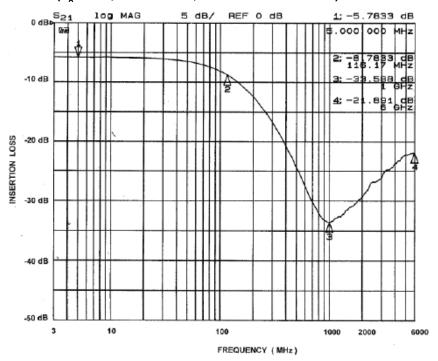


Figure 1. Insertion Loss vs. Frequency (FILTER1 Input to GND)

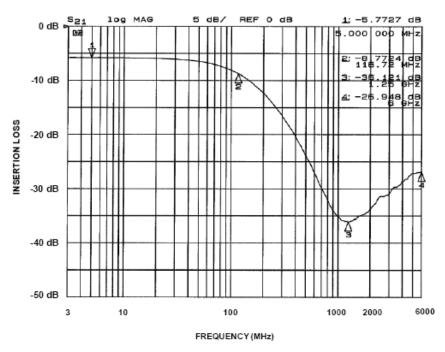


Figure 2. Insertion Loss vs. Frequency (FILTER2 Input to GND)

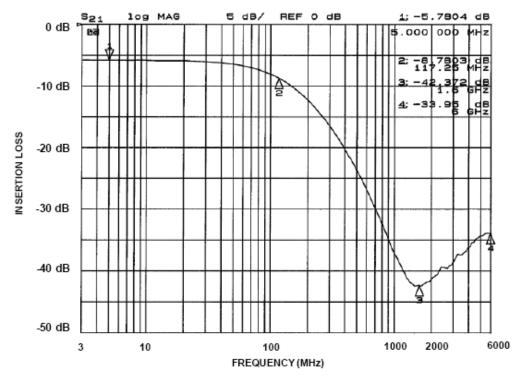


Figure 3. Insertion Loss vs. Frequency (FILTER3 Input to GND)

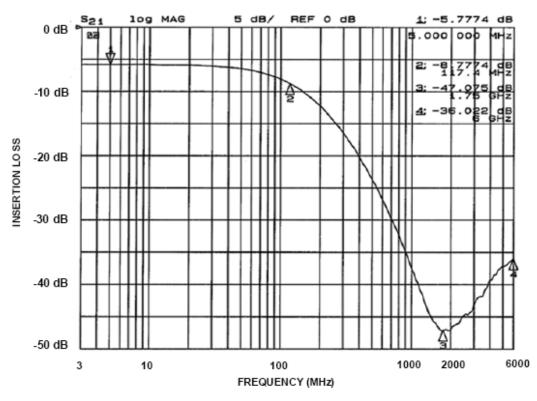


Figure 4. Insertion Loss vs. Frequency (FILTER4 Input to GND)

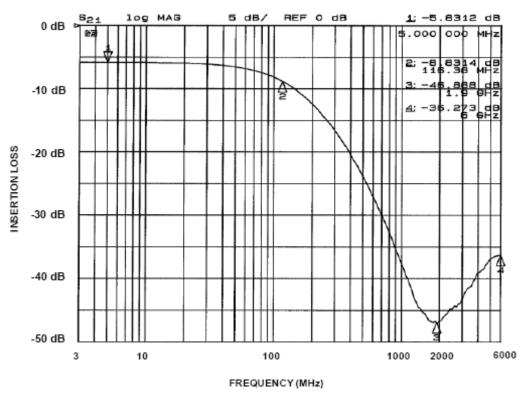


Figure 5. Insertion Loss vs. Frequency (FILTER5 Input to GND)

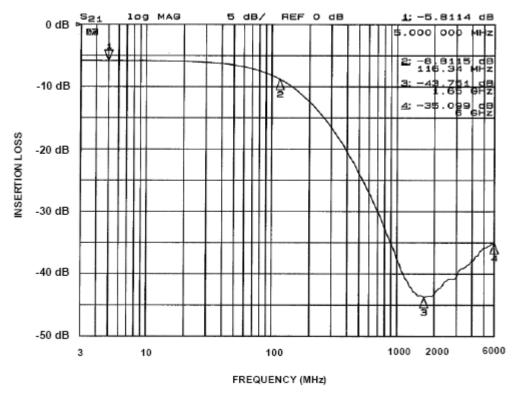


Figure 6. Insertion Loss vs. Frequency (FILTER6 Input to GND)

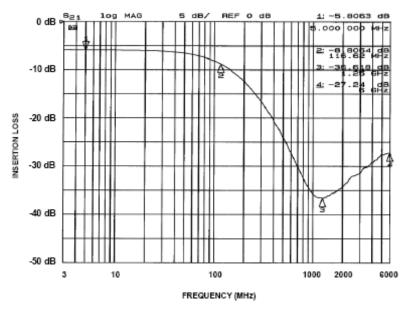


Figure 7. Insertion Loss vs. Frequency (FILTER7 Input to GND)

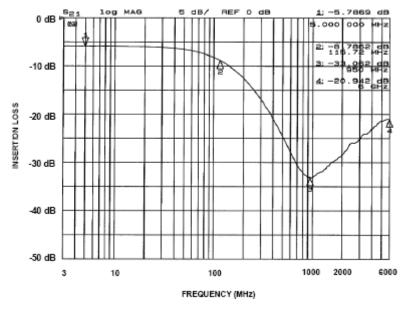


Figure 8. Insertion Loss vs. Frequency (FILTER8 Input to GND)

## Typical Diode Capacitance vs. Input Voltage

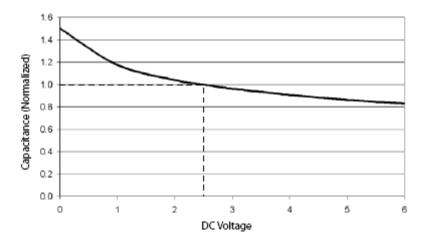


Figure 9. Filter Capacitance vs. Input Voltage (normalized to capacitance at 2.5VDC and 25°C)

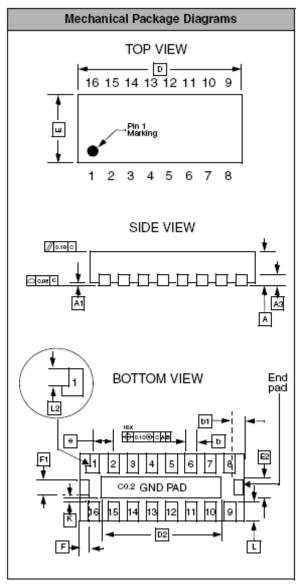
## **Mechanical Details**

#### NuDFN-16 Mechanical Specifications, 0.4mm

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

	PAC	KAGE	DIME	NSIO	NS			
Package	NuDFN							
JEDEC No.	MO-229C*							
Leads			1	16				
Dim.	N	lillimete	rs		Inches			
Diiii.	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		
А3	C	).127 RE	F	0.005 REF				
b	0.15	0.20	0.25	0.006 0.008 0.0				
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		
е	C	.400 BS	С	C	.016 BS	C		
F	(	0.20 RE	F	С	0.008 RE	F		
F1	0.30 REF			С	0.012 RE	F		
к	0.20 REF			0.008 REF				
L	0.20	0.25	0.30	0.008	0.010	0.012		
L2	0.15 REF 0.006 REF					F		
# per tape and reel	3000 pieces							
Controlling dimension: millimeters								

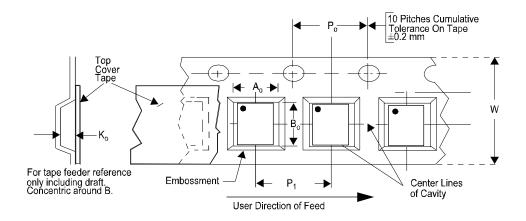
This package is compliant with JEDEC standard MO-229C with the exception of the D, D2, E, E2, and L dimensions as called out in the table above.



Dimensions for 16-Lead, 0.4mm pitch NuDFN Package

## **Tape and Reel Specifications**

PART NUMBER	PACKAGE SIZE (mm)	POCKET SIZE (mm) B <sub>o</sub> X A <sub>o</sub> X K <sub>o</sub>	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P <sub>o</sub>	P,
CM1622	3.50 X 1.20 X 0.50	3.75 X 1.45 X 0.70	12mm	178mm (7")	3000	4mm	4mm



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