ON Semiconductor®

8-Channel EMI Filter Array with ESD Protection

CM1443-08CP

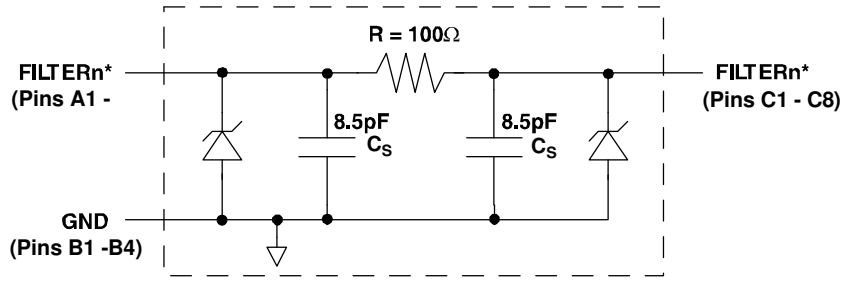
Features

- Eight channels of EMI filtering for data ports
- 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)
- Chip Scale Package (CSP) features extremely low lead inductance for optimum filter and ESD performance
- 20-bump; 0.4mm pitch, 3.160 x 1.053mm footprint
- *OptiGuard*™ coating for improved reliability at assembly
- RoHS-compliant, lead-free finishing

Applications

- EMI filtering and ESD protection for both data and I/O ports
- Wireless Handsets
- Handheld PCs / PDAs
- MP3 Players
- Notebooks
- Desktop PCs

Electrical Schematic



1 of 8 EMI/RFI+ESD Channels

*** See Package/Pinout Diagram for expanded pin information.**

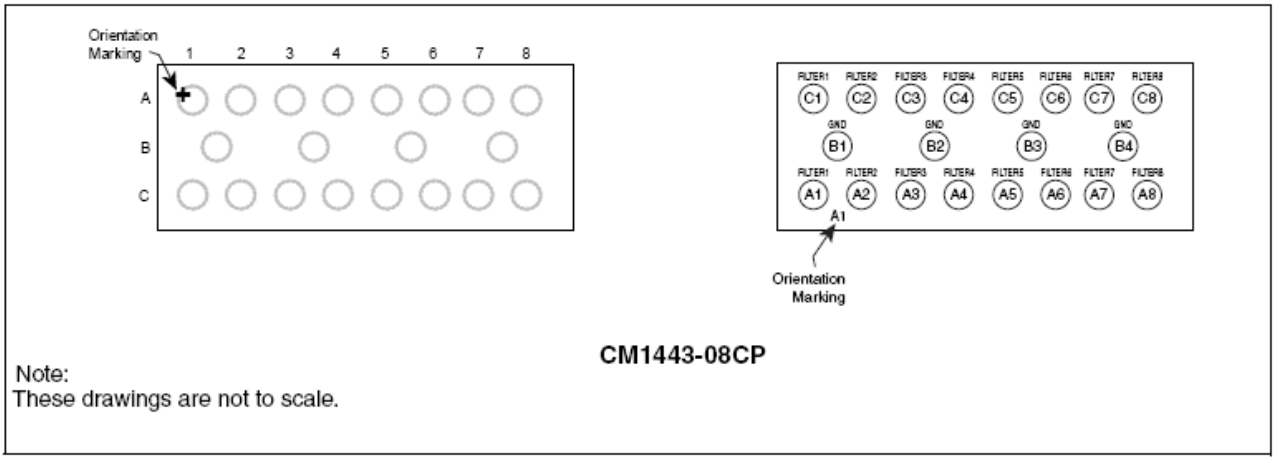
April 2010 Rev. 2

Publication Order Number:
CM1443-08CP/D

PACKAGE / PINOUT DIAGRAMS

TOP VIEW
(Bumps Down View)

BOTTOM VIEW
(Bumps Up View)



CM1443-08CP

Note:
These drawings are not to scale.

PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
A1	FILTER1	Filter Channel 1	C1	FILTER 1	Filter Channel 1
A2	FILTER 2	Filter Channel 2	C2	FILTER 2	Filter Channel 2
A3	FILTER 3	Filter Channel 3	C3	FILTER 3	Filter Channel 3
A4	FILTER 4	Filter Channel 4	C4	FILTER 4	Filter Channel 4
A5	FILTER 5	Filter Channel 5	C5	FILTER 5	Filter Channel 5
A6	FILTER 6	Filter Channel 6	C6	FILTER 6	Filter Channel 6
A7	FILTER 7	Filter Channel 7	C7	FILTER 7	Filter Channel 7
A8	FILTER 8	Filter Channel 8	C8	FILTER 8	Filter Channel 8
B1-B4	GND	Device Ground	-	-	-

Ordering Information

PART NUMBERING INFORMATION			
Bumps	Package	Lead-free Finish	
		Ordering Part Number[1]	Part Marking
20	CSP	CM1443-08CP	N438

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	℃
DC Power per Resistor	100	mW
DC Package Power Rating	600	mW

STANDARD OPERATING CONDITIONS		
PARAMETER	RATING	UNITS
Operating Temperature Range	-40 to +85	℃

ELECTRICAL OPERATING CHARACTERISTICS[1]

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
R	Resistance		80	100	120	Ω
C_T	Total Capacitance	At 2.5V DC	14	17	21	pF
C_S	Single Capacitor	At 2.5V DC		8.5		pF
TCR	Temperature Coefficient of Resistance			1200		ppm/°C
TCC	Temperature Coefficient of Capacitance	At 2.5V DC		-300		ppm/°C
V_{DIODE}	Diode Voltage (reverse bias)	I_{DIODE}=10µA	5.5			V
I_{LEAK}	Diode Leakage Current (reverse bias)	V_{DIODE}=3.3V		0.1	1.0	µA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{LOAD} = 10mA	 5.6 -1.5	 6.8 -0.8	 9.0 -0.4	 V 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	Notes 2 and 4	 ±30 ±15			 kV kV
V_{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8kV Positive Transients Negative Transients	Notes 2,3 and 4		 +10 -5		 V V
f_C	Cut-off frequency Z_{SOURCE} = 50Ω, Z_{LOAD} = 50Ω	R = 100Ω, C_S = 8.5pF		220		MHz

Note 1: T_A=25°C unless otherwise specified.
Note 2: ESD applied to input and output pins with respect to GND, one at a time.
Note 3: Clamping voltage is measured at the opposite side of the EMI filter to the ESD pin. For example, if ESD is applied to Pin A1, then clamping voltage is measured at Pin C1.
Note 4: Unused pins are left open.

Performance Information

Typical Filter Performance (T_A=25°C, DC Bias=0V, 50 Ohm Environment)

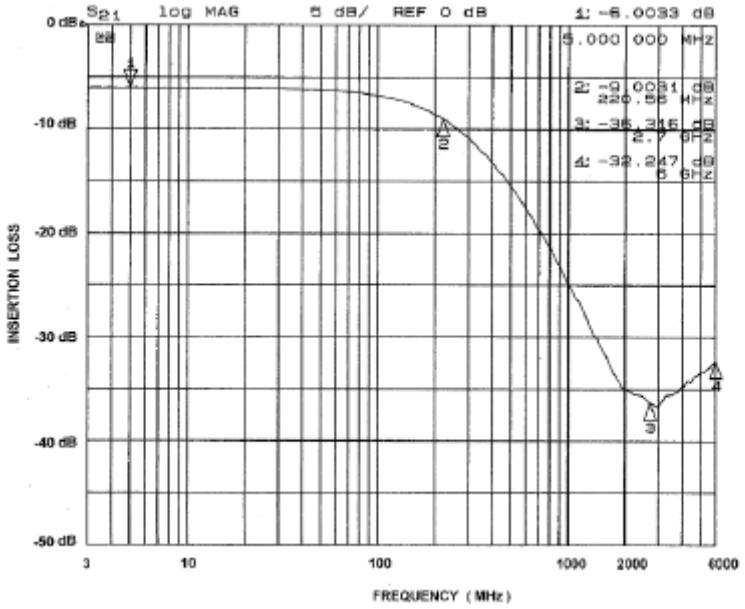


Figure 1. Insertion Loss VS. Frequency (A1-C1 to GND B1)

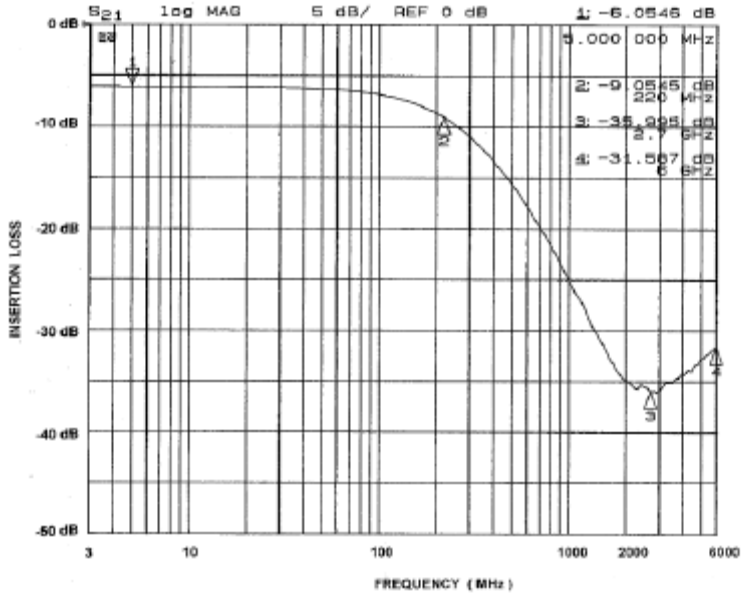


Figure 2. Insertion Loss VS. Frequency (A2-C2 to GND B1)

Performance Information (cont'd)

Typical Filter Performance (T_A=25°C, DC Bias=0V, 50 Ohm Environment)

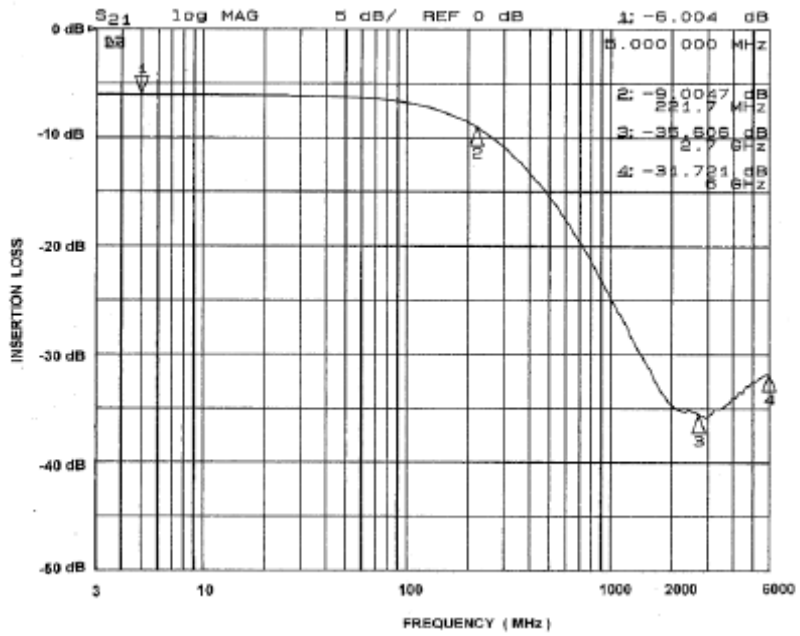


Figure 3. Insertion Loss VS. Frequency (A3-C3 to GND B2)

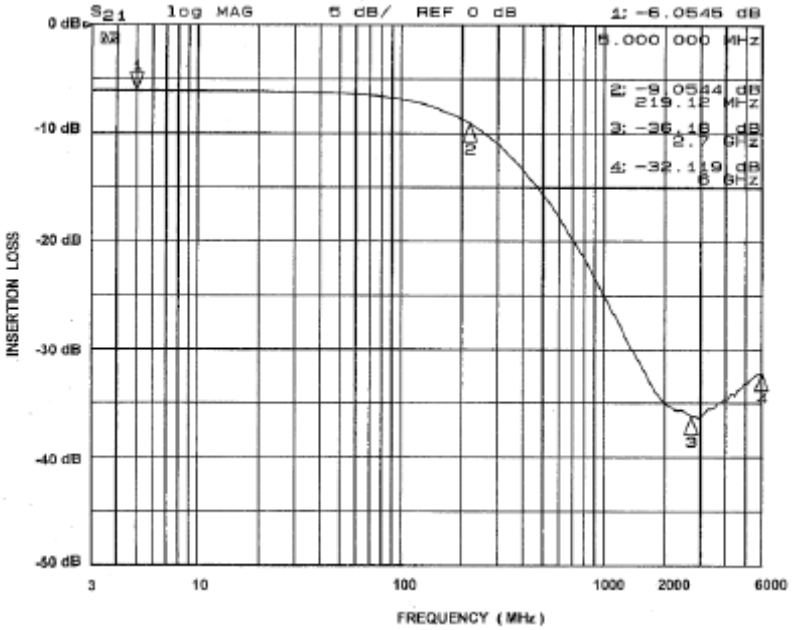


Figure 4. Insertion Loss VS. Frequency (A4-C4 to GND B2)

Performance Information (cont'd)

Typical Filter Performance (T_A=25°C, DC Bias=0V, 50 Ohm Environment)

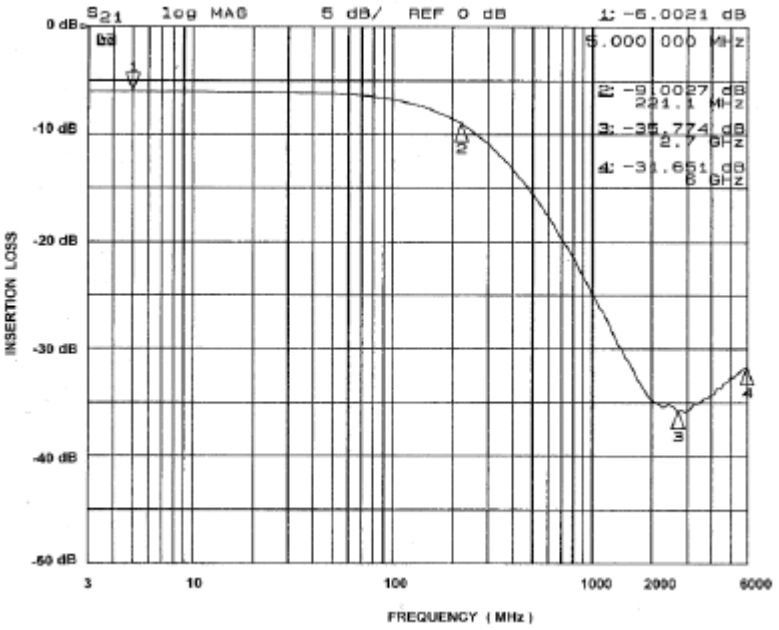


Figure 5. Insertion Loss VS. Frequency (A5-C5 to GND B3)

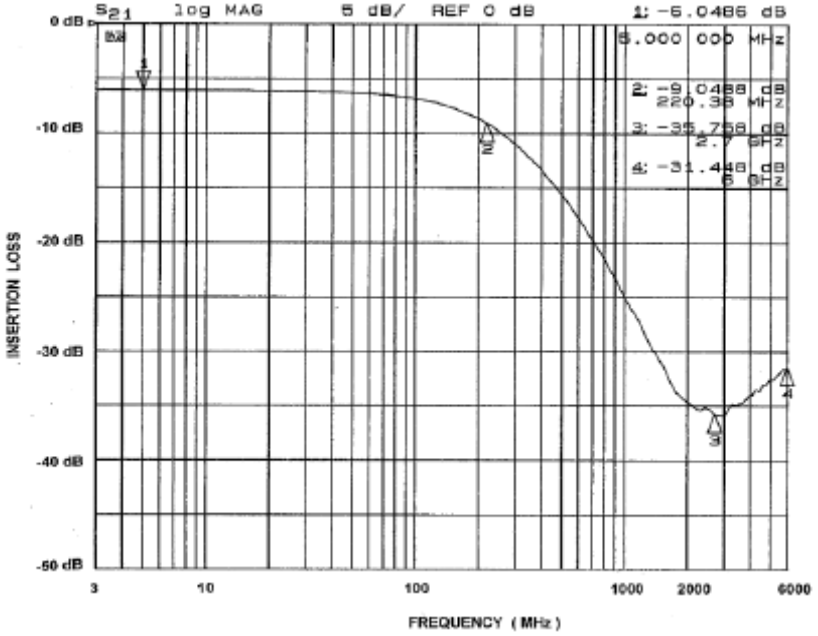


Figure 6. Insertion Loss VS. Frequency (A6-C6 to GND B3)

Performance Information (cont'd)

Typical Filter Performance (T_A=25°C, DC Bias=0V, 50 Ohm Environment)

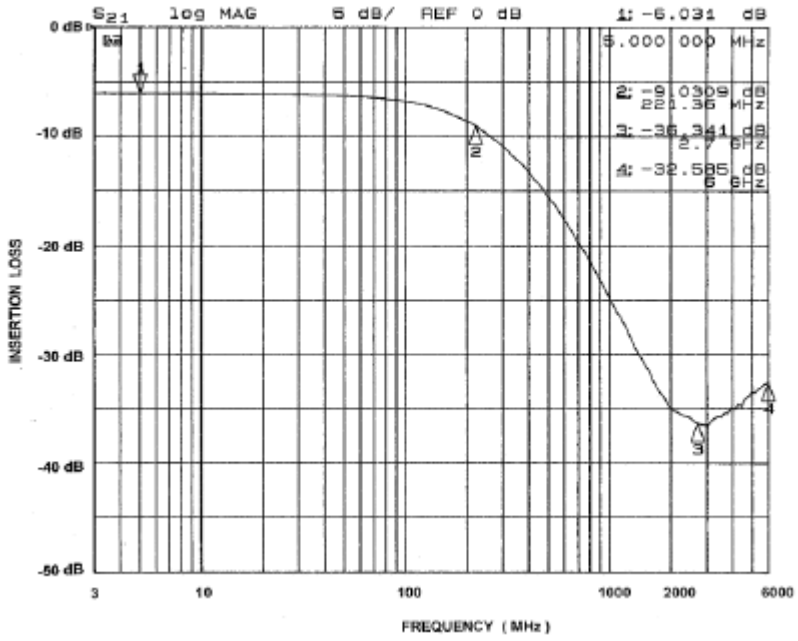


Figure 7. Insertion Loss VS. Frequency (A7-C7 to GND B4)

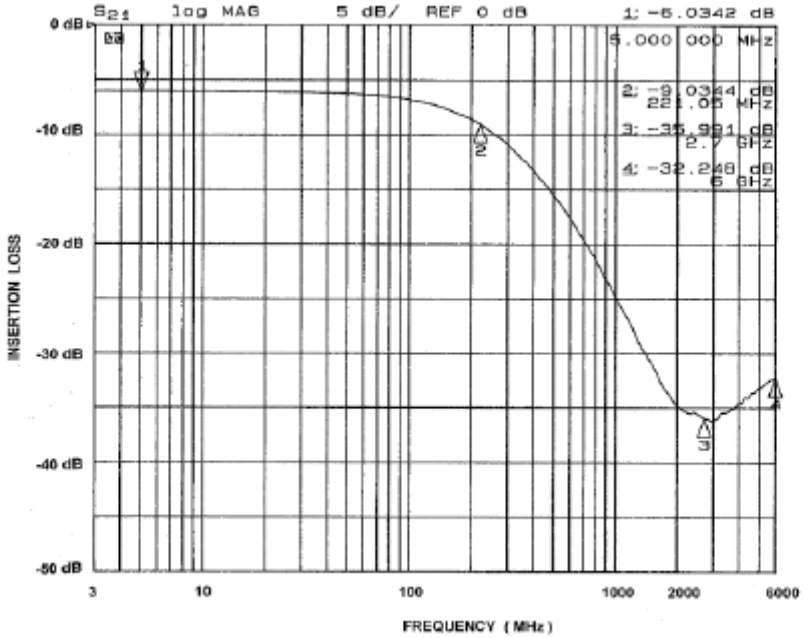


Figure 8. Insertion Loss VS. Frequency (A8-C8 to GND B4)

Performance Information (cont'd)

Typical Filter Performance (T_A=25°C, DC Bias=0V, 50 Ohm Environment)

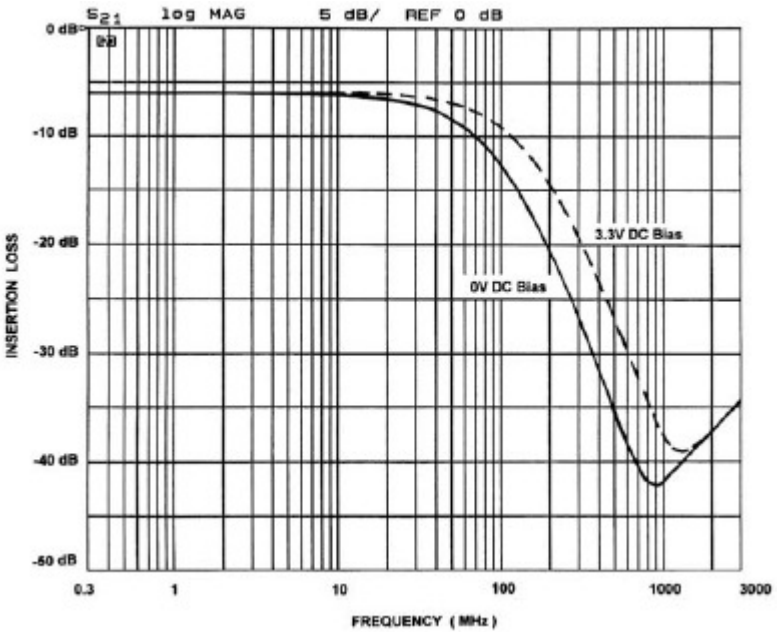


Figure 9. Comparison of Filter Response Curves for CM1443 VS. DC Bias

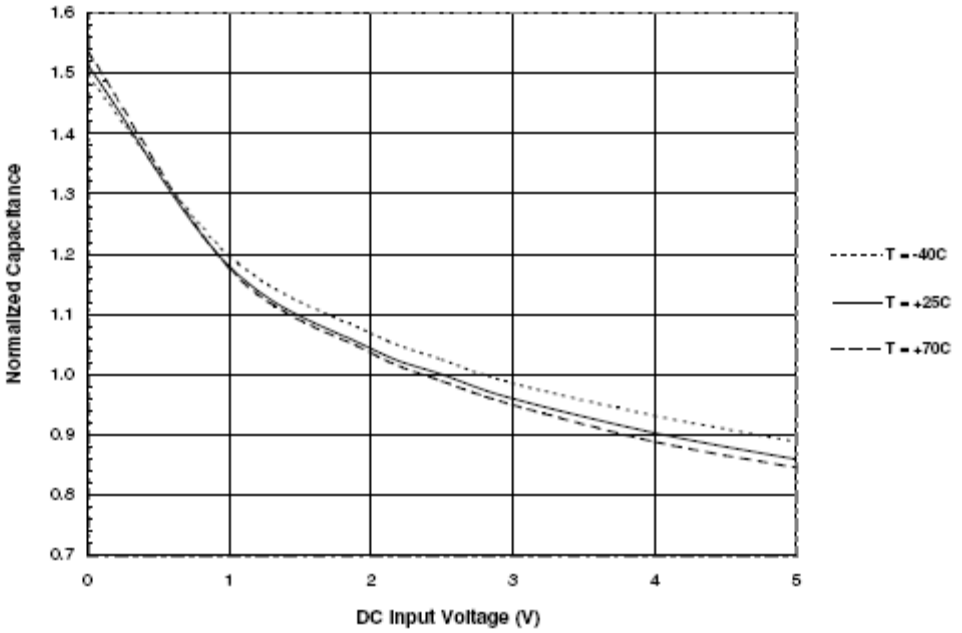


Figure 10. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5VDC and 25°C

Performance Information (cont'd)

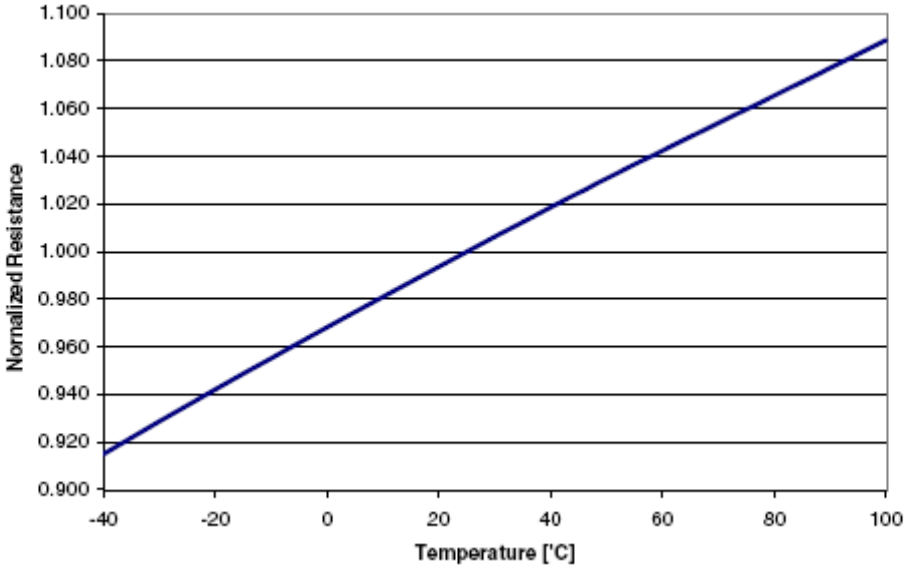


Figure 11. Resistance vs. Temperature (normalized to resistance at 25°C)

Application Information

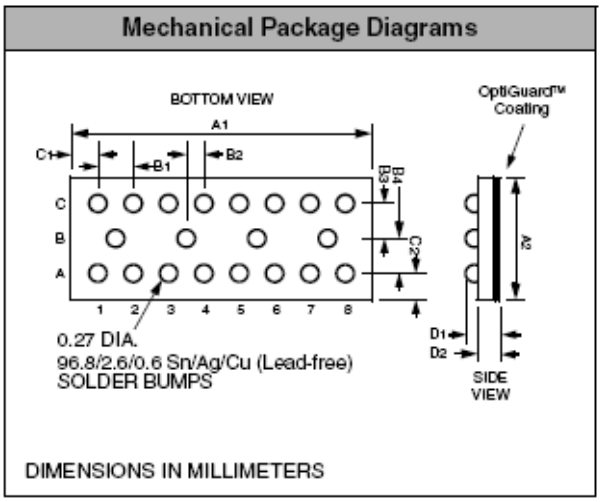
Refer to Application Note AP-217, "The Chip Scale Package", for a detailed description of Chip Scale Packages offered by California Micro Devices.

Mechanical Details

8-Channel CSP Mechanical Specifications

The CM1443-08CP is offered in a custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	20					
Dim	**Millimeters**			**Inches**		
	Min	**Nom**	**Max**	**Min**	**Nom**	**Max**
A1	3.115	3.160	3.205	0.1226	0.1244	0.1262
A2	1.008	1.053	1.098	0.0397	0.0415	0.0432
B1	0.395	0.400	0.405	0.0156	0.0157	0.0159
B2	0.195	0.200	0.205	0.0077	0.0079	0.0081
B3	0.342	0.347	0.352	0.0135	0.0137	0.0139
B4	0.342	0.347	0.352	0.0135	0.0137	0.0139
C1	0.130	0.180	0.230	0.0051	0.0070	0.0091
C2	0.130	0.180	0.230	0.0051	0.0070	0.0090
D1	0.545	0.615	0.685	0.0215	0.0242	0.0270
D2	0.378	0.419	0.460	0.0149	0.0165	0.0181
# per tape and reel	3500 pieces					
Controlling dimension: millimeters						



Package Dimensions for
8-Channel CM1443-08CP Chip Scale Package

CSP Tape and Reel Specifications

PART NUMBER	CHIP SIZE (mm)	POCKET SIZE (mm) B_0 X A_0 X K_0	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
CM1443-08CP	3.16 X 1.053X 0.615	3.28 X 1.32 X 0.81	8mm	178mm (7")	3500	4mm	4mm

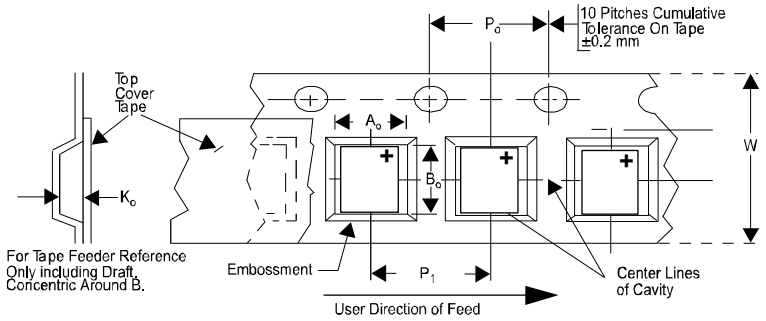


Figure 12. Tape and Reel Mechanical Data

PUBLICATION ORDERING INFORMATION

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