CM1443-04CP

4-Channel EMI Filter Array with ESD Protection

ON Semiconductor®

http://onsemi.com



WLCSP10
CP SUFFIX
CASE 567BH

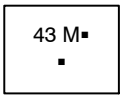
Features

- Four Channels of EMI Filtering for Data Ports
- Pi−Style EMI Filters in a Capacitor−Resistor−Capacitor (C−R−C) Network
- ±15 kV ESD Protection on Each Channel (IEC 61000−4−2 Level 4, Contact Discharge)
- ±30 kV ESD Protection on Each Channel (HBM)
- Chip Scale Package (CSP) Features Extremely Low Lead Inductance for Optimum Filter and ESD Performance
- 10−Bump; 0.4 mm Pitch, 1.560 x 1.053 mm Footprint
- *OptiGuard*™ Coating for Improved Reliability at Assembly
- These Devices are Pb−Free and are RoHS Compliant

Applications

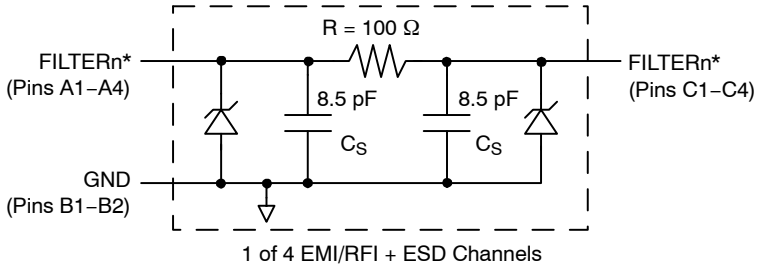
- EMI Filtering and ESD Protection for Both Data and I/O Ports
- Wireless Handsets
- Handheld PCs / PDAs
- MP3 Players
- Notebooks
- Desktop PCs

MARKING DIAGRAM



43 = CM1443−04CP
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

BLOCK DIAGRAM



*See Package/Pinout Diagrams for expanded pin information.

ORDERING INFORMATION

Device	Package	Shipping†
CM1443−04CP	CSP−10 (Pb−Free)	3500/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.

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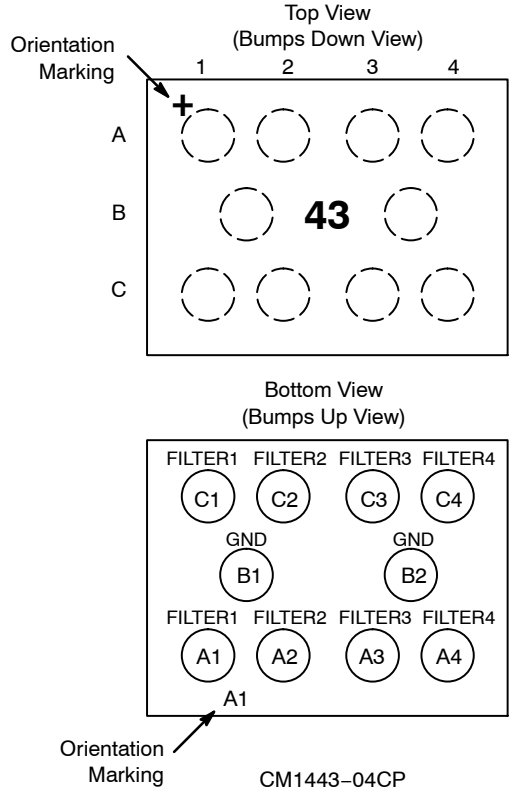
Table 1. PIN DESCRIPTIONS

10−bump CSP Package		
Pin(s)	**Name**	**Description**
A1	FILTER1	Filter Channel 1
A2	FILTER2	Filter Channel 2
A3	FILTER3	Filter Channel 3
A4	FILTER4	Filter Channel 4
B1−B2	GND	Device Ground
C1	FILTER1	Filter Channel 1
C2	FILTER2	Filter Channel 2
C3	FILTER3	Filter Channel 3
C4	FILTER4	Filter Channel 4

PACKAGE / PINOUT DIAGRAMS



SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC Power per Resistor	100	mW
DC Package Power Rating	600	mW

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.

Table 3. STANDARD OPERATING CONDITIONS

Parameter	Rating	Units
Operating Temperature Range	−40 to +85	°C

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R	Resistance		80	100	120	Ω
C_T	Total Capacitance	At 2.5 V DC	14	17	21	pF
C_S	Single Capacitor	At 2.5 V DC		8.5		pF
V_{DIODE}	Diode Voltage (reverse bias)	I_{DIODE} = 10 μA	5.5			V
I_{LEAK}	Diode Leakage Current (reverse bias)	V_{DIODE} = 3.3 V		0.1	1.0	μA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{LOAD} = 10 mA	 5.6 −0.4	 6.8 −0.8	 9.0 −1.5	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
V_{CL}	Clamping Voltage during ESD Discharge MIL−STD−883 (Method 3015), 8 kV Positive Transients Negative Transients	(Notes 2, 3 and 4)		 +10 −5		V
f_C	Cut−off Frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω	R = 100 Ω, C_S = 8.5 pF		220		MHz

1. T_A = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.
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.
4. Unused pins are left open.

APPLICATION INFORMATION

Refer to Application Note “The Chip Scale Package”, for a detailed description of Chip Scale Packages offered by ON Semiconductor.

PERFORMANCE INFORMATION

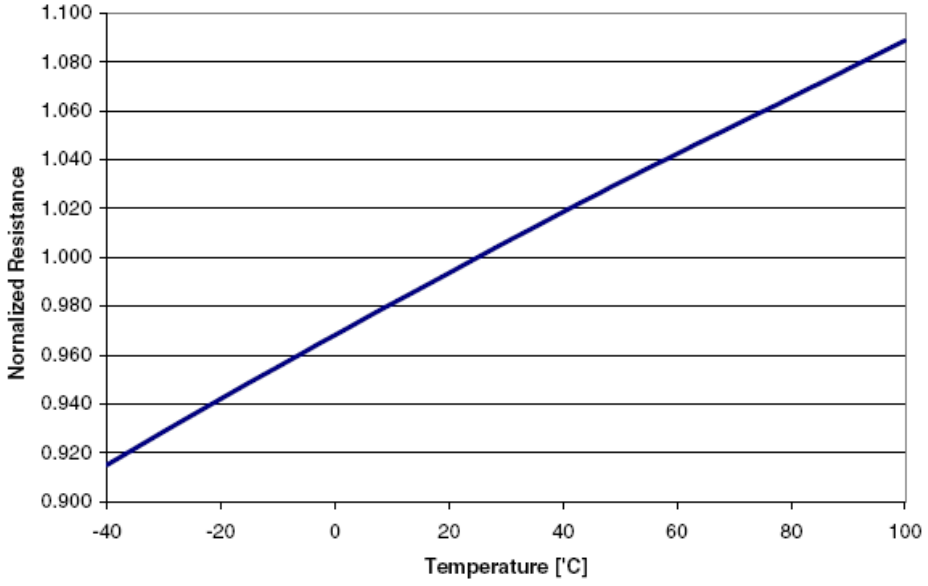


Figure 1. Resistance vs. Temperature (normalized to resistance at 25°C)

PERFORMANCE INFORMATION (Cont'd)

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

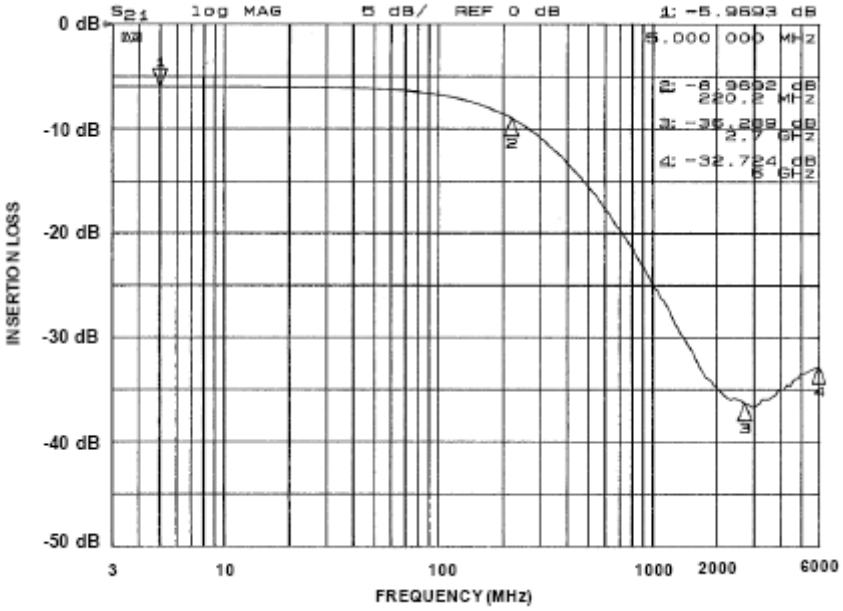


Figure 2. Insertion Loss vs. Frequency (A1−C1 to GND B1)

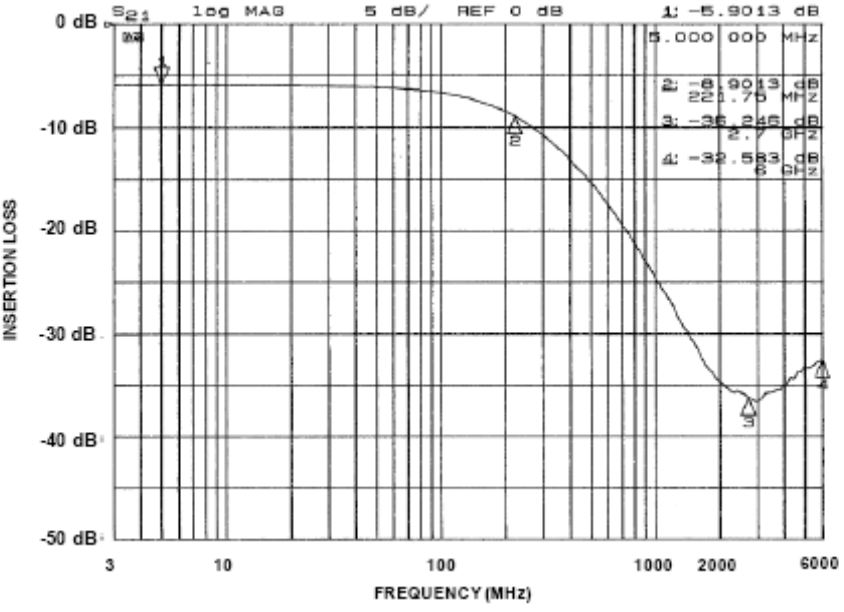


Figure 3. Insertion Loss vs. Frequency (A2−C2 to GND B1)

PERFORMANCE INFORMATION (Cont'd)

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

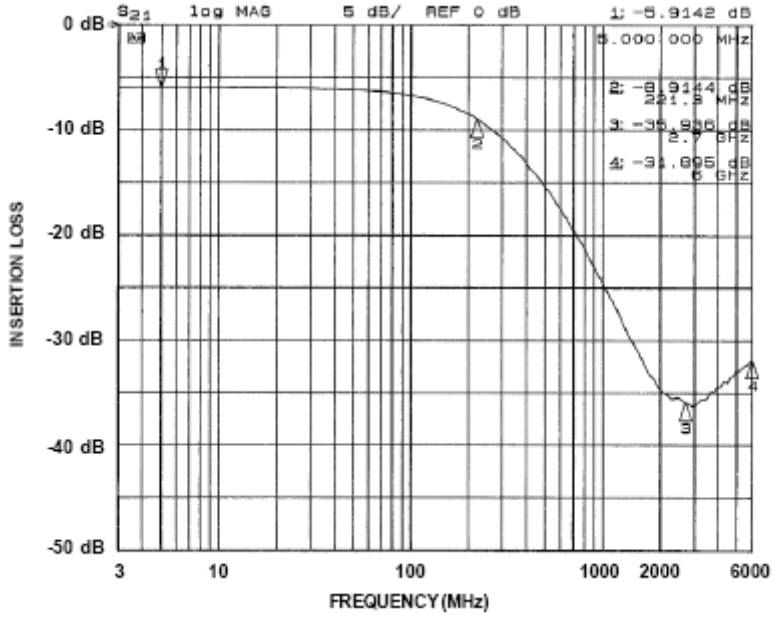


Figure 4. Insertion Loss vs. Frequency (A3−C3 to GND B2)

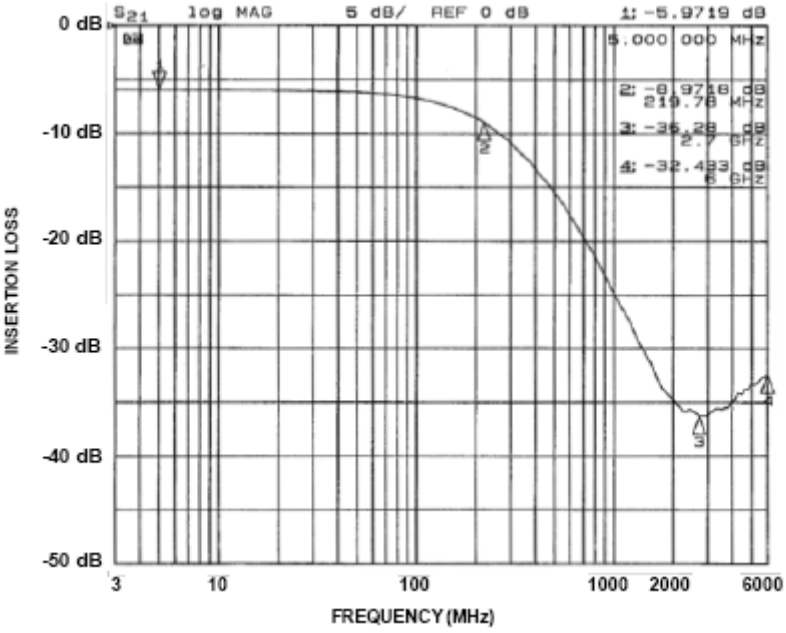


Figure 5. Insertion Loss vs. Frequency (A4−C4 to GND B2)

PERFORMANCE INFORMATION (Cont'd)

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

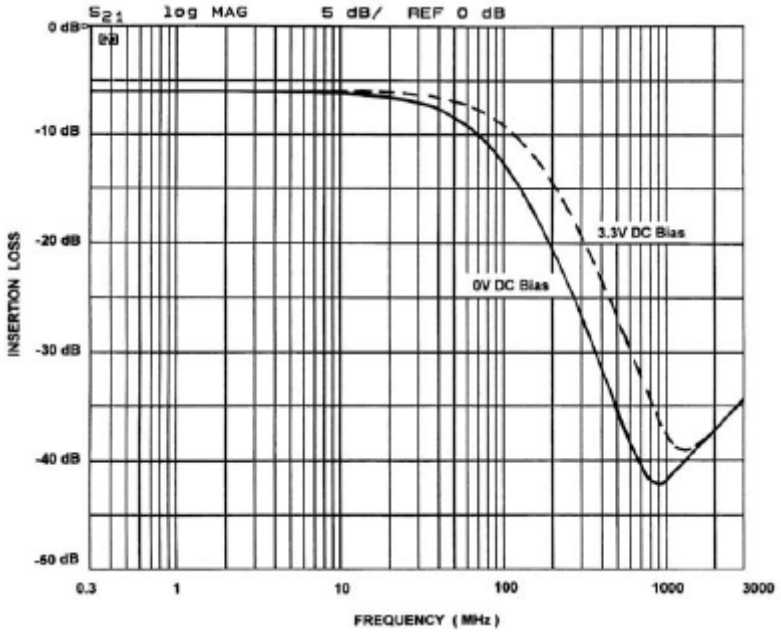


Figure 6. Comparison of Filter Response Curves for CM1443 vs. DC Bias

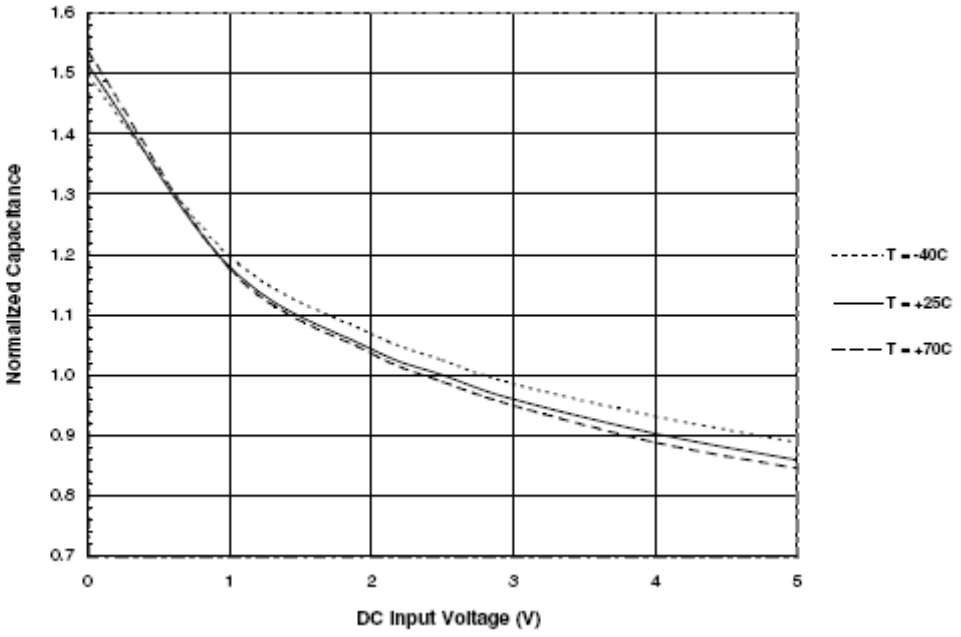


Figure 7. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 VDC and 25°C)

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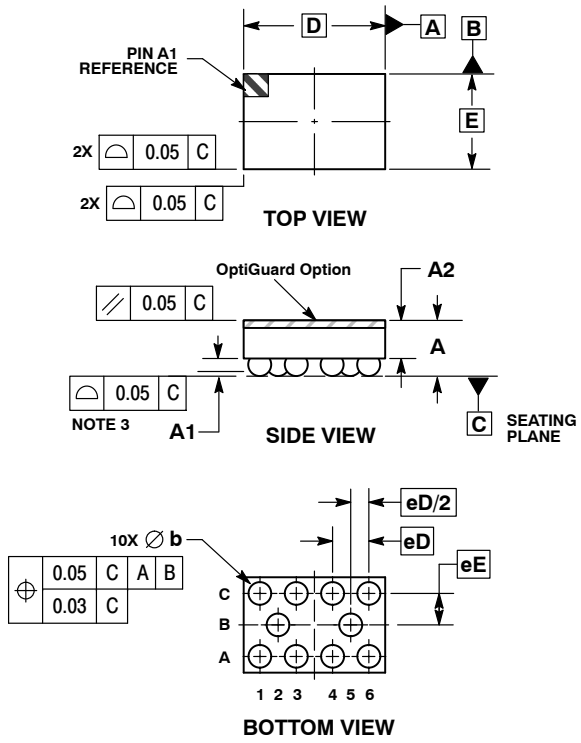
WLCSP10, 1.56x1.05
CASE 567BH
ISSUE O

SCALE 4:1

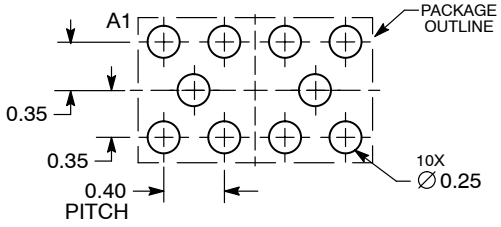
DATE 26 JUL 2010



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

DIM	MILLIMETERS MIN	MAX
A	0.54	0.69
A1	0.17	0.24
A2	0.42 REF	
b	0.24	0.29
D	1.56 BSC	
E	1.05 BSC	
eD	0.400 BSC	
eE	0.347 BSC	

RECOMMENDED 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.

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