

CM1443-08CP

8-Channel EMI Filter Array with ESD Protection

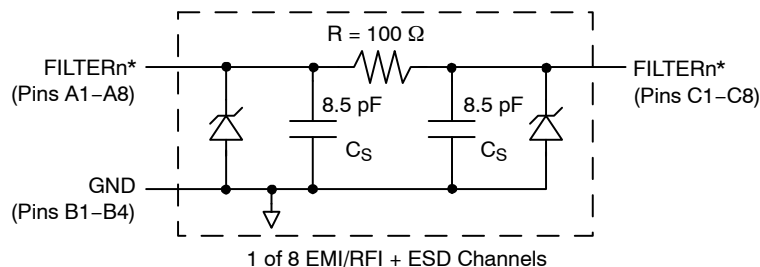
Features

- Eight 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
- 20-Bump; 0.4 mm Pitch, 3.160 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

BLOCK DIAGRAM



*See Package/Pinout Diagrams for expanded pin information.



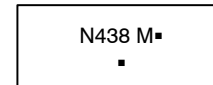
ON Semiconductor[®]

<http://onsemi.com>



WLCSP20
CP SUFFIX
CASE 567BU

MARKING DIAGRAM



N438 = CM1443-08CP
M = Date Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|-------------|---------------------|-----------------------|
| CM1443-08CP | CSP-20 (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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PACKAGE / PINOUT DIAGRAMS

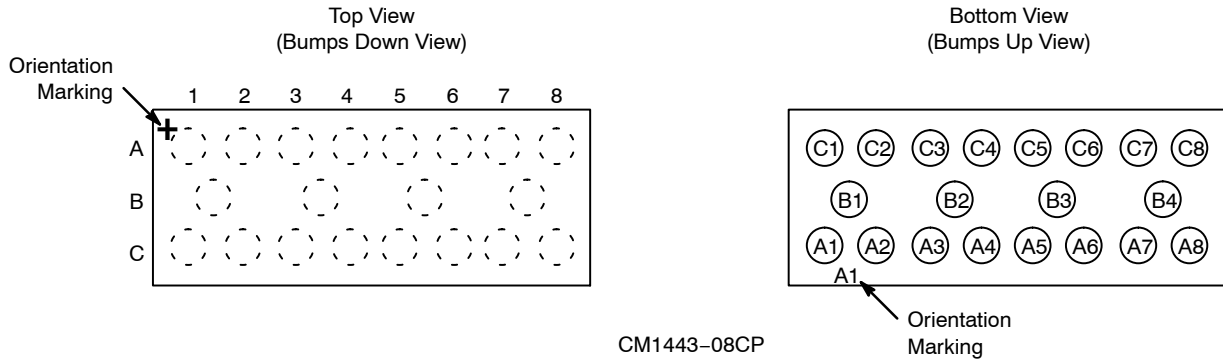


Table 1. PIN DESCRIPTIONS

| Pins | Name | Description | Pins | Name | Description |
|-------|---------|------------------|------|---------|------------------|
| A1 | FILTER1 | Filter Channel 1 | C1 | FILTER1 | Filter Channel 1 |
| A2 | FILTER2 | Filter Channel 2 | C2 | FILTER2 | Filter Channel 2 |
| A3 | FILTER3 | Filter Channel 3 | C3 | FILTER3 | Filter Channel 3 |
| A4 | FILTER4 | Filter Channel 4 | C4 | FILTER4 | Filter Channel 4 |
| A5 | FILTER5 | Filter Channel 5 | C5 | FILTER5 | Filter Channel 5 |
| A6 | FILTER6 | Filter Channel 6 | C6 | FILTER6 | Filter Channel 6 |
| A7 | FILTER7 | Filter Channel 7 | C7 | FILTER7 | Filter Channel 7 |
| A8 | FILTER8 | Filter Channel 8 | C8 | FILTER8 | Filter Channel 8 |
| B1-B4 | GND | Device Ground | | | |

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 |

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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 |
| TCR | Temperature Coefficient of Resistance | | | 1200 | | ppm/°C |
| TCC | Temperature Coefficient of Capacitance | At 2.5 V DC | | -300 | | ppm/°C |
| 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 -1.5 | 6.8 -0.8 | 9.0 -0.4 | 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

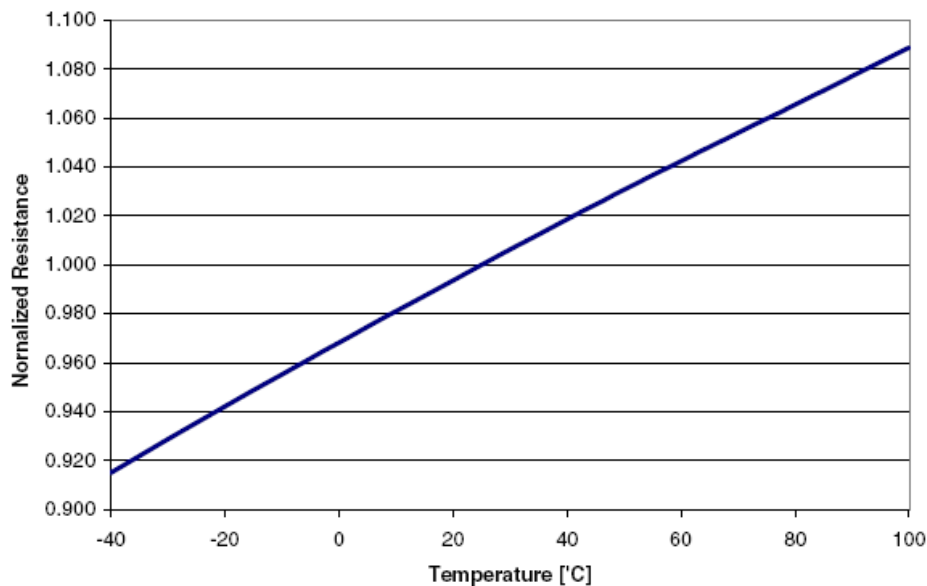


Figure 1. Resistance vs. Temperature (normalized to resistance at 25°C)

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PERFORMANCE INFORMATION (Cont'd)

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

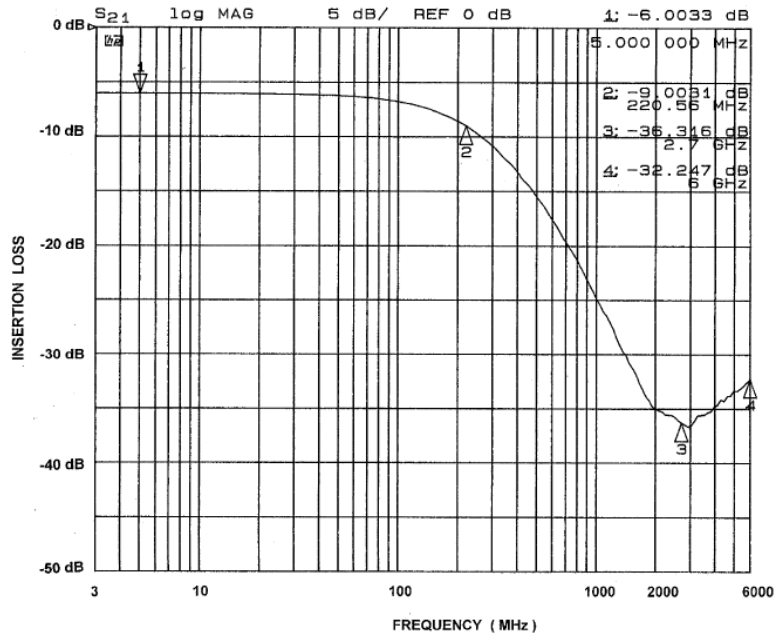


Figure 2. Insertion Loss vs. Frequency (A1-C1 to GND B1)

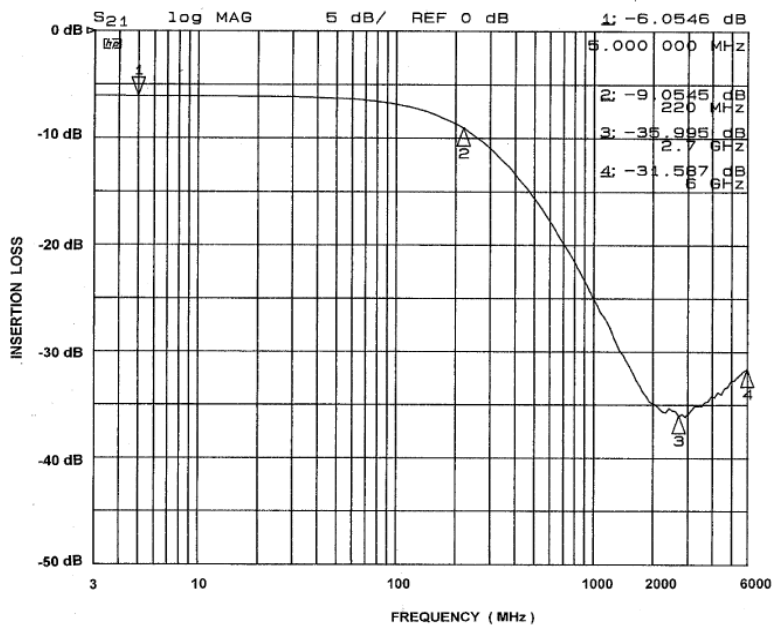


Figure 3. Insertion Loss vs. Frequency (A2-C2 to GND B1)

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PERFORMANCE INFORMATION (Cont'd)

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

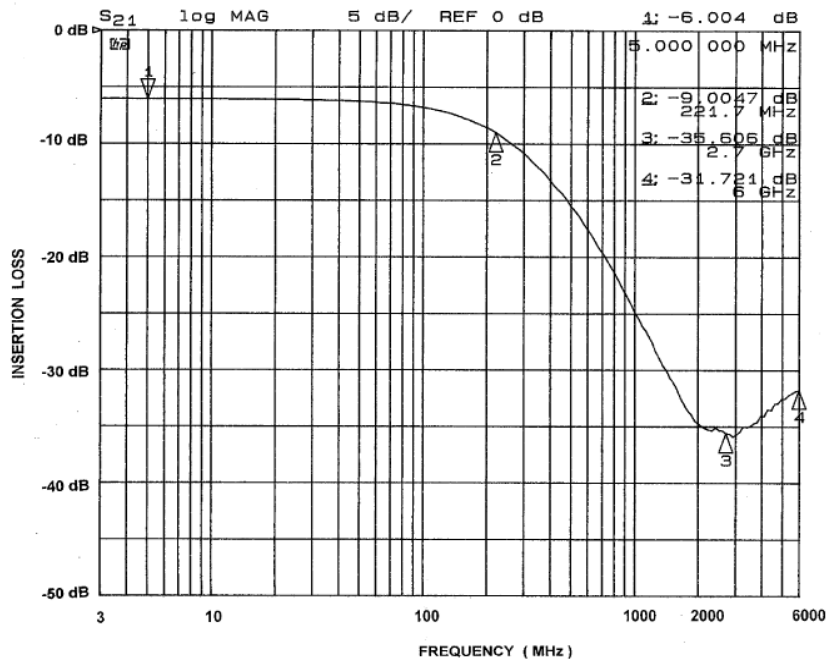


Figure 4. Insertion Loss vs. Frequency (A3-C3 to GND B2)

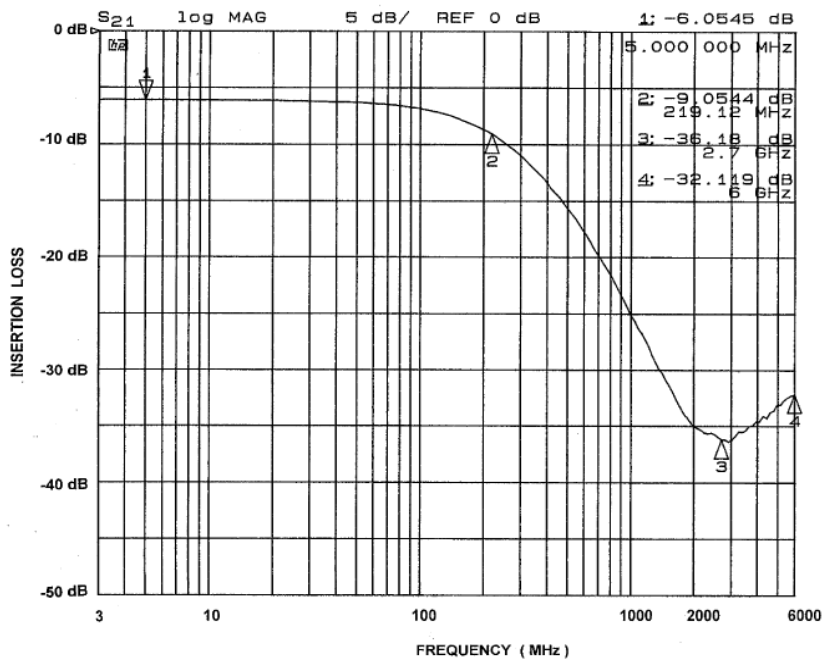


Figure 5. Insertion Loss vs. Frequency (A4-C4 to GND B2)

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PERFORMANCE INFORMATION (Cont'd)

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

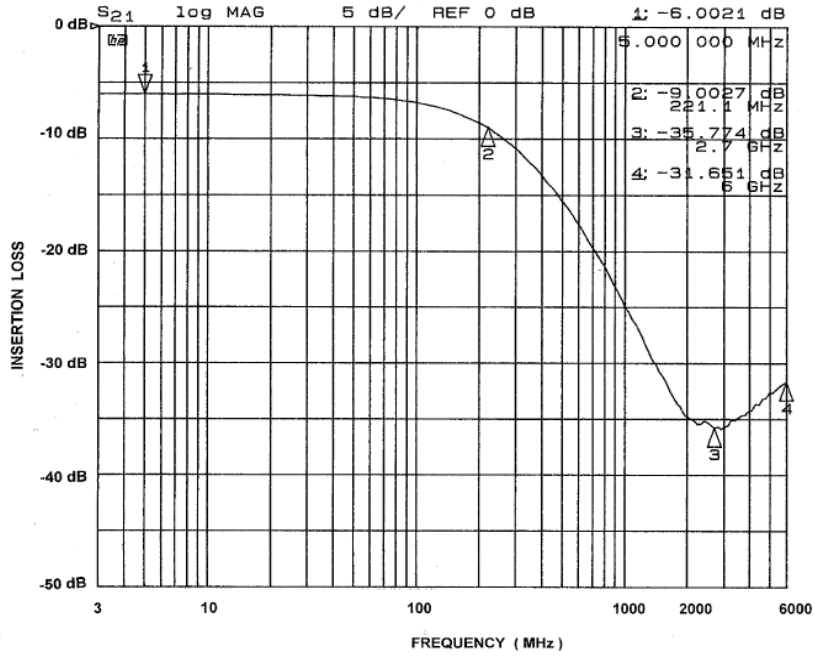


Figure 6. Insertion Loss vs. Frequency (A5-C5 to GND B3)

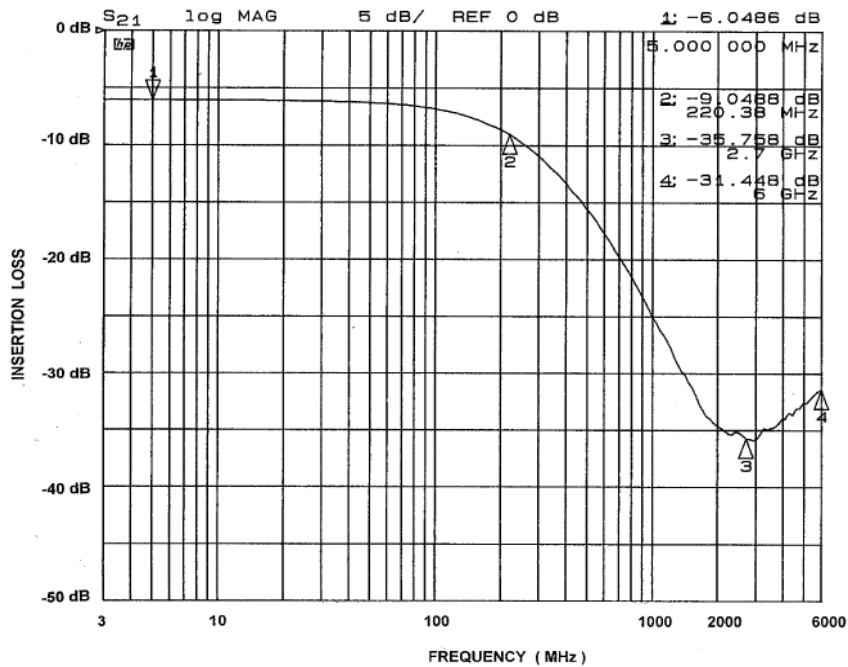


Figure 7. Insertion Loss vs. Frequency (A6-C6 to GND B3)

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PERFORMANCE INFORMATION (Cont'd)

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

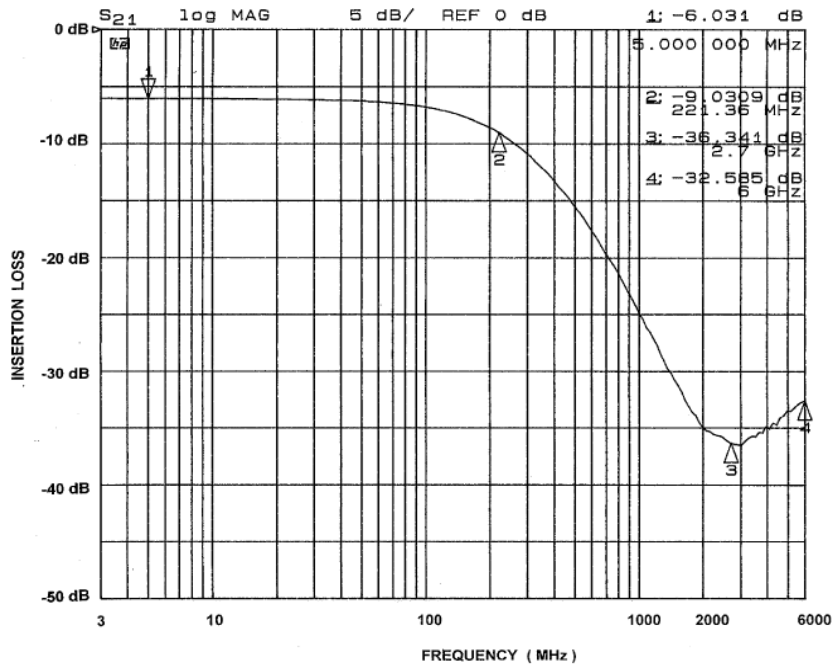


Figure 8. Insertion Loss vs. Frequency (A7-C7 to GND B4)

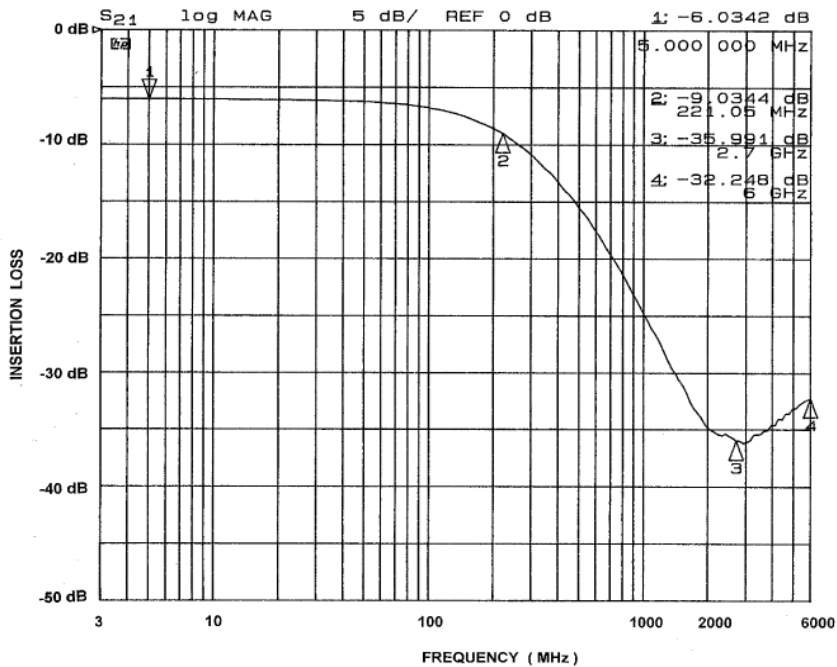


Figure 9. Insertion Loss vs. Frequency (A8-C8 to GND B4)

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PERFORMANCE INFORMATION (Cont'd)

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

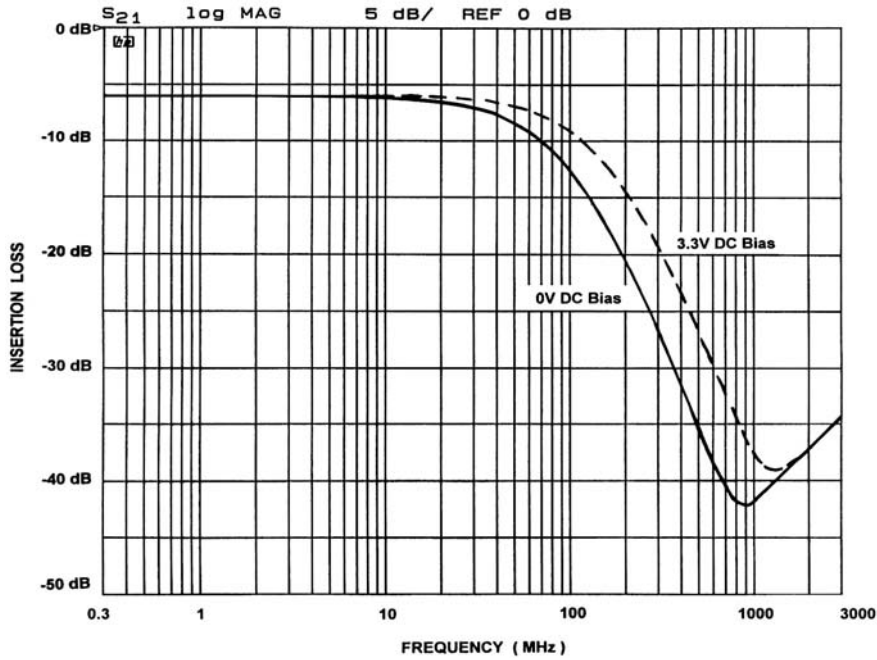


Figure 10. Comparison of Filter Response Curves for CM1443 vs. DC Bias

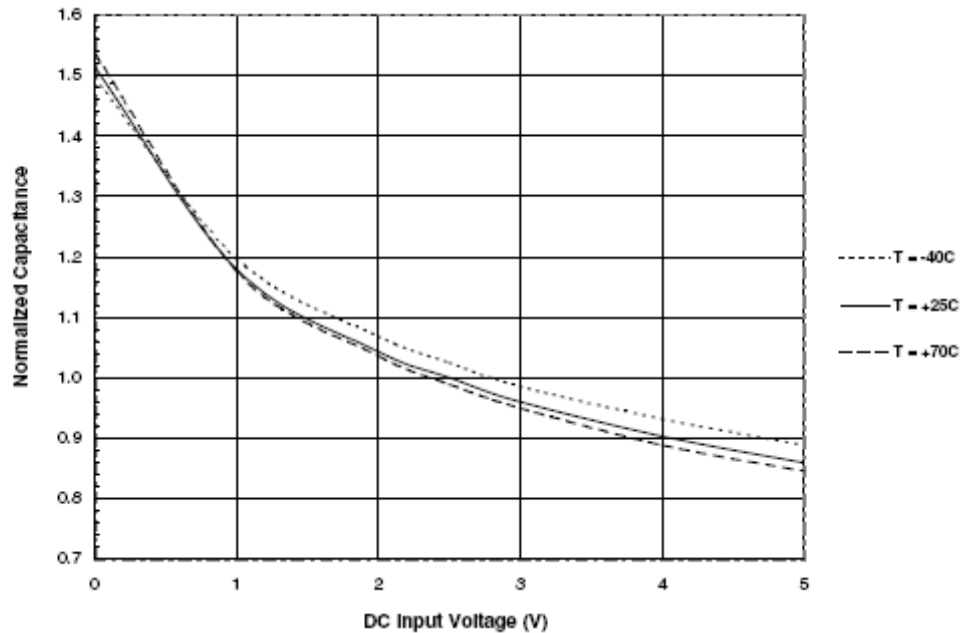
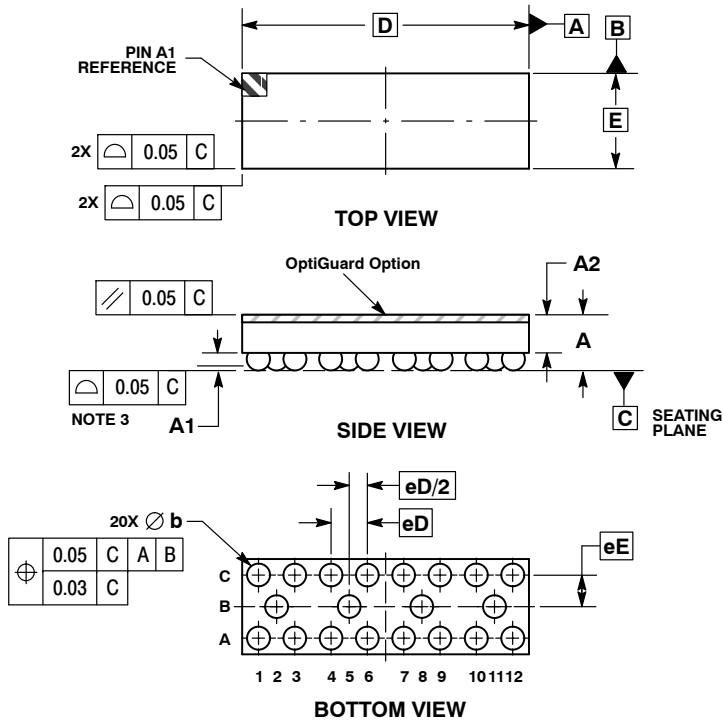


Figure 11. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 VDC and 25°C)

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PACKAGE DIMENSIONS

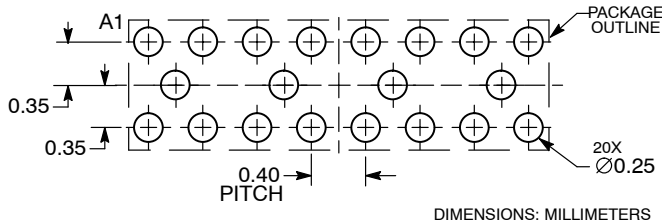
WLCSP20, 3.16x1.05
CASE 567BU-01
ISSUE O



- 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 | 3.16 BSC | |
| E | 1.05 BSC | |
| eD | 0.400 BSC | |
| eE | 0.347 BSC | |

RECOMMENDED SOLDERING FOOTPRINT*



*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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