4-, 6-, 8-Channel EMI Filter Array with ESD Protection

CM1457



WLCSP10
CP SUFFIX
CASE 567BJ

WLCSP15
CP SUFFIX
CASE 567BR

WLCSP20
CP SUFFIX
CASE 567BV

Description

The CM1457 is an inductor-based (L-C) EMI filter array with ESD protection, which integrates four, six, or eight filters in a CSP form factor with 0.40 mm pitch. Each EMI filter channel of the CM1457 is implemented with the component value of 6 pF – 35 nH – 4.7 pF – 35 nH – 1.8 pF. The cut-off frequency at −3 dB attenuation is 300 MHz and can be used in applications where the data rates are as high as 160 Mbps, while providing greater than −35 dB attenuation over the 800 MHz to 2.7 GHz frequency range. The parts include ESD diodes on every I/O pin and provide a high level of protection against electrostatic discharge (ESD). The ESD protection diodes connected to the external filter ports are designed and characterized to safely dissipate ESD strikes of ±15 kV, which is beyond the maximum requirement of the IEC61000−4−2 international standard.

This device is particularly well suited for wireless handsets, mobile LCD modules and PDAs because of its small package format and easy-to-use pin assignments. In particular, the CM1457 is ideal for EMI filtering and protecting data and control lines for the LCD display and camera interface in mobile handsets.

The CM1457 incorporates *OptiGuard* which results in improved reliability at assembly. It is manufactured with a 0.40 mm pitch and 0.25 mm CSP solder ball to provide up to 28% board space savings vs. competing CSP devices with 0.50 mm pitch and 0.30 mm CSP solder ball.

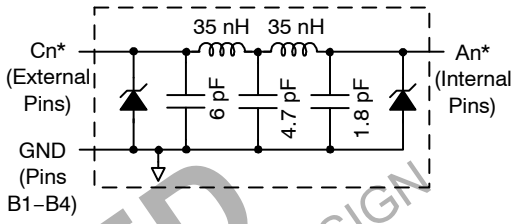
Features

- Four, Six or Eight Channels of EMI Filtering
- ±15 kV ESD Protection (IEC 61000−4−2, Contact Discharge) at External Pins
- Greater than −40 dB of Attenuation at 1 GHz
  MIL−STD−883 International ESD Standard
- Chip Scale Package (CSP) with 0.40 mm Pitch and 0.25 mm CSP Solder Ball which Features Extremely Low Parasitic Inductance for Optimum Filter and ESD Performance
- *OptiGuard* Coating for Improved Reliability at Assembly
- These Devices are Pb−Free and are RoHS Compliant

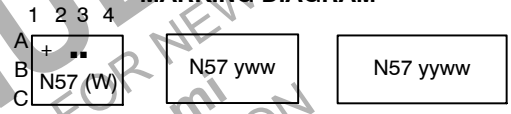
Applications

- 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
- LCD and Camera Modules

BLOCK DIAGRAM



MARKING DIAGRAM



CM1457−04
10−Bump CSP

CM1457−06
15−Bump CSP

CM1457−08
20−Bump CSP

N57 = CM1457−04CP
N57 = CM1457−06CP
N57 = CM1457−08CP
w/yww/yyww = date code

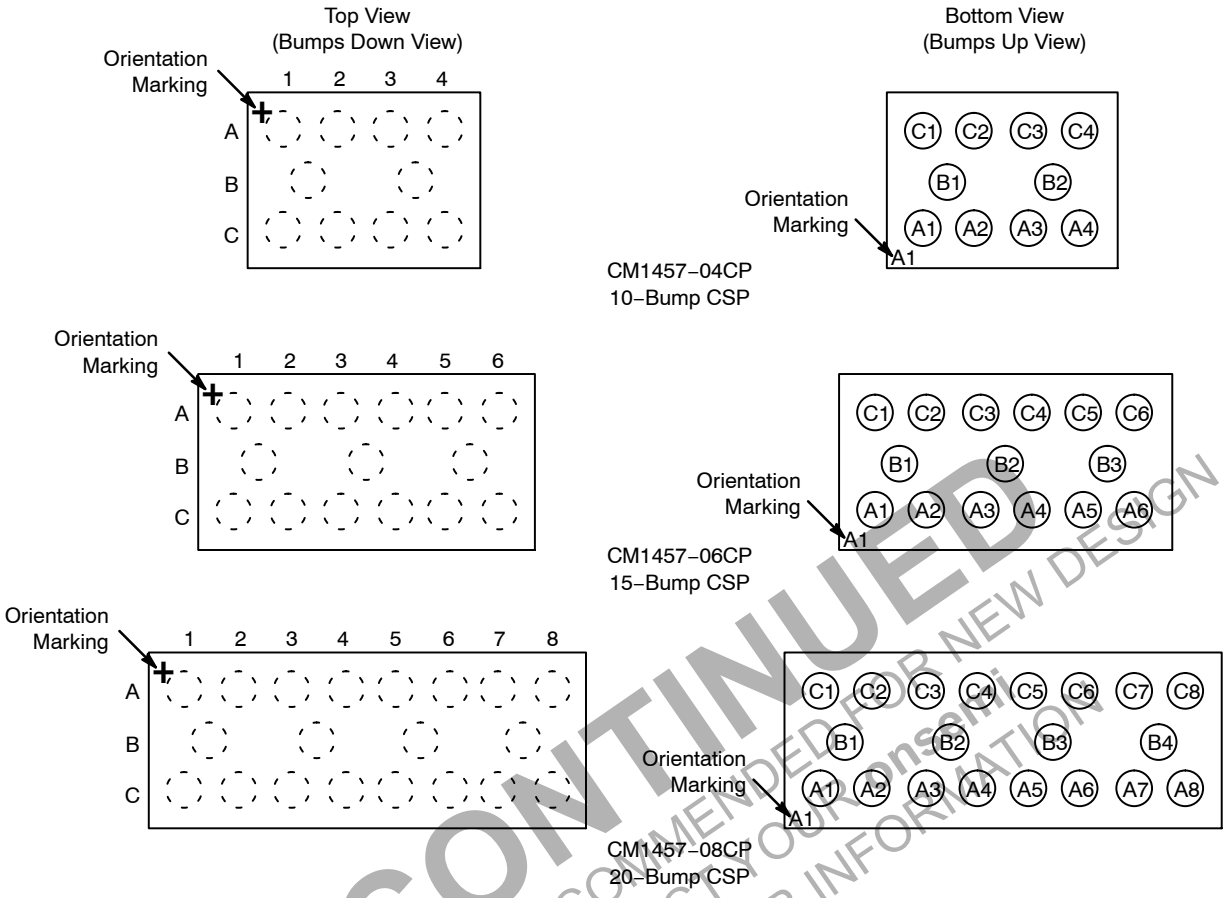
ORDERING INFORMATION

Device	Package	Shipping†
CM1457−04CP	CSP−10 (Pb−Free)	3500/Tape & Reel
CM1457−06CP	CSP−15 (Pb−Free)	3500/Tape & Reel
CM1457−08CP	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.

DISCONTINUED
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PACKAGE / PINOUT DIAGRAMS



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Table 1. PIN DESCRIPTIONS

Pin Number				Pin Number			
−04	**−06**	**−08**	**Pin Description**	**−04**	**−06**	**−08**	**Pin Description**
A1	A1	A1	Filter #1 (Internal)	C1	C1	C1	Filter #1 (External)
A2	A2	A2	Filter #2 (Internal)	C2	C2	C2	Filter #2 (External)
A3	A3	A3	Filter #3 (Internal)	C3	C3	C3	Filter #3 (External)
A4	A4	A4	Filter #4 (Internal)	C4	C4	C4	Filter #4 (External)
−	A5	A5	Filter #5 (Internal)	−	C5	C5	Filter #5 (External)
−	A6	A6	Filter #6 (Internal)	−	C6	C6	Filter #6 (External)
−	−	A7	Filter #7 (Internal)	−	−	C7	Filter #7 (External)
−	−	A8	Filter #8 (Internal)	−	−	C8	Filter #8 (External)
B1, B2	B1−B3	B1−B4	GND				

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC current per Inductor	15	mA
DC Package Power Rating	0.5	W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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
L_{TOT}	Total Channel Inductance			70		nH
R_{TOT}	Total Channel DC Resistance			45		Ω
C_{TOT_0V}	Total Channel Capacitance, 0 V bias	0 V dc; 1 MHz, 30 mV rms		20	24	pF
$C_{TOT_2.5V}$	Total Channel Capacitance, 2.5 V bias	2.5 V dc; 1 MHz, 30 mV rms		12.5		pF
V_{ST}	Stand−off Voltage	I = 10 μA	5.5			V
I_{LEAK}	Diode Leakage Current	V_{IN} = +3.3 V		0.1	0.5	μA
V_{SIG}	Signal Clamp Voltage Positive Clamp Negative Clamp	 I_{LOAD} = 10 mA 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) Contact Discharge per IEC 61000−4−2 standard, Level 4 **(External Pins)** b) Contact Discharge per IEC 61000−4−2 standard, Level 4 **(Internal Pins)**	(Notes 2 and 3)	 ±15 ±2			kV
f_C	Cut−off Frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω			300		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. Unused pins are left open.

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APPLICATION INFORMATION

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

PERFORMANCE INFORMATION

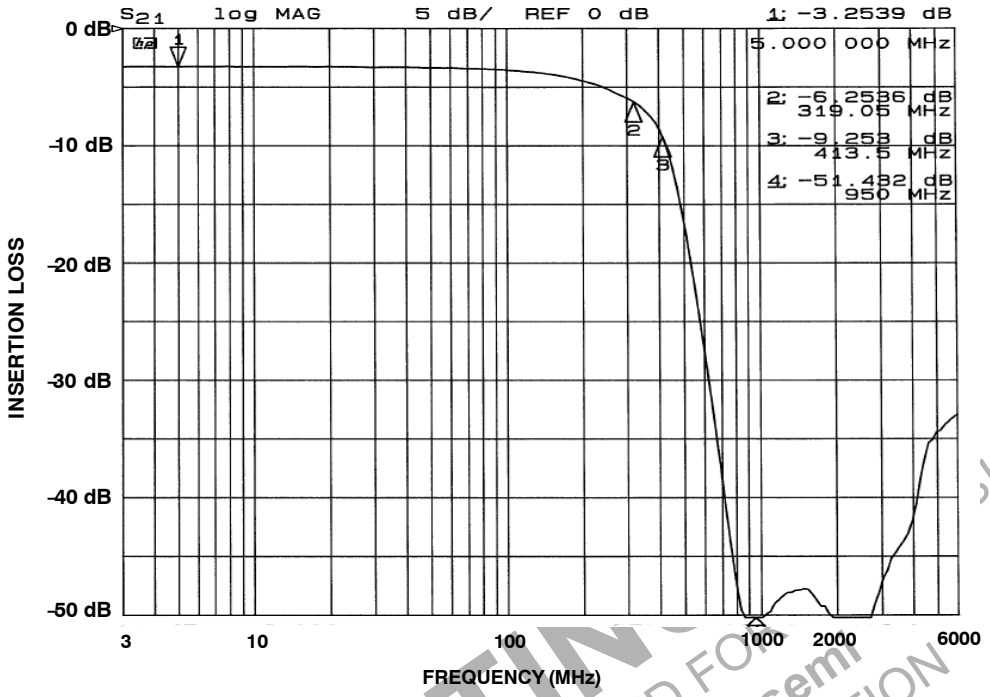


Figure 1. Insertion Loss vs. Frequency (0 V Bias)

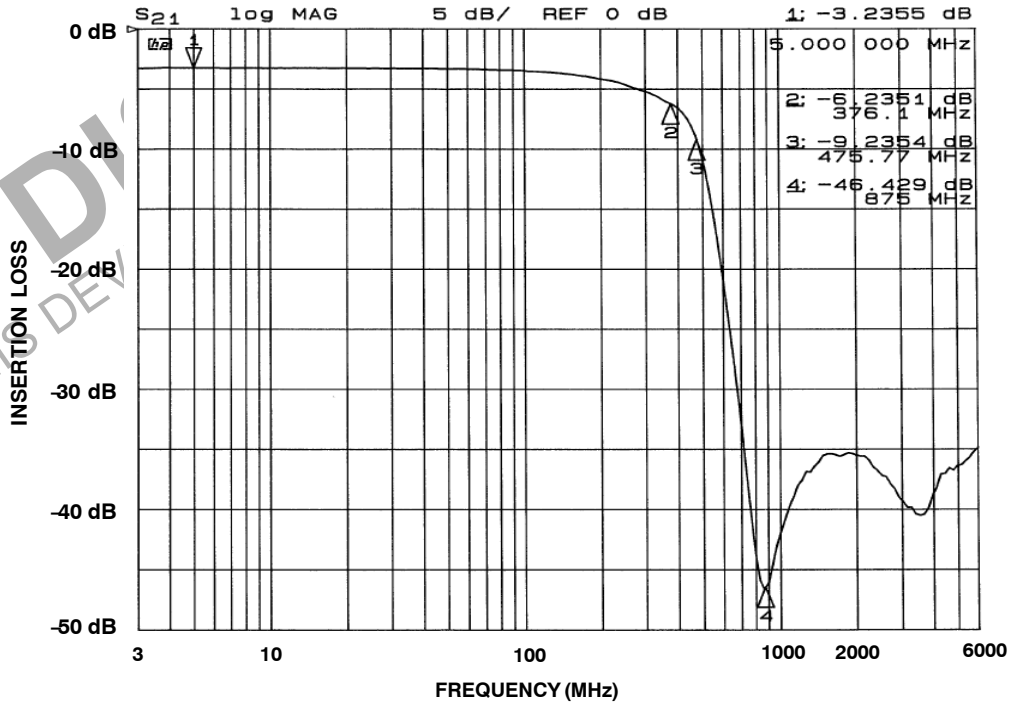


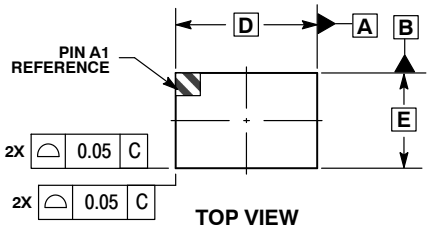
Figure 2. Insertion Loss vs. Frequency (2.5 V Bias)

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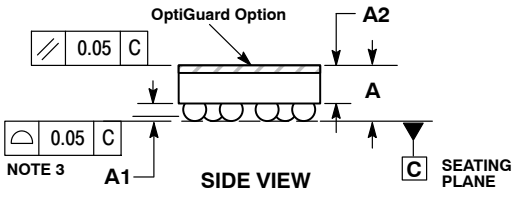
WLCSP10, 1.67x1.05
CASE 567BJ
ISSUE O

SCALE 4:1

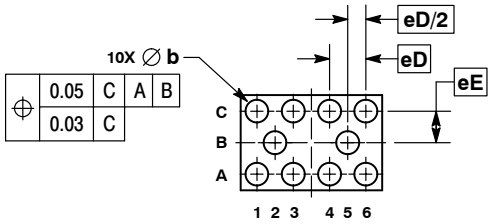
DATE 26 JUL 2010



TOP VIEW



SIDE VIEW

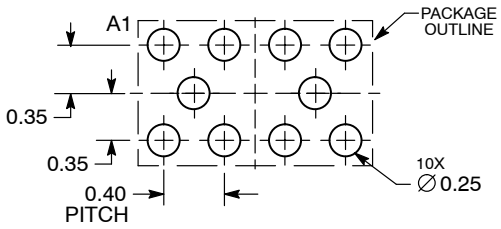


BOTTOM VIEW

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

	MILLIMETERS	
DIM	MIN	MAX
A	0.54	0.69
A1	0.17	0.24
A2	0.42 REF	
b	0.24	0.29
D	1.67 BSC	
E	1.05 BSC	
eD	0.400 BSC	
eE	0.347 BSC	

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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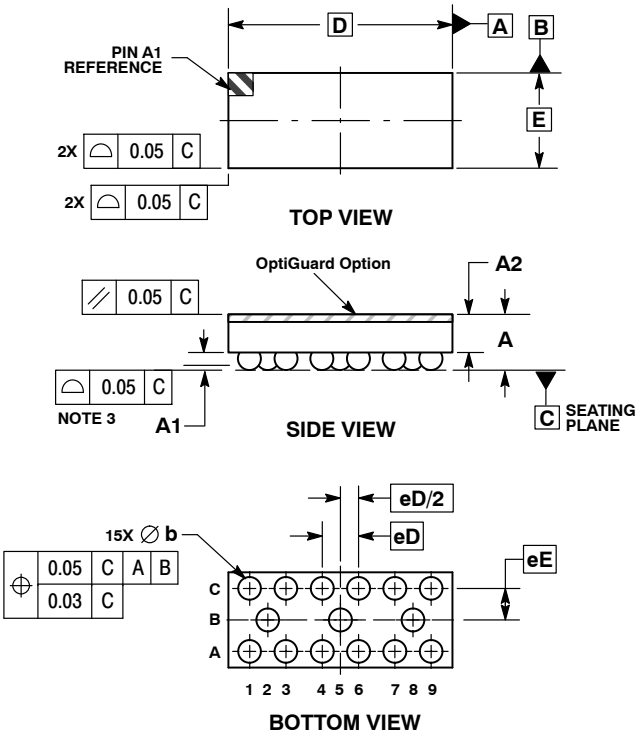
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SCALE 4:1

WLCSP15, 2.47x1.05
CASE 567BR
ISSUE O

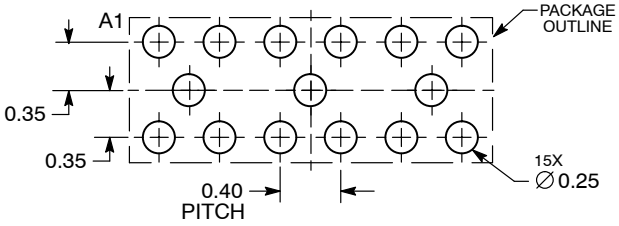
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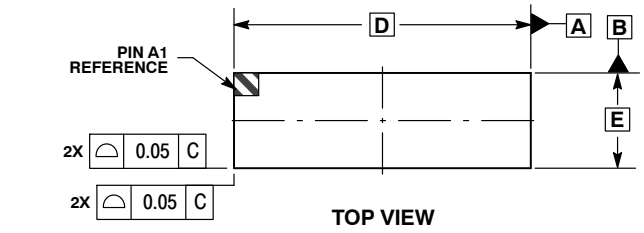
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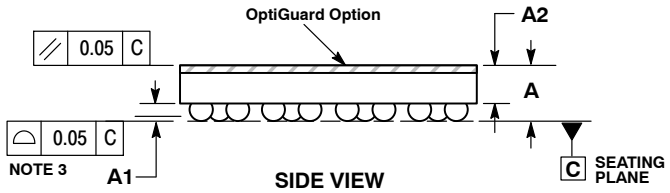
SCALE 4:1

WLCSP20, 3.27x1.05
CASE 567BV
ISSUE O

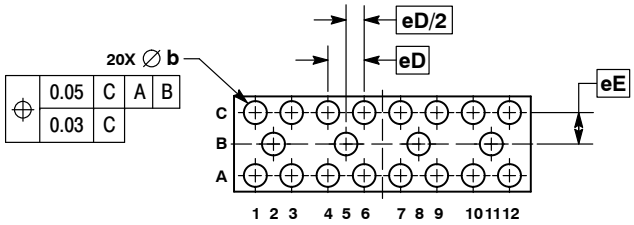
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TOP VIEW



SIDE VIEW

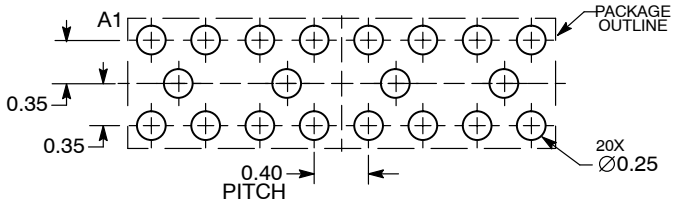


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RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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