

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.

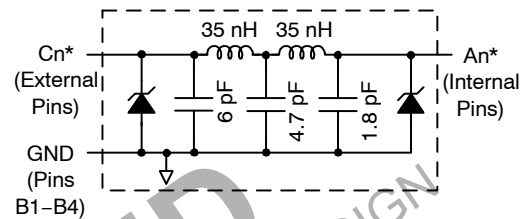
Features

- 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

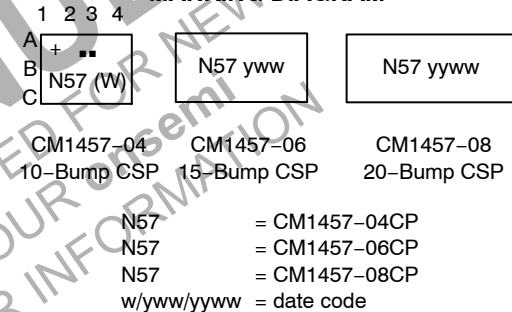
Applications

- 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



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.

CM1457

PACKAGE / PINOUT DIAGRAMS

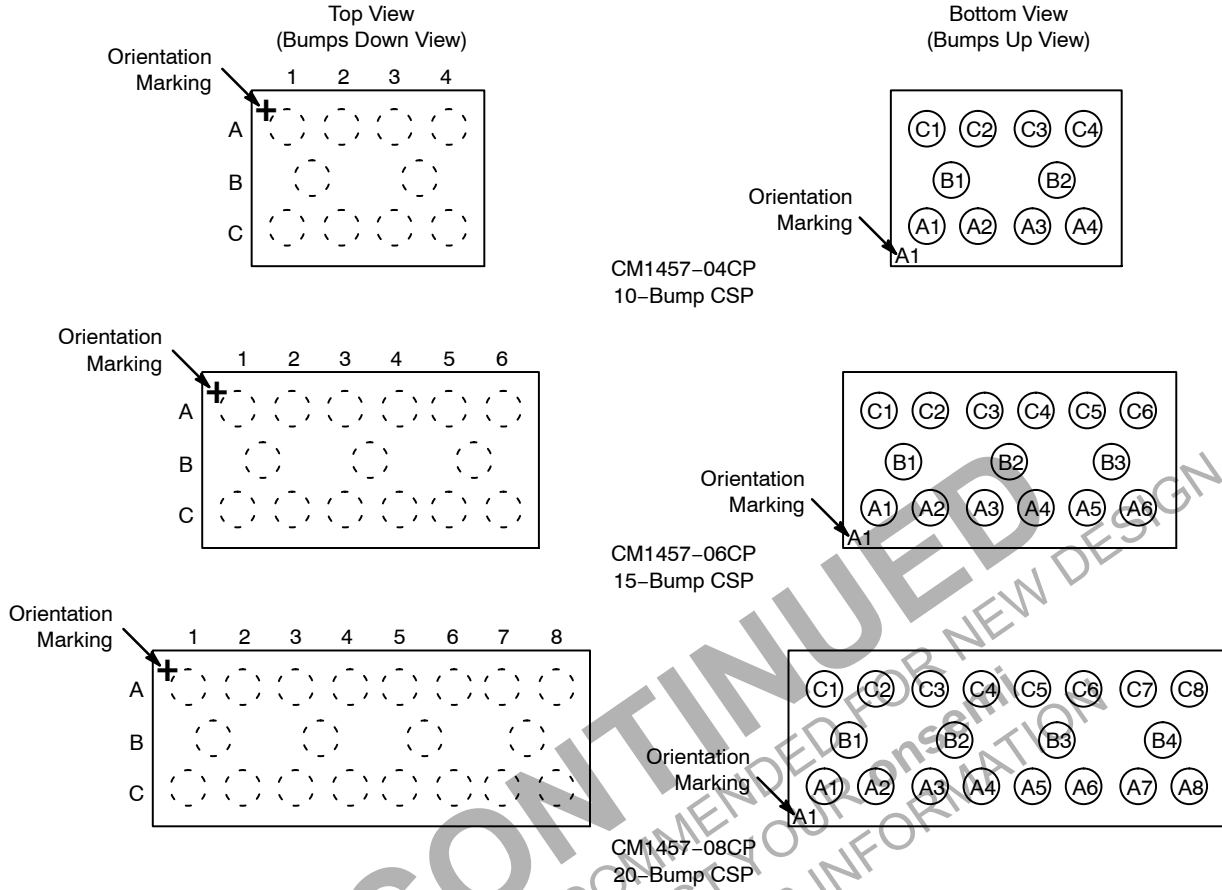


Table 1. PIN DESCRIPTIONS

Pin Number			Pin Description	Pin Number			Pin Description
-04	-06	-08		-04	-06	-08	
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				

CM1457

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.

APPLICATION INFORMATION

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

PERFORMANCE INFORMATION

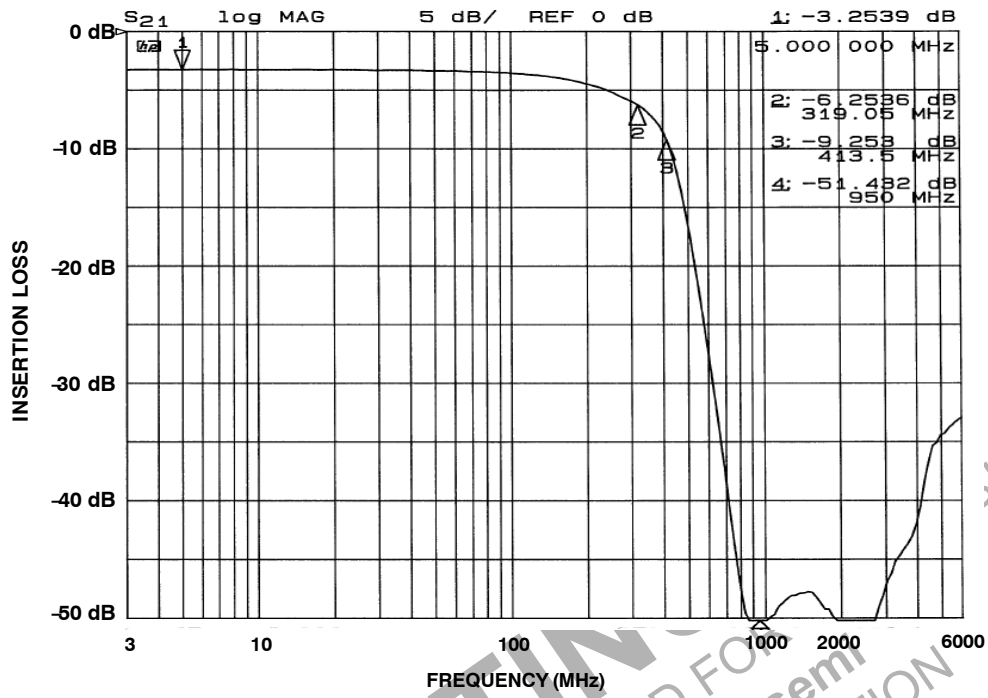


Figure 1. Insertion Loss vs. Frequency (0 V Bias)

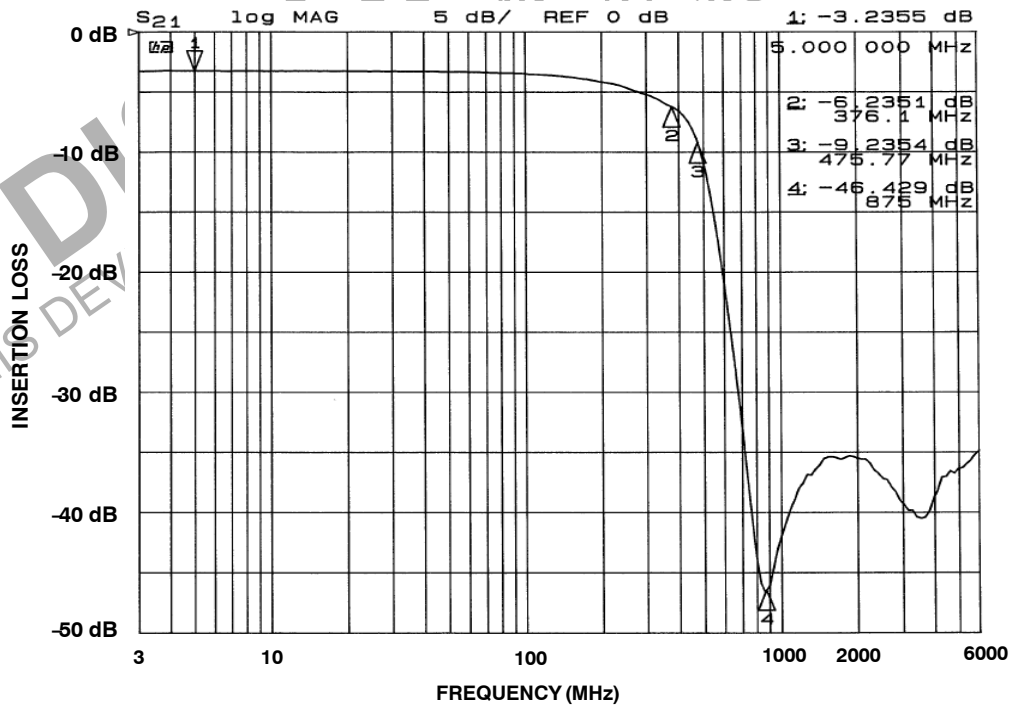


Figure 2. Insertion Loss vs. Frequency (2.5 V Bias)

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

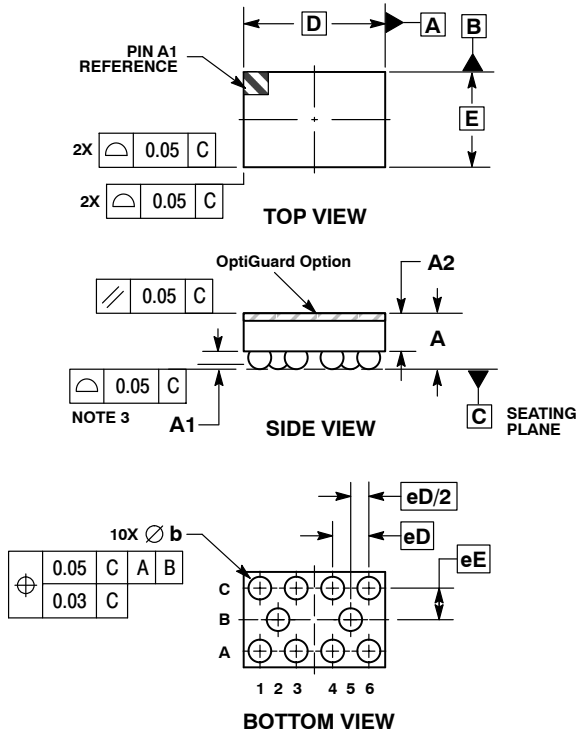
ON Semiconductor®



SCALE 4:1

WLCSP10, 1.67x1.05
CASE 567BJ-01
ISSUE O

DATE 26 JUL 2010

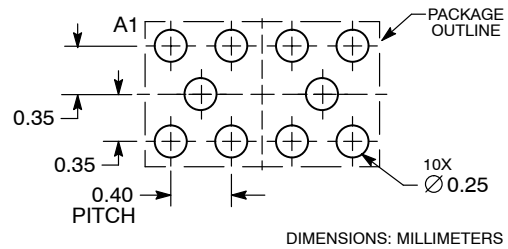


NOTES:

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	1.67	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.

DOCUMENT NUMBER:	98AON49818E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WLCSP10, 1.67X1.05	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

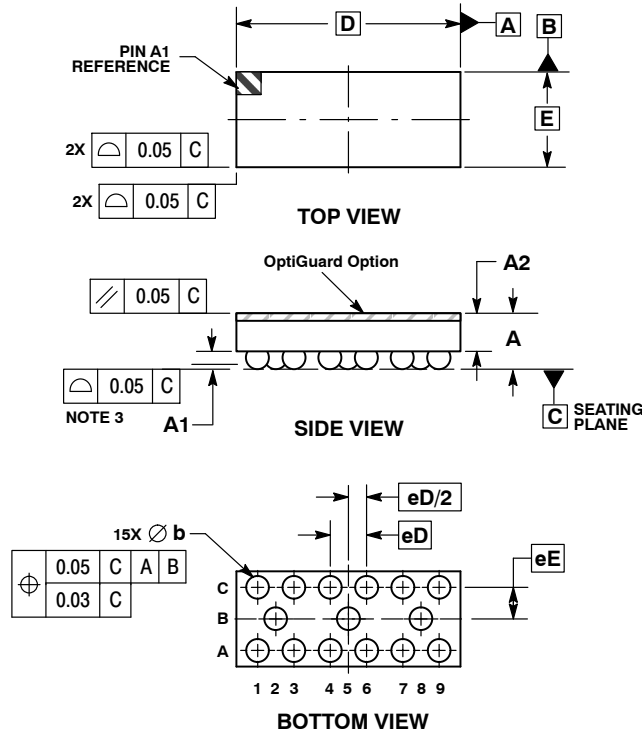
ON Semiconductor®



SCALE 4:1

WLCSP15, 2.47x1.05
CASE 567BR-01
ISSUE O

DATE 26 JUL 2010

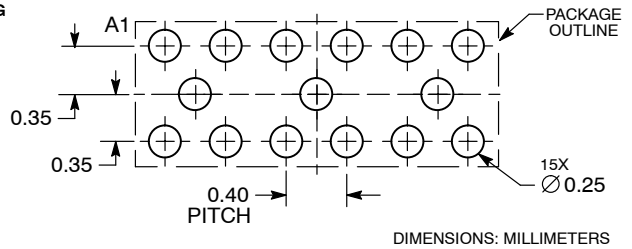


NOTES:

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	2.47	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.

DOCUMENT NUMBER:	98AON49825E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WLCSP15, 2.47X1.05	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

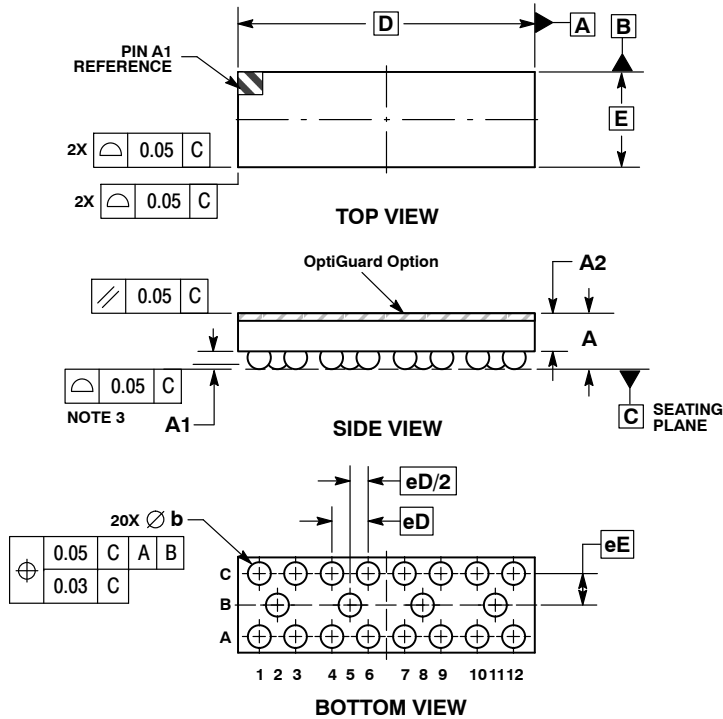
ON Semiconductor®



SCALE 4:1

WLCSP20, 3.27x1.05
CASE 567BV-01
ISSUE O

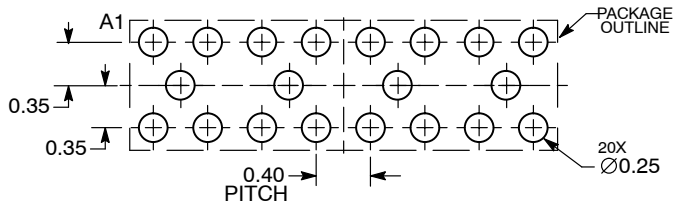
DATE 26 JUL 2010



- 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	3.27 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.

DOCUMENT NUMBER:	98AON49829E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WLCSP20, 3.27X1.05	PAGE 1 OF 1

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

onsemi, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales