

# ON Semiconductor

## Is Now

# onsemi™

To learn more about onsemi™, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)

---

**onsemi** and **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** product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://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. Other names and brands may be claimed as the property of others.

# MC14584B

## Hex Schmitt Trigger

The MC14584B Hex Schmitt Trigger is constructed with MOS P-channel and N-channel enhancement mode devices in a single monolithic structure. These devices find primary use where low power dissipation and/or high noise immunity is desired. The MC14584B may be used in place of the MC14069UB hex inverter for enhanced noise immunity to “square up” slowly changing waveforms.

### Features

- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-power TTL Loads or One Low-power Schottky TTL Load over the Rated Temperature Range
- Double Diode Protection on All Inputs
- Can Be Used to Replace MC14069UB
- For Greater Hysteresis, Use MC14106B which is Pin-for-Pin Replacement for CD40106B and MM74C14
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

### MAXIMUM RATINGS (Voltages Referenced to $V_{SS}$ )

Symbol	Parameter	Value	Unit
$V_{DD}$	DC Supply Voltage Range	-0.5 to +18.0	V
$V_{in}, V_{out}$	Input or Output Voltage Range (DC or Transient)	-0.5 to $V_{DD} + 0.5$	V
$I_{in}, I_{out}$	Input or Output Current (DC or Transient) per Pin	$\pm 10$	mA
$P_D$	Power Dissipation, per Package (Note 1)	500	mW
$T_A$	Ambient Temperature Range	-55 to +125	°C
$T_{stg}$	Storage Temperature Range	-65 to +150	°C
$T_L$	Lead Temperature (8-Second Soldering)	260	°C

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.

#### 1. Temperature Derating:

“D/DT” Packages: - 7.0 mW/°C From 65°C To 125°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$ .

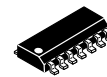
Unused inputs must always be tied to an appropriate logic voltage level (e.g., either  $V_{SS}$  or  $V_{DD}$ ). Unused outputs must be left open.



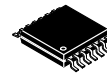
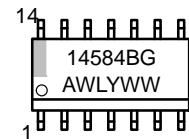
ON Semiconductor®

<http://onsemi.com>

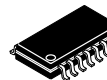
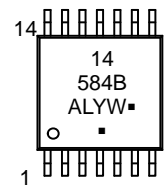
### MARKING DIAGRAMS



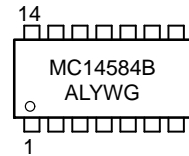
SOIC-14  
D SUFFIX  
CASE 751A



TSSOP-14  
DT SUFFIX  
CASE 948G



SOEIAJ-14  
F SUFFIX  
CASE 965



A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G or ■ = Pb-Free Package

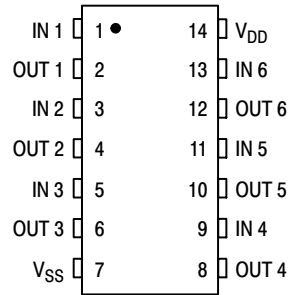
(Note: Microdot may be in either location)

### ORDERING INFORMATION

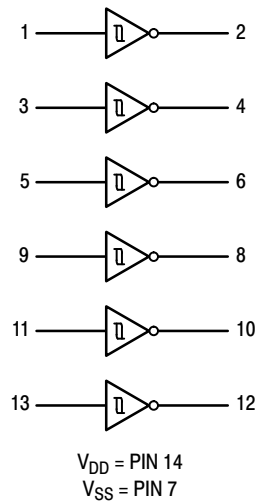
See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

# MC14584B

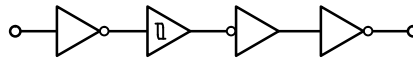
## PIN ASSIGNMENT



## LOGIC DIAGRAM



## EQUIVALENT CIRCUIT SCHEMATIC (1/6 OF CIRCUIT SHOWN)



## ORDERING INFORMATION

Device	Package	Shipping†
MC14584BDG	SOIC-14 (Pb-Free)	55 Units / Rail
NLV14584BDG*		55 Units / Rail
MC14584BDR2G		2500 / Tape & Reel
NLV14584BDR2G*		2500 / Tape & Reel
MC14584BDTR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel
NLV14584BDTR2G*		2500 / Tape & Reel
MC14584BFG	SOEIAJ-14 (Pb-Free)	50 Units / Rail
MC14584BFELG		2000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

# MC14584B

## ELECTRICAL CHARACTERISTICS (Voltages Referenced to V<sub>SS</sub>)

Characteristic	Symbol	V <sub>DD</sub> Vdc	- 55°C		25°C			125°C		Unit
			Min	Max	Min	Typ <sup>(2)</sup>	Max	Min	Max	
Output Voltage V <sub>in</sub> = V <sub>DD</sub>  V <sub>in</sub> = 0	"0" Level V <sub>OL</sub>	5.0	-	0.05	-	0	0.05	-	0.05	Vdc
		10	-	0.05	-	0	0.05	-	0.05	
		15	-	0.05	-	0	0.05	-	0.05	
	"1" Level V <sub>OH</sub>	5.0	4.95	-	4.95	5.0	-	4.95	-	
		10	9.95	-	9.95	10	-	9.95	-	
		15	14.95	-	14.95	15	-	14.95	-	
Output Drive Current (V <sub>OH</sub> = 2.5 Vdc) (V <sub>OH</sub> = 4.6 Vdc) (V <sub>OH</sub> = 9.5 Vdc) (V <sub>OH</sub> = 13.5 Vdc)  (V <sub>OL</sub> = 0.4 Vdc) (V <sub>OL</sub> = 0.5 Vdc) (V <sub>OL</sub> = 1.5 Vdc)	Source I <sub>OH</sub>	5.0	-3.0	-	-2.4	-4.2	-	-1.7	-	mAdc
		5.0	-0.64	-	-0.51	-0.88	-	-0.36	-	
		10	-1.6	-	-1.3	-2.25	-	-0.9	-	
	Sink I <sub>OL</sub>	5.0	0.64	-	0.51	0.88	-	0.36	-	
		10	1.6	-	1.3	2.25	-	0.9	-	
		15	4.2	-	3.4	8.8	-	2.4	-	
Input Current	I <sub>in</sub>	15	-	±0.1	-	±0.00001	±0.1	-	±1.0	μAdc
Input Capacitance (V <sub>in</sub> = 0)	C <sub>in</sub>	-	-	-	-	5.0	7.5	-	-	pF
Quiescent Current (Per Package)	I <sub>DD</sub>	5.0	-	0.25	-	0.0005	0.25	-	7.5	μAdc
		10	-	0.5	-	0.0010	0.5	-	15	
		15	-	1.0	-	0.0015	1.0	-	30	
Total Supply Current <sup>(3) (4)</sup> (Dynamic plus Quiescent, Per Package) (C <sub>L</sub> = 50 pF on all outputs, all buffers switching)	I <sub>T</sub>	5.0	I <sub>T</sub> = (1.8 μA/kHz) f + I <sub>DD</sub>							μAdc
		10	I <sub>T</sub> = (3.6 μA/kHz) f + I <sub>DD</sub>							
		15	I <sub>T</sub> = (5.4 μA/kHz) f + I <sub>DD</sub>							
Hysteresis Voltage	V <sub>H</sub> <sup>(5)</sup>	5.0	0.27	1.0	0.25	0.6	1.0	0.21	1.0	Vdc
		10	0.36	1.3	0.3	0.7	1.2	0.25	1.2	
		15	0.77	1.7	0.6	1.1	1.5	0.50	1.4	
Threshold Voltage Positive-Going  Negative-Going	V <sub>T+</sub>	5.0	1.9	3.5	1.8	2.7	3.4	1.7	3.4	Vdc
		10	3.4	7.0	3.3	5.3	6.9	3.2	6.9	
		15	5.2	10.6	5.2	8.0	10.5	5.2	10.5	
	V <sub>T-</sub>	5.0	1.6	3.3	1.6	2.1	3.2	1.5	3.2	
		10	3.0	6.7	3.0	4.6	6.7	3.0	6.7	
		15	4.5	9.7	4.6	6.9	9.8	4.7	9.9	

2. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

3. The formulas given are for the typical characteristics only at 25°C.

4. To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) \text{ Vfk}$$

where: I<sub>T</sub> is in μA (per package), C<sub>L</sub> in pF, V = (V<sub>DD</sub> - V<sub>SS</sub>) in volts, f in kHz is input frequency, and k = 0.001.

5. V<sub>H</sub> = V<sub>T+</sub> - V<sub>T-</sub> (But maximum variation of V<sub>H</sub> is specified as less than V<sub>T+ max</sub> - V<sub>T- min</sub>).

## SWITCHING CHARACTERISTICS (C<sub>L</sub> = 50 pF, T<sub>A</sub> = 25°C)

Characteristic	Symbol	V <sub>DD</sub> Vdc	Min	Typ <sup>(6)</sup>	Max	Unit
Output Rise Time	t <sub>TLH</sub>	5.0	-	100	200	ns
		10	-	50	100	
		15	-	40	80	
Output Fall Time	t <sub>THL</sub>	5.0	-	100	200	ns
		10	-	50	100	
		15	-	40	80	
Propagation Delay Time	t <sub>PLH</sub> , t <sub>PHL</sub>	5.0	-	125	250	ns
		10	-	50	100	
		15	-	40	80	

6. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

# MC14584B

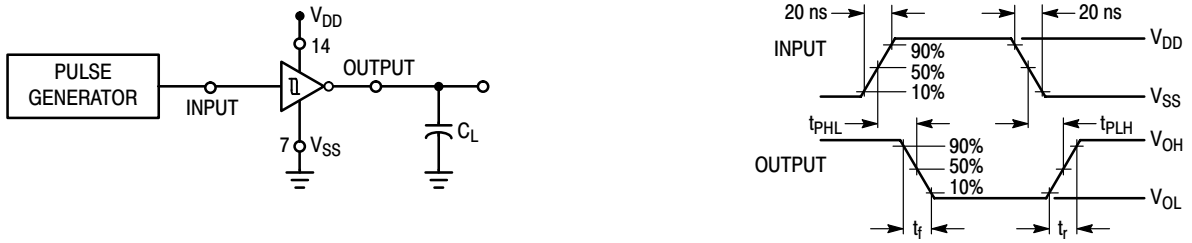
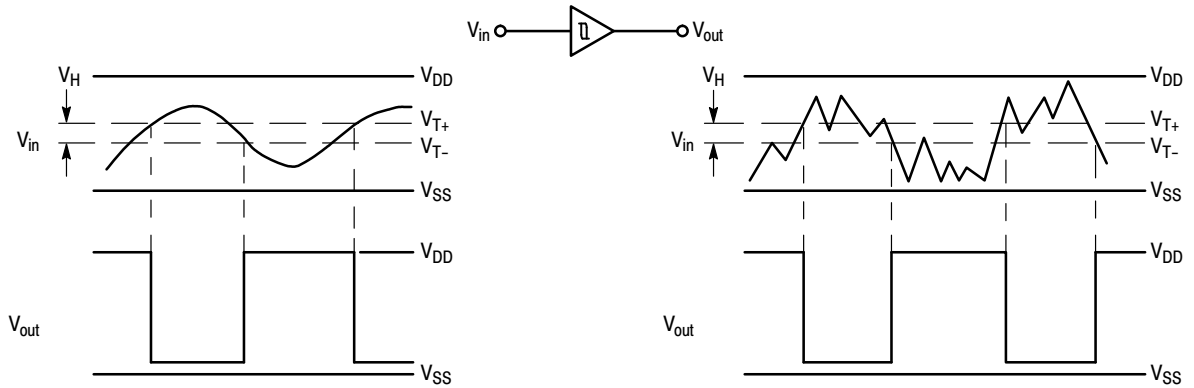


Figure 1. Switching Time Test Circuit and Waveforms



(a) Schmitt Triggers will square up inputs with slow rise and fall times.

(b) A Schmitt trigger offers maximum noise immunity in gate applications.

Figure 2. Typical Schmitt Trigger Applications

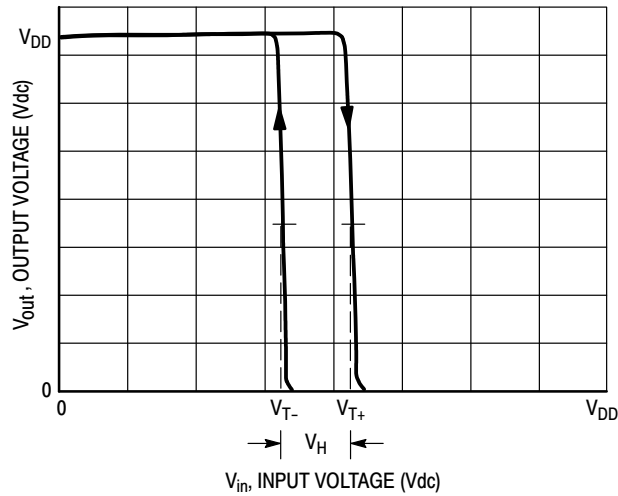
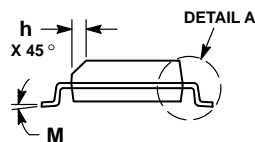
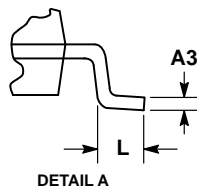
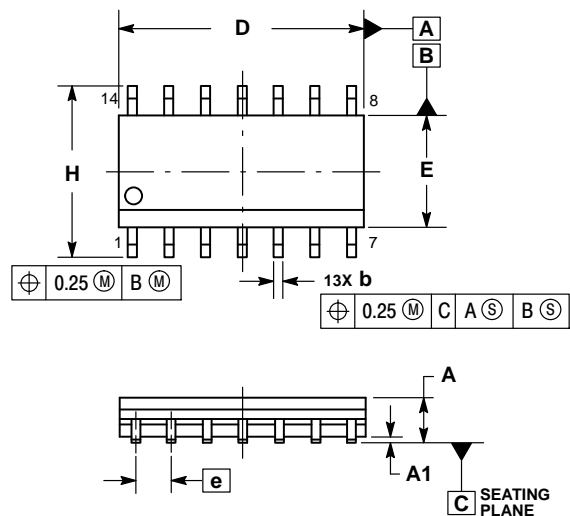


Figure 3. Typical Transfer Characteristics

# MC14584B

## PACKAGE DIMENSIONS

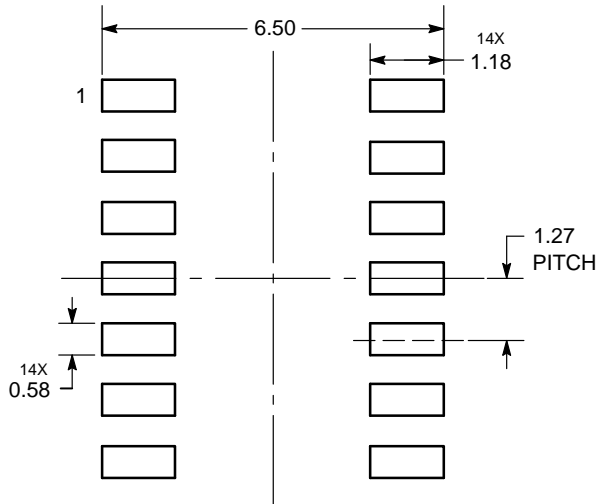
SOIC-14 NB  
CASE 751A-03  
ISSUE K



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF AT MAXIMUM MATERIAL CONDITION.
  4. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSIONS.
  5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.054	0.068
A1	0.10	0.25	0.004	0.010
A3	0.19	0.25	0.008	0.010
b	0.35	0.49	0.014	0.019
D	8.55	8.75	0.337	0.344
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.019
L	0.40	1.25	0.016	0.049
M	0°	7°	0°	7°

### SOLDERING FOOTPRINT\*



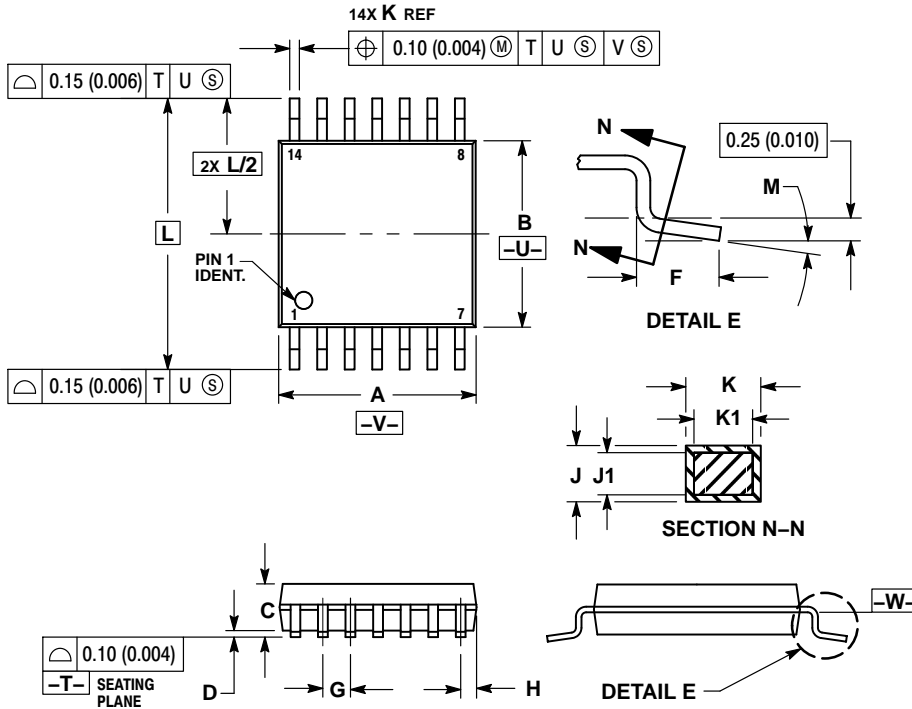
DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MC14584B

## PACKAGE DIMENSIONS

TSSOP-14  
CASE 948G  
ISSUE B

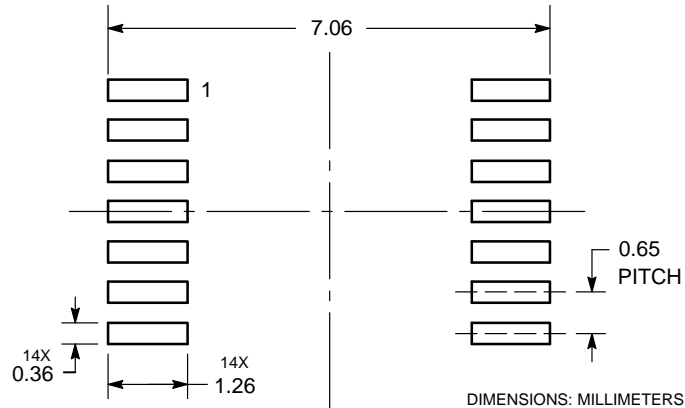


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.50	0.60	0.020	0.024
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

### 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.