

# 2-Bit Bus Switch

## 7WB3306

The 7WB3306 is an advanced high-speed low-power 2-bit bus switch in ultra-small footprints.

### Features

- High Speed:  $t_{PD} = 0.25$  ns (Max) @  $V_{CC} = 4.5$  V
- $3 \Omega$  Switch Connection Between 2 Ports
- Power Down Protection Provided on Inputs
- Zero Bounce
- TTL-Compatible Control Inputs
- Ultra-Small Pb-Free Packages
- These are Pb-Free Devices



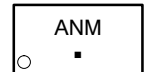
**ON Semiconductor®**

[www.onsemi.com](http://www.onsemi.com)

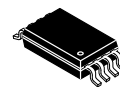
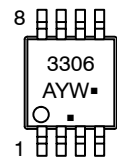
### MARKING DIAGRAMS



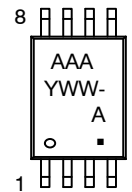
**UDFN8**  
**MU SUFFIX**  
**CASE 517AJ**



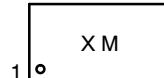
**Micro8**  
**DM SUFFIX**  
**CASE 846A**



**TSSOP8**  
**DT SUFFIX**  
**CASE 948AL**



**UDFN8**  
**1.95 x 1.0**  
**CASE 517CA**

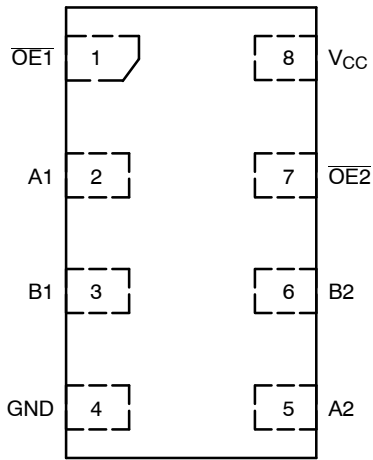


- A = Assembly Location
- Y = Year
- W = Work Week
- M = Date Code
- = Pb-Free Package

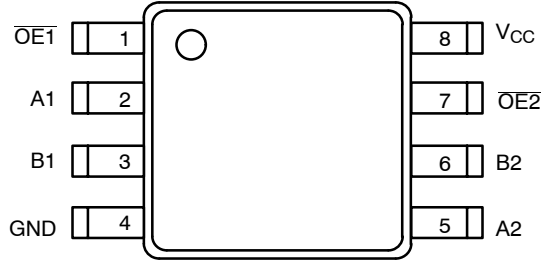
(Note: Microdot may be in either location)

### ORDERING INFORMATION

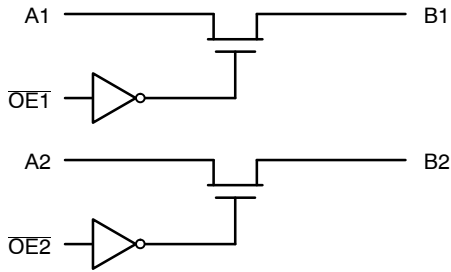
See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.



**Figure 1. UDFN8**  
(Top Thru-View)



**Figure 2. Micro8/TSSOP8**  
(Top View)



**Figure 3. Logic Diagram**

**FUNCTION TABLE**

Input $\overline{OE_n}$	Function
L	$B_n = A_n$
H	Disconnect

## MAXIMUM RATINGS

Symbol	Parameter	Value	Unit	
$V_{CC}$	DC Supply Voltage	-0.5 to +7.0	V	
$V_{IN}$	Control Pin Input Voltage	-0.5 to +7.0	V	
$V_{I/O}$	Switch Input / Output Voltage	-0.5 to +7.0	V	
$I_{IK}$	Control Pin DC Input Diode Current $V_{IN} < GND$	-50	mA	
$I_{OK}$	Switch I/O Port DC Diode Current $V_{I/O} < GND$	-50	mA	
$I_O$	ON-State Switch Current	$\pm 128$	mA	
	Continuous Current Through $V_{CC}$ or GND	$\pm 150$	mA	
$I_{CC}$	DC Supply Current Per Supply Pin	$\pm 150$	mA	
$I_{GND}$	DC Ground Current per Ground Pin	$\pm 150$	mA	
$T_{STG}$	Storage Temperature Range	-65 to +150	$^{\circ}C$	
$T_L$	Lead Temperature, 1 mm from Case for 10 Seconds	260	$^{\circ}C$	
$T_J$	Junction Temperature Under Bias	150	$^{\circ}C$	
$\theta_{JA}$	Thermal Resistance	UDFN8 (Note 1)	111	$^{\circ}C/W$
		Micro8	392	
		TSSOP8	150	
$P_D$	Power Dissipation in Still Air at 85 $^{\circ}C$	UDFN8	1127	mW
		Micro8	319	
		TSSOP8	833	
MSL	Moisture Sensitivity	Level 1		
$F_R$	Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in		
$V_{ESD}$	ESD Withstand Voltage (Note 2)	Human Body Model, all pins	> 1.5	kV
		Human Body Model, $A_n/B_n$ to Ground	> 4	kV
		Human Body Model, $A_n/B_n$ to $V_{CC}$	> 4	kV
$I_{LATCHUP}$	Latchup Performance Above $V_{CC}$ and Below GND at 125 $^{\circ}C$ (Note 3)	$\pm 100$	mA	

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.

1. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2 ounce copper trace no air flow.
2. Tested to EIA / JESD22-A114-A.
3. Tested to EIA / JESD78.

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	Positive DC Supply Voltage	4.0	5.5	V
$V_{IN}$	Control Pin Input Voltage	0	5.5	V
$V_{I/O}$	Switch Input / Output Voltage	0	5.5	V
$T_A$	Operating Free-Air Temperature	-55	+125	$^{\circ}C$
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate	Control Input	0	5
		Switch I/O	0	DC

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			T <sub>A</sub> = -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
V <sub>IK</sub>	Clamp Diode Voltage	I <sub>I/O</sub> = -18 mA	4.5			-1.2		-1.2	V
V <sub>IH</sub>	High-Level Input Voltage (Control)		4.0 to 5.5	2.0			2.0		V
V <sub>IL</sub>	Low-Level Input Voltage (Control)		4.0 to 5.5			0.8		0.8	V
V <sub>OH</sub>	Output Voltage High	See Figure 4							
I <sub>IN</sub>	Input Leakage Current	0 ≤ V <sub>IN</sub> ≤ 5.5 V	5.5			±0.1		±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current	V <sub>I/O</sub> = 0 to 5.5 V	0			±0.1		±1.0	μA
I <sub>CC</sub>	Quiescent Supply Current	I <sub>O</sub> = 0, V <sub>IN</sub> = V <sub>CC</sub> or 0 V	5.5			±0.1		±1.0	μA
ΔI <sub>CC</sub>	Increase in Supply Current (Control Pin)	One input at 3.4 V; Other inputs at V <sub>CC</sub> or GND	5.5					2.5	mA
R <sub>ON</sub>	Switch ON Resistance	V <sub>I/O</sub> = 0, I <sub>I/O</sub> = 64 mA I <sub>I/O</sub> = 30 mA	4.5		3 3	7 7		7 7	Ω
		V <sub>I/O</sub> = 2.4, I <sub>I/O</sub> = 15 mA			6	15		15	
		V <sub>I/O</sub> = 2.4, I <sub>I/O</sub> = 15 mA	4.0		10	20		20	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Condition	V <sub>CC</sub> (V)	T <sub>A</sub> = 25 °C			T <sub>A</sub> = -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
t <sub>PD</sub>	Propagation Delay, Bus to Bus	See Figure 5	4.0 to 5.5			0.25		0.25	ns
t <sub>EN</sub>	Output Enable Time	See Figure 5	4.5 to 5.5	0.8	2.5	4.2	0.8	4.2	ns
			4.0	0.8	3.0	4.6	0.8	4.6	
t <sub>DIS</sub>	Output Disable Time		4.5 to 5.5	0.8	3.0	4.8	0.8	4.8	ns
			4.0	0.8	2.9	4.4	0.8	4.4	
C <sub>IN</sub>	Control Input Capacitance	V <sub>IN</sub> = 5 or 0 V	5.0		2.5				pF
C <sub>IO(ON)</sub>	Switch On Capacitance	Switch ON	5.0		10				pF
C <sub>IO(OFF)</sub>	Switch Off Capacitance	Switch OFF	5.0		5				pF

# 7WB3306

## TYPICAL DC CHARACTERISTICS

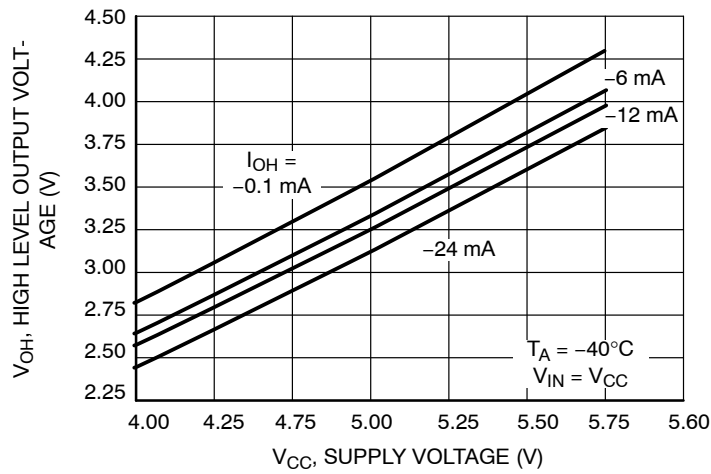
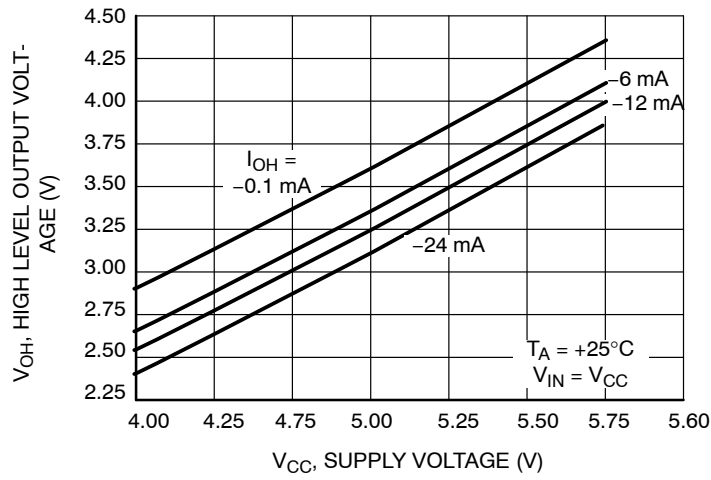
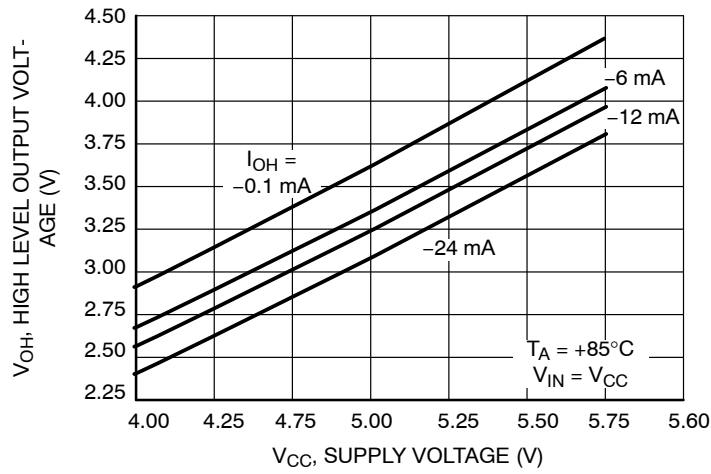
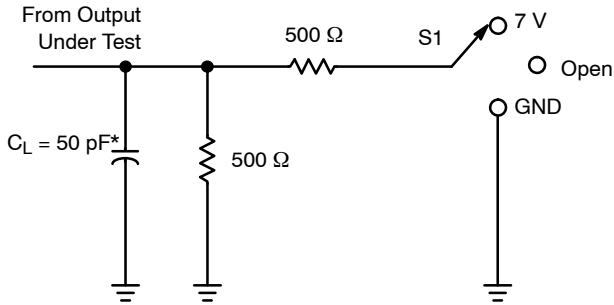


Figure 4. Output Voltage High vs Supply Voltage

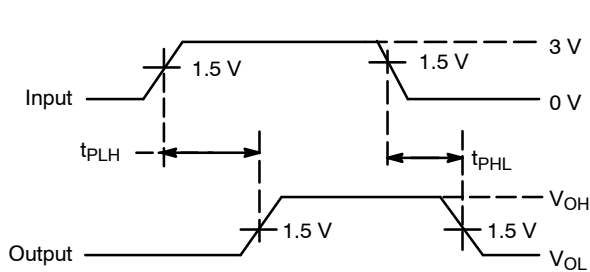
AC LOADING AND WAVEFORMS

Parameter Measurement Information

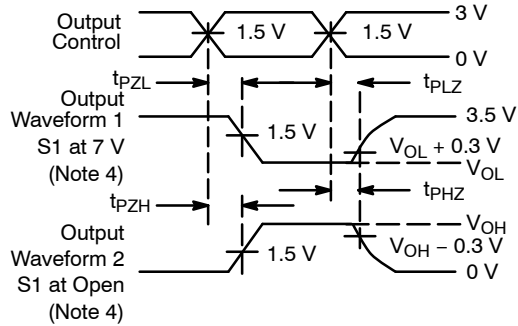


\* $C_L$  includes probes and jig capacitance.

Test	S1
$t_{PD}$	Open
$t_{PLZ}/t_{PZL}$	7 V
$t_{PHZ}/t_{PZH}$	Open



Voltage Waveforms  
Propagation Delay Times



Voltage Waveforms  
Enable and Disable Times

- Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
- All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .
- The outputs are measured one at a time, with one transition per measurement.
- $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{DIS}$ .
- $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{EN}$ .
- $t_{PHL}$  and  $t_{PLH}$  are the same as  $t_{PD}$ .

Figure 5.  $t_{PD}$ ,  $t_{EN}$ ,  $t_{DIS}$  Loading and Waveforms

# 7WB3306

## ORDERING INFORMATION

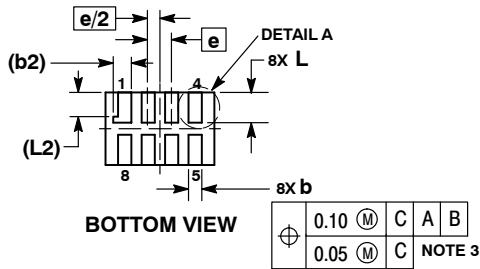
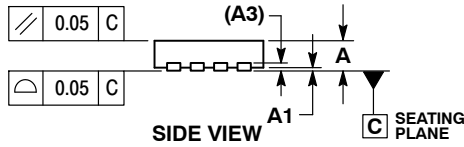
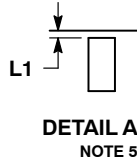
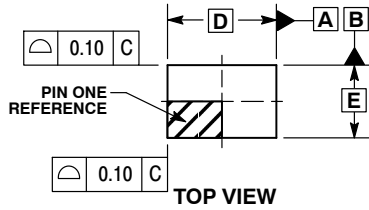
Device	Package	Shipping†
7WB3306MU2AG	UDFN8 (Pb-Free)	3000 / Tape & Reel
7WB3306DMR2G	Micro8 (Pb-Free)	4000 / Tape & Reel
7WB3306DTR2G	TSSOP8 (Pb-Free)	5000 / Tape & Reel
7WB3306DMUTCG	UDFN8, 1.95 x 1.0, 0.5 mm Pitch (Pb-Free)	3000 / Tape & Reel

†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.

# 7WB3306

## PACKAGE DIMENSIONS

UDFN8 1.8 x 1.2, 0.4P  
CASE 517AJ  
ISSUE O

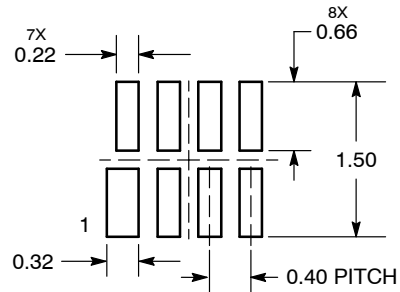


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.
4. MOLD FLASH ALLOWED ON TERMINALS ALONG EDGE OF PACKAGE. FLASH MAY NOT EXCEED 0.03 ONTO BOTTOM SURFACE OF TERMINALS.
5. DETAIL A SHOWS OPTIONAL CONSTRUCTION FOR TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127	REF
b	0.15	0.25
b2	0.30	REF
D	1.80	BSC
E	1.20	BSC
e	0.40	BSC
L	0.45	0.55
L1	0.00	0.03
L2	0.40	REF

**MOUNTING FOOTPRINT\*  
SOLDERMASK DEFINED**



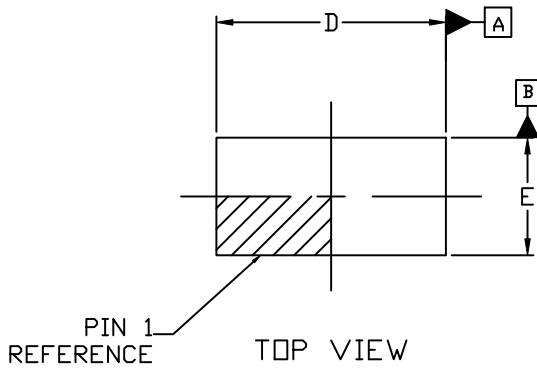
DIMENSIONS: MILLIMETERS

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



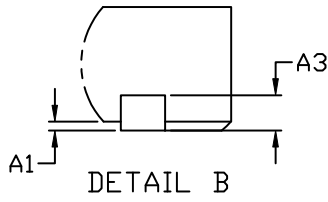
PACKAGE DIMENSIONS

UDFN8 1.95x1.0, 0.5P  
CASE 517CA  
ISSUE A

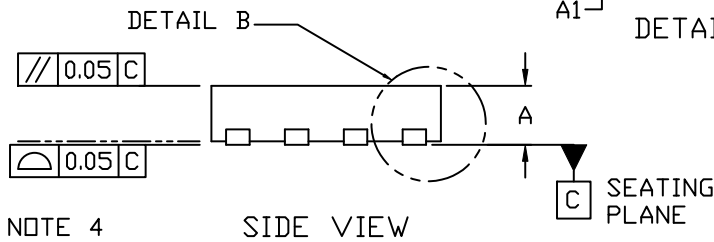


NOTES:

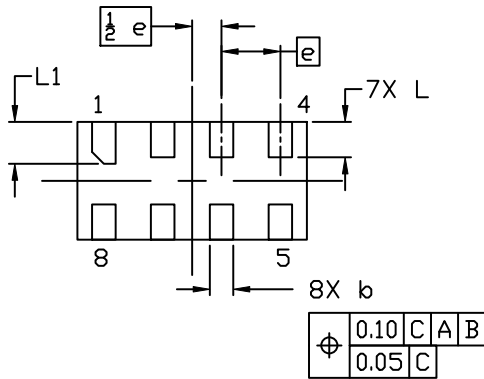
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO TO ALL THE TERMINALS.
5. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.



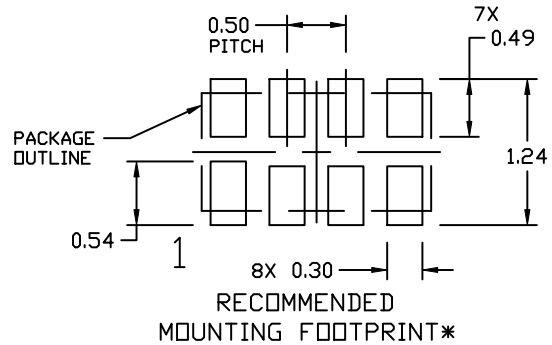
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.45	0.50	0.55
A1	0.00	---	0.05
A3	0.13 REF		
b	0.15	0.20	0.25
D	1.85	1.95	2.05
E	0.90	1.00	1.10
e	0.50 BSC		
L	0.25	0.30	0.35
L1	0.30	0.35	0.40



NOTE 4



BOTTOM VIEW NOTE 3

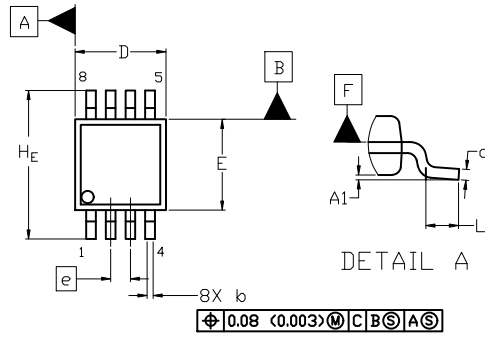


\* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

# 7WB3306

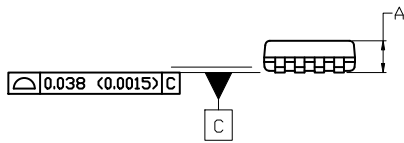
## PACKAGE DIMENSIONS

### Micro8 CASE 846A ISSUE K

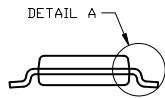


TOP VIEW

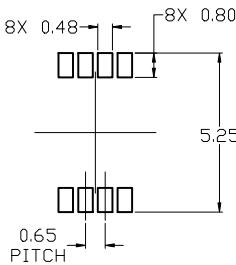
NOTE 3



SIDE VIEW



END VIEW



RECOMMENDED  
MOUNTING FOOTPRINT

#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION *b* DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.10 mm IN EXCESS OF MAXIMUM MATERIAL CONDITION.
4. DIMENSIONS *D* AND *E* DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 mm PER SIDE. DIMENSION *E* DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 mm PER SIDE. DIMENSIONS *D* AND *E* ARE DETERMINED AT DATUM *F*.
5. DATUMS *A* AND *B* ARE TO BE DETERMINED AT DATUM *F*.
6. *A1* IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

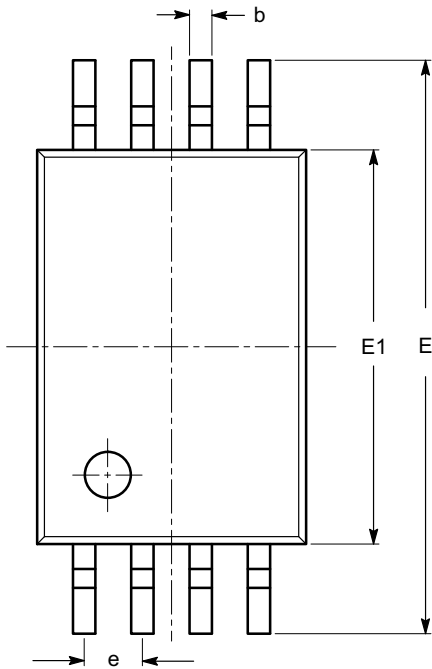
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.10
A1	0.05	0.08	0.15
<i>b</i>	0.25	0.33	0.40
<i>c</i>	0.13	0.18	0.23
<i>D</i>	2.90	3.00	3.10
<i>E</i>	2.90	3.00	3.10
<i>e</i>	0.65 BSC		
<i>H<sub>E</sub></i>	4.75	4.90	5.05
<i>L</i>	0.40	0.55	0.70

■ For additional information on our Pb-Free strategy and soldering details, please download the DN Semiconductor Soldering and Mounting Techniques Reference Manual, SD-10000-11.

# 7WB3306

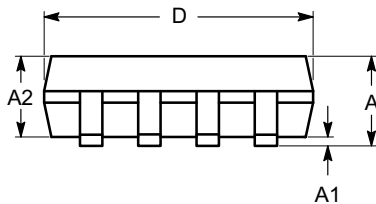
## PACKAGE DIMENSIONS

**TSSOP8, 4.4x3**  
CASE 948AL  
ISSUE O

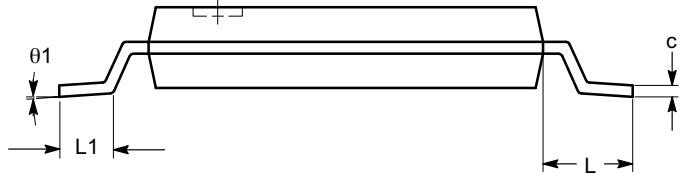


SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80	0.90	1.05
b	0.19		0.30
c	0.09		0.20
D	2.90	3.00	3.10
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e	0.65 BSC		
L	1.00 REF		
L1	0.50	0.60	0.75
$\theta$	0°		8°

**TOP VIEW**




**SIDE VIEW**



**END VIEW**

**Notes:**

- (1) All dimensions are in millimeters. Angles in degrees.
- (2) Complies with JEDEC MO-153.

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 owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marketing.pdf](http://www.onsemi.com/site/pdf/Patent-Marketing.pdf). 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor 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 ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

**PUBLICATION ORDERING INFORMATION**

**LITERATURE FULFILLMENT:**  
Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**TECHNICAL SUPPORT**  
**North American Technical Support:**  
Voice Mail: 1 800-282-9855 Toll Free USA/Canada  
Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**  
Phone: 00421 33 790 2910  
For additional information, please contact your local Sales Representative

**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](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.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)