7WB383

Bus Exchange Switch

The 7WB383 is an advanced high−speed low−power bus exchange switch in ultra−small footprints.

Features

- High Speed: t_{PD} = 0.25 ns (Max) @ V_{CC} = 4.5 V
- 3 Ω 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

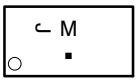
ON Semiconductor®

http://onsemi.com

MARKING DIAGRAMS

UDFN8
MU SUFFIX
CASE 517AJ

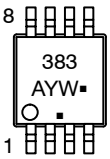
ULLGA8
1.45 x 1.0
CASE 613AA



ULLGA8
1.6 x 1.0
CASE 613AB

ULLGA8
1.95 x 1.0
CASE 613AC

Micro8™
DM SUFFIX
CASE 846A



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.

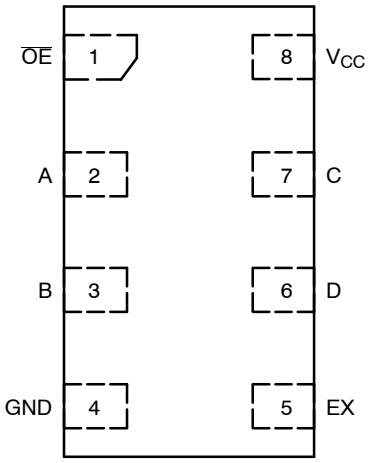


Figure 1. ULLGA8/UDFN8
(Top Thru−View)

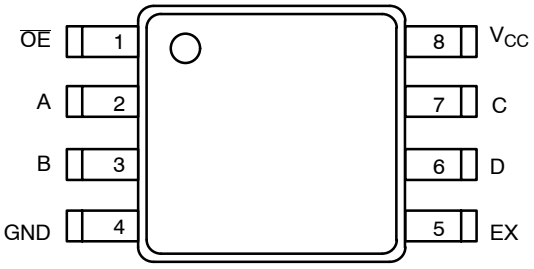


Figure 2. Micro8
(Top View)

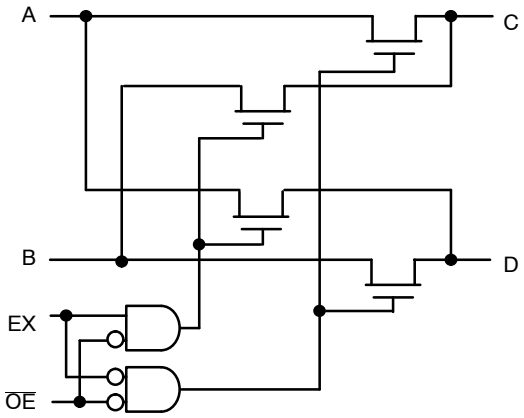


Figure 3. Logic Diagram

FUNCTION TABLE

Input $\overline{OE}$	Input EX	Function
L	L	A = C; B = D
L	H	A = D; B = C
H	X	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		±128	mA
	Continuous Current Through V_{CC} or GND		±150	mA
I_{CC}	DC Supply Current Per Supply Pin		±150	mA
I_{GND}	DC Ground Current per Ground Pin		±150	mA
T_{STG}	Storage Temperature Range		−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
T_J	Junction Temperature Under Bias		150	°C
θ_{JA}	Thermal Resistance	UDFN8 (Note 1) ULLGA8 Micro8	111 455 392	°C/W
P_D	Power Dissipation in Still Air at 85°C	UDFN8 ULLGA8 Micro8	1127 274 319	mW
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	Human Body Mode (Note 2) Machine Model (Note 3) Charged Device Model (Note 4)	> 2000 > 200 N/A	V
$I_{LATCHUP}$	Latchup Performance Above V_{CC} and Below GND at 125 °C (Note 5)		±200	mA

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. 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 / JESD22−A115−A.
4. Tested to JESD22−C101−A.
5. 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	°C
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate	Control Input Switch I/O	0 0	5 DC	nS/V

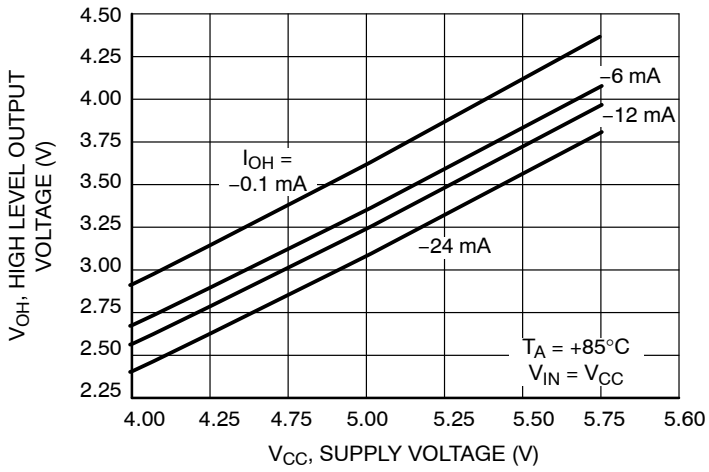
DC ELECTRICAL CHARACTERISTICS

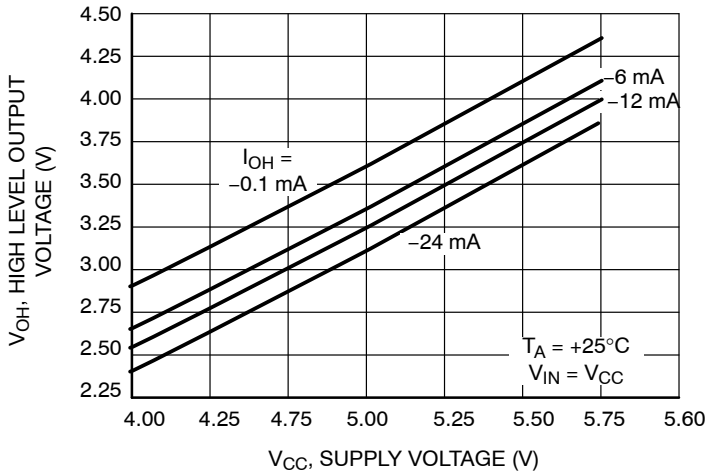
Symbol	Parameter	Conditions	V_{CC} (V)	T_A = 25°C			T_A = −55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
V_{IK}	Clamp Diode Voltage	$I_{I/O}$ = −18 mA	4.5			−1.2		−1.2	V
V_{IH}	High−Level Input Voltage (Control)		4.0 to 5.5	2.0			2.0		V
V_{IL}	Low−Level Input Voltage (Control)		4.0 to 5.5			0.8		0.8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

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Condition	V_{CC} (V)	T_A = 25 °C			T_A = −55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PD}	Propagation Delay, Bus to Bus	See Figure 5	4.0 to 5.5			0.25		0.25	ns
$t_{PD−EX}$	Propagation Delay, EX to Bus	See Figure 5 and Figure 6	4.0 to 5.5			4.5		4.5	ns
t_{EN}	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_{DIS}	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_{IN}	Control Input Capacitance	V_{IN} = 5 or 0 V	5.0		2.5				pF
$C_{IO(ON)}$	Switch On Capacitance	Switch ON	5.0		10				pF
$C_{IO(OFF)}$	Switch Off Capacitance	Switch OFF	5.0		5				pF

TYPICAL DC CHARACTERISTICS





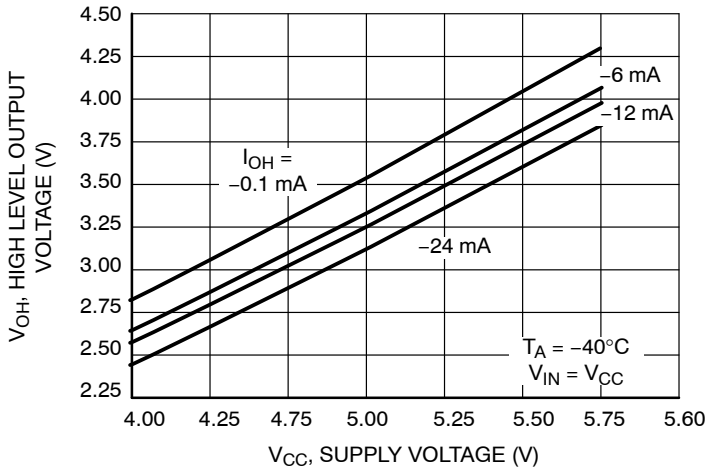
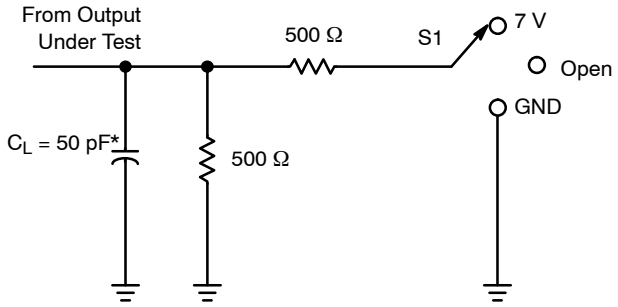


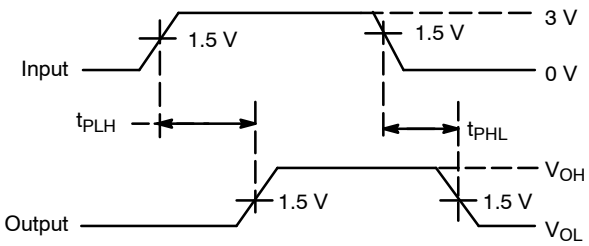
Figure 4. Output Voltage High vs Supply Voltage

AC LOADING AND WAVEFORMS

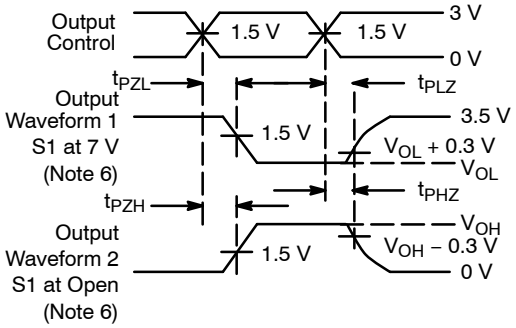


Test	S1
t_{PD}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

*C_L includes probes and jig capacitance.



Voltage Waveforms
Propagation Delay Times



Voltage Waveforms
Enable and Disable Times

6. 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
7. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
8. The outputs are measured one at a time, with one transition per measurement.
9. t_{PLZ} and t_{PHZ} are the same as t_{DIS}.
10. t_{PZL} and t_{PZH} are the same as t_{EN}.
11. t_{PHL} and t_{PLH} are the same as t_{PD}.

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

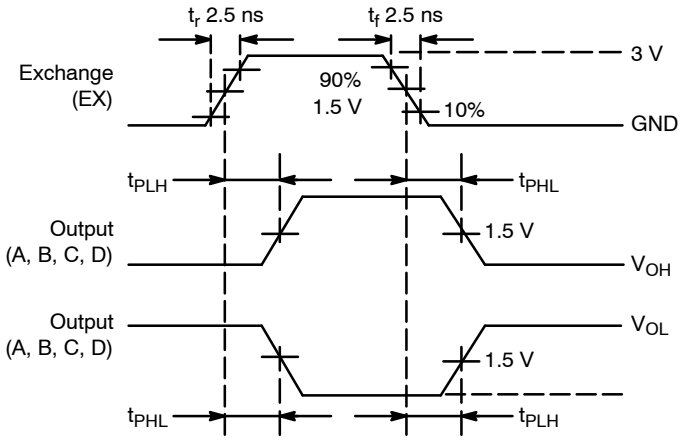


Figure 6. t_{PD-EX} Waveforms

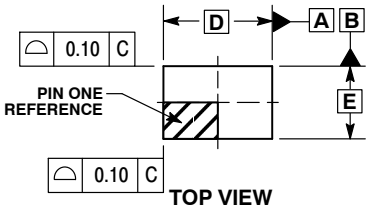
ORDERING INFORMATION

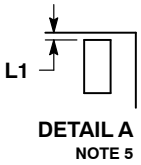
Device	Package	Shipping†
7WB383MUTAG	UDFN8 (Pb−Free)	3000 / Tape & Reel
7WB383AMX1TCG	ULLGA8 − 0.5 mm Pitch (Pb−Free)	3000 / Tape & Reel
7WB383BMX1TCG	ULLGA8 − 0.4 mm Pitch (Pb−Free)	3000 / Tape & Reel
7WB383CMX1TCG	ULLGA8 − 0.35 mm Pitch (Pb−Free)	3000 / Tape & Reel
7WB383DMR2G	Micro8 (Pb−Free)	4000 / Tape & Reel

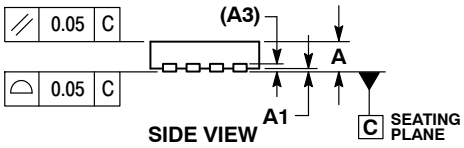
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

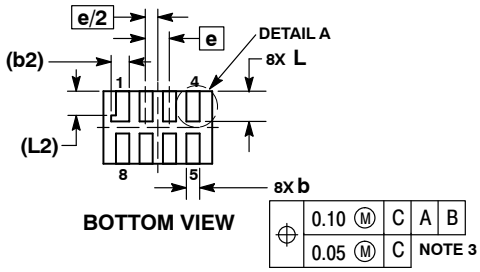
PACKAGE DIMENSIONS

UDFN8 1.8 x 1.2, 0.4P
CASE 517AJ−01
ISSUE O





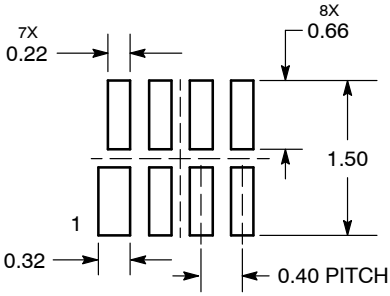




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL TIP.
4. MOLD FLASH ALLOWED ON TERMINALS ALONG EDGE OF PACKAGE. FLASH MAY NOT EXCEED 0.03 ONTO BOTTOM SURFACE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

	MILLIMETERS	
DIM	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

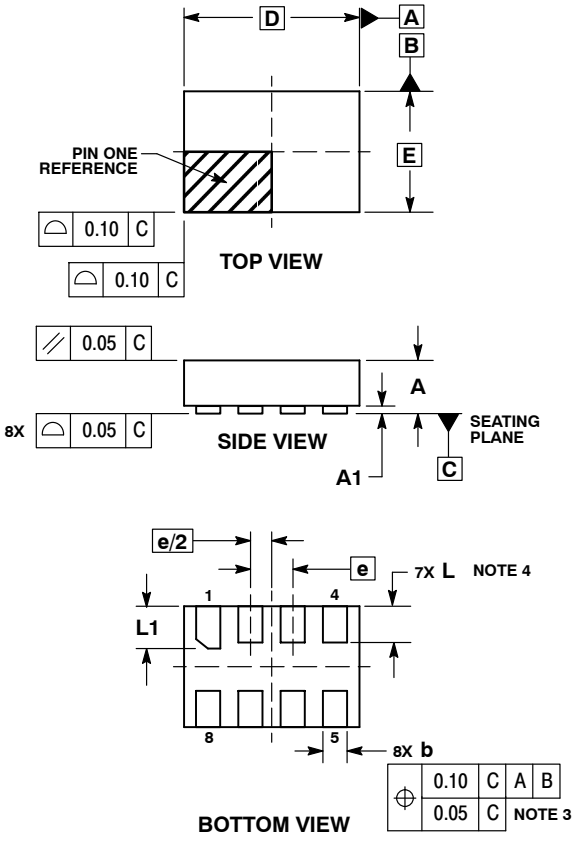


DIMENSIONS: MILLIMETERS

*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

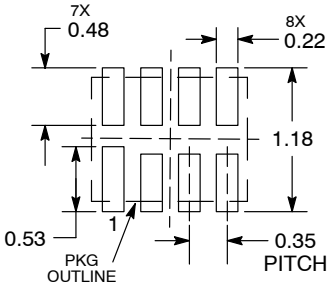
ULLGA8 1.45x1.0, 0.35P
CASE 613AA−01
ISSUE A



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 THE TERMINAL TIP.
4. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE PACKAGE IS ALLOWED.

	MILLIMETERS	
DIM	MIN	MAX
A	---	0.40
A1	0.00	0.05
b	0.15	0.25
D	1.45 BSC	
E	1.00 BSC	
e	0.35 BSC	
L	0.25	0.35
L1	0.30	0.40

MOUNTING FOOTPRINT SOLDERMASK DEFINED*



DIMENSIONS: MILLIMETERS

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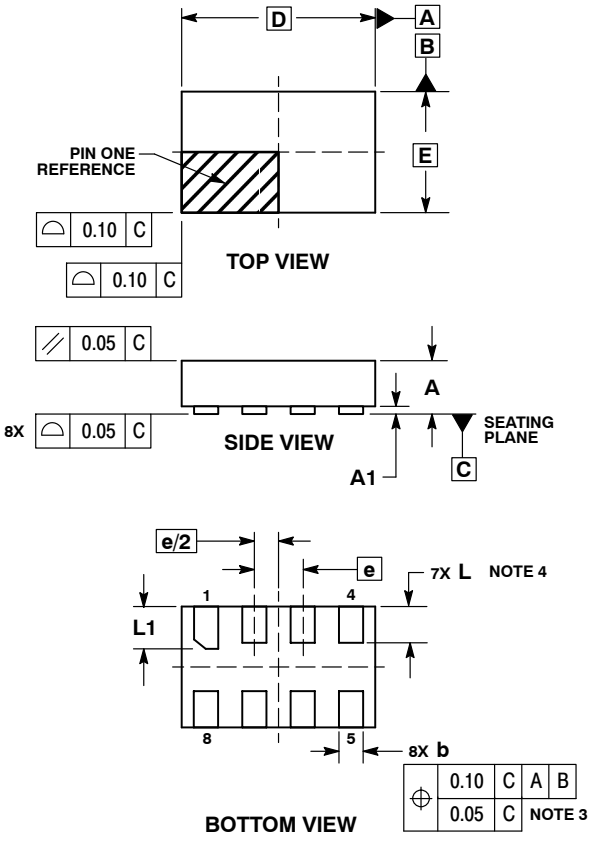
PACKAGE DIMENSIONS

ULLGA8 1.6x1.0, 0.4P
CASE 613AB−01
ISSUE A



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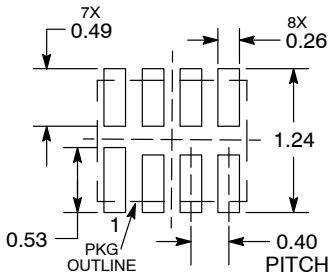
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
4. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE PACKAGE IS ALLOWED.

	MILLIMETERS	
DIM	MIN	MAX
A	−−−	0.40
A1	0.00	0.05
b	0.15	0.25
D	1.60 BSC	
E	1.00 BSC	
e	0.40 BSC	
L	0.25	0.35
L1	0.30	0.40

MOUNTING FOOTPRINT SOLDERMASK DEFINED*



DIMENSIONS: MILLIMETERS

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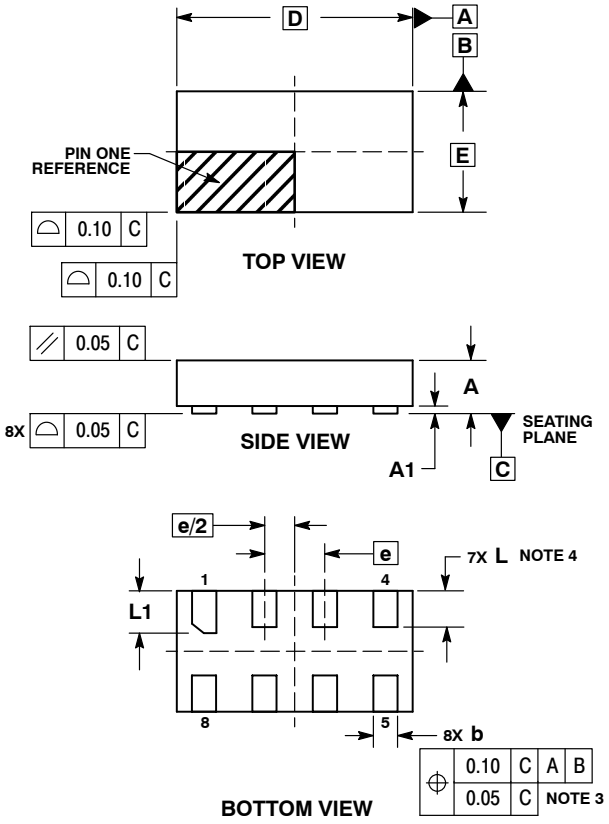
PACKAGE DIMENSIONS

ULLGA8 1.95x1.0, 0.5P
CASE 613AC−01
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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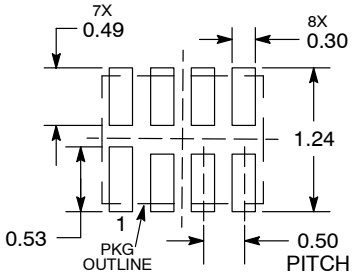
4. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE PACKAGE IS ALLOWED.

	MILLIMETERS	
DIM	MIN	MAX
A	---	0.40
A1	0.00	0.05
b	0.15	0.25
D	1.95 BSC	
E	1.00 BSC	
e	0.50 BSC	
L	0.25	0.35
L1	0.30	0.40

MOUNTING FOOTPRINT SOLDERMASK DEFINED*



DIMENSIONS: MILLIMETERS

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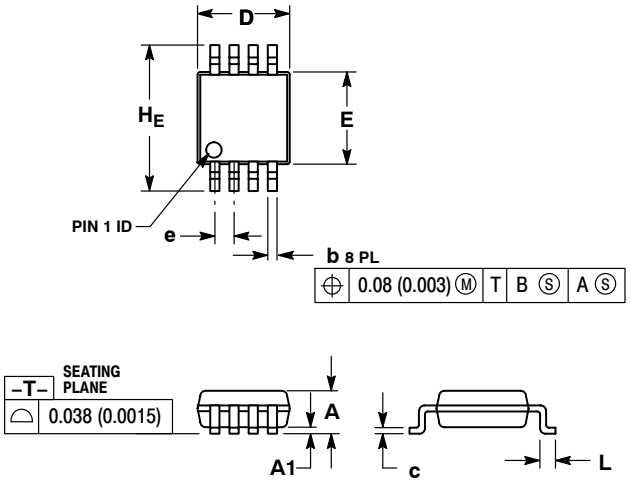
PACKAGE DIMENSIONS

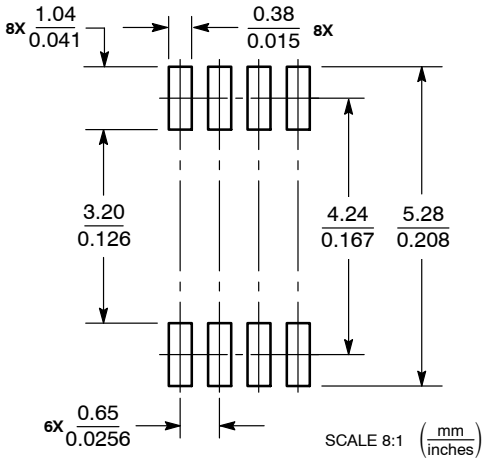
Micro8™
CASE 846A–02
ISSUE H



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, PROTRUSIONS 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. 846A–01 OBSOLETE, NEW STANDARD 846A–02.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	––	––	1.10	––	––	0.043
A1	0.05	0.08	0.15	0.002	0.003	0.006
b	0.25	0.33	0.40	0.010	0.013	0.016
c	0.13	0.18	0.23	0.005	0.007	0.009
D	2.90	3.00	3.10	0.114	0.118	0.122
E	2.90	3.00	3.10	0.114	0.118	0.122
e	0.65 BSC			0.026 BSC		
L	0.40	0.55	0.70	0.016	0.021	0.028
H_E	4.75	4.90	5.05	0.187	0.193	0.199

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.

Micro8 is a trademark of International Rectifier.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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