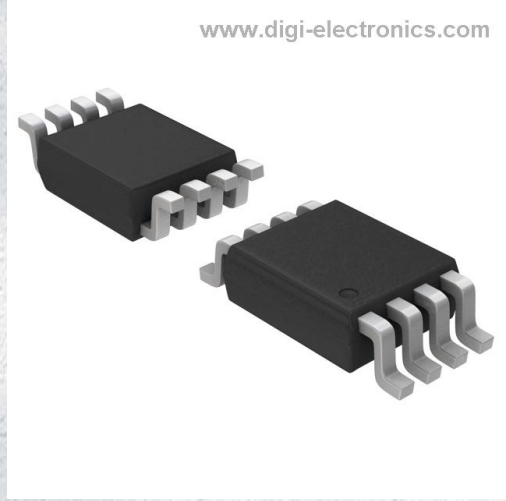
NLV37WZ17USG Datasheet



DiGi Electronics Part Number	NLV37WZ17USG-DG
Manufacturer	onsemi
Manufacturer Product Number	NLV37WZ17USG
Description	IC BUFFER NON-INVERT 5.5V US8
Detailed Description	Buffer, Non-Inverting 3 Element 1 Bit per Element Push-Pull Output US8

https://www.DiGi-Electronics.com

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
NLV37WZ17USG	onsemi
Series:	Product Status:
37WZ	Obsolete
Logic Type:	Number of Elements:
Buffer, Non-Inverting	3
Number of Bits per Element:	Input Type:
1	Schmitt Trigger
Output Type:	Current - Output High, Low:
Push-Pull	32mA, 32mA
Voltage - Supply:	Operating Temperature:
2.3V ~ 5.5V	-55°C ~ 125°C (TA)
Grade:	Qualification:
Automotive	AEC-Q100
Mounting Type:	Package / Case:
Surface Mount	8-VFSOP (0.091", 2.30mm Width)
Supplier Device Package:	Base Product Number:
US8	37WZ17

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	

onsemi

DATA SHEET
www.onsemi.com

Triple Noninverting Schmitt-Trigger Buffer

NL37WZ17

The NL37WZ17 is a high performance triple buffer with Schmitt−Trigger inputs operating from a 1.65 V to 5.5 V supply.

Features

- Designed for 1.65 V to 5.5 V V_{CC} Operation
- 3.2 ns t_{PD} at V_{CC} = 5 V (Typ)
- Inputs/Outputs Overvoltage Tolerant up to 5.5 V
- I_{OFF} Supports Partial Power Down Protection
- Source/Sink 24 mA at 3.0 V
- Available in US8, UDFN8 and UQFN8 Packages
- Chip Complexity < 100 FETs
- −Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q100 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

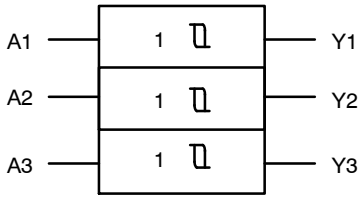
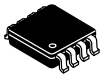
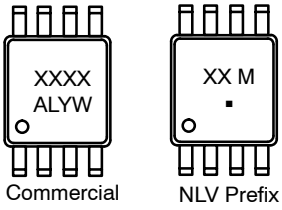


Figure 1. Logic Symbol

MARKING DIAGRAMS

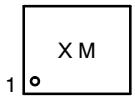


US8
US SUFFIX
CASE 493

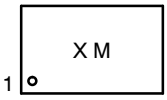


Commercial NLV Prefix

UDFN8, 1.45x1.0
MU3 SUFFIX
CASE 517BZ

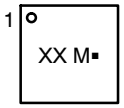


UDFN8, 1.95x1.0
MU1 SUFFIX
CASE 517CA



UQFN8, 1.4x1.2
MQ2 SUFFIX
CASE 523AS

UQFN8, 1.6x1.6
MQ1 SUFFIX
CASE 523AN



X, XX, XXXX	= Specific Device Code
A	= Assembly Location
L	= Lot Code
Y	= Year Code
W	= Week Code
M	= Date Code
▪	= Pb−Free Package

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 6 of this data sheet.

NL37WZ17

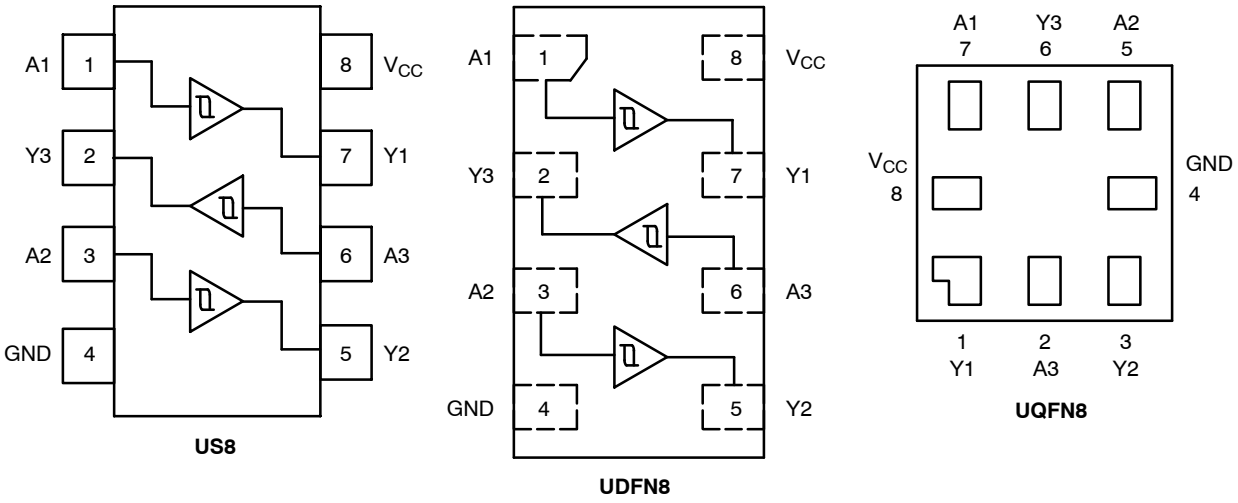


Figure 2. Pinout

PIN ASSIGNMENT

Pin	US8 / UDFN8	UQFN8
1	A1	Y1
2	Y3	A3
3	A2	Y2
4	GND	GND
5	Y2	A2
6	A3	Y3
7	Y1	A1
8	V_{CC}	V_{CC}

FUNCTION TABLE

A Input	Y Output
L	L
H	H

MAXIMUM RATINGS

Symbol	Characteristics		Value	Unit
V_{CC}	DC Supply Voltage		−0.5 to +6.5	V
V_{IN}	DC Input Voltage		−0.5 to +6.5	V
V_{OUT}	DC Output Voltage	Active−Mode (High or Low State) Tri−State Mode (Note 1) Power−Down Mode (V_{CC} = 0 V)	−0.5 to V_{CC} + 0.5 −0.5 to +6.5 −0.5 to +6.5	V
I_{IK}	DC Input Diode Current	V_{IN} < GND	−50	mA
I_{OK}	DC Output Diode Current	V_{OUT} < GND	−50	mA
I_{OUT}	DC Output Source/Sink Current		±50	mA
I_{CC} or I_{GND}	DC Supply Current per Supply Pin or Ground Pin		±100	mA
T_{STG}	Storage Temperature Range		−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 secs		260	°C
T_J	Junction Temperature Under Bias		+150	°C
θ_{JA}	Thermal Resistance (Note 2)	US8 UQFN8 UDFN	250 210 231	°C/W
P_D	Power Dissipation in Still Air	US8 UQFN8 UDFN8	500 595 541	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 (Note 3)	Human Body Model Charged Device Model	2000 1000	V
$I_{Latchup}$	Latchup Performance (Note 4)		±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. Applicable to devices with outputs that may be tri−stated.
2. Measured with minimum pad spacing on an FR4 board, using 10mm−by−1inch, 2 ounce copper trace no air flow per JESD51−7.
3. HBM tested to ANSI/ESDA/JEDEC JS−001−2017. CDM tested to EIA/JESD22−C101−F. JEDEC recommends that ESD qualification to EIA/JESD22−A115−A (Machine Model) be discontinued per JEDEC/JEP172A.
4. Tested to EIA/JESD78 Class II.

RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		1.65	5.5	V
V_{IN}	DC Input Voltage		0	5.5	V
V_{OUT}	DC Output Voltage	Active−Mode (High or Low State) Tri−State Mode (Note 1) Power−Down Mode (V_{CC} = 0 V)	0 0 0	V_{CC} 5.5 5.5	V
T_A	Operating Temperature Range		−55	+125	°C
t_r , t_f	Input Rise and Fall Time	V_{CC} = 1.65 V to 1.95 V V_{CC} = 2.3 V to 2.7 V V_{CC} = 3.0 V to 3.6 V V_{CC} = 4.5 V to 5.5 V	0 0 0 0	No Limit No Limit No Limit No Limit	ns/V

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	Condition	V_{CC} (V)	T_A = 25°C			−55°C ≤ T_A ≤ 125°C		Units
				Min	Typ	Max	Min	Max	
V_{T+}	Positive Input Threshold Voltage		1.65	–	1.0	1.4	–	1.4	V
			2.3	–	1.5	1.8	–	1.8	
			2.7	–	1.7	2.0	–	2.0	
			3.0	–	1.9	2.2	–	2.2	
			4.5	–	2.7	3.1	–	3.1	
			5.5	–	3.3	3.6	–	3.6	
V_{T-}	Negative Input Threshold Voltage		1.65	0.2	0.5	–	0.2	–	V
			2.3	0.4	0.75	–	0.4	–	
			2.7	0.5	0.87	–	0.5	–	
			3.0	0.6	1.0	–	0.6	–	
			4.5	1.0	1.5	–	1.0	–	
			5.5	1.2	1.9	–	1.2	–	
V_H	Input Hysteresis Voltage		1.65 2.3 2.7 3.0 4.5 5.5	0.15 0.25 0.3 0.4 0.6 0.7	0.52 0.75 0.83 0.93 1.2 1.4	1.0 1.1 1.15 1.2 1.5 1.7	0.15 0.25 0.3 0.4 0.6 0.7	1.0 1.1 1.15 1.2 1.5 1.7	V
V_{OH}	High−Level Output Voltage	V_{IN} = V_{IH} or V_{IL} I_{OH} = −100 μA I_{OH} = −4 mA I_{OH} = −8 mA I_{OH} = −12 mA I_{OH} = −16 mA I_{OH} = −24 mA I_{OH} = −32 mA	 1.65 to 5.5 1.65 2.3 2.7 3.0 3.0 4.5	 V_{CC} − 0.1 1.29 1.9 2.2 2.4 2.3 3.8	 V_{CC} 1.4 2.1 2.4 2.7 2.5 4.0	 – – – – – – –	 V_{CC} − 0.1 1.29 1.9 2.2 2.4 2.3 3.8	 – – – – – – –	V
V_{OL}	Low−Level Output Voltage	V_{IN} = V_{IH} or V_{IL} I_{OL} = 100 μA I_{OL} = 4 mA I_{OL} = 8 mA I_{OL} = 12 mA I_{OL} = 16 mA I_{OL} = 24 mA I_{OL} = 32 mA	 1.65 to 5.5 1.65 2.3 2.7 3.0 3.0 4.5	 – – – – – – –	 0.08 0.2 0.22 0.28 0.38 0.42	 0.1 0.24 0.3 0.4 0.4 0.55 0.55	 – – – – – – –	 0.1 0.24 0.3 0.4 0.4 0.55 0.55	V
I_{IN}	Input Leakage Current	V_{IN} = 5.5 V or GND	1.65 to 5.5	–	–	±0.1	–	±1.0	μA
I_{OFF}	Power Off Leakage Current	V_{IN} = 5.5 V or V_{OUT} = 5.5 V	0	–	–	1.0	–	10	μA
I_{CC}	Quiescent Supply Current	V_{IN} = V_{CC} or GND	5.5	–	–	1.0	–	10	μA

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.

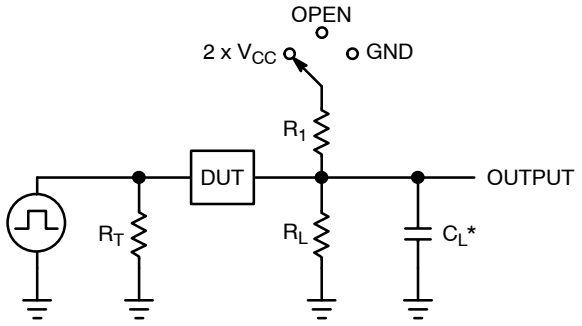
AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	Test Conditions	T_A = 25°C			T_A = −55 to 125°C		Units
				Min	Typ	Max	Min	Max	
t_{PLH}, t_{PHL}	Propagation Delay	1.85 ± 0.15	C_L = 15 pF R_D = 1 MΩ R_1 = Open	–	6.8	9.2	–	9.2	ns
		2.5 ± 0.2		–	4.3	7.4	–	8.1	
		3.3 ± 0.3		–	3.3	5.0	–	7.0	
		5.0 ± 0.5		–	2.7	4.1	–	4.5	
		3.3 ± 0.3	C_L = 50 pF, R_D = 500 Ω, R_1 = Open	–	4.0	5.0	–	6.6	
		5.0 ± 0.5		–	3.2	4.9	–	5.4	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Units
C_{IN}	Input Capacitance	V_{CC} = 5.5 V, V_{IN} = 0 V or V_{CC}	2.5	pF
C_{OUT}	Output Capacitance	V_{CC} = 5.5 V, V_{IN} = 0 V or V_{CC}	2.5	pF
C_{PD}	Power Dissipation Capacitance (Note 5)	10 MHz, V_{CC} = 3.3 V, V_{IN} = 0 V or V_{CC} 10 MHz, V_{CC} = 5.5 V, V_{IN} = 0 V or V_{CC}	9 11	pF

5. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}$. C_{PD} is used to determine the no−load dynamic power consumption; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.



C_L includes probe and jig capacitance
R_T is Z_{OUT} of pulse generator (typically 50 Ω)
f = 1 MHz

Figure 3. Test Circuit

Test	Switch Position	C_L, pF	R_L, Ω	R_1, Ω
t_{PLH} / t_{PHL}	Open	See AC Characteristics Table		
t_{PLZ} / t_{PZL}	2 x V_{CC}	50	500	500
t_{PHZ} / t_{PZH}	GND	50	500	500

X = Don't Care

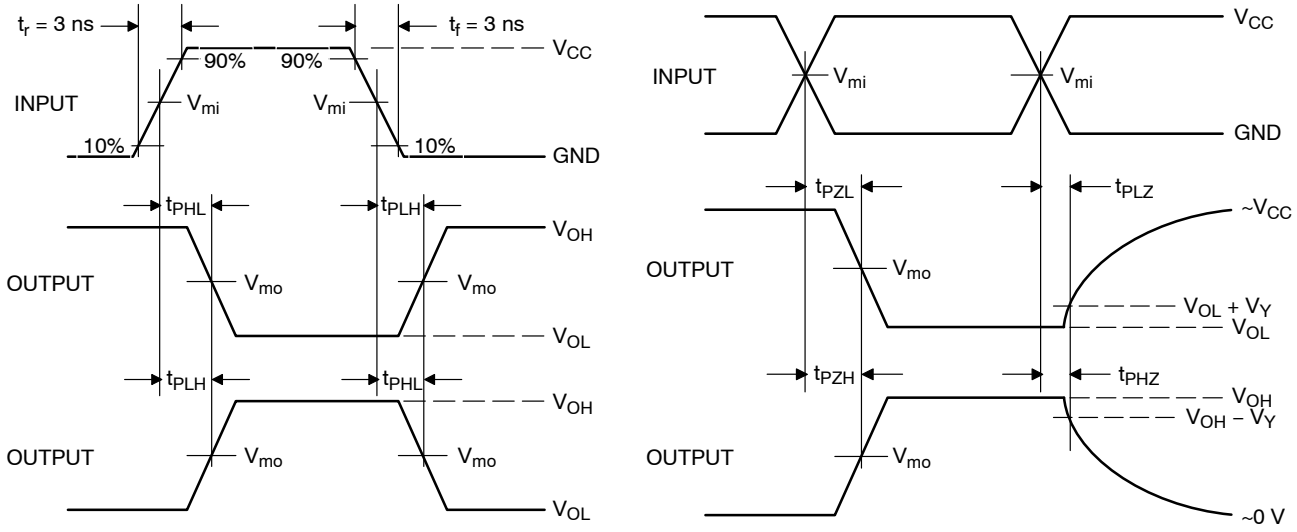


Figure 4. Switching Waveforms

V_{CC}, V	V_{mi}, V	V_{mo}, V		V_Y, V
		t_{PLH}, t_{PHL}	t_{PZL}, t_{PLZ}, t_{PZH}, t_{PHZ}	
1.65 to 1.95	V_{CC}/2	V_{CC}/2	V_{CC}/2	0.15
2.3 to 2.7	V_{CC}/2	V_{CC}/2	V_{CC}/2	0.15
3.0 to 3.6	V_{CC}/2	V_{CC}/2	V_{CC}/2	0.3
4.5 to 5.5	V_{CC}/2	V_{CC}/2	V_{CC}/2	0.3

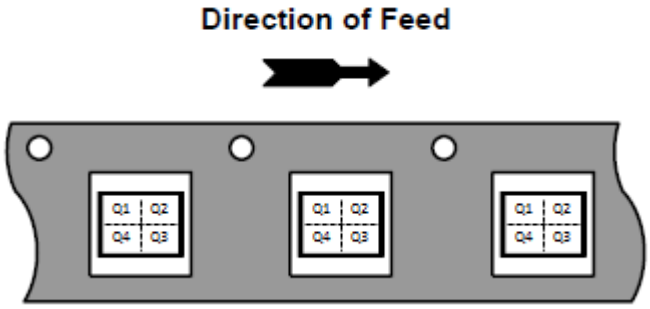
DEVICE ORDERING INFORMATION

Device	Packages	Specific Device Code	Pin 1 Orientation (See below)	Shipping†
NL37WZ17USG	US8	LX	Q4	3000 / Tape & Reel
NL37WZ17USG−Q* (Contact **onsemi**)	US8	LX	Q4	3000 / Tape & Reel
NL37WZ17MQ1TCG (Contact **onsemi**)	UQFN8, 1.6 x 1.6, 0.5P	TBD	TBD	3000 / Tape & Reel
NL37WZ17MU1TCG (Contact **onsemi**)	UDFN8, 1.95 x 1.0, 0.5P	TBD	Q4	3000 / Tape & Reel
NL37WZ17MU3TCG (Contact **onsemi**)	UDFN8, 1.45 x 1.0, 0.35P	2	Q4	3000 / Tape & Reel
NL37WZ17MQ2TCG (Contact **onsemi**)	UQFN8, 1.4 x 1.2, 0.4P	TBD	TBD	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.

*−Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q100 Qualified and PPAP Capable.

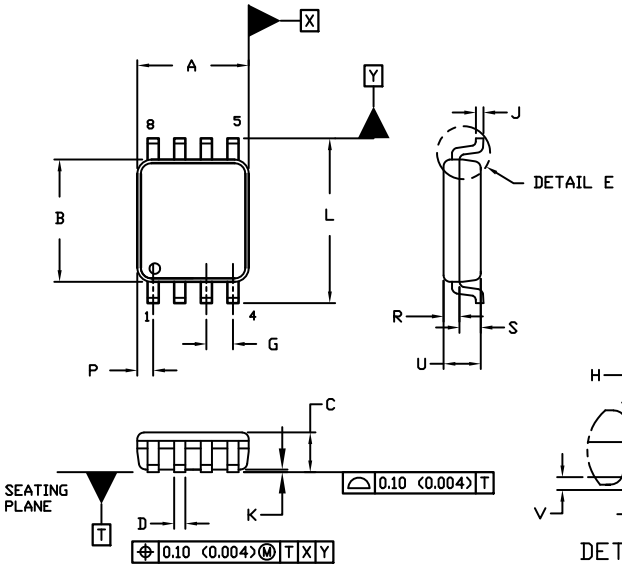
PIN 1 ORIENTATION IN TAPE AND REEL

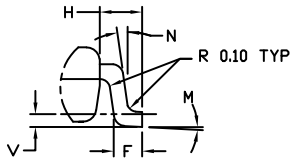


NL37WZ17

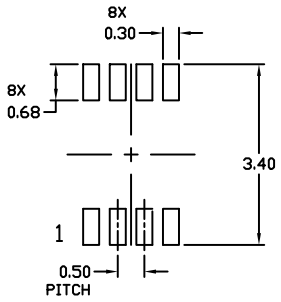
PACKAGE DIMENSIONS

US8
US SUFFIX
CASE 493
ISSUE F





DETAIL E



RECOMMENDED *
MOUNTING 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.

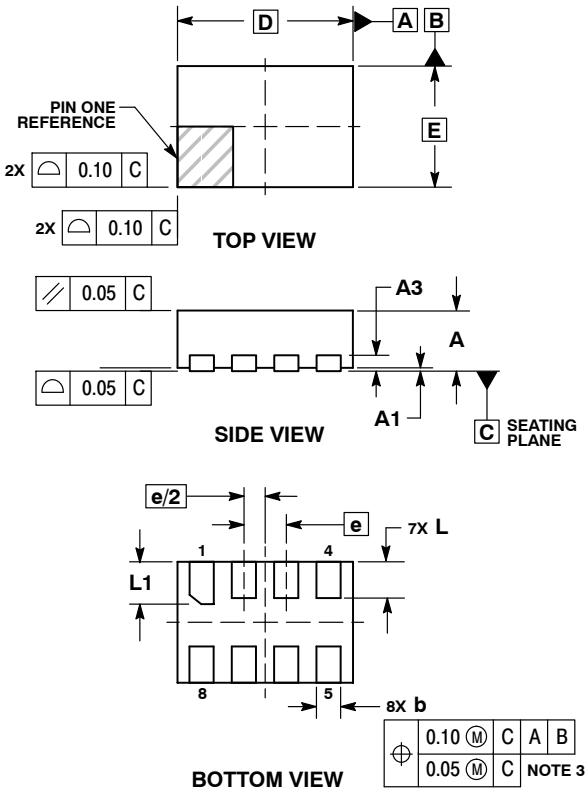
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSION, OR GATE BURR. MOLD FLASH, PROTRUSION, OR GATE BURR SHALL NOT EXCEED 0.14 (0.0055") PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH AND PROTRUSION SHALL NOT EXCEED 0.14 (0.0055") PER SIDE.
5. LEAD FINISH IS SOLDER PLATING WITH THICKNESS OF 0.0076–0.0203 MM (0.003–0.008").
6. ALL TOLERANCE UNLESS OTHERWISE SPECIFIED ±0.0508 MM (0.002").

	MILLIMETERS		INCHES	
DIM	MIN.	MAX.	MIN.	MAX.
A	1.90	2.10	0.075	0.083
B	2.20	2.40	0.087	0.094
C	0.60	0.90	0.024	0.035
D	0.17	0.25	0.007	0.010
F	0.20	0.35	0.008	0.014
G	0.50 BSC		0.020 BSC	
H	0.40 REF		0.016 REF	
J	0.10	0.18	0.004	0.007
K	0.00	0.10	0.000	0.004
L	3.00	3.25	0.118	0.128
M	0°	6°	0°	6°
N	0°	10°	0°	10°
P	0.23	0.34	0.010	0.013
R	0.23	0.33	0.009	0.013
S	0.37	0.47	0.015	0.019
U	0.60	0.80	0.024	0.031
V	0.12 BSC		0.005 BSC	

NL37WZ17

PACKAGE DIMENSIONS

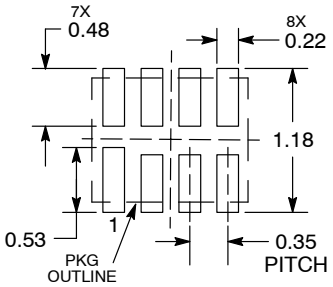
UDFN8, 1.45x1, 0.35P
CASE 517BZ
ISSUE O



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 0.20 MM FROM TERMINAL TIP.
4. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.

	MILLIMETERS	
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
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

RECOMMENDED SOLDERING FOOTPRINT*



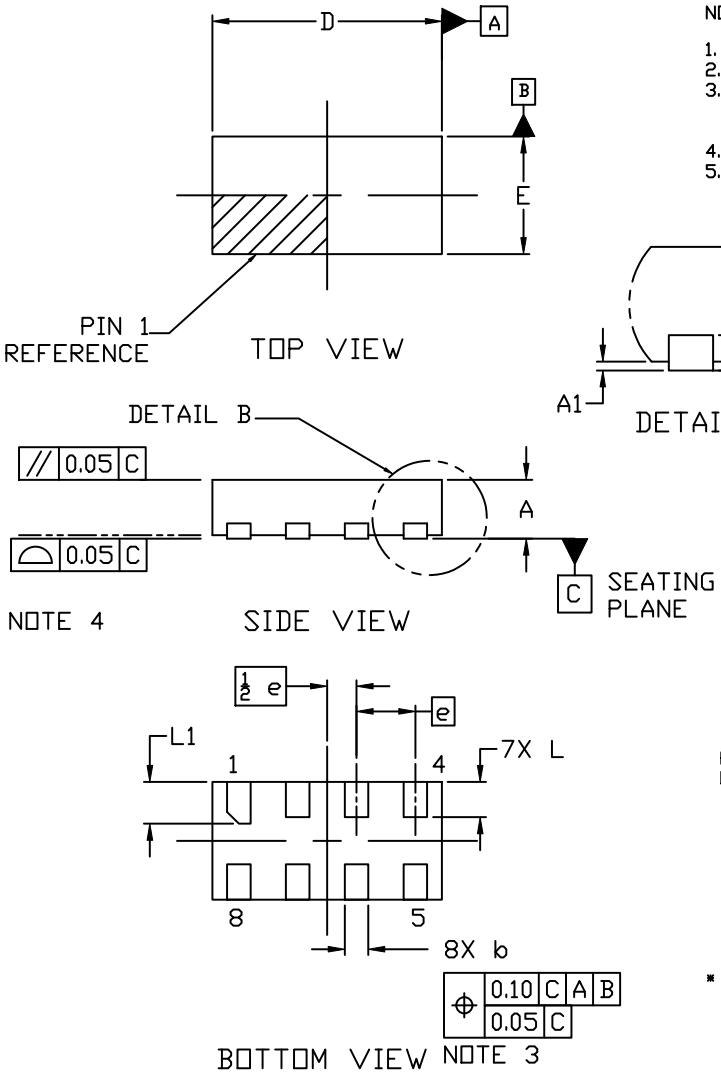
DIMENSIONS: MILLIMETERS

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

NL37WZ17

PACKAGE DIMENSIONS

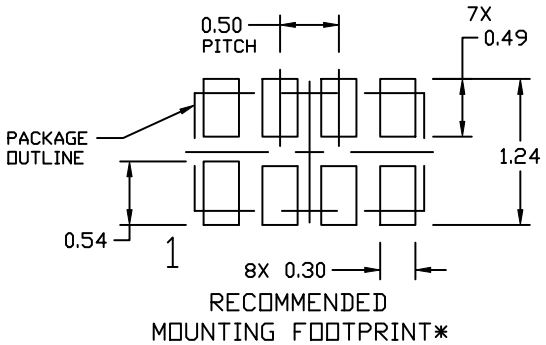
UDFN8, 1.95x1, 0.5P
CASE 517CA
ISSUE A



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.

	MILLIMETERS		
DIM	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

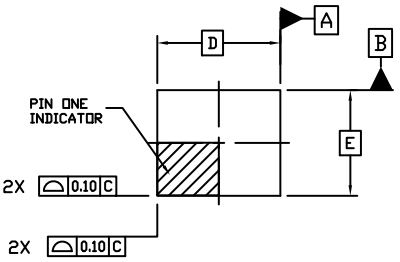


* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

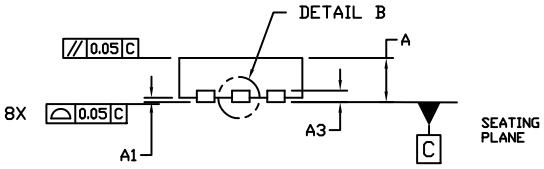
NL37WZ17

PACKAGE DIMENSIONS

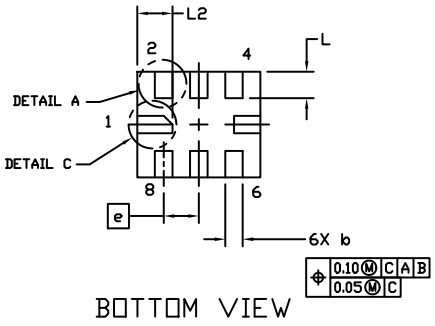
UQFN8, 1.4x1.2, 0.4P
CASE 523AS
ISSUE B



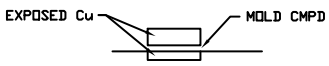
TOP VIEW



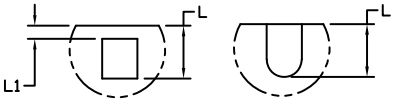
SIDE VIEW



BOTTOM VIEW



DETAIL B
ALTERNATE CONSTRUCTION



DETAIL A
ALTERNATE CONSTRUCTIONS

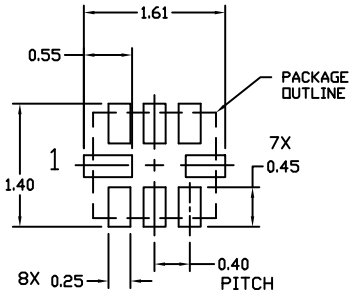
DETAIL C
ALTERNATE CONSTRUCTION

NOTE 4

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 0.25MM FROM THE TERMINAL TIP.
4. REFER TO SPECIFIC DEVICE DATA SHEET FOR PIN 1 NOTCH LOCATION.

	MILLIMETERS	
DIM	MIN.	MAX.
A	0.45	0.55
A1	0.00	0.05
A3	0.13 REF	
b	0.15	0.25
D	1.40 BSC	
E	1.20 BSC	
e	0.40 BSC	
L	0.20	0.40
L1	---	0.15
L2	0.30	0.50



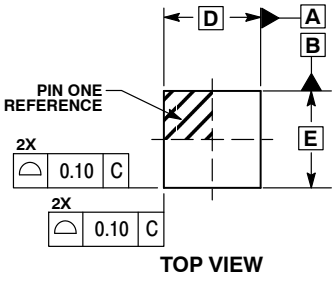
RECOMMENDED
MOUNTING FOOTPRINT *

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

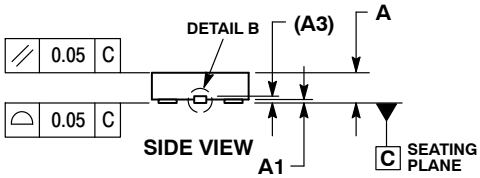
NL37WZ17

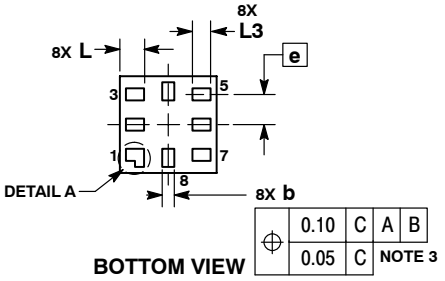
PACKAGE DIMENSIONS

UQFN8, 1.6x1.6, 0.5P
CASE 523AN
ISSUE O

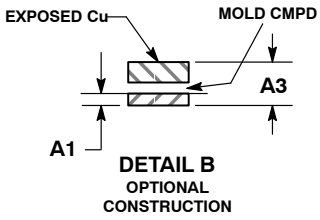


TOP VIEW

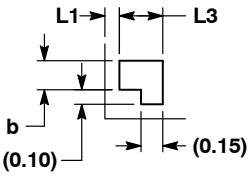




BOTTOM VIEW



DETAIL B
OPTIONAL CONSTRUCTION

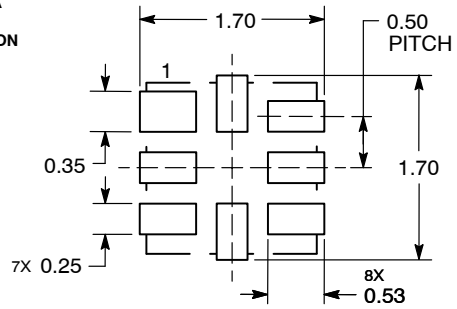


DETAIL A
OPTIONAL CONSTRUCTION

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.

DIM	MILLIMETERS MIN	MAX
A	0.45	0.60
A1	0.00	0.05
A3	0.13 REF	
b	0.15	0.25
D	1.60 BSC	
E	1.60 BSC	
e	0.50 BSC	
L	0.35	0.45
L1	---	0.15
L3	0.25	0.35

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

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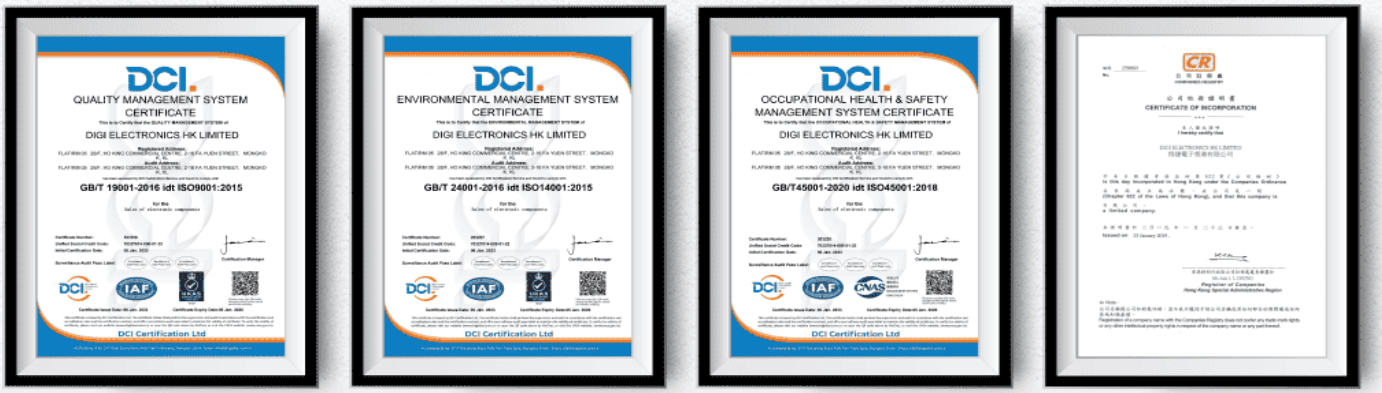

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