

1-to-2 Demultiplexer with 3-State Deselected Output

NL7SZ18

The NL7SZ18 is a high-performance non-inverting 1-to-2 demultiplexer operating from a 1.65 to 5.5 V supply.

Features

- Designed for 1.65 V to 5.5 V V_{CC} Operation
- 2.5 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
- Sink 32 mA at 5.0 V
- Available in SC-88, SC-74 and UDFN6 Packages
- Chip Complexity < 100 FETs
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

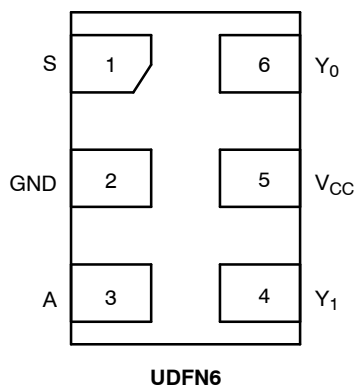
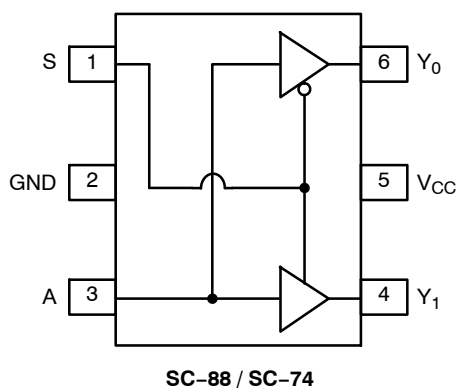


Figure 1. Pinout (Top View)



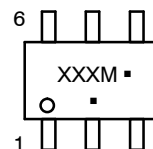
ON Semiconductor®

www.onsemi.com

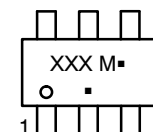
MARKING DIAGRAMS



**SC-88
DF SUFFIX
CASE 419B**



**SC-74
CASE 318F-05**



**UDFN6, 1.2x1.0, 0.4P
CASE 517AA-01**



X, XXX = Specific Device Code
M = Date Code*
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 6 of this data sheet.

NL7SZ18

PIN ASSIGNMENT

Pin	Function
1	S
2	GND
3	A
4	Y ₁
5	V _{CC}
6	Y ₀

FUNCTION TABLE

Input			Output
S	A	Y ₀	Y ₁
L	L	L	Z
L	H	H	Z
H	L	Z	L
H	H	Z	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) SC–88 SC–74 UDFN6	659 555 382	°C/W
P _D	Power Dissipation in Still Air SC–88 SC–74 UDFN6	190 225 327	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.
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.

NL7SZ18

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	0	V_{CC}	
	Active-Mode (High or Low State)	0	5.5	
	Tri-State Mode (Note 1)	0	5.5	
T_A	Operating Temperature Range	-55	+125	°C
	Input Rise and Fall Time	0	20	ns
	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0	20	
	$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0	10	
	$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	0	5	
	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	0	5	

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)	$T_A = 25^\circ\text{C}$			$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$		Units
				Min	Typ	Max	Min	Max	
V_{IH}	High-Level Input Voltage		1.65 to 1.95	$0.65 V_{CC}$	–	–	$0.65 V_{CC}$	–	V
			2.3 to 5.5	$0.70 V_{CC}$	–	–	$0.70 V_{CC}$	–	
V_{IL}	Low-Level Input Voltage		1.65 to 1.95	–	–	$0.35 V_{CC}$	–	$0.35 V_{CC}$	V
			2.3 to 5.5	–	–	$0.30 V_{CC}$	–	$0.30 V_{CC}$	
V_{OH}	High-Level Output Voltage	$V_{IN} = V_{IH}$ or V_{IL}	1.65 to 5.5	$V_{CC} - 0.1$	V_{CC}	–	$V_{CC} - 0.1$	–	V
		$I_{OH} = -100\text{ }\mu\text{A}$	1.65	1.29	1.52	–	1.29	–	
		$I_{OH} = -4\text{ mA}$	2.3	1.9	2.1	–	1.9	–	
		$I_{OH} = -8\text{ mA}$	3	2.4	2.7	–	2.4	–	
		$I_{OH} = -16\text{ mA}$	3	2.3	2.5	–	2.3	–	
		$I_{OH} = -24\text{ mA}$	3	2.3	2.5	–	2.3	–	
		$I_{OH} = -32\text{ mA}$	4.5	3.8	4	–	3.8	–	
V_{OL}	Low-Level Output Voltage	$V_{IN} = V_{IH}$ or V_{IL}	1.65 to 5.5	–	–	0.1	–	0.1	V
		$I_{OH} = 100\text{ }\mu\text{A}$	1.65	–	0.08	0.24	–	0.24	
		$I_{OH} = 3\text{ mA}$	2.3	–	0.12	0.3	–	0.3	
		$I_{OH} = 8\text{ mA}$	3	–	0.24	0.4	–	0.4	
		$I_{OH} = 16\text{ mA}$	3	–	0.26	0.55	–	0.55	
		$I_{OH} = 24\text{ mA}$	3	–	0.26	0.55	–	0.55	
		$I_{OH} = 32\text{ mA}$	4.5	–	0.31	0.55	–	0.55	
I_{IN}	Input Leakage Current	$V_{IN} = 5.5\text{ V or GND}$	1.65 to 5.5	–	–	± 0.1	–	± 1.0	μA
I_{OZ}	3-State Output Leakage Current	$V_{OUT} = 0\text{ V to }5.5\text{ V}$	1.65 to 5.5	–	–	± 0.5	–	± 5.0	μA
I_{OFF}	Power Off Leakage Current	$V_{IN} = 5.5\text{ V or }V_{OUT} = 5.5\text{ V}$	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.

NL7SZ18

AC ELECTRICAL CHARACTERISTICS ($t_R = t_F = 3.0$ ns)

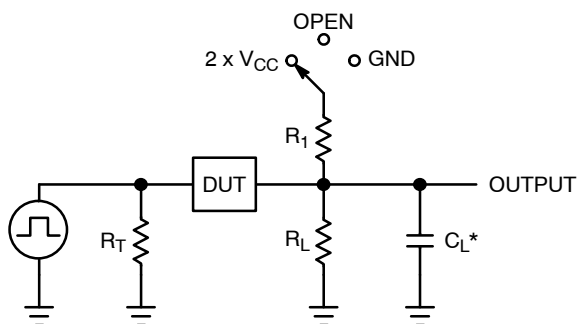
Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25°C			-55°C ≤ T _A ≤ 125°C		Units
				Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay, A to Y (Figures 2 and 3)	R _L = 1 MΩ, C _L = 15 pF	1.65 to 1.95	–	6.3	10.1	–	10.5	ns
		R _L = 1 MΩ, C _L = 15 pF	2.3 to 2.7	–	3.6	5.7	–	6.0	
		R _L = 1 MΩ, C _L = 15 pF	3.0 to 3.6	–	2.7	4.0	–	4.3	
		R _L = 500 Ω, C _L = 50 pF		–	3.4	4.9	–	5.4	
		R _L = 1 MΩ, C _L = 15 pF	4.5 to 5.5	–	2.0	3.1	–	3.3	
		R _L = 500 Ω, C _L = 50 pF		–	2.5	3.9	–	4.2	
t _{PZH} t _{PZL}	Output Enable Time, OE to Y (Figures 2 and 3)		1.65 to 1.95	–	6.9	12	–	12.5	ns
			2.3 to 2.7	–	4.2	6.8	–	7.3	
			3.0 to 3.6	–	3.2	5.0	–	5.5	
			4.5 to 5.5	–	2.5	4.0	–	4.3	
t _{PHZ} t _{PLZ}	Output Disable Time, OE to Y (Figures 2 and 3)		1.65 to 1.95	–	6.0	10	–	10.5	ns
			2.3 to 2.7	–	4.0	6.8	–	7.1	
			3.0 to 3.6	–	2.9	4.9	–	5.3	
			4.5 to 5.5		1.8	3.5	–	3.7	

CAPACITIVE CHARACTERISTICS ($t_R = t_F = 3.0$ ns)

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 10)	10 MHz, V _{CC} = 3.3 V, V _{IN} = 0 V or V _{CC}	9	pF
		10 MHz, V _{CC} = 5.5 V, V _{IN} = 0 V or V _{CC}	11	

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} • V_{CC} • f_{in} + I_{CC}. C_{PD} is used to determine the no-load dynamic power consumption; P_D = C_{PD} • V_{CC}² • f_{in} + I_{CC} • V_{CC}.

NL7SZ18



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

Figure 2. 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}	–	–	–
		See AC Characteristics Table		
t _{PHZ} / t _{PZH}	GND	–	–	–
		See AC Characteristics Table		

X = Don't Care

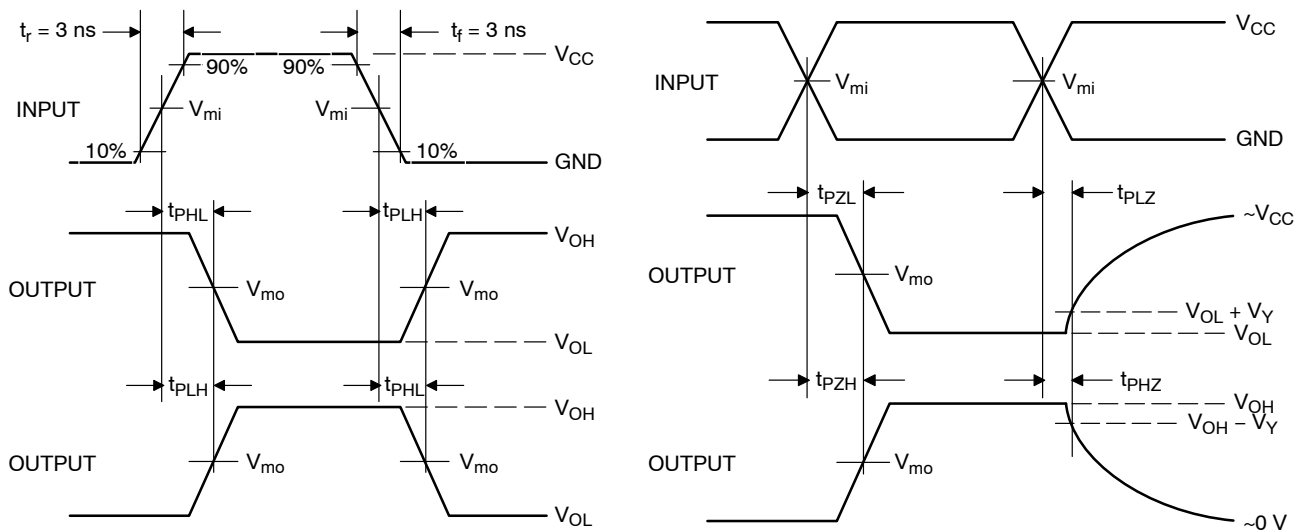


Figure 3. Switching Waveforms

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 _{OH} - V _{OL})/2	V _{CC} /2	0.15
2.3 to 2.7	V _{CC} /2	(V _{OH} - V _{OL})/2	V _{CC} /2	0.15
3.0 to 3.6	V _{CC} /2	(V _{OH} - V _{OL})/2	V _{CC} /2	0.3
4.5 to 5.5	V _{CC} /2	(V _{OH} - V _{OL})/2	V _{CC} /2	0.3

NL7SZ18

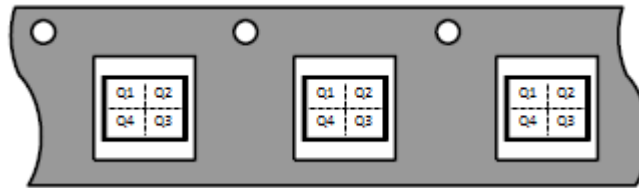
DEVICE ORDERING INFORMATION

Device	Packages	Specific Device Code	Pin 1 Orientation (See below)	Shipping [†]
NL7SZ18DFT2G	SC-88	LD	Q4	3000 / Tape & Reel
NL7SZ18DBVT1G	SC-74	AJ	Q4	3000 / Tape & Reel
NL7SZ18MUR2G	UDFN6, 1.2 x 1.0 x 0.5P	T	Q2	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.

Pin 1 Orientation in Tape and Reel

Direction of Feed



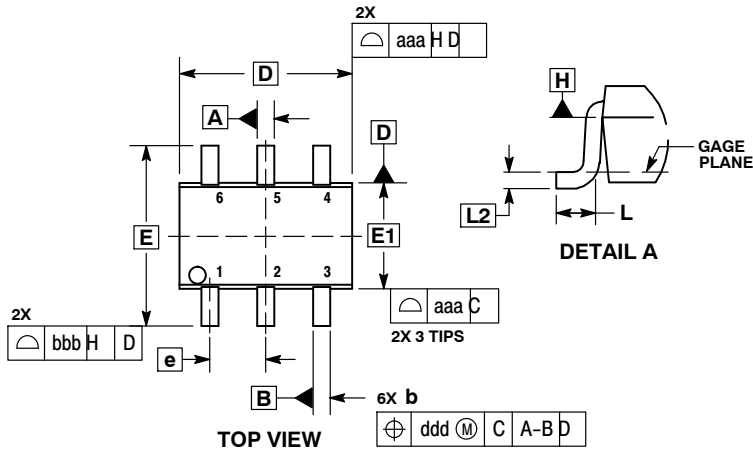
NL7SZ18

PACKAGE DIMENSIONS

SC – 88/SC70 – 6/SOT – 363

CASE 419B – 02

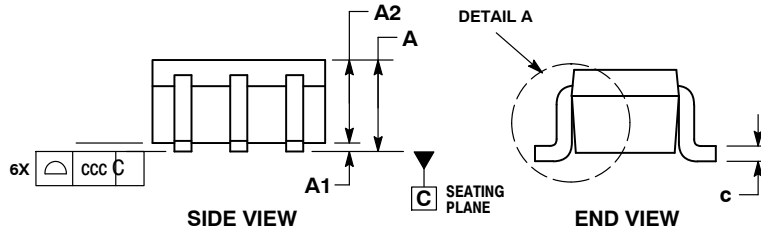
ISSUE Y



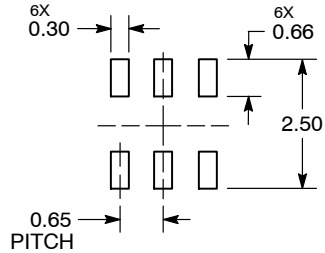
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	—	—	—	—	—	—
A1	0.00	—	0.10	0.000	—	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		



RECOMMENDED SOLDERING FOOTPRINT*

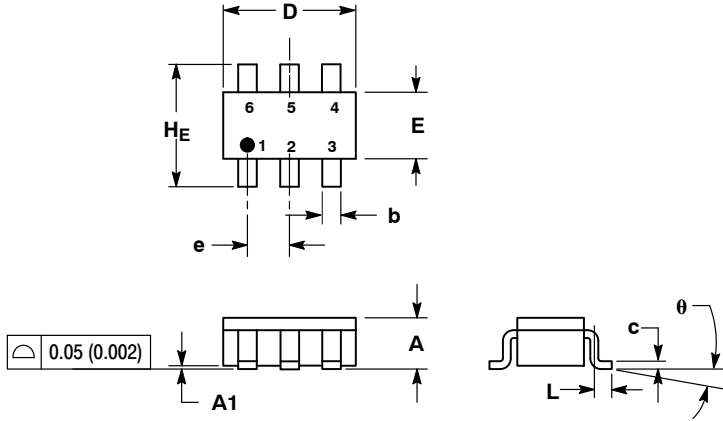


*For additional information on our Pb – Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NL7SZ18

PACKAGE DIMENSIONS

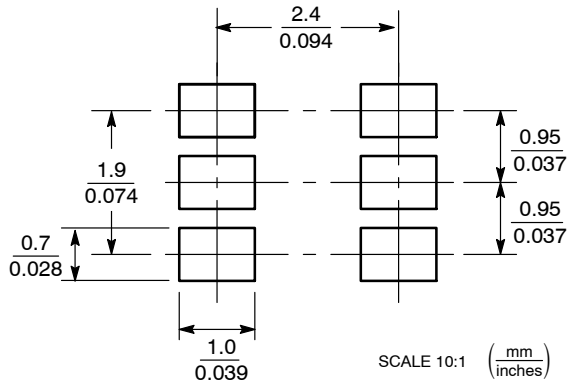
SC-74
CASE 318F-05
ISSUE N



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318F-01, -02, -03, -04 OBSOLETE. NEW STANDARD 318F-05.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.95	0.95	1.05	0.037	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
theta		-			-	

SOLDERING FOOTPRINT*

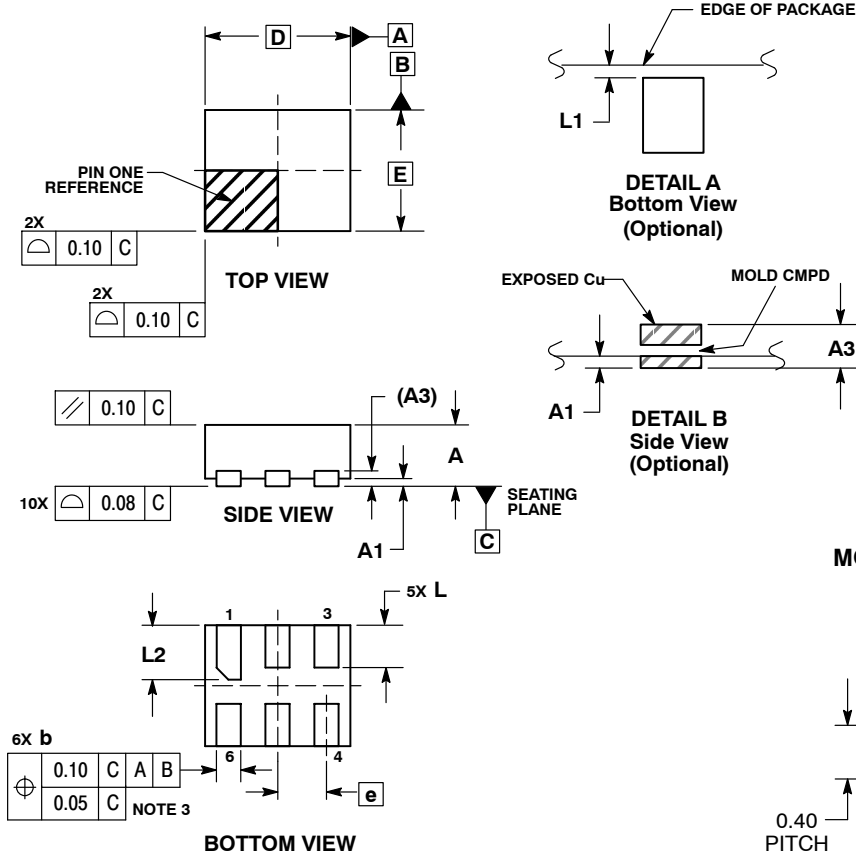


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

NL7SZ18

PACKAGE DIMENSIONS

UDFN6, 1.2x1.0, 0.4P
CASE 517AA-01
ISSUE D

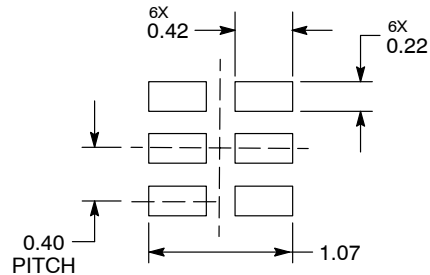


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127 REF	
b	0.15	0.25
D	1.20 BSC	
E	1.00 BSC	
e	0.40 BSC	
L	0.30	0.40
L1	0.00	0.15
L2	0.40	0.50

MOUNTING 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.

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-Marking.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:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative