

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

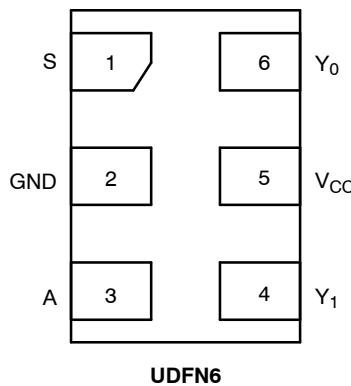
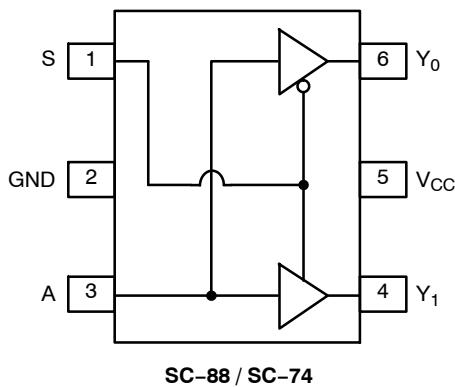
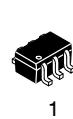


Figure 1. Pinout (Top View)

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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*
■ = 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.

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	°C/W	
P _D	Power Dissipation in Still Air	SC-88 SC-74 UDFN6	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 JED51-7.
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	0 0 0	V_{CC} 5.5 5.5		
T_A	Operating Temperature Range	-55	+125	°C	
t_r, t_f	Input Rise and Fall Time	$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$ $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	0 0 0 0	20 20 10 5	ns

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} $I_{OH} = -100 \mu\text{A}$ $I_{OH} = -4 \text{ mA}$ $I_{OH} = -8 \text{ mA}$ $I_{OH} = -16 \text{ mA}$ $I_{OH} = -24 \text{ mA}$ $I_{OH} = -32 \text{ mA}$	1.65 to 5.5 1.65 2.3 3 3 3 4.5	$V_{CC} - 0.1$ 1.29 1.9 2.1 2.4 2.7 2.3 3.8	V_{CC} 1.52 — — — — — —	— — — — — — — —	$V_{CC} - 0.1$ 1.29 1.9 2.4 2.3 3.8	— — — — — — — —	V
V_{OL}	Low-Level Output Voltage	$V_{IN} = V_{IH}$ or V_{IL} $I_{OH} = 100 \mu\text{A}$ $I_{OH} = 3 \text{ mA}$ $I_{OH} = 8 \text{ mA}$ $I_{OH} = 16 \text{ mA}$ $I_{OH} = 24 \text{ mA}$ $I_{OH} = 32 \text{ mA}$	1.65 to 5.5 1.65 2.3 3 3 3 4.5	— — — — — — —	0.08 0.12 0.24 0.4 0.55 0.55	0.1 0.3 0.24 0.4 0.55 0.55	— — — — — —	0.1 0.24 0.3 0.4 0.55 0.55	V
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 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.

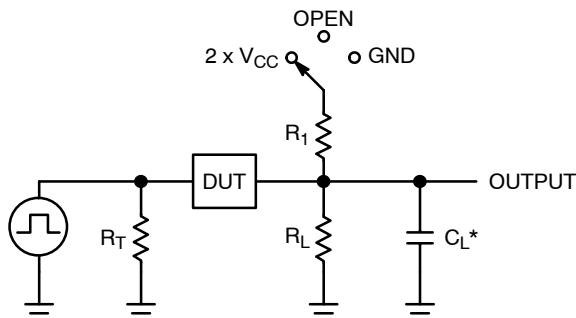
AC ELECTRICAL CHARACTERISTICS

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, S 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, S 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

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 15)	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} • 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}.



C_1 includes probe and i_{ij} capacitance

R_T is Z_{OUT} of pulse generator (typically 50 Ω)

R is 200
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}	$2 \times V_{CC}$	50	500	500
t_{PHZ} / t_{PZH}	GND	50	500	500

X = Don't Care

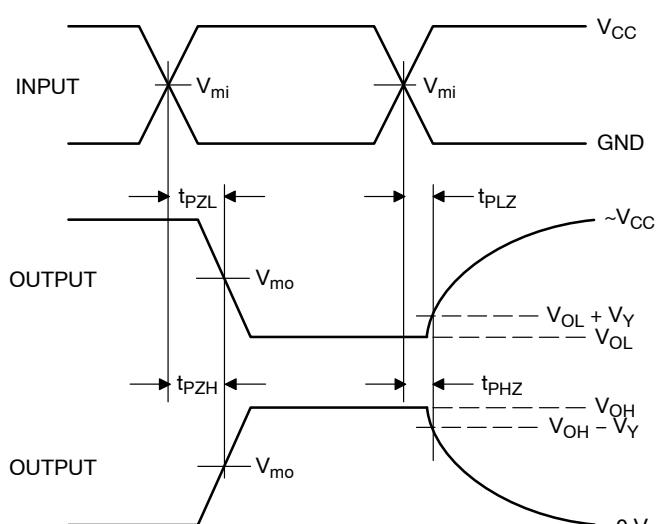
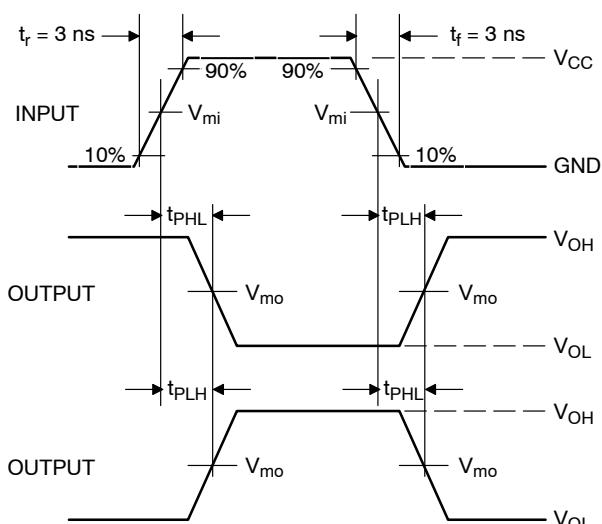


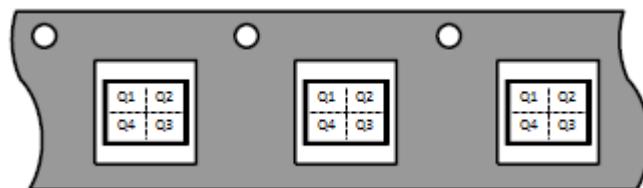
Figure 3. Switching Waveforms

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 _{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 [†]
NL7SZ18DFT2G	SC-88	LD	Q4	3000 / Tape & Reel
NL7SZ18DBVT1G	SC-74	AJ	Q4	3000 / Tape & Reel
NL7SZ18MU2TCG (In Development)	UDFN6, 1.2 x 1.0, 0.4P	T	Q4	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**

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

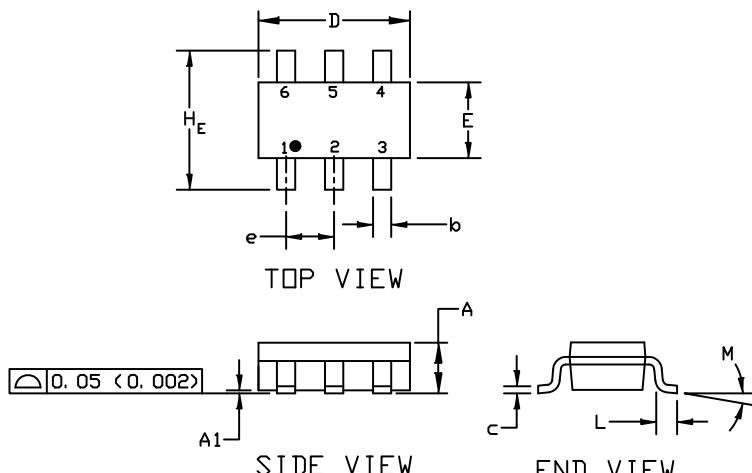
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SCALE 2:1

SC-74
CASE 318F
ISSUE P

DATE 07 OCT 2021

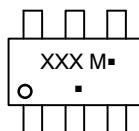


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
2. CONTROLLING DIMENSION: INCHES
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.

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	0.85	0.95	1.05	0.034	0.037	0.041
H _E	2.50	2.75	3.00	0.099	0.108	0.118
L	0.20	0.40	0.60	0.008	0.016	0.024
M	0°	---	10°	0°	---	10°

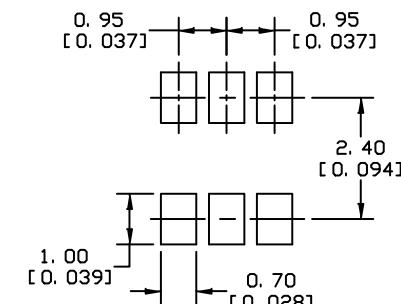
**GENERIC
MARKING DIAGRAM***



XXX = Specific Device Code
M = Date Code
■ = Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.



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

SOLDERING FOOTPRINT

STYLE 1:	STYLE 2:	STYLE 3:	STYLE 4:	STYLE 5:	STYLE 6:
PIN 1. CATHODE	PIN 1. NO CONNECTION	PIN 1. Emitter 1	PIN 1. Collector 2	PIN 1. CHANNEL 1	PIN 1. CATHODE
2. ANODE	2. COLLECTOR	2. BASE 1	2. Emitter 1/Emitter 2	2. ANODE	2. ANODE
3. CATHODE	3. Emitter	3. COLLECTOR 2	3. COLLECTOR 1	3. CHANNEL 2	3. CATHODE
4. CATHODE	4. NO CONNECTION	4. Emitter 2	4. Emitter 3	4. CHANNEL 3	4. CATHODE
5. ANODE	5. COLLECTOR	5. BASE 2	5. BASE 1/BASE 2/Collector 3	5. CATHODE	5. CATHODE
6. CATHODE	6. BASE	6. COLLECTOR 1	6. BASE 3	6. CHANNEL 4	6. CATHODE

STYLE 7:	STYLE 8:	STYLE 9:	STYLE 10:	STYLE 11:
PIN 1. SOURCE 1	PIN 1. Emitter 1	PIN 1. Emitter 2	PIN 1. ANODE/CATHODE	PIN 1. Emitter
2. GATE 1	2. BASE 2	2. BASE 2	2. BASE	2. BASE
3. DRAIN 2	3. COLLECTOR 2	3. COLLECTOR 1	3. Emitter	3. ANODE/CATHODE
4. SOURCE 2	4. Emitter 2	4. Emitter 1	4. COLLECTOR	4. ANODE
5. GATE 2	5. BASE 1	5. BASE 1	5. ANODE	5. CATHODE
6. DRAIN 1	6. COLLECTOR 1	6. COLLECTOR 2	6. CATHODE	6. COLLECTOR

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MECHANICAL CASE OUTLINE

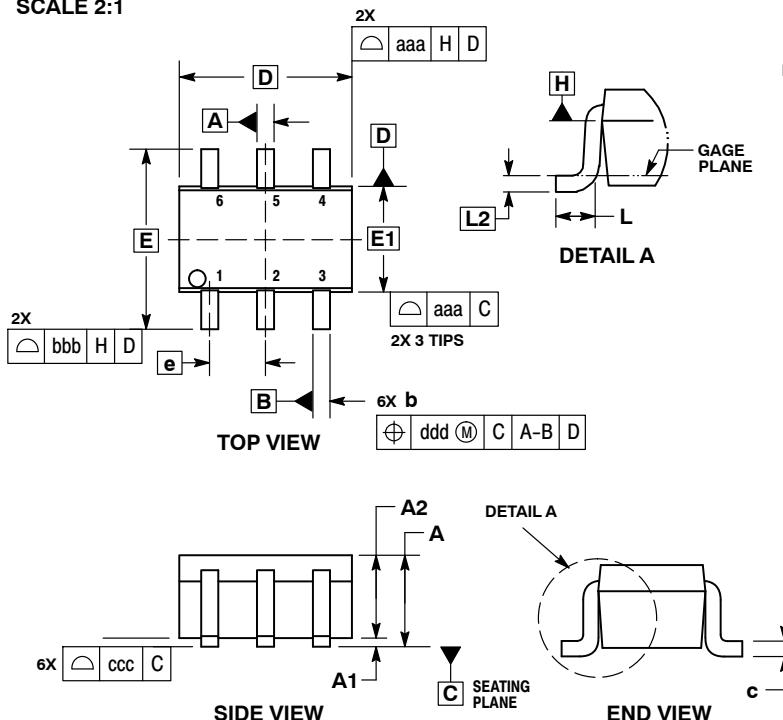
PACKAGE DIMENSIONS

ON Semiconductor®



SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE Y

DATE 11 DEC 2012

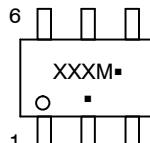


NOTES:

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	---	---	1.10	---	---	0.043
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		

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code

M = Date Code*

▪ = Pb-Free Package

(Note: Microdot may be in either location)

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

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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DESCRIPTION:	SC-88/SC70-6/SOT-363	PAGE 1 OF 2

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SC-88/SC70-6/SOT-363

CASE 419B-02

ISSUE Y

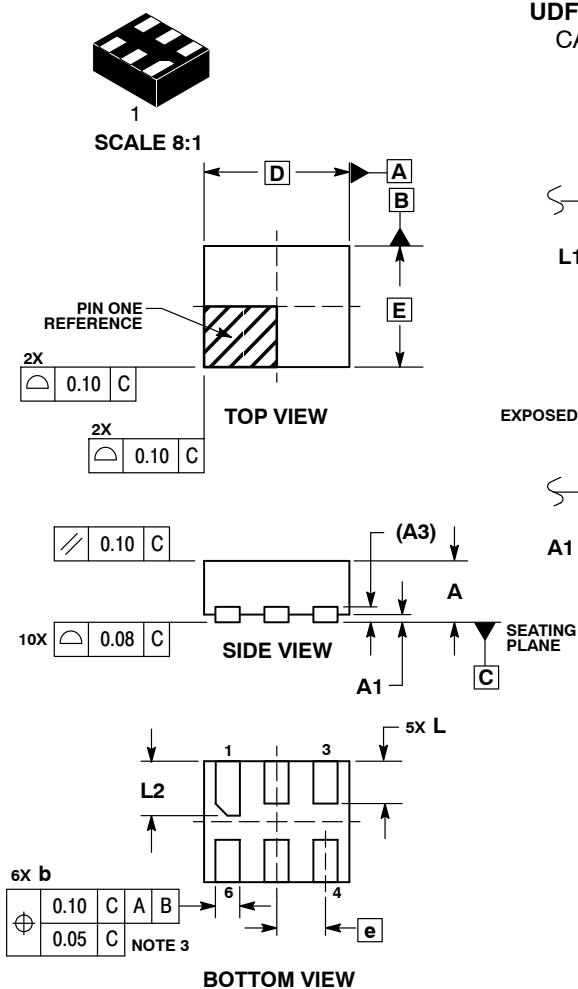
DATE 11 DEC 2012

STYLE 1: PIN 1. Emitter 2 2. Base 2 3. Collector 1 4. Emitter 1 5. Base 1 6. Collector 2	STYLE 2: Cancelled	STYLE 3: Cancelled	STYLE 4: PIN 1. Cathode 2. Cathode 3. Collector 4. Emitter 5. Base 6. Anode	STYLE 5: PIN 1. Anode 2. Anode 3. Collector 4. Emitter 5. Base 6. Cathode	STYLE 6: PIN 1. Anode 2 2. N/C 3. Cathode 1 4. Anode 1 5. N/C 6. Cathode 2
STYLE 7: PIN 1. Source 2 2. Drain 2 3. Gate 1 4. Source 1 5. Drain 1 6. Gate 2	STYLE 8: Cancelled	STYLE 9: PIN 1. Emitter 2 2. Emitter 1 3. Collector 1 4. Base 1 5. Base 2 6. Collector 2	STYLE 10: PIN 1. Source 2 2. Source 1 3. Collector 1 4. Drain 1 5. Drain 2 6. Gate 2	STYLE 11: PIN 1. Cathode 2 2. Cathode 2 3. Anode 1 4. Cathode 1 5. Cathode 1 6. Anode 2	STYLE 12: PIN 1. Anode 2 2. Anode 2 3. Cathode 1 4. Anode 1 5. Anode 1 6. Cathode 2
STYLE 13: PIN 1. Anode 2. N/C 3. Collector 4. Emitter 5. Base 6. Cathode	STYLE 14: PIN 1. VREF 2. GND 3. GND 4. IOUT 5. VEN 6. VCC	STYLE 15: PIN 1. Anode 1 2. Anode 2 3. Anode 3 4. Cathode 3 5. Cathode 2 6. Cathode 1	STYLE 16: PIN 1. Base 1 2. Emitter 2 3. Collector 2 4. Base 2 5. Emitter 1 6. Collector 1	STYLE 17: PIN 1. Base 1 2. Emitter 1 3. Collector 2 4. Base 2 5. Emitter 2 6. Collector 1	STYLE 18: PIN 1. VIN1 2. VCC 3. VOUT2 4. VIN2 5. GND 6. VOUT1
STYLE 19: PIN 1. I OUT 2. GND 3. GND 4. VCC 5. V EN 6. V REF	STYLE 20: PIN 1. Collector 2. Collector 3. Base 4. Emitter 5. Collector 6. Collector	STYLE 21: PIN 1. Anode 1 2. N/C 3. Anode 2 4. Cathode 2 5. N/C 6. Cathode 1	STYLE 22: PIN 1. D1 (i) 2. GND 3. D2 (i) 4. D2 (c) 5. VBUS 6. D1 (c)	STYLE 23: PIN 1. Vn 2. CH1 3. Vp 4. N/C 5. CH2 6. N/C	STYLE 24: PIN 1. Cathode 2. Anode 3. Cathode 4. Cathode 5. Cathode 6. Cathode
STYLE 25: PIN 1. Base 1 2. Cathode 3. Collector 2 4. Base 2 5. Emitter 6. Collector 1	STYLE 26: PIN 1. Source 1 2. Gate 1 3. Drain 2 4. Source 2 5. Gate 2 6. Drain 1	STYLE 27: PIN 1. Base 2 2. Base 1 3. Collector 1 4. Emitter 1 5. Emitter 2 6. Collector 2	STYLE 28: PIN 1. Drain 2. Drain 3. Gate 4. Source 5. Drain 6. Drain	STYLE 29: PIN 1. Anode 2. Anode 3. Collector 4. Emitter 5. Base/Anode 6. Cathode	STYLE 30: PIN 1. Source 1 2. Drain 2 3. Drain 2 4. Source 2 5. Gate 1 6. Drain 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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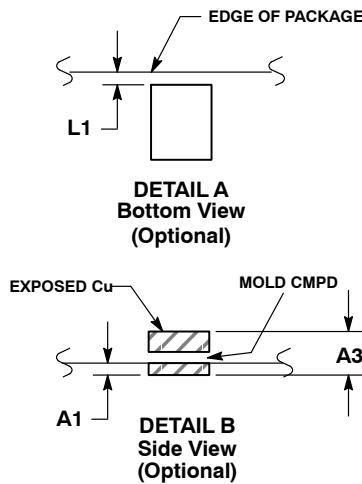


UDFN6, 1.2x1.0, 0.4P
CASE 517AA-01
ISSUE D

DATE 03 SEP 2010

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.

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



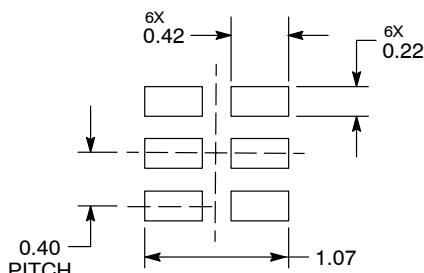
**GENERIC
MARKING DIAGRAM***



X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present.

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.

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