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Bus Buffer with 3-State Output

The NL17SG126 MiniGate[™] is an advanced high–speed CMOS Bus Buffer with 3–State Output in ultra–small footprint.

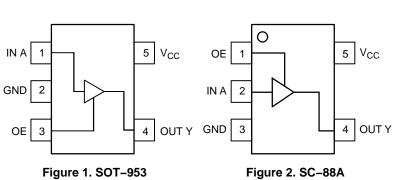
The NL17SG126 input structures provides protection when voltages up to 4.6 V are applied.

Features

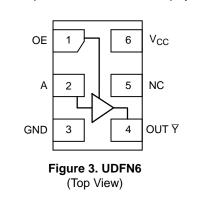
- Wide Operating V_{CC} Range: 0.9 V to 3.6 V
- High Speed: $t_{PD} = 2.3$ ns (Typ) at $V_{CC} = 3.0$ V, $C_L = 15$ pF
- Low Power Dissipation: $I_{CC} = 0.5 \ \mu A$ (Max) at $T_A = 25^{\circ}C$
- 4.6 V Overvoltage Tolerant (OVT) Input Pins
- Ultra-Small Packages

(Top Thru View)

• These are Pb–Free and Halide–Free Devices



(Top View)



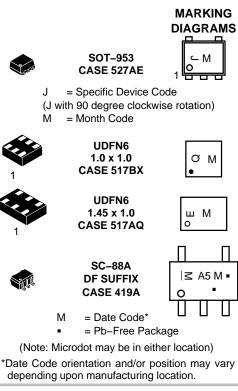






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PIN ASSIGNMENT						
	SOT-953 SC-88A UDFN6					
1	IN A	OE	OE			
2	GND	IN A	IN A			
3	OE	GND	GND			
4	OUT Y	OUT Y	OUT Y			
5	V _{CC}	V _{CC}	NC			
6			V _{CC}			

FUNCTION TABLE

A Input	OE Input	Y Output
x	L	Z
L	н	L
н	н	н

ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

MAXIMUM RATINGS

Symbol	Pa	rameter	Value	Unit
V _{CC}	DC Supply Voltage		–0.5 to +5.5	V
V _{IN}	DC Input Voltage		-0.5 to +4.6	V
V _{OUT}	DC Output Voltage		–0.5 to V _{CC} +0.5	V
I _{IK}	DC Input Diode Current	V _{IN} < GND	-20	mA
Ι _{ΟΚ}	DC Output Diode Current	V _{OUT} < GND	-20	mA
I _{OUT}	DC Output Source/Sink Current		±20	mA
I _{CC}	DC Supply Current per Supply Pin		±20	mA
I _{GND}	DC Ground Current per Ground Pin		±20	mA
T _{STG}	Storage Temperature Range		-65 to +150	°C
ΤL	Lead Temperature, 1 mm from Case for	10 Seconds	260	°C
Τ _J	Junction Temperature Under Bias		+150	°C
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 Model (Note 2) Machine Model (Note 3)	>2000 >100	V
I _{LATCHUP}	Latchup Performance	Above V_{CC} and Below GND at 125°C (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.

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

3. Tested to EIA/JESD22-A115-A.

4. Tested to EIA/JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	0.9	3.6	V
V _{IN}	Digital Input Voltage	0.0	3.6	V
V _{OUT}	Output Voltage Output at High or Low State Power–Down Mode (V _{CC} = 0 V)	0.0 0.0	V _{CC} 3.6	V
T _A	Operating Temperature Range	-55	+125	°C
$\Delta t / \Delta V$	Input Transition Rise or Fail Rate $$V_{CC}$$ = 3.3 V \pm 0.3 V	0	10	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

					T _A =	25°C		∖ = o +125°C	
Symbol Paramete	Parameter	Parameter C	meter Conditions	V _{CC} (V)	Min	Max	Min	Max	Unit
V _{IH}	High-Level			0.9	V _{CC}		V _{CC}		V
	Input Voltage			1.1 to 1.3	0.7xV _{CC}		0.7xV _{CC}		
	voltage			1.4 to 1.6	0.65xV _{CC}		0.65xV _{CC}		
				1.65 to 1.95	0.65xV _{CC}		0.65xV _{CC}		1
				2.3 to 2.7	1.7		1.7		1
				3.0 to 3.6	2.0		2.0		1
VIL	Low–Level Input			0.9		GND		GND	V
	Voltage			1.1 to 1.3		0.3xV _{CC}		0.3xV _{CC}	1
				1.4 to 1.6		0.35xV _{CC}		0.35xV _{CC}	1
				1.65 to 1.95		0.35xV _{CC}		0.35xV _{CC}	1
				2.3 to 2.7		0.7		0.7	1
				3.0 to 3.6		0.8		0.8	1
V _{OH}	High-Level	V _{IN} =	I _{OH} = -20 μA	0.9	0.75		0.75		V
	Output Voltage	V _{IH} or V _{IL}	I _{OH} = -0.3 mA	1.1 to 1.3	0.75xV _{CC}		0.75xV _{CC}		1
			I _{OH} = -1.7 mA	1.4 to 1.6	0.75xV _{CC}		0.75xV _{CC}		1
			I _{OH} = -3.0 mA	1.65 to 1.95	V _{CC} -0.45		V _{CC} -0.4 5		
			I _{OH} = -4.0 mA	2.3 to 2.7	2.07		2.07		1
			I _{OH} = -8.0 mA	3.0 to 3.6	2.75		2.75		
V _{OL}	Low-Level	V _{IN} =	I _{OL} = 20 μA	0.9		0.1		0.1	V
	Output Voltage	V _{IH} or V _{IL}	I _{OL} = 0.3 mA	1.1 to 1.3		0.25xV _{CC}		0.25xV _{CC}	
			I _{OL} = 1.7 mA	1.4 to 1.6		0.25xV _{CC}		0.25xV _{CC}	
			I _{OL} = 3.0 mA	1.65 to 1.95		0.45		0.45	
			I _{OL} = 4.0 mA	2.3 to 2.7		0.4		0.4	
			I _{OL} = 8.0 mA	3.0 to 3.6		0.4		0.4	
I _{IN}	Input Leakage Current	0 ≤	V _{IN} ≤ 3.6 V	0 to 3.6		±0.1		±1.0	μA
I _{CC}	Quiescent Supply Current	V _{IN} =	V _{CC} or GND	3.6		1.0		10.0	μΑ
I _{OZ}	3–State Output Leakage Current	V _{IN} V _{OUT}	= V _{IH} or V _{IL} _F = 0 to 3.6 V	0.9 to 3.6		1.0		10.0	μΑ

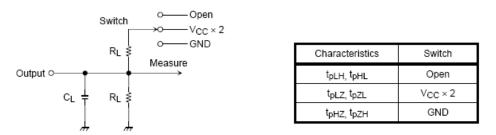
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0 \text{ ns}$)

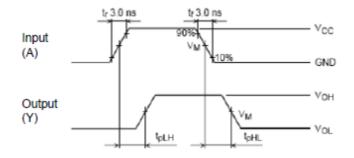
					T _A = 25 °C	₄ = 25 °C		∖ = o +125°C		
Symbol	Parameter	Test Condition	V _{CC} (V)	Min	Тур	Max	Min	Мах	Uni	
t _{PLH} ,	Propagation Delay,	C _L = 10 pF,	0.9	-	11.3	13.6	-	15.9	ns	
t _{PHL}	A to Y	$R_L = 1 M\Omega$	1.1 to 1.3	-	8.3	10.4	-	12.8		
			1.4 to 1.6	-	5.0	8.5	-	10.0		
			1.65 to 1.95	-	4.0	6.2	-	6.7		
			2.3 to 2.7	-	2.6	3.9	-	4.4		
			3.0 to 3.6	-	2.1	3.1	-	3.7		
		C _L = 15 pF,	0.9	-	12.6	14.7	-	17.0	ns	
		$R_L = 1 M\Omega$	1.1 to 1.3	-	9.6	11.5	-	15.2		
			1.4 to 1.6	-	5.6	9.3	-	11.2		
			1.65 to 1.95	-	4.5	6.9	-	7.1		
			2.3 to 2.7	-	2.9	4.4	-	5.0		
			3.0 to 3.6	-	2.4	3.4	-	3.9		
		C _L = 30 pF,	0.9	-	14.5	16.3	-	19.6	ns	
		$R_L = 1 M\Omega$	1.1 to 1.3	-	11.3	13.6	-	17.5		
				1.4 to 1.6	-	8.2	13.1	-	15.9	
			1.65 to 1.95	-	6	9.2	-	9.6		
			2.3 to 2.7	-	4	5.7	-	6.1		
			3.0 to 3.6	-	3.3	4.4	-	4.8		
t _{PZH} ,	Output Enable Time,	C _L = 10 pF;							ns	
t _{PZL}	OE to Y	$R_L = 100 \text{ k}\Omega$	0.9	-	11.0	13.3	-	15.8		
		$R_L = 5 k\Omega$	1.1 to 1.3	-	8.4	10.9	-	13.0		
		$R_L = 5 k\Omega$	1.4 to 1.6	-	5.3	7.8	-	8.3		
		$R_L = 5 k\Omega$	1.65 to 1.95	-	3.9	5.5	-	5.9		
		$R_L = 5 k\Omega$	2.3 to 2.7	-	2.5	3.5	-	3.8	1	
		$R_L = 5 k\Omega$	3.0 to 3.6	-	2.1	2.7	-	3		
		C _L = 15 pF;							ns	
		$R_L = 100 \text{ k}\Omega$	0.9	-	12.0	14.8	-	17.0		
		$R_L = 5 k\Omega$	1.1 to 1.3	-	9.0	11.7	-	13.8	1	
		$R_L = 5 k\Omega$	1.4 to 1.6	-	5.9	8.9	-	11		
		$R_L = 5 k\Omega$	1.65 to 1.95	-	4.4	6.3	-	6.5		
		$R_L = 5 k\Omega$	2.3 to 2.7	-	2.9	3.9	-	4.2		
		$R_L = 5 k\Omega$	3.0 to 3.6	-	2.3	3	-	3.3		
		C _L = 30 pF;							ns	
		$R_L = 100 \text{ k}\Omega$	0.9	-	13.0	15.2	-	18.3		
		$R_L = 5 k\Omega$	1.1 to 1.3	-	10.0	13.1	-	15.2		
		$R_L = 5 k\Omega$	1.4 to 1.6	-	8.3	12.2	-	13.7		
		$R_L = 5 k\Omega$	1.65 to 1.95	-	6.1	8.6	-	9.7		
		$R_L = 5 k\Omega$	2.3 to 2.7	-	3.8	5	-	5.5		
		$R_L = 5 k\Omega$	3.0 to 3.6	_	2.9	3.8	-	4.2	1	

				T _A = 25 °C			T _A = −55°C to +125°C		
Symbol	Parameter	Test Condition	V _{CC} (V)	Min	Тур	Max	Min	Max	Unit
t _{PHZ} ,	Output Disable Time,	C _L = 10 pF;							ns
t _{PLZ}	OE to Y	R _L = 100 kΩ	0.9	-	100.4	-	-	-	1
		$R_L = 5 k\Omega$	1.1 to 1.3	-	9.1	14.4	-	22.4	1
		$R_L = 5 k\Omega$	1.4 to 1.6	-	7.1	9.1	-	10.4	1
		$R_L = 5 k\Omega$	1.65 to 1.95	-	6.5	8.3	-	9	1
		$R_L = 5 k\Omega$	2.3 to 2.7	-	5.8	7.3	-	8.8	1
		$R_L = 5 k\Omega$	3.0 to 3.6	-	5.4	6.9	-	7.6	1
		C _L = 15 pF;							ns
		R _L = 100 kΩ	0.9	-	122.2	-	-	-	1
		$R_L = 5 k\Omega$	1.1 to 1.3	-	9.8	15.3	-	25.1	1
		$R_L = 5 k\Omega$	1.4 to 1.6	-	7.8	9.8	-	11.3	1
		$R_L = 5 k\Omega$	1.65 to 1.95	-	7.2	9.2	-	10.6	1
		$R_L = 5 k\Omega$	2.3 to 2.7	-	7	8.2	-	10.3	1
		$R_L = 5 k\Omega$	3.0 to 3.6	-	6.6	7.7	-	9.5	1
		C _L = 30 pF;							ns
		R _L = 100 kΩ	0.9	-	217.1	_	-	-	1
		$R_L = 5 k\Omega$	1.1 to 1.3	-	13.2	19.6	-	31.9	1
		$R_L = 5 k\Omega$	1.4 to 1.6	-	12.2	13.5	-	14.9	1
		$R_L = 5 k\Omega$	1.65 to 1.95	-	11.4	12.7	-	13.9	1
		$R_L = 5 \ k\Omega$	2.3 to 2.7	-	11.3	12.2	-	13.5	1
		$R_L = 5 \ k\Omega$	3.0 to 3.6	_	10.2	11.5	-	12.9	1
C _{IN}	Input Capacitance		0 to 3.6		3	-	-	-	pF
CO	Output Capacitance	V _O = GND	0		3	-	-	-	pF
C _{PD}	Power Dissipation Capacitance (Note 5)	f = 10 MHz	0.9 to 3.6	_	4	-	_	_	pF

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.
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}.









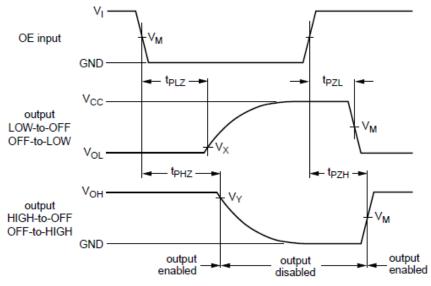


Figure 7. t_{PLZ} , t_{PHZ} , t_{PZH} , t_{PZL} Waveforms

	V _{CC}					
Unit	$3.3 \pm 0.3 \text{ V}$	$2.5\pm0.2~\textrm{V}$	1.8 ± 0.15 V	1.5 ± 0.1 V	1.2 ± 0.1 V	0.9 V
VM	V _{CC} / 2	V _{CC} / 2	V _{CC} / 2	V _{CC} / 2	V _{CC} / 2	V _{CC} / 2
V_{X}	V _{OL} + 0.3 V	V _{OL} + 0.15 V	V _{OL} + 0.1 V	V _{OL} + 0.1 V	V _{OL} + 0.1 V	V _{OL} + 0.1 V
V_{Y}	V _{OH} – 0.3 V	V _{OH} – 0.15 V	V _{OH} – 0.15 V	V _{OH} – 0.1 V	V _{OH} – 0.1 V	V _{OH} – 0.1 V

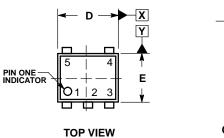
ORDERING INFORMATION

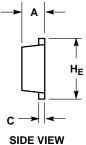
Device	Package	Shipping [†]
NL17SG126P5T5G	SOT-953 (Pb-Free)	8000 / Tape & Reel
NL17SG126P5T6G	SOT–953 (Pb–Free)	8000 / Tape & Reel
NL17SG126DFT2G	SC-88A (Pb-Free)	3000 / Tape & Reel
NL17SG126AMUTCG*	UDFN6 1.45x1 mm (Pb-Free)	3000 / Tape & Reel
NL17SG126CMUTCG*	UDFN6 1x1 mm (Pb-Free)	3000 / Tape & Reel

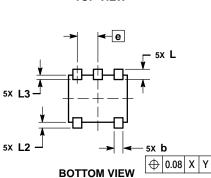
For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.
*In Development

PACKAGE DIMENSIONS

SOT-953 CASE 527AE ISSUE E



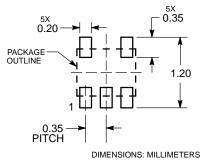




NOTES:
 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

FLASH, PROTRUSIONS, OR G							
	MIL	MILLIMETERS					
DIM	MIN	NOM	MAX				
Α	0.34	0.37	0.40				
b	0.10	0.15	0.20				
С	0.07	0.12	0.17				
D	0.95	1.00	1.05				
Е	0.75	0.80	0.85				
е		0.35 BS	С				
HE	0.95	1.00	1.05				
L	0.175 REF						
L2	0.05	0.10	0.15				
L3			0.15				

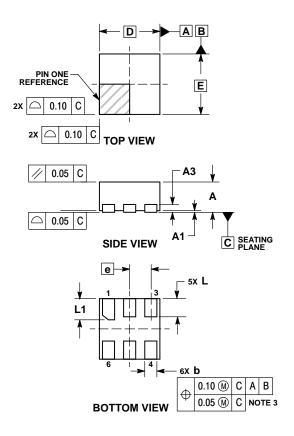
SOLDERING FOOTPRINT*



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

PACKAGE DIMENSIONS

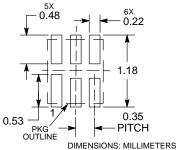
UDFN6 1.0x1.0, 0.35P CASE 517BX ISSUE O



- NOTES:
 DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 CONTROLLING DIMENSION: MILLIMETERS.
 DIMENSION & APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM TERMINAL TIP.
 PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.

BURRS AND MOLD FLASH.						
	MILLIN	IETERS				
DIM	MIN					
Α	0.45	0.55				
A1	0.00	0.05				
A3	0.13	REF				
b	0.12	0.22				
D	1.00	BSC				
Е	1.00	BSC				
е	0.35					
L	0.25	0.35				
L1	0.30	0.40				

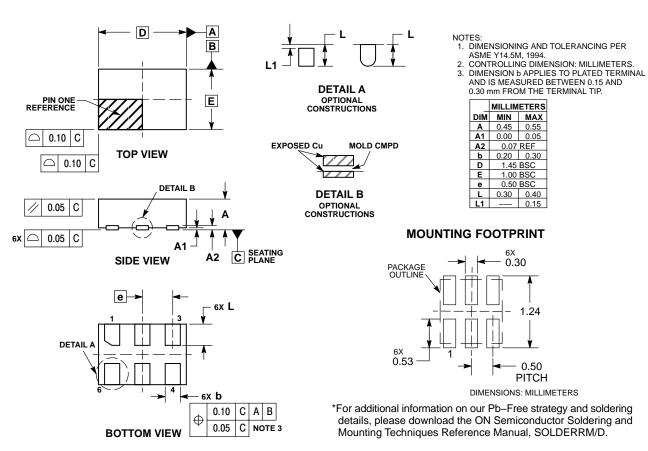
RECOMMENDED **SOLDERING FOOTPRINT***



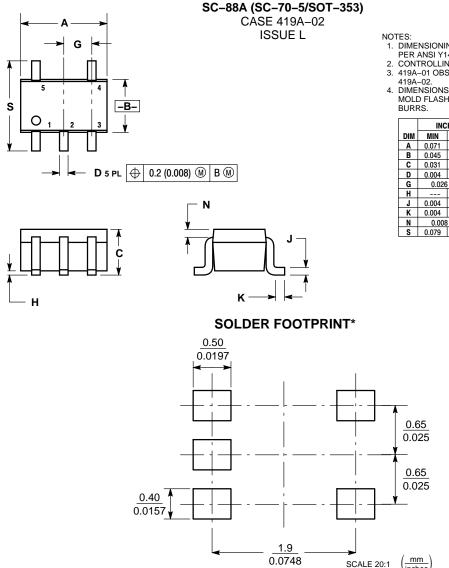
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PACKAGE DIMENSIONS

UDFN6 1.45x1.0, 0.5P CASE 517AQ ISSUE O



PACKAGE DIMENSIONS



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PER ANSI Y14.5M, 1982. CONTROLLING DIMENSION: INCH.

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4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.071	0.087	1.80	2.20
В	0.045	0.053	1.15	1.35
С	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
Н		0.004		0.10
J	0.004	0.010	0.10	0.25
Κ	0.004	0.012	0.10	0.30
Ν	0.008 REF		0.20 REF	
s	0.079	0.087	2.00	2.20

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