

# NL7SB3257

## Product Preview

### Mux / Demux Bus Switch

The NL7SB3257 Mux / Demux Bus Switch is an advanced high-speed line switch in ultra-small footprint.

#### Features

- High Speed:  $t_{PD} = 0.25$  ns (Max) @  $V_{CC} = 4.5$  V
- 3  $\Omega$  Switch Connection Between 2 Ports
- Power Down Protection Provided on Inputs
- Ultra-Small Packages
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

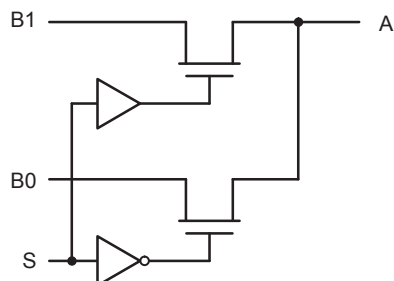


Figure 1. Logic Diagram

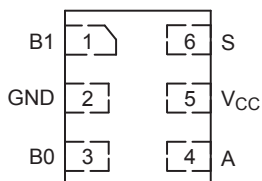


Figure 2. ULLGA6  
(Top View)

#### Function Table

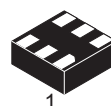
Input S	Function
L	A = B0
H	A = B1



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#### MARKING DIAGRAMS



ULLGA6  
1.0 x 1.0  
CASE 613AD



V = Specific Device Code  
(Rotated 180°)

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 4 of this data sheet.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

**Table 1. 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	$\pm 128$	mA
	Continuous Current Through $V_{CC}$ or GND	$\pm 150$	mA
$I_{CC}$	DC Supply Current per Supply Pin	$\pm 150$	mA
$I_{GND}$	DC Ground Current per Ground Pin	$\pm 150$	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
$\theta_{JA}$	Thermal Resistance (Note 1) ULLGA6	496	°C/W
$P_D$	Power Dissipation in Still Air at 85°C (Note 1) ULLGA6	252	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)	>2000	V
	Machine Mode (Note 3)	>200	
	Charged Device Mode (Note 4)	N/A	
$I_{LATCHUP}$	Latchup Performance Above $V_{CC}$ and Below GND at 85°C (Note 5)	$\pm 100$	mA

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.

**Table 2. RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	Positive DC Supply Voltage	4.0	5.5	V
$V_I$	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

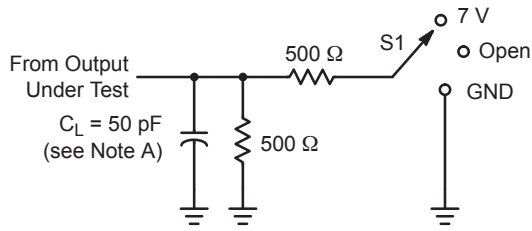
Table 3. DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			T <sub>A</sub> = -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
V <sub>IK</sub>	Clamp Diode Voltage	I <sub>IN</sub> = -18 mA	4.5			-1.2		-1.2	V
V <sub>IH</sub>	High-Level Input Voltage (Control)		4.0 to 5.5	2.0			2.0		V
V <sub>IL</sub>	Low-Level Input Voltage (Control)		4.0 to 5.5			0.8		0.8	V
I <sub>IN</sub>	Input Leakage Current	0 ≤ V <sub>IN</sub> ≤ 5.5 V	5.5			±0.1		±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current	V <sub>I/O</sub> = 0 to 5.5 V	0			±0.1		±1.0	μA
I <sub>CC</sub>	Quiescent Supply Current	I <sub>O</sub> = 0, V <sub>IN</sub> = V <sub>CC</sub> or 0 V	5.5			±0.1		±1.0	μA
ΔI <sub>CC</sub>	Increase in Supply Current (Control Pin)	One input at 3.4 V; Other inputs at V <sub>CC</sub> or GND	5.5					2.5	mA
R <sub>ON</sub>	Switch ON Resistance	V <sub>I/O</sub> = 0, I <sub>I/O</sub> = 64 mA I <sub>I/O</sub> = 30 mA	4.5		3 3	7 7		7 7	Ω
		V <sub>I/O</sub> = 2.4, I <sub>I/O</sub> = 15 mA	4.5		6	15		15	
		V <sub>I/O</sub> = 2.4, I <sub>I/O</sub> = 15 mA	4.0		10	20		20	

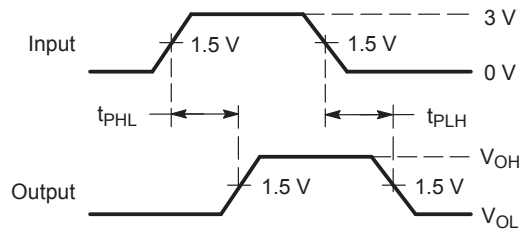
Table 4. AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	Test Condition	T <sub>A</sub> = 25°C			T <sub>A</sub> = -55°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
t <sub>PD</sub>	Propagation Delay, A to B or B to A	4.0 to 5.5	See Figure 4			0.25		0.25	ns
t <sub>EN</sub>	Output Enable Time	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 <sub>DIS</sub>	Output Disable Time	4.5 to 5.5		0.8	3.1	4.8	0.8	4.8	ns
		4.0		0.8	2.9	4.4	0.8	4.4	
C <sub>IN</sub>	Control Input Capacitance	5.0	V <sub>IN</sub> = 3 V or 0			2.0			pF
C <sub>IO(ON)</sub>	Switch On Capacitance	5.0	Switch ON			10			pF
C <sub>IO(OFF)</sub>	Switch Off Capacitance	5.0	Switch OFF			5.0			pF

## AC Loading and Waveforms

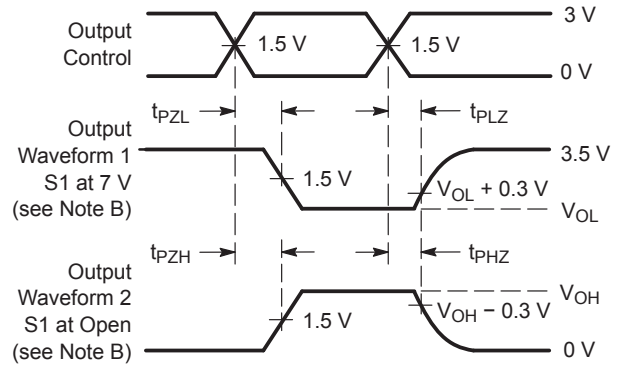


**LOAD CIRCUIT**



**VOLTAGE WAVEFORMS  
PROPAGATION DELAY TIMES**

TEST	S1
$t_{PD}$	Open
$t_{PLZ}/t_{PZL}$	7 V
$t_{PHZ}/t_{PZH}$	GND



**VOLTAGE WAVEFORMS  
ENABLE AND DISABLE TIMES**

- A.  $C_L$  includes probe and jig capacitance.
- B. 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.
- C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .
- D. The output is measured with one input transition per measurement.
- E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
- F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
- G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

**Figure 3. Load Circuit and Voltage Waveforms**

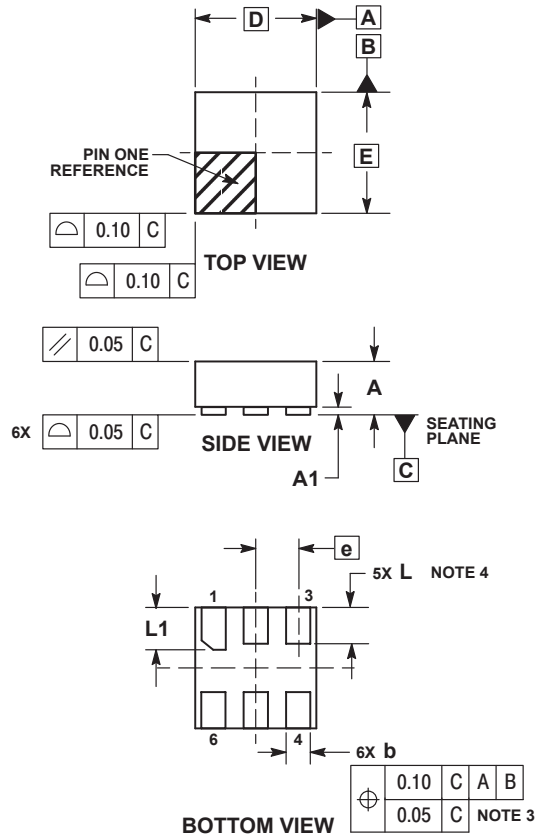
## DEVICE ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NL7SB3257CMX1TCG	ULLGA6 – 1.0 x 1.0, 0.35P (Pb-Free)	3000 / Tape & Reel

<sup>†</sup>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

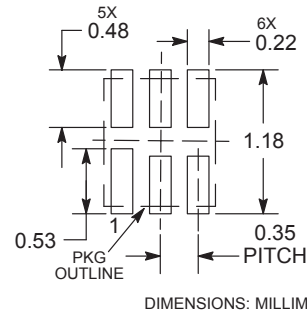
ULLGA6 1.0x1.0, 0.35P  
CASE 613AD  
ISSUE A



- 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	0.12	0.22
D	1.00	BSC
E	1.00	BSC
e	0.35	BSC
L	0.25	0.35
L1	0.30	0.40

MOUNTING FOOTPRINT  
SOLDERMASK DEFINED\*



\*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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