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 Ω Switch Connection Between 2 Ports
- Power Down Protection Provided on Inputs
- Ultra−Small Packages
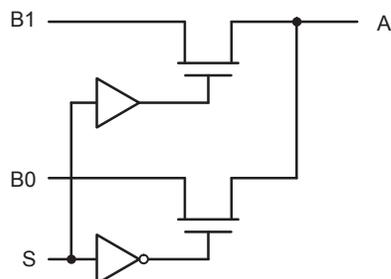- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant
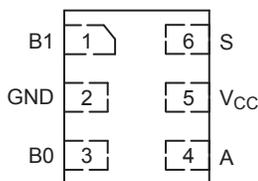
Figure 1. Logic Diagram

Figure 2. ULLGA6
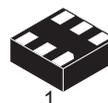**(Top View)**

Function Table

Input S	Function
L	A = B0
H	A = B1

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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		±128	mA
	Continuous Current Through V_{CC} or GND		±150	mA
I_{CC}	DC Supply Current per Supply Pin		±150	mA
I_{GND}	DC Ground Current per Ground Pin		±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
θ_{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)		±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	0	5	nS/V
		Switch I/O	0	DC	

Table 3. DC ELECTRICAL CHARACTERISTICS

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

Table 4. AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	V_{CC} (V)	Test Condition	$T_A = 25°C$			$T_A = -55°C$ to $+125°C$		Unit
				Min	Typ	Max	Min	Max	
t_{PD}	Propagation Delay, A to B or B to A	4.0 to 5.5	See Figure 4			0.25		0.25	ns
t_{EN}	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_{DIS}	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_{IN}	Control Input Capacitance	5.0	$V_{IN} = 3$ V or 0			2.0			pF
$C_{IO(ON)}$	Switch On Capacitance	5.0	Switch ON			10			pF
$C_{IO(OFF)}$	Switch Off Capacitance	5.0	Switch OFF			5.0			pF

AC Loading and Waveforms

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

LOAD CIRCUIT

From Output Under Test

500 Ω S1 7 V — Open — GND

C_L = 50 pF (see Note A)

500 Ω
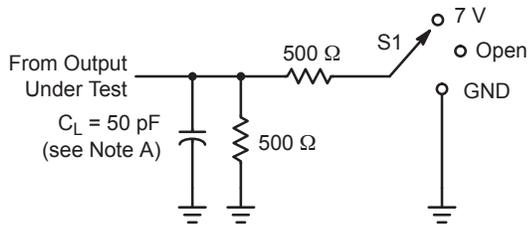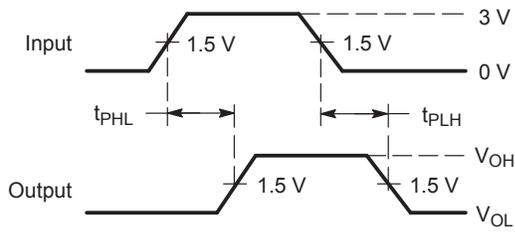
VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

Input — 1.5 V — 1.5 V — 3 V / 0 V

t_{PHL} — t_{PLH}

Output — 1.5 V — 1.5 V — V_{OH} / V_{OL}
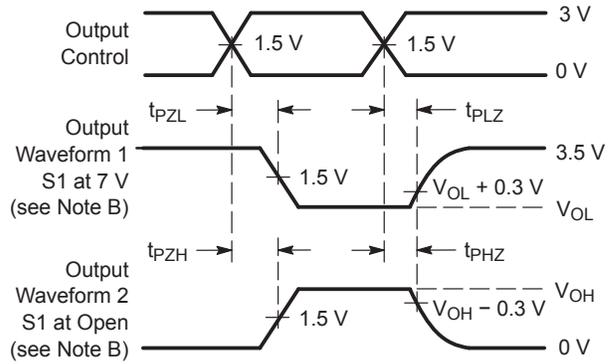
VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

Output Control — 1.5 V — 1.5 V — 3 V / 0 V

t_{PZL} — t_{PLZ}

Output Waveform 1 S1 at 7 V (see Note B) — 1.5 V — V_{OL} + 0.3 V — 3.5 V / V_{OL}

t_{PZH} — t_{PHZ}

Output Waveform 2 S1 at Open (see Note B) — 1.5 V — V_{OH} − 0.3 V — V_{OH} / 0 V

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 ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 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[†]
NL7SB3257CMX1TCG	ULLGA6 − 1.0 x 1.0, 0.35P (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.

## PACKAGE DIMENSIONS

ULLGA6 1.0x1.0, 0.35P
CASE 613AD
ISSUE A
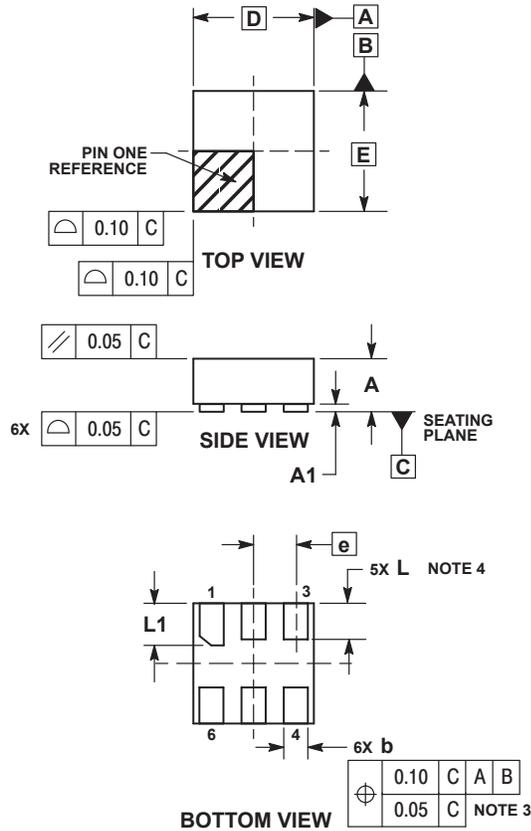
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
4. A MAXIMUM OF 0.05 PULL BACK OF THE PLATED TERMINAL FROM THE EDGE OF THE PACKAGE IS ALLOWED.

| DIM | MILLIMETERS | |
	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

TOP VIEW

SIDE VIEW

BOTTOM VIEW

MOUNTING FOOTPRINT
SOLDERMASK DEFINED*

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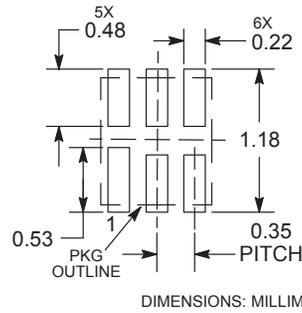
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.