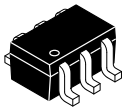
2:1 Multiplexer/Demultiplexer Bus Switch

NC7SB3257



1

SC−88 (SC−70 6 Lead),
1.25 x 2
CASE 419AD

Description

The NC7SB3257 is a high performance, 2:1 NMOS passgate multiplexer/demultiplexer. The device is fabricated with advanced sub−micron CMOS technology to achieve high speed enable and disable times and low On Resistance. The device is specified to operate over the 4.0 to 5.5 V V_{CC} operating range.

The control input tolerates voltages up to 5.5 V independent of the V_{CC} operating range.

Features

- Space Saving SC70 6−Lead Surface Mount Package
- Typical 3 Ω Switch Resistance at 5.0 V V_{CC}
- Minimal Propagation Delay through the Switch
- Power−Down High Impedance Control Input
- Zero Bounce in Flow through Mode
- TTL Compatible Control Input
- Over−Voltage Tolerance of Control Input to 7.0 V
- Break−before−Make Enable Circuitry
- This Device is Pb−Free and Halide Free

Logic Symbol

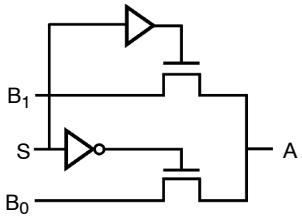
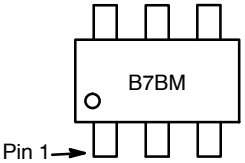


Figure 1. Logic Symbol

MARKING DIAGRAM



B7B = Specific Device Code
M = Assembly Operation Month

ORDERING INFORMATION

Device	Package	Shipping†
NC7SB3257P6X	SC−88 (SC−70 6 Lead)	3000 / Tape & Reel

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

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Pin Configurations

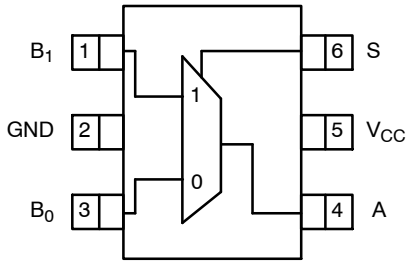


Figure 2. SC70 (Top View)

PIN DEFITIONS

Pin #	Name	Description
1	B_1	Data Ports
2	GND	Ground
3	B_0	Data Ports
4	A	Data Ports
5	V_{CC}	Supply Voltage
6	S	Control Input

FUNCTION TABLE

Inputs	Function
L	B_0 Connected to A
H	B_1 Connected to A

NOTE: H = HIGH Logic Level.
L = LOW Logic Level.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	−0.5	7.0	V
V_S	DC Switch Voltage	−0.5	7.0	V
V_{IN}	DC Input Voltage (Note 1)	−0.5	7.0	V
I_{IK}	DC Input Diode Current at V_{IN} < 0 V	–	−50	mA
I_{OUT}	DC Output Current	–	128	mA
I_{CC}/I_{GND}	DC V_{CC} or Ground Current	–	±100	mA
T_{STG}	Storage Temperature Range	−65	+150	°C
T_J	Junction Lead Temperature under Bias	–	+150	°C
T_L	Lead Temperature (Soldering, 10 seconds)	–	+260	°C
P_D	Power Dissipation at +85°C	–	180	mW

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. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

RECOMMENDED OPERATING CONDITIONS (Note 2)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Supply Voltage Operating		4.0	5.5	V
V_{IN}	Control Input Voltage		0	V_{CC}	V
	Switch Input Voltage		0	V_{CC}	V
V_{OUT}	Output Voltage		0	V_{CC}	V
T_A	Operating Temperature		−40	+85	°C
t_r, t_f	Input Rise and Fall Time	Control Input V_{CC} = 4.0 V to 5.5 V	0	5	ns/V
θ_{JA}	Thermal Resistance		–	350	°C/W

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.
2. Control input must be held HIGH or LOW; it must not float.

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC}	T_A = −40 to +85°C			Unit
				Min	Typ	Max	
V_{IK}	Clamp Diode Voltage	I_{IN} = −18 mA	4.5	–	–	−1.2	V
V_{IH}	HIGH Level Input Voltage		4.5–5.5	2.0	–	_	V
V_{IL}	LOW Level Input Voltage		4.5–5.5	–	–	0.8	V
I_{IN}	Input Leakage Current	0 ≤ V_{IN} ≤ 5.5 V	5.5	–	–	±1.0	μA
I_{OFF}	OFF State Leakage Current	0 ≤ A, B ≤ V_{CC}	5.5	–	–	±1.0	μA
R_{ON}	Switch On Resistance (Note 3)	V_{IN} = 0 V, I_{IN} = 64 mA	4.5	–	3.0	7.0	Ω
		V_{IN} = 0 V, I_{IN} = 30 mA	4.5	–	3.0	7.0	
		V_{IN} = 2.4 V, I_{IN} = 15 mA	4.5	–	6.0	15.0	
		V_{IN} = 2.4 V, I_{IN} = 15 mA	4.0	–	10.0	20.0	
I_{CC}	Quiescent Supply Current	V_{IN} = V_{CC} or GND I_{OUT} = 0	5.5	–	–	10.0	μA
ΔI_{CC}	Increase in ICC per Input (Note 4)	V_{IN} = 3.4 V, I_O = 0 Control input only	5.5	–	0.9	2.5	mA

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.

3. Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the two (A or B Ports).
4. Per TTL driven Input (V_{IN} = 3.4 V, Control input only). A and B pins do not contribute to I_{CC}.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = −40°C to +85°C, CL = 50 pF, RU = RD = _500 Ω			Unit
				Min	Typ	Max	
t_{PHL}, t_{PLH}	Propagation Delay Bus−to−Bus (Note 5)	V_I = OPEN	4.0–5.5	–	–	0.25	ns
t_{PZL}, t_{PZH}	Output Enable Time	V_I = 7 V for t_{PZL} V_I = 0 V for t_{PZH}	4.0–5.5	1.8	–	6.5	ns
			4.0	1.8	–	7.3	
t_{PLZ}, t_{PHZ}	Output Disable Time	V_I = 7 V for t_{PLZ} V_I = 0 V for t_{PHZ}	4.5–5.5	0.8	–	4.7	ns
			4.0	0.8	–	5.3	
t_{B-M}	Break−before−Make Time (Note 6)		4.5–5.5	0.5	–	–	ns
			4.0	0.5	–	–	

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.

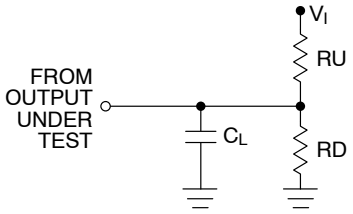
5. This parameter is guaranteed by design but not tested. The bus switch contributes no propagation delay other than the RC delay of the on resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage source (zero output impedance).
6. Guaranteed by design.

CAPACITANCE (Note 7)

Symbol	Parameter	Conditions	Typ	Unit
C_{IN}	Control Pin Input Capacitance	V_{CC} = 0.0 V	2.3	pF
C_{IO-B}	B Port OFF Capacitance	V_{CC} = 5.0 V	5.7	pF
C_{IO-A}	A Port ON Capacitance	V_{CC} = 5.0 V	16.0	pF

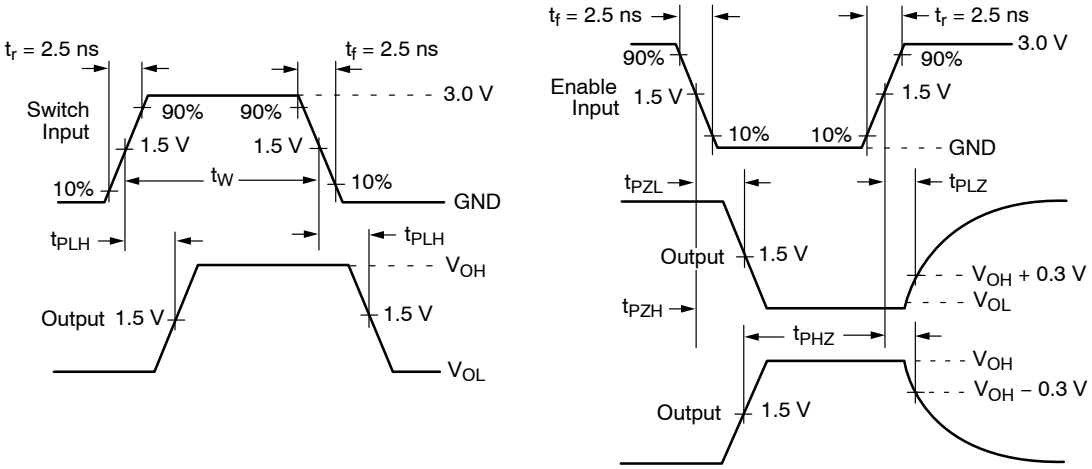
7. Capacitance is characterized but not tested.

AC LOADING AND WAVEFORMS



NOTE: Input driven by 50 Ω source terminated in 50 Ω
C_L includes load and stray capacitance.
Input PRR = 10 MHz, t_W = 500 ns.

Figure 3. AC Test Circuit



NOTE: Input = AC Waveform;
PRR = Variable; Duty Cycle = 50%

Figure 4. AC Waveforms

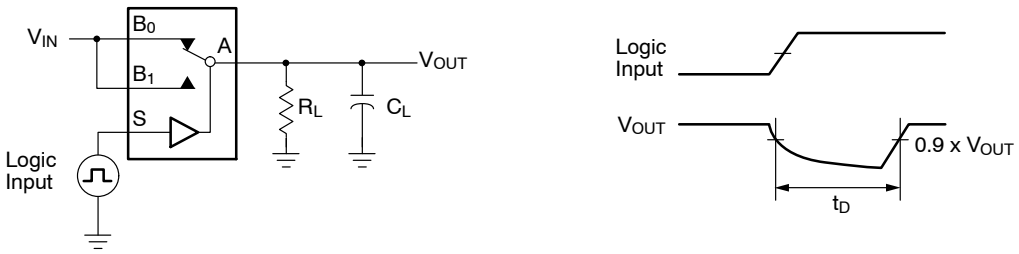
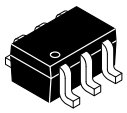


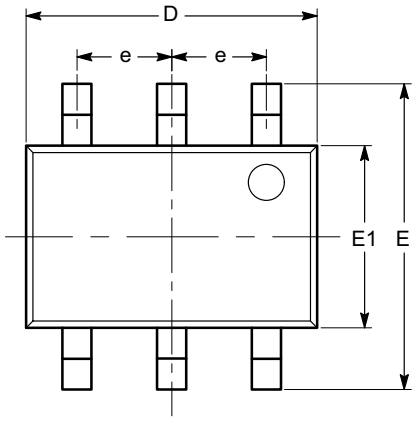
Figure 5. Break−Before−Make Interval Timing



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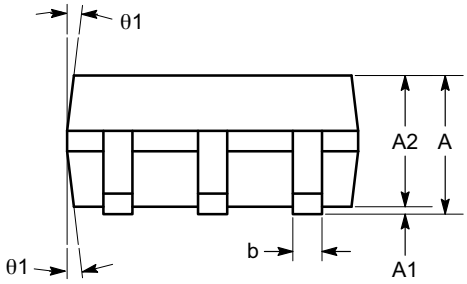
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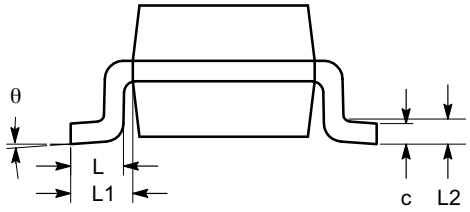


TOP VIEW

SYMBOL	MIN	NOM	MAX
A	0.80		1.10
A1	0.00		0.10
A2	0.80		1.00
b	0.15		0.30
c	0.10		0.18
D	1.80	2.00	2.20
E	1.80	2.10	2.40
E1	1.15	1.25	1.35
e		0.65 BSC	
L	0.26	0.36	0.46
L1		0.42 REF	
L2		0.15 BSC	
θ	0°		8°
θ1	4°		10°



SIDE VIEW



END VIEW

Notes:
(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC MO-203.

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