

7SB3257

Mux / Demux Bus Switch

The 7SB3257 Mux / Demux Bus Switch is an advanced high-speed line switch in ultra-small footprint.

Features

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

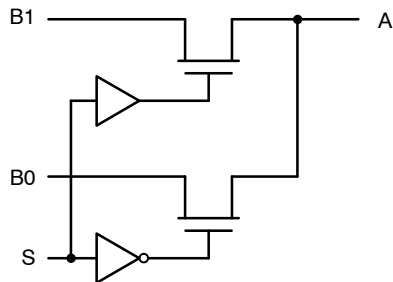


Figure 1. Logic Diagram

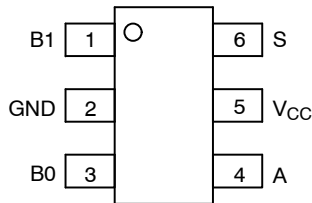


Figure 2. TSOP-6/SC-88 (Top View)

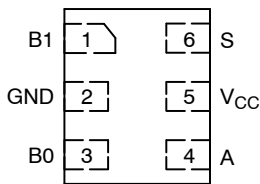


Figure 3. ULLGA6/UDFN6 (Top View)

Function Table

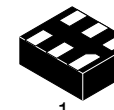
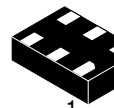
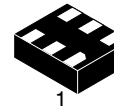
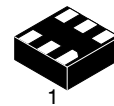
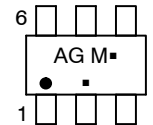
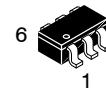
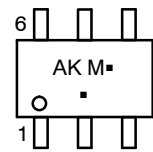
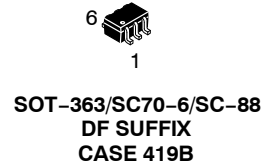
| Input S | Function |
|---------|----------|
| L | A = B0 |
| H | A = B1 |



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MARKING DIAGRAMS



AK, AG, K, D, L = Specific Device Code
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.

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 | $^{\circ}C$ |
| T_L | Lead Temperature, 1 mm from Case for 10 Seconds | 260 | $^{\circ}C$ |
| T_J | Junction Temperature Under Bias | 150 | $^{\circ}C$ |
| θ_{JA} | Thermal Resistance SC-88 / TSOP-6 (Note 1) ULLGA6/UDFN6 | 333 496 | $^{\circ}C/W$ |
| P_D | Power Dissipation in Still Air at 85 $^{\circ}C$ SC-88 / TSOP-6 (Note 1) ULLGA6/UDFN6 | 200 252 | 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) Machine Mode (Note 3) Charged Device Mode (Note 4) | >2000 >200 N/A | V |
| $I_{LATCHUP}$ | Latchup Performance Above V_{CC} and Below GND at 85 $^{\circ}C$ (Note 5) | ± 100 | mA |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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 | $^{\circ}C$ |
| $\Delta t / \Delta V$ | 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 _{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 ≤ V _{IN} ≤ 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 | |
| | | 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 | | | |
| C _{IO(ON)} | Switch On Capacitance | 5.0 | Switch ON | | 10 | | | | pF |
| C _{IO(OFF)} | Switch Off Capacitance | 5.0 | Switch OFF | | 3.5 | | | | 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 MHz, $Z_O = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ 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 4. Load Circuit and Voltage Waveforms

DEVICE ORDERING INFORMATION

| Device | Package | Shipping [†] |
|----------------|-------------------------------------|-----------------------|
| 7SB3257DTT1G | TSOP-6 (Pb-Free) | 3000 / Tape & Reel |
| 7SB3257DFT2G | SC-88 (Pb-Free) | 3000 / Tape & Reel |
| 7SB3257AMX1TCG | ULLGA6 – 0.5 mm Pitch (Pb-Free) | 3000 / Tape & Reel |
| 7SB3257BMX1TCG | ULLGA6 – 0.4 mm Pitch (Pb-Free) | 3000 / Tape & Reel |
| 7SB3257CMX1TCG | ULLGA6 – 0.35 mm Pitch (Pb-Free) | 3000 / Tape & Reel |
| 7SB3257MUTCG | UDFN6 – 0.4 mm Pitch (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.

7SB3257

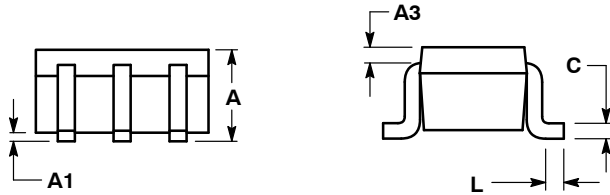
PACKAGE DIMENSIONS

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

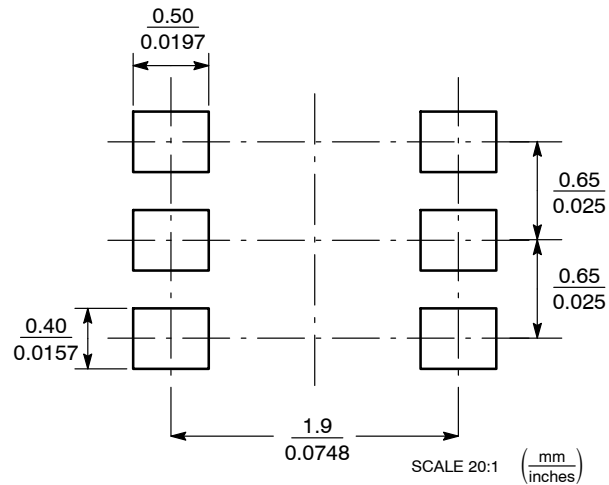


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.20 REF | | | 0.008 REF | | |
| b | 0.10 | 0.21 | 0.30 | 0.004 | 0.008 | 0.012 |
| C | 0.10 | 0.14 | 0.25 | 0.004 | 0.005 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.070 | 0.078 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| HE | 2.00 | 2.10 | 2.20 | 0.078 | 0.082 | 0.086 |



SOLDERING FOOTPRINT*

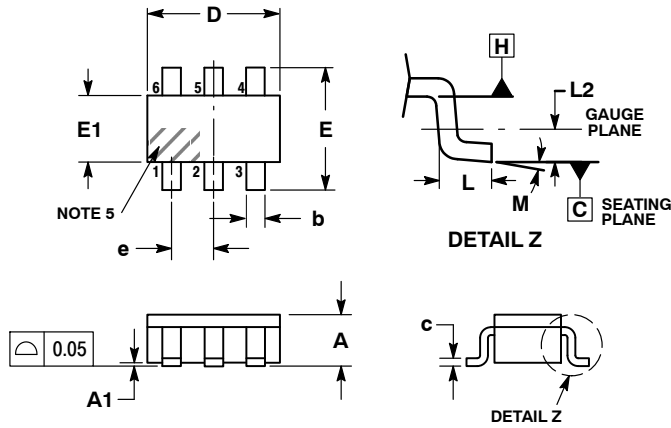


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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PACKAGE DIMENSIONS

TSOP-6
CASE 318G-02
ISSUE U

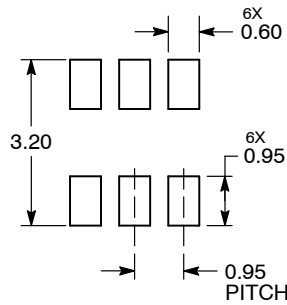


NOTES:

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 BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
5. PIN ONE INDICATOR MUST BE LOCATED IN THE INDICATED ZONE.

| DIM | MILLIMETERS | | |
|-----|-------------|------|------|
| | MIN | NOM | MAX |
| A | 0.90 | 1.00 | 1.10 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.25 | 0.38 | 0.50 |
| c | 0.10 | 0.18 | 0.26 |
| D | 2.90 | 3.00 | 3.10 |
| E | 2.50 | 2.75 | 3.00 |
| E1 | 1.30 | 1.50 | 1.70 |
| e | 0.85 | 0.95 | 1.05 |
| L | 0.20 | 0.40 | 0.60 |
| L2 | 0.25 BSC | | |
| M | 0° | - | 10° |

RECOMMENDED SOLDERING FOOTPRINT*



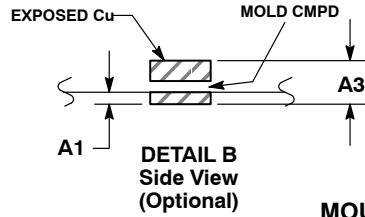
DIMENSIONS: MILLIMETERS

*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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PACKAGE DIMENSIONS

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

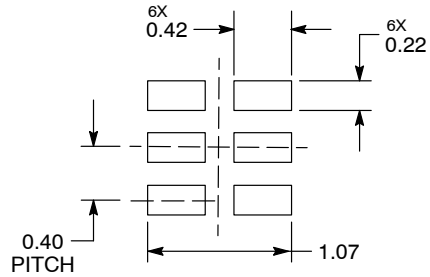


NOTES:

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.

| MILLIMETERS | | |
|-------------|-------|------|
| 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 |

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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PACKAGE DIMENSIONS

ULLGA6 1.0x1.0, 0.35P CASE 613AD-01 ISSUE A

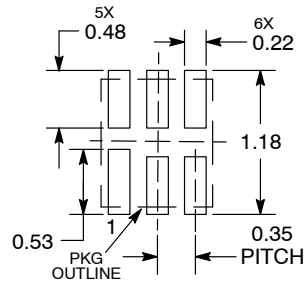


NOTES:

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*



DIMENSIONS: MILLIMETERS

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PACKAGE DIMENSIONS

ULLGA6 1.2x1.0, 0.4P
CASE 613AE-01
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 | 0.15 | 0.25 |
| D | 1.20 BSC | |
| E | 1.00 BSC | |
| e | 0.40 BSC | |
| L | 0.25 | 0.35 |
| L1 | 0.35 | 0.45 |

**MOUNTING FOOTPRINT
SOLDERMASK DEFINED***



DIMENSIONS: MILLIMETERS

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PACKAGE DIMENSIONS

ULLGA6 1.45x1.0, 0.5P
CASE 613AF-01
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 | 0.15 | 0.25 |
| D | 1.45 BSC | |
| E | 1.00 BSC | |
| e | 0.50 BSC | |
| L | 0.25 | 0.35 |
| L1 | 0.30 | 0.40 |

MOUNTING FOOTPRINT SOLDERMASK DEFINED*



DIMENSIONS: MILLIMETERS

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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