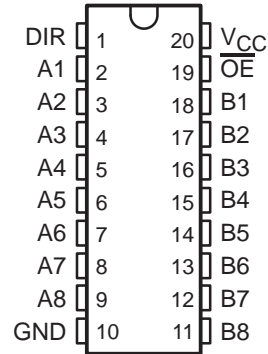


SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639 OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

- Bidirectional Bus Transceivers in High-Density 20-Pin Packages
- Choice of True or Inverting Logic
- A-Bus Outputs Are Open Collector; B-Bus Outputs Are 3 State
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

DW OR N PACKAGE
(TOP VIEW)



| DEVICE | A OUTPUT | B OUTPUT | LOGIC |
|-------------------------|----------------|----------|-----------|
| SN74ALS638A, SN74AS638A | Open collector | 3 state | Inverting |
| SN74ALS639A, SN74AS639 | Open collector | 3 state | True |

description

These octal bus transceivers are designed for asynchronous two-way communication between open-collector and 3-state buses. The devices transmit data from the A bus (open-collector) to the B bus (3 state) or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so the buses are isolated.

The -1 version of SN74ALS638A is identical to the standard version, except that the recommended maximum I_{OL} is increased to 48 mA.

The SN74ALS638A, SN74ALS639A, SN74AS638A, and SN74AS639 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

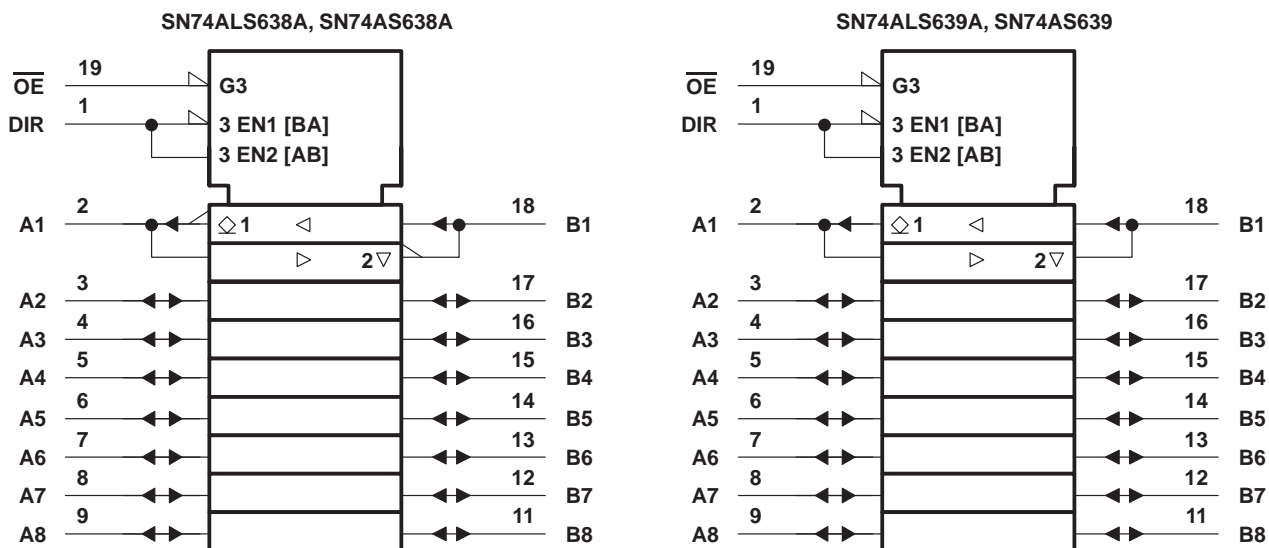
| INPUTS | | OPERATION | |
|-----------------|-----|------------------------------|--------------------------|
| \overline{OE} | DIR | SN74ALS638A SN74AS638A | SN74ALS639A SN74AS639 |
| L | L | \overline{B} data to A bus | B data to A bus |
| L | H | \overline{A} data to B bus | A data to B bus |
| H | X | Isolation | Isolation |

SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639

OCTAL BUS TRANSCEIVERS

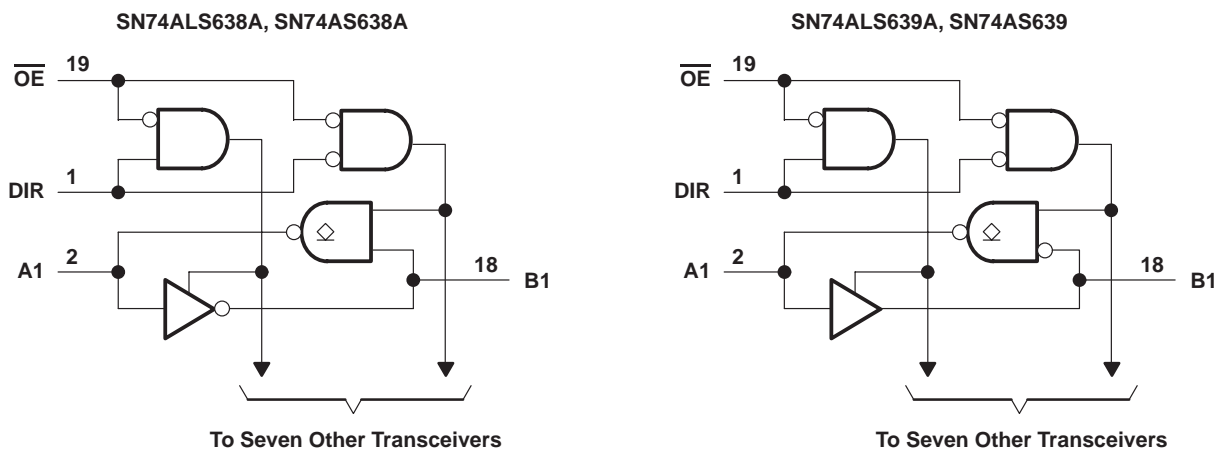
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logic symbols†



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagrams (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

| | |
|--|----------------|
| Supply voltage, V_{CC} | 7 V |
| Input voltage, V_I : All inputs | 7 V |
| A-bus I/O ports | 7 V |
| B-bus I/O ports | 5.5 V |
| Operating free-air temperature range, T_A : SN74ALS638A, SN74ALS639A | 0°C to 70°C |
| Storage temperature range | -65°C to 150°C |

‡ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.



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SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639A OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

recommended operating conditions

| | | | SN74ALS638A SN74ALS639A | | | UNIT |
|----------|--------------------------------|--------------|----------------------------|-----|-----|------|
| | | | MIN | NOM | MAX | |
| V_{CC} | Supply voltage | | 4.5 | 5 | 5.5 | V |
| V_{IH} | High-level input voltage | | 2 | | | V |
| V_{IL} | Low-level input voltage | | 0.8 | | | V |
| V_{OH} | High-level output voltage | A ports | 5.5 | | | V |
| I_{OH} | High-level output current | B ports | -15 | | | mA |
| I_{OL} | Low-level output current | A or B ports | 24 | | | mA |
| | | | 48† | | | |
| T_A | Operating free-air temperature | | 0 | 70 | | °C |

† Applies only to the SN74ALS638A-1 version and only if V_{CC} is between 4.75 V and 5.25 V

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | | SN74ALS638A SN74ALS639A | | UNIT |
|-------------------|----------------|--|---------------------------------|----------------------------|------|------|
| | | | | MIN | TYP‡ | |
| V_{IK} | | $V_{CC} = 4.5\text{ V}$, | $I_I = -18\text{ mA}$ | -1.5 | | V |
| I_{OH} | A ports | $V_{CC} = 4.5\text{ V}$, | $V_{OH} = 5.5\text{ V}$ | 0.1 | | mA |
| V_{OH} | B ports | $V_{CC} = 4.5\text{ V to } 5.5\text{ V}$, $I_{OH} = -0.4\text{ mA}$ | | $V_{CC} - 2$ | | V |
| | | $V_{CC} = 4.5\text{ V}$ | $I_{OH} = -3\text{ mA}$ | 2.4 | 3.2 | |
| | | | $I_{OH} = -15\text{ mA}$ | 2 | | |
| V_{OL} | A or B ports | $V_{CC} = 4.5\text{ V}$ | $I_{OL} = 12\text{ mA}$ | 0.25 | 0.4 | V |
| | | | $I_{OL} = 24\text{ mA}$ | 0.35 | 0.5 | |
| | | | $I_{OL} = 48\text{ mA}^\dagger$ | 0.35 | 0.5 | |
| I_I | Control inputs | $V_{CC} = 5.5\text{ V}$ | $V_I = 7\text{ V}$ | 0.1 | | mA |
| | A or B ports | | $V_I = 5.5\text{ V}$ | 0.1 | | |
| I_{IH} | Control inputs | $V_{CC} = 5.5\text{ V}$, | $V_I = 2.7\text{ V}$ | 20 | | µA |
| | A or B ports§ | | | 20 | | |
| I_{IL} | Control inputs | $V_{CC} = 5.5\text{ V}$, | $V_I = 0.4\text{ V}$ | -0.1 | | mA |
| | A or B ports§ | | | -0.1 | | |
| I_{O}^\parallel | B ports | $V_{CC} = 5.5\text{ V}$, | $V_O = 2.25\text{ V}$ | -30 | -112 | mA |
| I_{CC} | SN74ALS638A | $V_{CC} = 5.5\text{ V}$ | Outputs high | 18 | 30 | mA |
| | | | Outputs low | 26 | 41 | |
| | | | Outputs disabled | 16 | 30 | |
| | SN74ALS639A | | Outputs high | 25 | 40 | |
| | | | Outputs low | 30 | 50 | |
| | | | Outputs disabled | 33 | 54 | |

† Applies only to the SN74ALS638A-1 version and only if V_{CC} is between 4.75 V and 5.25 V

‡ All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

§ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

¶ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639

OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

switching characteristics (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 680 Ω (A outputs), R ₁ = R ₂ = 500 Ω (B outputs), T _A = MIN to MAX† | | | | UNIT |
|------------------|-----------------|----------------|---|-----|-------------|-----|------|
| | | | SN74ALS638A | | SN74ALS639A | | |
| | | | MIN | MAX | MIN | MAX | |
| t _{PLH} | A | B | 2 | 12 | 2 | 12 | ns |
| t _{PHL} | | | 2 | 12 | 2 | 12 | |
| t _{PLH} | B | A | 8 | 25 | 10 | 30 | ns |
| t _{PHL} | | | 8 | 30 | 5 | 22 | |
| t _{PLH} | \overline{OE} | A | 5 | 25 | 10 | 30 | ns |
| t _{PHL} | | | 10 | 45 | 10 | 35 | |
| t _{PZH} | \overline{OE} | B | 5 | 20 | 6 | 21 | ns |
| t _{PZL} | | | 5 | 22 | 8 | 25 | |
| t _{PHZ} | \overline{OE} | B | 2 | 10 | 2 | 10 | ns |
| t _{PLZ} | | | 3 | 15 | 3 | 16 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

| | |
|--|----------------|
| Supply voltage, V _{CC} | 7 V |
| Input voltage, V _I : All inputs | 7 V |
| A-bus I/O ports | 7 V |
| B-bus I/O ports | 5.5 V |
| Operating free-air temperature range, T _A : SN74AS638A, SN74AS639 | 0°C to 70°C |
| Storage temperature range | –65°C to 150°C |

‡ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

| | | SN74AS638A SN74AS639 | | | UNIT |
|-----------------|--------------------------------|-------------------------|-----|-----|------|
| | | MIN | NOM | MAX | |
| V _{CC} | Supply voltage | 4.5 | 5 | 5.5 | V |
| V _{IH} | High-level input voltage | 2 | | | V |
| V _{IL} | Low-level input voltage | | | 0.8 | V |
| V _{OH} | High-level output voltage | | | 5.5 | V |
| I _{OH} | High-level output current | | | –15 | mA |
| I _{OL} | Low-level output current | | | 64 | mA |
| T _A | Operating free-air temperature | 0 | | 70 | °C |



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639A OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | | SN74AS638A SN74AS639 | | | UNIT | |
|-------------------|----------------|---|--|-------------------------|------|-----|------|----|
| | | | | MIN | TYP† | MAX | | |
| V _{IK} | | V _{CC} = 4.5 V, I _I = -18 mA | | -1.2 | | | V | |
| I _{OH} | A ports | V _{CC} = 4.5 V, V _{OH} = 5.5 V | | 0.1 | | | mA | |
| V _{OH} | B ports | V _{CC} = 4.5 V to 5.5 V, I _{OH} = -2 mA | | V _{CC} - 2 | | | V | |
| | | V _{CC} = 4.5 V, I _{OH} = -3 mA | | 2.4 | 3.2 | | | |
| | | V _{CC} = 4.5 V, I _{OH} = -15 mA | | 2.4 | | | | |
| V _{OL} | A or B ports | V _{CC} = 4.5 V, I _{OL} = 64 mA | | 0.35 | 0.55 | | V | |
| I _I | Control inputs | V _{CC} = 5.5 V, V _I = 7 V | | 0.1 | | | mA | |
| | A or B ports | V _{CC} = 5.5 V, V _I = 5.5 V | | 0.1 | | | | |
| I _{IH} | Control inputs | V _{CC} = 5.5 V, V _I = 2.7 V | | 20 | | | μA | |
| | A or B ports‡ | | | 70 | | | | |
| I _{IL} | Control inputs | V _{CC} = 5.5 V, V _I = 0.4 V | | -0.5 | | | mA | |
| | A or B ports‡ | | | -0.75 | | | | |
| I _{OS} § | | V _{CC} = 5.5 V, V _O = 2.25 V | | -50 | -150 | | mA | |
| I _{CC} | SN74AS638A | V _{CC} = 5.5 V | | Outputs high | | 24 | 54 | mA |
| | | | | Outputs low | | 75 | 122 | |
| | | | | Outputs disabled | | 37 | 61 | |
| | SN74AS639 | V _{CC} = 5.5 V | | Outputs high | | 56 | 92 | |
| | | | | Outputs low | | 95 | 154 | |
| | | | | Outputs disabled | | 62 | 100 | |

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

switching characteristics (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω (A outputs), R ₁ = R ₂ = 500 Ω (B outputs), T _A = MIN to MAX†† | | | | UNIT |
|------------------|-----------------|----------------|--|-----|-----------|------|------|
| | | | SN74AS638A | | SN74AS639 | | |
| | | | MIN | MAX | MIN | MAX | |
| t _{PLH} | A | B | 2 | 7 | 2 | 9.5 | ns |
| t _{PHL} | | | 2 | 6.5 | 2 | 9 | |
| t _{PLH} | B | A | 5 | 20 | 5 | 22 | ns |
| t _{PHL} | | | 2 | 7 | 2 | 9 | |
| t _{PLH} | \overline{OE} | A | 5 | 19 | 5 | 21.5 | ns |
| t _{PHL} | | | 2 | 9 | 2 | 11.5 | |
| t _{PZH} | \overline{OE} | B | 2 | 8 | 2 | 10.5 | ns |
| t _{PZL} | | | 2 | 10 | 2 | 10.5 | |
| t _{PHZ} | \overline{OE} | B | 2 | 7 | 2 | 7 | ns |
| t _{PLZ} | | | 2 | 10 | 2 | 10.5 | |

†† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639

OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms



PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/ Ball Finish | MSL Peak Temp ⁽³⁾ | Samples (Requires Login) |
|--------------------|-----------------------|--------------|-----------------|------|-------------|----------------------------|----------------------|------------------------------|----------------------------------|
| SN74ALS638A-1N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS638A-1NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS638A-1NSR | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS638A-1NSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS638A-1NSRG4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS638AN | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS638ANE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS638ANSR | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS638ANSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS638ANSRG4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639ADW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639ADWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639ADWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639AN | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS639ANE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Purchase Samples |
| SN74ALS639ANSR | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639ANSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74ALS639ANSRG4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | Purchase Samples |
| SN74AS638AN | NRND | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Samples Not Available |
| SN74AS638ANE4 | NRND | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | Samples Not Available |
| SN74AS639DW | OBSOLETE | SOIC | DW | 20 | | TBD | Call TI | Call TI | Samples Not Available |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/ Ball Finish | MSL Peak Temp ⁽³⁾ | Samples (Requires Login) |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|----------------------|------------------------------|-----------------------------|
| SN74AS639DWR | OBSOLETE | SOIC | DW | 20 | | TBD | Call TI | Call TI | Samples Not Available |
| SN74AS639N | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI | Samples Not Available |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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TAPE AND REEL INFORMATION
REEL DIMENSIONS

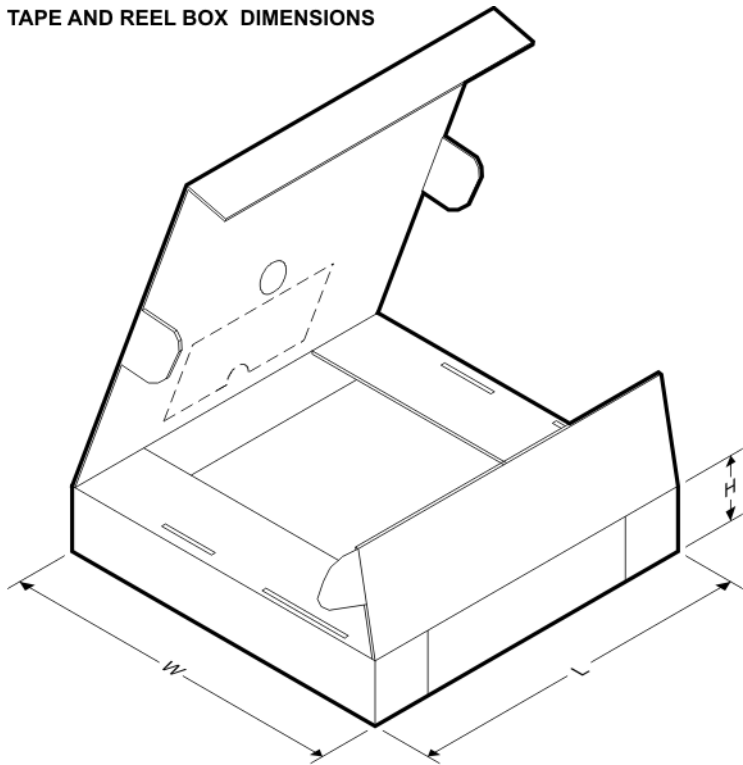
TAPE DIMENSIONS


| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

TAPE AND REEL INFORMATION

*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74ALS638A-1NSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74ALS638ANSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74ALS639ANSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74ALS638A-1NSR | SO | NS | 20 | 2000 | 367.0 | 367.0 | 45.0 |
| SN74ALS638ANSR | SO | NS | 20 | 2000 | 367.0 | 367.0 | 45.0 |
| SN74ALS639ANSR | SO | NS | 20 | 2000 | 367.0 | 367.0 | 45.0 |

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



4209202-4/E 07/11

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Refer to IPC7351 for alternate board design.
 - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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