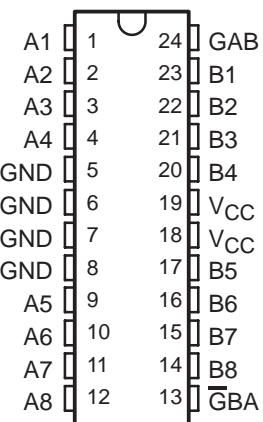


74ACT11623
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

SCAS059A – D2957, JULY 1987 – REVISED APRIL 1993

- Local Bus-Latch Capability
- Inputs Are TTL-Voltage Compatible
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- μ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs

DW OR NT PACKAGE
(TOP VIEW)



description

The 74ACT11623 is designed for asynchronous two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

The device allows data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the enable inputs (\overline{GBA} and GAB). The enable inputs can be used to disable the device so that the buses are effectively isolated.

The dual-enable configuration gives these devices the capability to store data by simultaneous enabling of \overline{GBA} and GAB. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states. The 8-bit codes appearing on the two sets of buses will be identical for the 74ACT11623.

The 74ACT11623 is characterized for operation from – 40°C to 85°C.

FUNCTION TABLE

| ENABLE INPUTS | | OPERATION |
|---------------|-----|-------------------------------------|
| GBA | GAB | |
| L | L | B data to A bus |
| H | H | A data to B bus |
| H | L | Isolation |
| L | H | B data to A bus, A data to B bus |

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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TEXAS
INSTRUMENTS

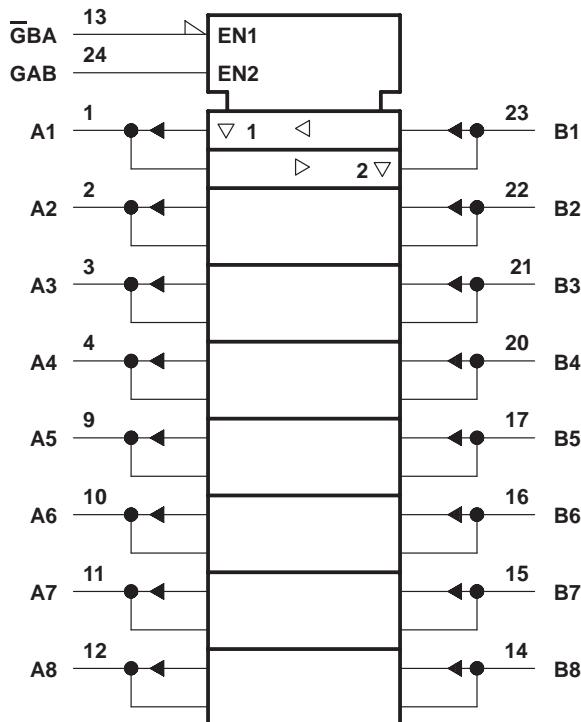
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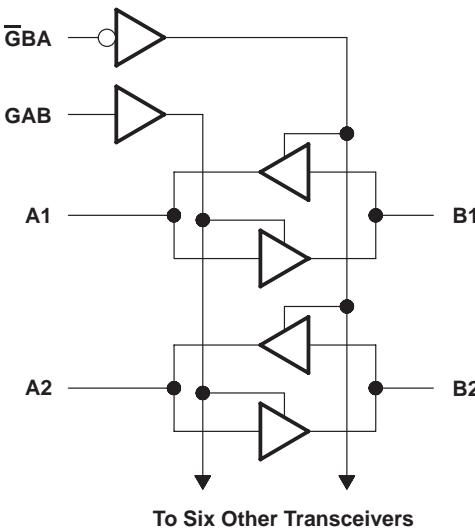
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logic symbol†



logic diagram (positive logic)



† This symbol is in accordance with ANSI/IEEE Std 91-1984
 and IEC Publication 617-12.

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

| | |
|--|----------------------------|
| Supply voltage range, V_{CC} | -0.5 V to 7 V |
| Input voltage range, V_I (see Note 1) | -0.5 V to $V_{CC} + 0.5$ V |
| Output voltage range, V_O (see Note 1) | -0.5 V to $V_{CC} + 0.5$ V |
| Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) | ± 20 mA |
| Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) | ± 50 mA |
| Continuous output current, I_O ($V_O = 0$ to V_{CC}) | ± 50 mA |
| Continuous current through V_{CC} or GND | ± 200 mA |
| 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.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

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recommended operating conditions

| | | MIN | MAX | UNIT |
|---------------------|------------------------------------|-----|----------|------|
| V_{CC} | Supply voltage | 4.5 | 5.5 | V |
| V_{IH} | High-level input voltage | 2 | | V |
| V_{IL} | Low-level input voltage | | 0.8 | V |
| V_I | Input voltage | 0 | V_{CC} | V |
| V_O | Output voltage | 0 | V_{CC} | V |
| I_{OH} | High-level output current | | -24 | mA |
| I_{OL} | Low-level output current | | 24 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | 0 | 10 | ns/V |
| T_A | Operating free-air temperature | -40 | 85 | °C |

electrical characteristics over recommended operating free-air temperature range

| PARAMETER | TEST CONDITIONS | V_{CC} | $T_A = 25^\circ C$ | | | MIN | MAX | UNIT | |
|--------------------------|---------------------------|---|--------------------|------|-----------|---------|---------|------|--|
| | | | MIN | TYP | MAX | | | | |
| V_{OH} | $I_{OH} = -50 \mu A$ | 4.5 V | 4.4 | | 4.4 | V | 5.4 | mA | |
| | | 5.5 V | 5.4 | | 5.4 | | | | |
| | $I_{OH} = -24 mA$ | 4.5 V | 3.94 | | 3.8 | | | | |
| | | 5.5 V | 4.94 | | 4.8 | | | | |
| | $I_{OH} = -75 mA^\dagger$ | 5.5 V | | | 3.85 | | | | |
| | $I_{OL} = 50 \mu A$ | 4.5 V | | 0.1 | 0.1 | V | 0.1 | mA | |
| V_{OL} | | 5.5 V | | 0.1 | 0.1 | | | | |
| | | 4.5 V | | 0.36 | 0.44 | | | | |
| | | 5.5 V | | 0.36 | 0.44 | | | | |
| $I_{OL} = 75 mA^\dagger$ | 5.5 V | | | 1.65 | | | | | |
| I_{OZ} | A or B ports ‡ | $V_O = V_{CC}$ or GND | 5.5 V | | ± 0.5 | ± 5 | μA | | |
| I_I | $\overline{G}BA$ or GAB | $V_I = V_{CC}$ or GND | 5.5 V | | ± 0.1 | ± 1 | μA | | |
| I_{CC} | | $V_I = V_{CC}$ or GND, $I_O = 0$ | 5.5 V | | 4 | 40 | μA | | |
| ΔI_{CC}^\S | | One input at 3.4 V, Other inputs at GND or V_{CC} | 5.5 V | | 0.9 | 1 | mA | | |
| C_i | $\overline{G}BA$ or GAB | $V_I = V_{CC}$ or GND | 5 V | | 4 | | pF | | |
| C_{io} | A or B ports | $V_O = V_{CC}$ or GND | 5 V | | 20 | | pF | | |

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

‡ For I/O ports, the parameter I_{OZ} includes the input leakage.

§ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC} .

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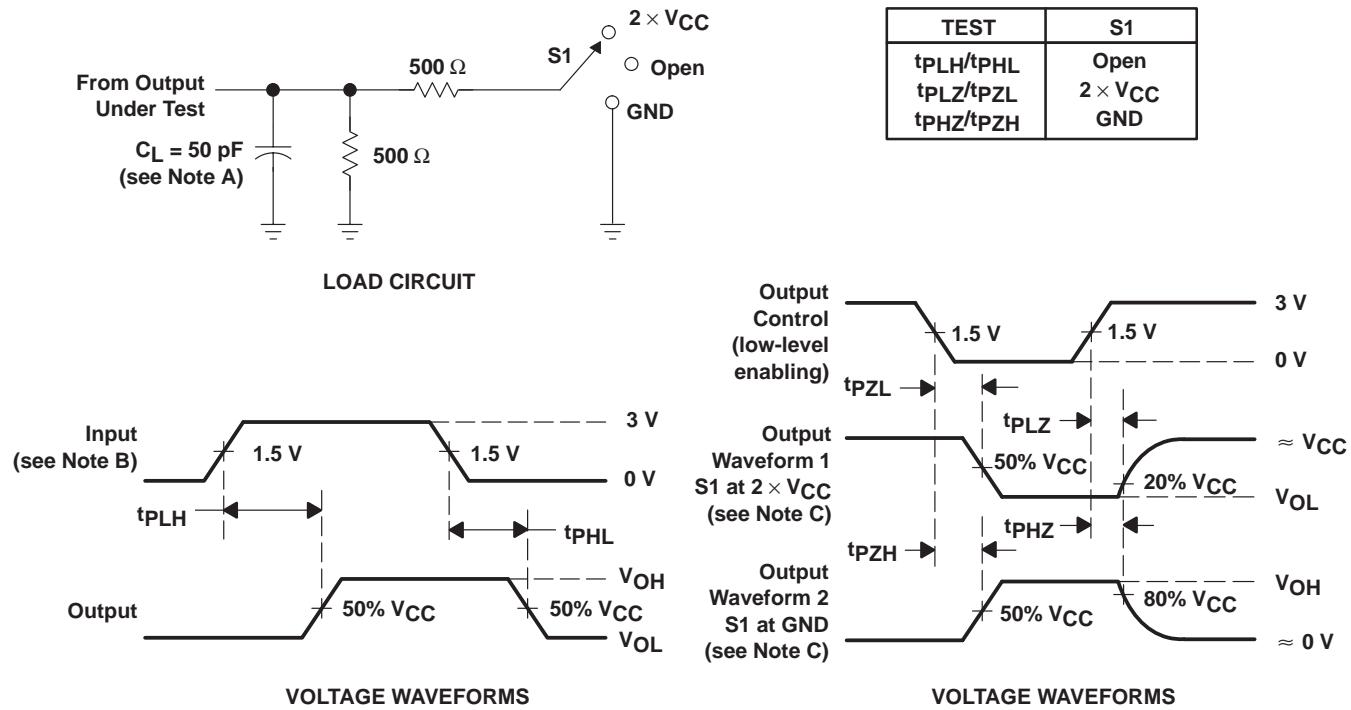
switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TA = 25°C | | | MIN | MAX | UNIT |
|-----------|-----------------|----------------|-----------|-----|------|-----|------|------|
| | | | MIN | TYP | MAX | | | |
| tPLH | A or B | B or A | 1.5 | 6 | 7.5 | 1.5 | 8.5 | ns |
| tPHL | | | 1.5 | 5.5 | 7.2 | 1.5 | 7.9 | |
| tPZH | G _{BA} | A | 1.5 | 6.9 | 8.6 | 1.5 | 9.7 | ns |
| tPZL | | | 1.5 | 6.9 | 9 | 1.5 | 10 | |
| tPHZ | G _{BA} | A | 1.5 | 8.1 | 10 | 1.5 | 10.9 | ns |
| tPLZ | | | 1.5 | 8.5 | 10.5 | 1.5 | 11.5 | |
| tPZH | G _{AB} | B | 1.5 | 7.7 | 9.3 | 1.5 | 10.7 | ns |
| tPZL | | | 1.5 | 7.7 | 9.7 | 1.5 | 10.9 | |
| tPHZ | G _{AB} | B | 1.5 | 7.1 | 8.8 | 1.5 | 9.5 | ns |
| tPLZ | | | 1.5 | 7.3 | 9.2 | 1.5 | 10 | |

operating characteristics, V_{CC} = 5 V, TA = 25°C

| PARAMETER | TEST CONDITIONS | TYP | UNIT |
|---|--|-----|------|
| | | | |
| C _{pd} Power dissipation capacitance per transceiver | Outputs enabled C _L = 50 pF, f = 1 MHz | 41 | pF |
| | | 8 | |

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.

B. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\ MHz$, $Z_O = 50\ \Omega$, $t_r = 3\ ns$, $t_f = 3\ ns$.
 C. 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.
 D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit 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⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 74ACT11623DW | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWE4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWE4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWG4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWG4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWR | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWR | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWRE4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWRE4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWRG4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623DWRG4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| 74ACT11623NT | ACTIVE | PDIP | NT | 24 | | TBD | Call TI | Call TI |
| 74ACT11623NT | ACTIVE | PDIP | NT | 24 | | TBD | Call TI | Call TI |
| 74ACT11623NTE4 | ACTIVE | PDIP | NT | 24 | | TBD | Call TI | Call TI |
| 74ACT11623NTE4 | ACTIVE | PDIP | NT | 24 | | TBD | Call TI | Call TI |

⁽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.

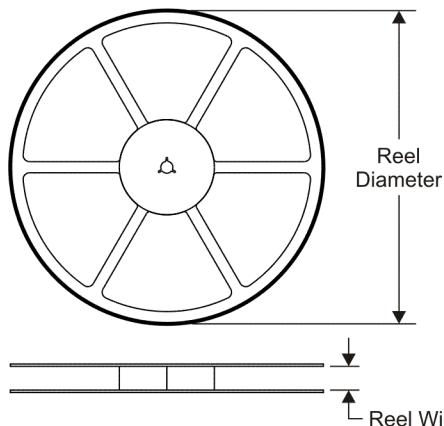
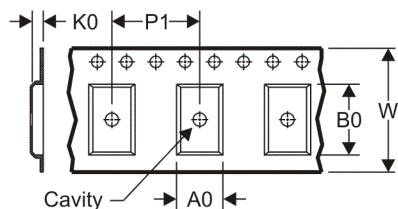
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

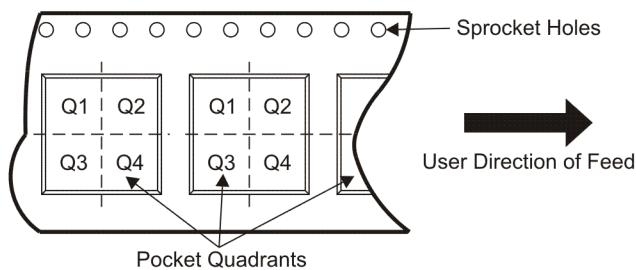
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TAPE AND REEL INFORMATION
REEL DIMENSIONS

TAPE DIMENSIONS


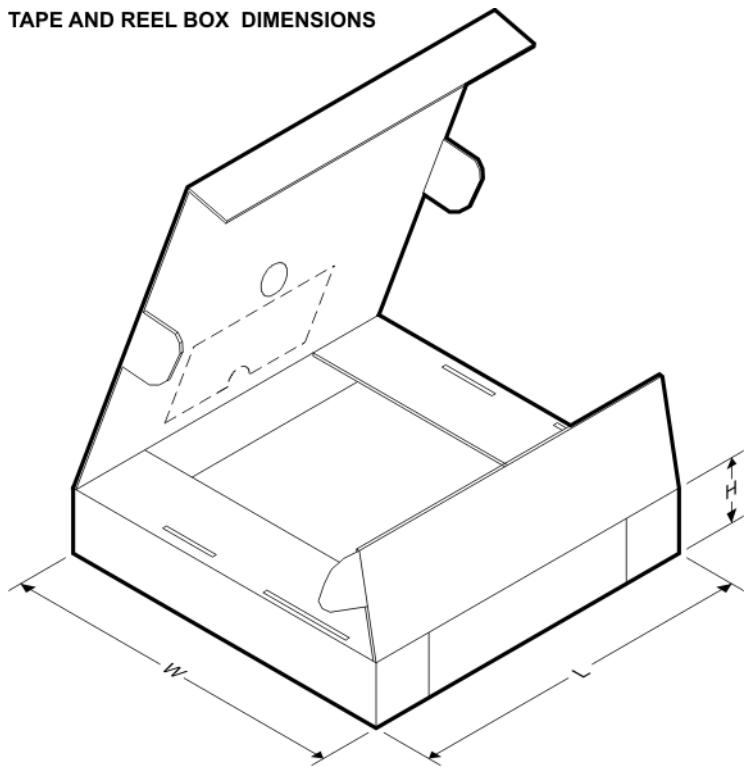
| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| 74ACT11623DWR | SOIC | DW | 24 | 2000 | 330.0 | 24.4 | 10.75 | 15.7 | 2.7 | 12.0 | 24.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

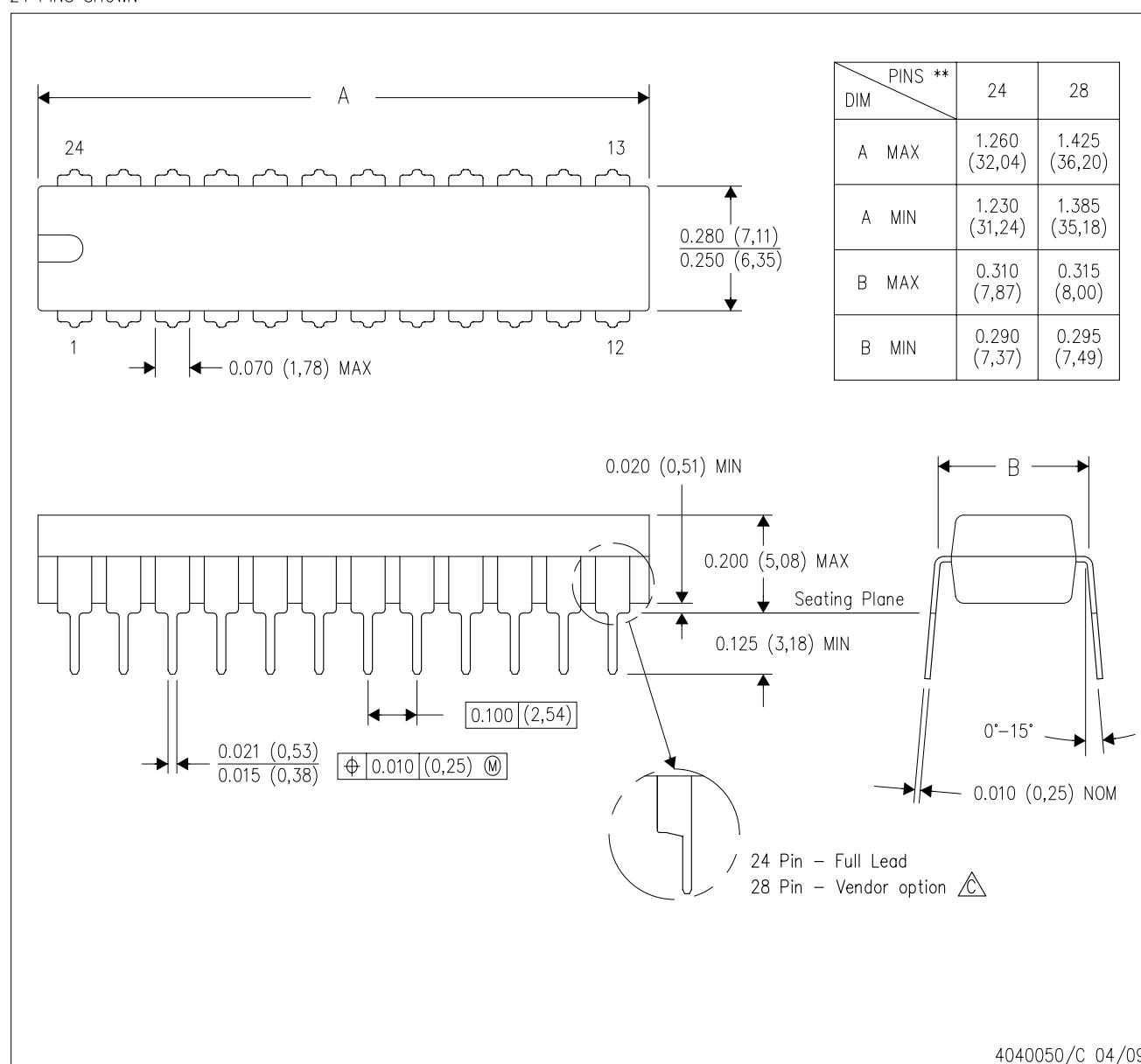
| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| 74ACT11623DWR | SOIC | DW | 24 | 2000 | 346.0 | 346.0 | 41.0 |

MECHANICAL DATA

NT (R-PDIP-T**)

24 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



4040050/C 04/09

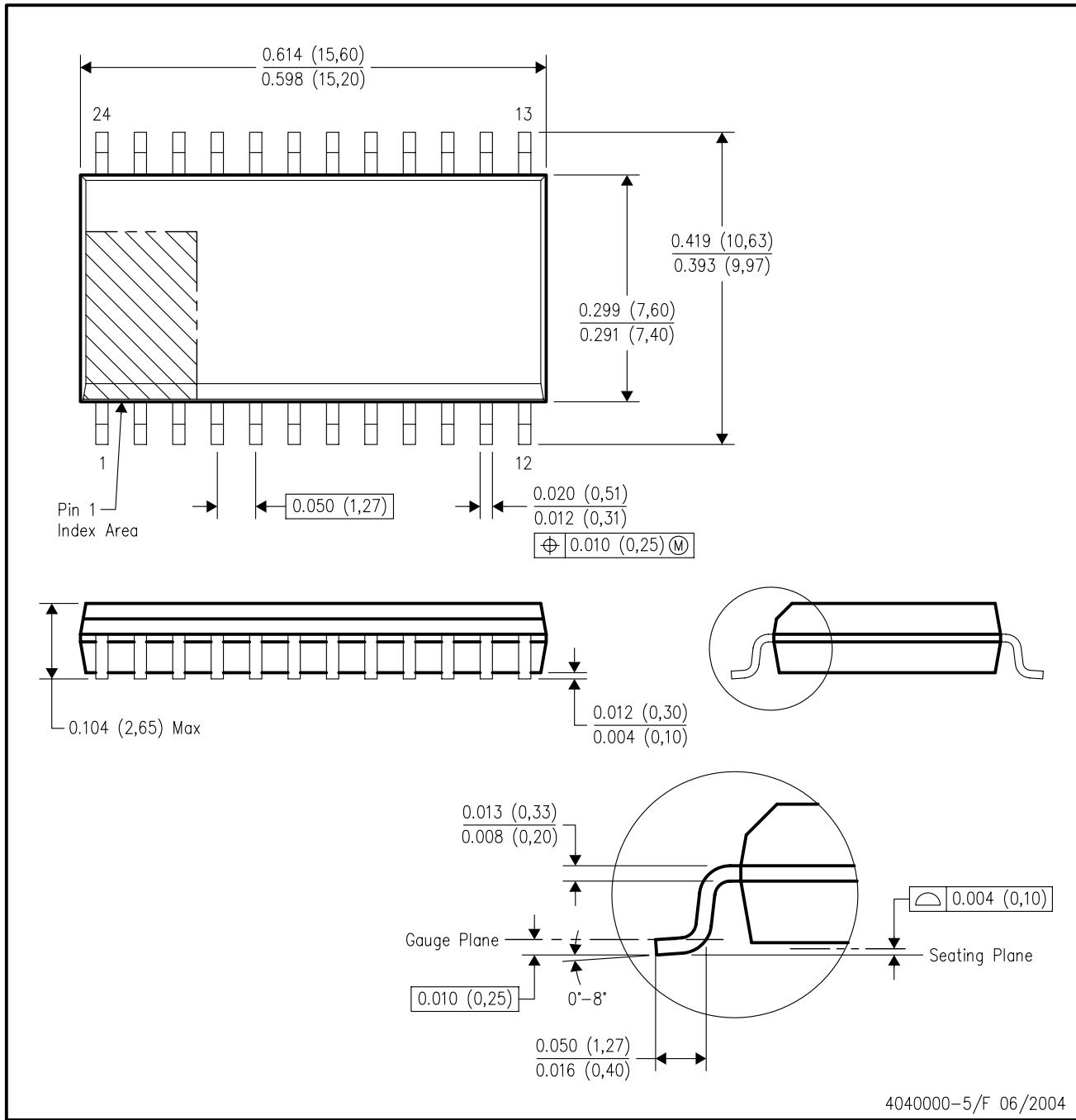
NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.

B. This drawing is subject to change without notice.

 The 28 pin end lead shoulder width is a vendor option, either half or full width.

DW (R-PDSO-G24)

PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

- All linear dimensions are in inches (millimeters).
- This drawing is subject to change without notice.
- Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0.15).
- Falls within JEDEC MS-013 variation AD.

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