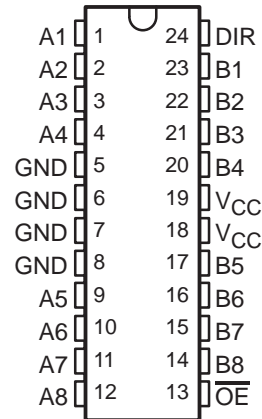


- **3-State Outputs Drive Bus Lines Directly**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin  $V_{CC}$  and GND Configurations Minimize High-Speed Switching Noise**
- **EPIC™ (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, and Standard Plastic 300-mil DIPs (NT)**

**DB, DW, NT, OR PW PACKAGE**  
**(TOP VIEW)**



**description**

This octal bus transceiver is designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements.

The device allows noninverted data transmission from the A bus to the B bus 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 that the buses are effectively isolated.

The 74AC11245 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

**FUNCTION TABLE**

| OUTPUT<br>ENABLE<br>$\overline{OE}$ | DIRECTION<br>CONTROL<br>DIR | OPERATION       |
|-------------------------------------|-----------------------------|-----------------|
| L                                   | L                           | B data to A bus |
| L                                   | H                           | A data to B bus |
| H                                   | X                           | Isolation       |



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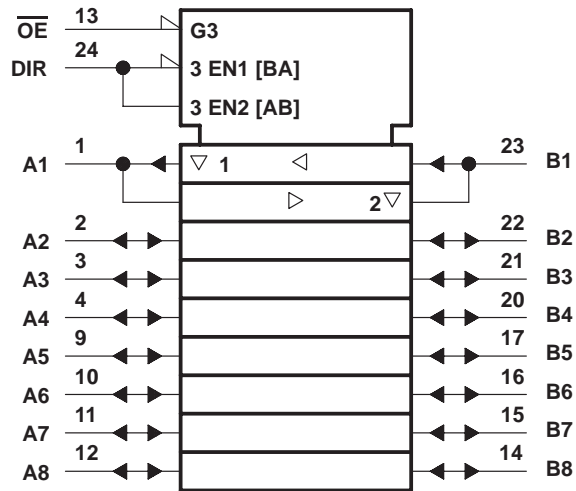


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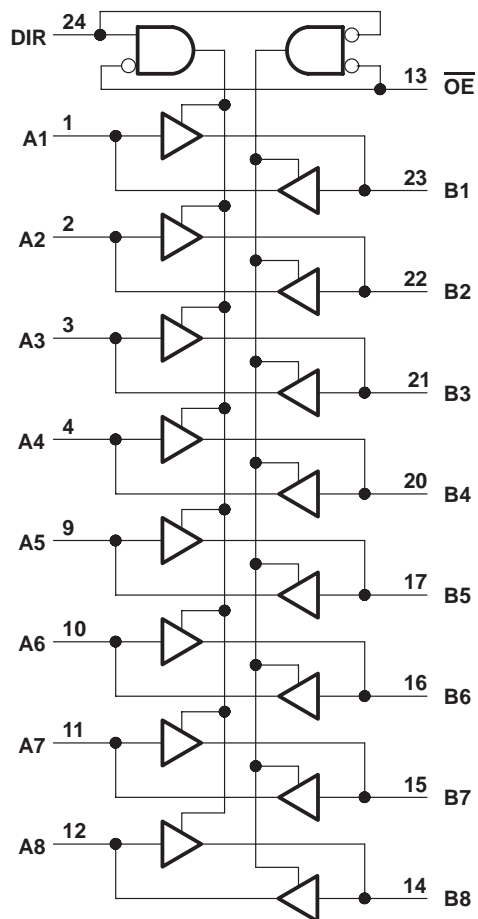
**74AC11245**  
**OCTAL BUS TRANSCEIVER**  
**WITH 3-STATE OUTPUTS**  
 SCAS010B – JULY 1987 – REVISED APRIL 1996

**logic symbol†**



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

**logic diagram (positive logic)**



**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                    |        |
| Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2): | DB package .....           | 0.65 W |
|  | DW package .....           | 1.7 W  |
|  | NT package .....           | 1.3 W  |
|  | PW package .....           | 0.7 W  |
| Storage temperature range, $T_{stg}$ .....   | –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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the NT package, which has a trace length of zero.

**recommended operating conditions**

|                     |                                    | MIN              | NOM  | MAX      | UNIT |
|---------------------|------------------------------------|------------------|------|----------|------|
| $V_{CC}$            | Supply voltage                     | 3                | 5    | 5.5      | V    |
| $V_{IH}$            | High-level input voltage           | $V_{CC} = 3$ V   | 2.1  |          | V    |
|                     |                                    | $V_{CC} = 4.5$ V | 3.15 |          |      |
|                     |                                    | $V_{CC} = 5.5$ V | 3.85 |          |      |
| $V_{IL}$            | Low-level input voltage            | $V_{CC} = 3$ V   |      | 0.9      | V    |
|                     |                                    | $V_{CC} = 4.5$ V |      | 1.35     |      |
|                     |                                    | $V_{CC} = 5.5$ V |      | 1.65     |      |
| $V_I$               | Input voltage                      | 0                |      | $V_{CC}$ | V    |
| $V_O$               | Output voltage                     | 0                |      | $V_{CC}$ | V    |
| $I_{OH}$            | High-level output current          | $V_{CC} = 3$ V   |      | –4       | mA   |
|                     |                                    | $V_{CC} = 4.5$ V |      | –24      |      |
|                     |                                    | $V_{CC} = 5.5$ V |      | –24      |      |
| $I_{OL}$            | Low-level output current           | $V_{CC} = 3$ V   |      | 12       | mA   |
|                     |                                    | $V_{CC} = 4.5$ V |      | 24       |      |
|                     |                                    | $V_{CC} = 5.5$ V |      | 24       |      |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | 0                |      | 10       | ns/V |
| $T_A$               | Operating free-air temperature     | –40              |      | 85       | °C   |

**74AC11245**  
**OCTAL BUS TRANSCEIVER**  
**WITH 3-STATE OUTPUTS**  
 SCAS010B – JULY 1987 – REVISED APRIL 1996

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

| PARAMETER                             | TEST CONDITIONS   | V <sub>CC</sub>                         | T <sub>A</sub> = 25°C |     |      | MIN  | MAX  | UNIT |    |
|---------------------------------------|---|---|-----------------------|-----|------|------|------|------|----|
|                                       |   |   | MIN                   | TYP | MAX  |      |      |      |    |
| V <sub>OH</sub>                       | I <sub>OH</sub> = -50 μA                                    | 3 V                                     | 2.9                   |     |      | 2.9  |      | V    |    |
|                                       |   | 4.5 V                                   | 4.4                   |     |      | 4.4  |      |      |    |
|                                       |   | 5.5 V                                   | 5.4                   |     |      | 5.4  |      |      |    |
|                                       | I <sub>OH</sub> = -4 mA                                     | 3 V                                     | 2.58                  |     |      | 2.48 |      |      |    |
|                                       |   | 4.5 V                                   | 3.94                  |     |      | 3.8  |      |      |    |
|                                       |   | 5.5 V                                   | 4.94                  |     |      | 4.8  |      |      |    |
| I <sub>OH</sub> = -75 mA <sup>†</sup> | 5.5 V   |   |                       |     | 3.85 |      |      |      |    |
| V <sub>OL</sub>                       | I <sub>OL</sub> = 50 μA                                     | 3 V                                     |                       |     |      | 0.1  |      | V    |    |
|                                       |   | 4.5 V                                   |                       |     |      | 0.1  |      |      |    |
|                                       |   | 5.5 V                                   |                       |     |      | 0.1  |      |      |    |
|                                       | I <sub>OL</sub> = 12 mA                                     | 3 V                                     |                       |     |      | 0.36 |      |      |    |
|                                       |   | 4.5 V                                   |                       |     |      | 0.36 |      |      |    |
|                                       |   | 5.5 V                                   |                       |     |      | 0.36 |      |      |    |
| I <sub>OL</sub> = 24 mA               | 5.5 V   |   |                       |     | 1.65 |      |      |      |    |
| I <sub>I</sub>                        | A or B ports <sup>‡</sup>                                   | V <sub>O</sub> = V <sub>CC</sub> or GND | 5.5 V                 |     |      |      | ±0.5 |      | μA |
|                                       | $\overline{\text{OE}}$ or DIR                               |   |                       |     |      |      | ±1   |      |    |
| I <sub>CC</sub>                       | V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0 | 5.5 V                                   |                       |     |      | 8    |      | μA   |    |
| C <sub>i</sub>                        | V <sub>I</sub> = V <sub>CC</sub> or GND                     | 5 V                                     |                       |     |      | 4    |      | pF   |    |
| C <sub>io</sub>                       | V <sub>O</sub> = V <sub>CC</sub> or GND                     | 5 V                                     |                       |     |      | 12   |      | pF   |    |

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

<sup>‡</sup> For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.

**switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)**

| PARAMETER        | FROM (INPUT)           | TO (OUTPUT) | T <sub>A</sub> = 25°C |     |      | MIN | MAX  | UNIT |
|------------------|------------------------|-------------|-----------------------|-----|------|-----|------|------|
|                  |                        |             | MIN                   | TYP | MAX  |     |      |      |
| t <sub>PLH</sub> | A or B                 | B or A      | 1.5                   | 6.5 | 11.2 | 1.5 | 12.5 | ns   |
| t <sub>PHL</sub> |                        |             | 1.5                   | 5.7 | 8.5  | 1.5 | 9.7  |      |
| t <sub>PZH</sub> | $\overline{\text{OE}}$ | B or A      | 1.5                   | 8.6 | 14.2 | 1.5 | 15.9 | ns   |
| t <sub>PZL</sub> |                        |             | 1.5                   | 8.2 | 11.5 | 1.5 | 12.7 |      |
| t <sub>PHZ</sub> | $\overline{\text{OE}}$ | B or A      | 1.5                   | 7.7 | 10.5 | 1.5 | 11.3 | ns   |
| t <sub>PLZ</sub> |                        |             | 1.5                   | 8.5 | 12   | 1.5 | 13   |      |

**switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)**

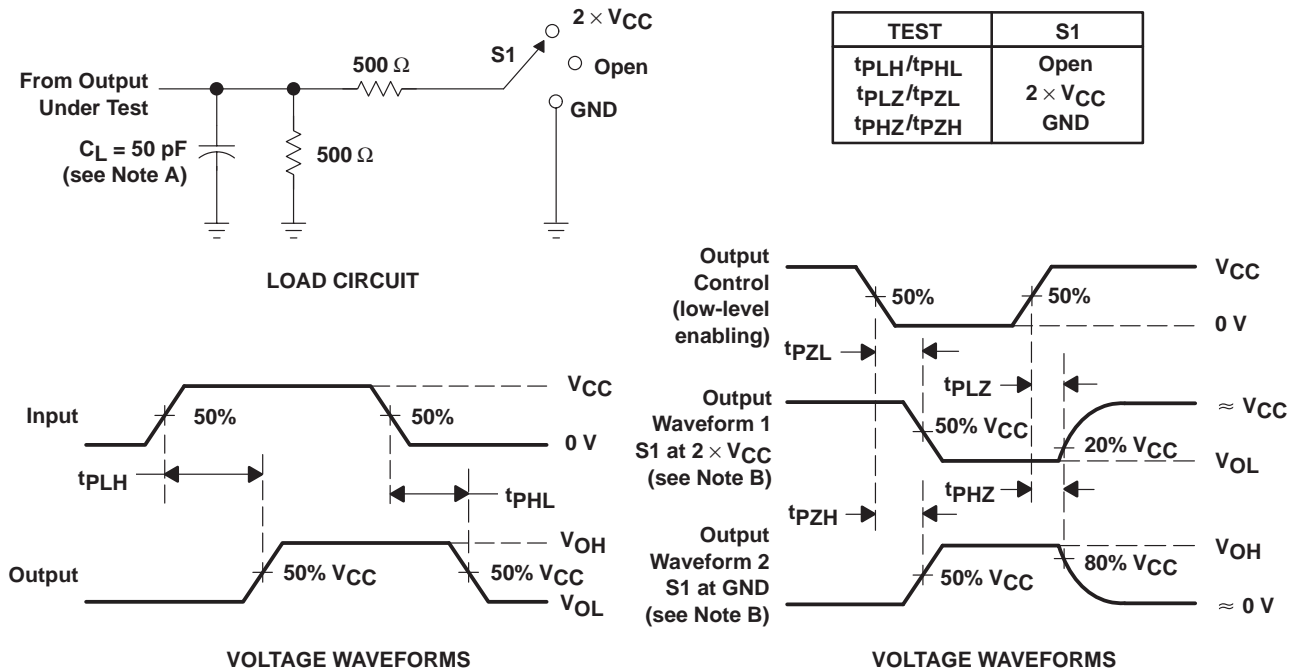
| PARAMETER        | FROM (INPUT)           | TO (OUTPUT) | T <sub>A</sub> = 25°C |     |      | MIN | MAX  | UNIT |
|------------------|------------------------|-------------|-----------------------|-----|------|-----|------|------|
|                  |                        |             | MIN                   | TYP | MAX  |     |      |      |
| t <sub>PLH</sub> | A or B                 | B or A      | 1.5                   | 4.8 | 8.5  | 1.5 | 9.5  | ns   |
| t <sub>PHL</sub> |                        |             | 1.5                   | 4.1 | 6.3  | 1.5 | 6.9  |      |
| t <sub>PZH</sub> | $\overline{\text{OE}}$ | B or A      | 1.5                   | 6.2 | 10.2 | 1.5 | 11.4 | ns   |
| t <sub>PZL</sub> |                        |             | 1.5                   | 5.9 | 8.6  | 1.5 | 9.5  |      |
| t <sub>PHZ</sub> | $\overline{\text{OE}}$ | B or A      | 1.5                   | 6.4 | 8.8  | 1.5 | 9.5  | ns   |
| t <sub>PLZ</sub> |                        |             | 1.5                   | 7   | 9.6  | 1.5 | 10.4 |      |



operating characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

| PARAMETER |   | TEST CONDITIONS  | TYP | UNIT |
|-----------|---|------------------|-----|------|
| $C_{pd}$  | Power dissipation capacitance per transceiver | Outputs enabled  | 64  | pF   |
|           |   | Outputs disabled |     |      |

**PARAMETER MEASUREMENT INFORMATION**



- 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. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1\text{ MHz}$ ,  $Z_O = 50\ \Omega$ ,  $t_r = 3\text{ ns}$ ,  $t_f = 3\text{ ns}$ .  
 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 <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 74AC11245DBLE    | OBSOLETE              | SSOP         | DB              | 24   |             | TBD                     | Call TI          | Call TI                      |
| 74AC11245DBR     | OBSOLETE              | SSOP         | DB              | 24   |             | TBD                     | Call TI          | Call TI                      |
| 74AC11245DW      | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245DWE4    | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245DWG4    | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245DWR     | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245DWRE4   | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245DWRG4   | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| 74AC11245NT      | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| 74AC11245NTE4    | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| 74AC11245PWLE    | OBSOLETE              | TSSOP        | PW              | 24   |             | TBD                     | Call TI          | Call TI                      |

<sup>(1)</sup> 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.

<sup>(2)</sup> 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)

<sup>(3)</sup> 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 BOX DIMENSIONS**



\*All dimensions are nominal

| Device       | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| 74AC11245DWR | SOIC         | DW              | 24   | 2000 | 346.0       | 346.0      | 41.0        |



DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 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.  
 D. Falls within JEDEC MO-150

PW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97


- 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.  
 D. Falls within JEDEC MO-153

# MECHANICAL DATA

NT (R-PDIP-T\*\*) 24 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



- 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.



**PACKAGING INFORMATION**

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|-------------------------|
| 74AC11245DW      | ACTIVE        | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | NIPDAU                  | Level-1-260C-UNLIM   | -40 to 85    | AC11245                 | <a href="#">Samples</a> |
| 74AC11245DWR     | ACTIVE        | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | NIPDAU                  | Level-1-260C-UNLIM   | -40 to 85    | AC11245                 | <a href="#">Samples</a> |

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

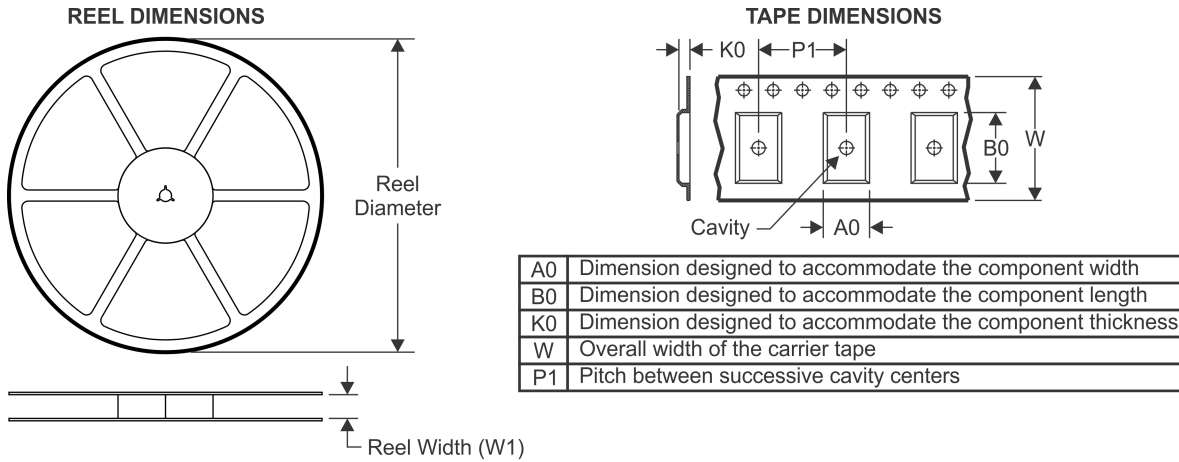
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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## TAPE AND REEL INFORMATION



### 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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| 74AC11245DWR | 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) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| 74AC11245DWR | SOIC         | DW              | 24   | 2000 | 350.0       | 350.0      | 43.0        |



DW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



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