

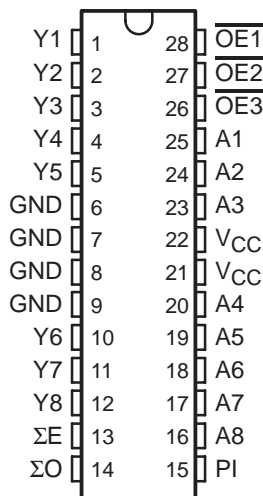
74ACT11656

OCTAL BUFFER/LINE DRIVER WITH PARITY CHECKER/GENERATOR AND 3-STATE OUTPUTS

SCAS460A – DECEMBER 1994 – REVISED APRIL 1996

- Inputs Are TTL-Voltage Compatible
- Combines '244 and '280 Functions In One Package
- 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

DW PACKAGE
(TOP VIEW)



description

The 74ACT11656 contains eight noninverting buffers with 3-state outputs and a 9-bit parity generator/checker. The device is intended for bus-oriented applications.

When data is transmitted, the parity input (PI) terminal is configured as an input and combined with the A-input data to generate a flag on either parity output (ΣE or ΣO) terminal, depending on the number of inputs that are high.

The output-enable ($\overline{OE1}$, $\overline{OE2}$, and $\overline{OE3}$) inputs can be used to disable the device so that the buses are effectively isolated.

The 74ACT11656 is characterized for operation from -40°C to 85°C .

FUNCTION TABLES

| INPUTS | | | | OUTPUT |
|------------------|------------------|------------------|---|--------|
| $\overline{OE1}$ | $\overline{OE2}$ | $\overline{OE3}$ | A | Y |
| L | L | L | L | L |
| L | L | L | H | H |
| H | X | X | X | Z |
| X | H | X | X | Z |
| X | X | H | X | Z |

| NO. OF INPUTS HIGH (PI, A1–A8) | PARITY OUTPUTS | |
|-----------------------------------|-------------------|------------|
| | ΣE | ΣO |
| EVEN 0, 2, 4, 6, 8 | H | L |
| ODD 1, 3, 5, 7, 9 | L | H |
| Any $\overline{OE} = \text{high}$ | Z | Z |



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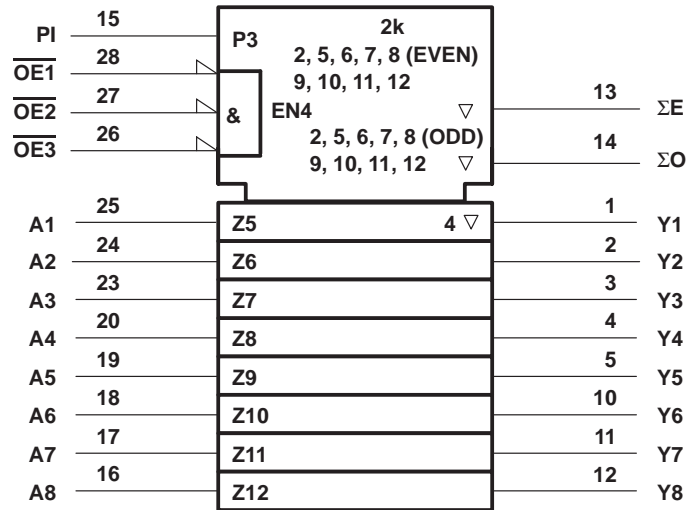
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logic symbol†

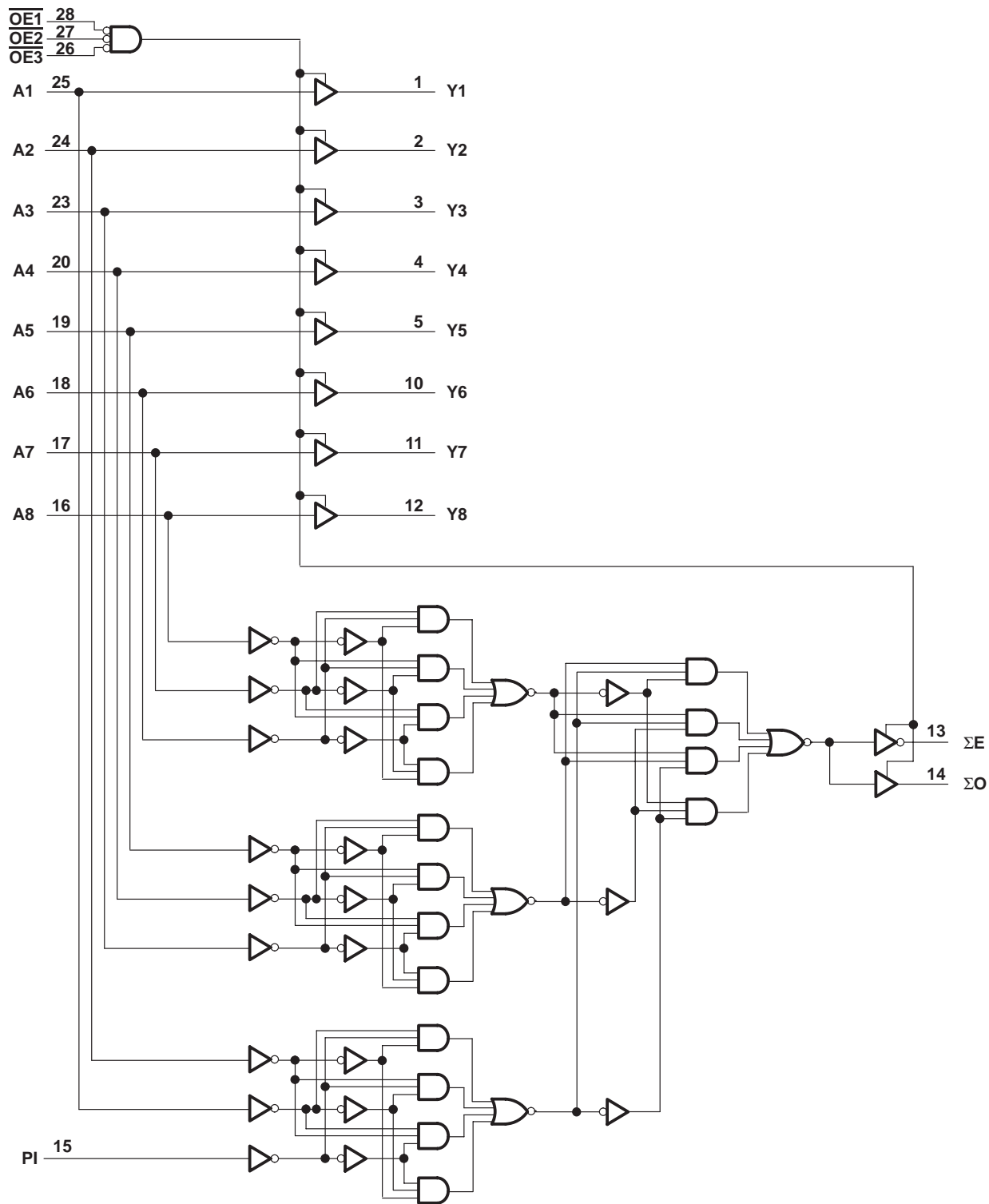


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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logic diagram (positive logic)



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absolute maximum rating over operating free-air temperature range (unless otherwise noted)†

| | | |
|---|-------|--|
| Supply voltage, 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 | | ± 225 mA |
| Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2) | | 1.7 W |
| Operating free-air temperature range, T_A | | -40°C to 85°C |
| 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.

recommended operating conditions (see Note 3)

| | | MIN | NOM | MAX | UNIT |
|---------------------|------------------------------------|-----|-----|----------|------------------|
| 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_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 | $^\circ\text{C}$ |

NOTE 3: Unused inputs must be held high or low to prevent them from floating.



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

| PARAMETER | TEST CONDITIONS | V _{CC} | T _A = 25°C | | | MIN | MAX | UNIT |
|---------------------------|---|-----------------|-----------------------|------|------|------|-----|------|
| | | | MIN | TYP | MAX | | | |
| V _{OH} | I _{OH} = -50 μA | 4.5 V | 4.4 | | 4.4 | | V | |
| | | 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† | 5.5 V | | | 3.85 | | | | |
| V _{OL} | I _{OL} = 50 μA | 4.5 V | | | 0.1 | 0.1 | V | |
| | | 5.5 V | | | 0.1 | 0.1 | | |
| | I _{OL} = 24 mA | 4.5 V | | | 0.36 | 0.44 | | |
| | | 5.5 V | | | 0.36 | 0.44 | | |
| | I _{OL} = 75 mA† | 5.5 V | | | | 1.65 | | |
| I _I | V _I = V _{CC} or GND | 5.5 V | | | ±0.1 | ±1 | μA | |
| I _{OZ} | V _O = V _{CC} or GND | 5.5 V | | | ±0.5 | ±5 | μA | |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 5.5 V | | | 8 | 80 | μA | |
| ΔI _{CC} ‡ | One input at 3.4 V, Other inputs at V _{CC} or GND | 5.5 V | | | 0.9 | 1 | mA | |
| C _i | V _I = V _{CC} or GND | 5 V | | 4.5 | | | pF | |
| C _o | V _O = V _{CC} or GND | 5 V | | 10 | | | pF | |

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

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

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | T _A = 25°C | | | MIN | MAX | UNIT |
|------------------|--------------|-------------|-----------------------|-----|------|-----|------|------|
| | | | MIN | TYP | MAX | | | |
| t _{PLH} | A | Y | 3.2 | 5.9 | 7.5 | 3.2 | 8.4 | ns |
| t _{PHL} | | | 2.5 | 5.9 | 8.3 | 2.5 | 9.5 | |
| t _{PLH} | A | ΣE, ΣO | 3.5 | 8.1 | 10.7 | 3.5 | 12 | ns |
| t _{PHL} | | | 3.9 | 8.7 | 11.4 | 3.9 | 13.2 | |
| t _{PZH} | OE | Y | 2.5 | 6.6 | 9.6 | 2.5 | 11.2 | ns |
| t _{PZL} | | | 3.8 | 8.3 | 12.1 | 3.8 | 14.6 | |
| t _{PHZ} | OE | Y | 4.9 | 7.8 | 10 | 4.9 | 10.9 | ns |
| t _{PLZ} | | | 5.1 | 7.6 | 9.2 | 5.1 | 9.9 | |

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

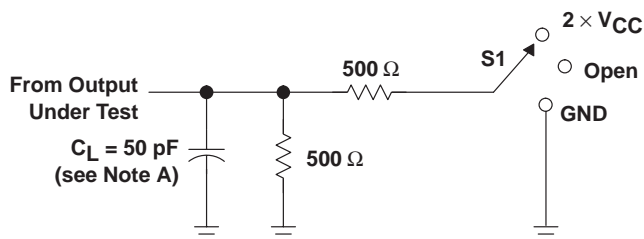
| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|-----------------|--|------------------|-----|------|
| C _{pd} | Power dissipation capacitance per buffer | Outputs enabled | 70 | pF |
| | | Outputs disabled | 22 | |



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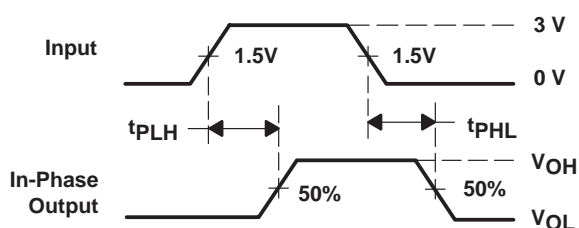
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PARAMETER MEASUREMENT INFORMATION

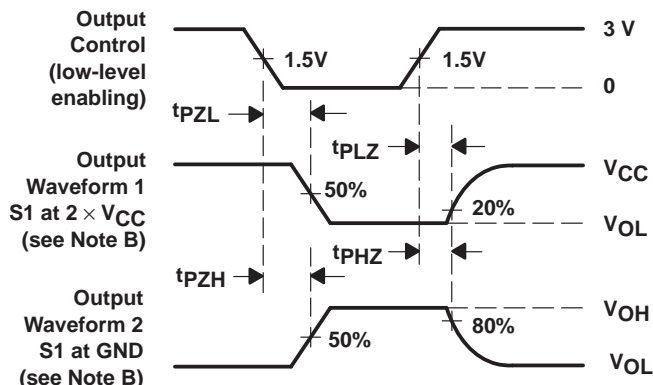


LOAD CIRCUIT

| TEST | S1 |
|------------------------------------|---------------------|
| t _{PLH} /t _{PHL} | Open |
| t _{PLZ} /t _{PZL} | 2 × V _{CC} |
| t _{PHZ} /t _{PZH} | GND |



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

- 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 ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 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 ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 74ACT11656DW | OBSOLETE | SOIC | DW | 28 | | 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) 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.

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)

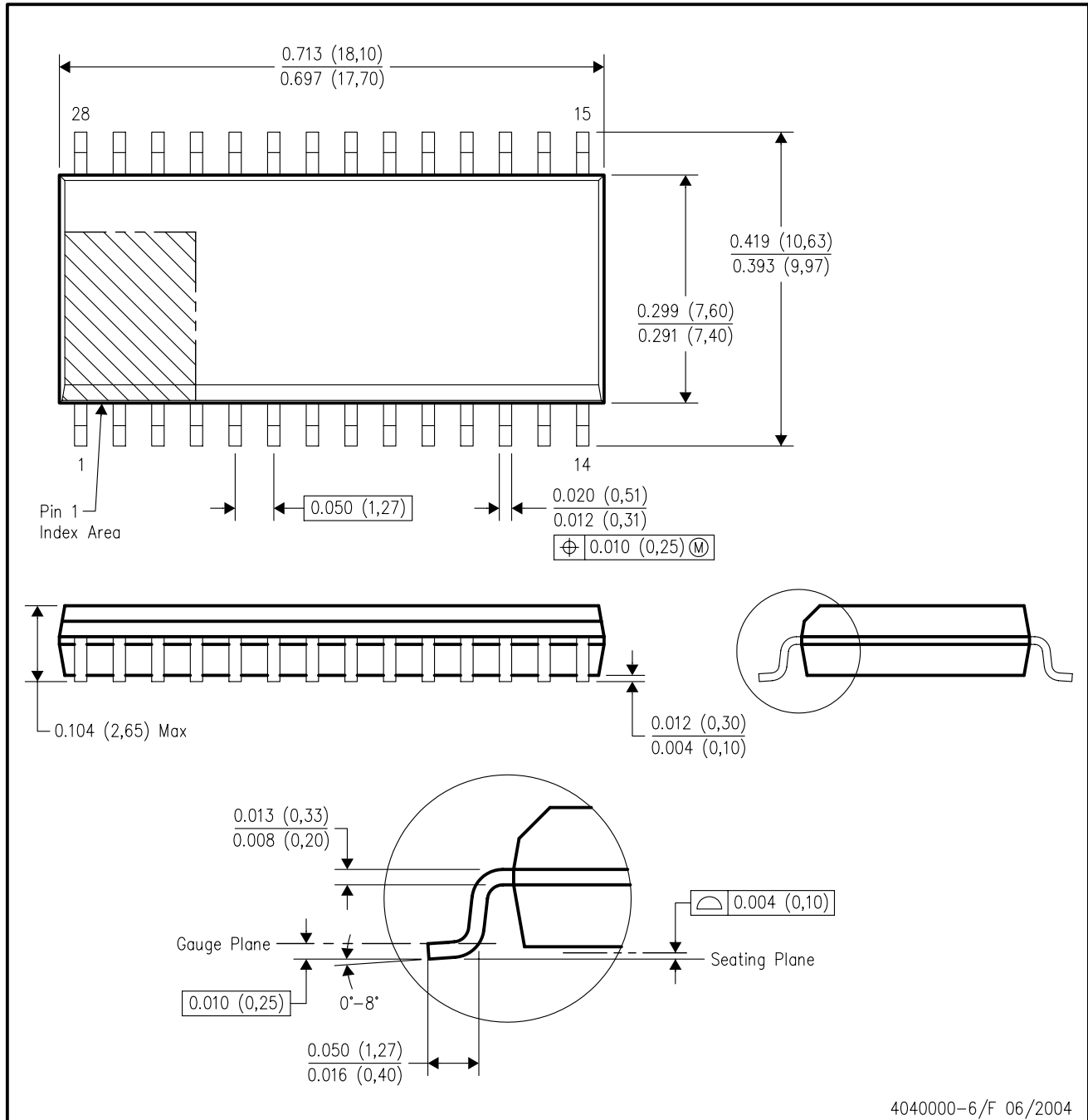
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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DW (R-PDSO-G28)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - 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 AE.

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) | Op Temp (°C) | Top-Side Markings (4) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-----------------|------------------|----------------------|--------------|--------------------------|---------|
| 74ACT11656DW | OBSOLETE | SOIC | DW | 28 | | TBD | Call TI | Call TI | -40 to 85 | | |

(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.

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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.

(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side 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 Top-Side Marking for that device.

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DW (R-PDSO-G28)

PLASTIC SMALL OUTLINE



4040000-6/G 01/11

- NOTES:
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 - Falls within JEDEC MS-013 variation AE.

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