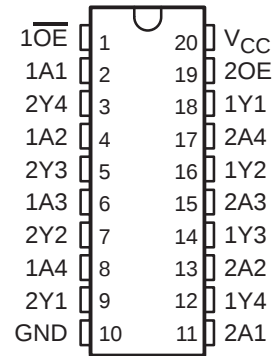


# SN64BCT757 OCTAL BUFFER/DRIVER WITH OPEN-COLLECTOR OUTPUTS

SCBS479 – MARCH 1993 – REVISED MAY 1994

- BiCMOS Design Significantly Reduces  $I_{CCZ}$
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model ( $C = 200$  pF,  $R = 0$ )
- High-Impedance State During Power Up and Power Down
- Open-Collector Outputs Drive Bus Lines or Buffer-Memory Address Registers
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic and Ceramic 300-mil DIPs (N)

DW OR N PACKAGE  
(TOP VIEW)



## description

This octal buffer and line driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The device provides complementary output-enable (OE and  $\overline{OE}$ ) inputs and noninverting outputs.

The SN64BCT757 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  and  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLES

| INPUTS           |    | OUTPUT |
|------------------|----|--------|
| $\overline{1OE}$ | 1A | 1Y     |
| H                | X  | H      |
| L                | L  | L      |
| L                | H  | H      |

| INPUTS |    | OUTPUT |
|--------|----|--------|
| 2OE    | 2A | 2Y     |
| L      | X  | H      |
| H      | L  | L      |
| H      | H  | H      |

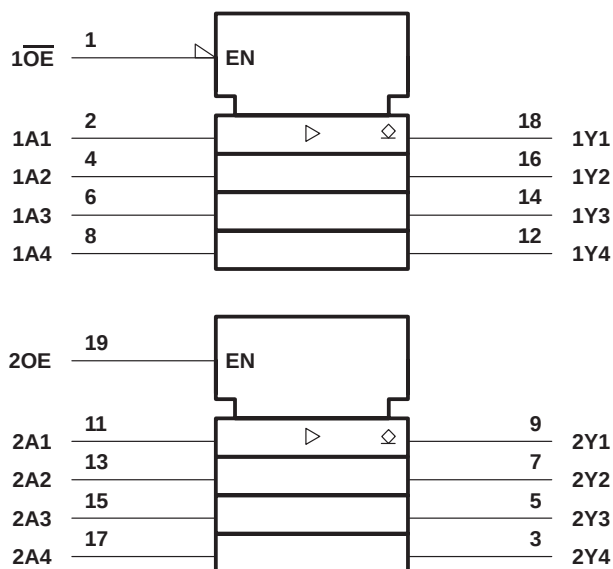
# SN64BCT757

## OCTAL BUFFER/DRIVER

### WITH OPEN-COLLECTOR OUTPUTS

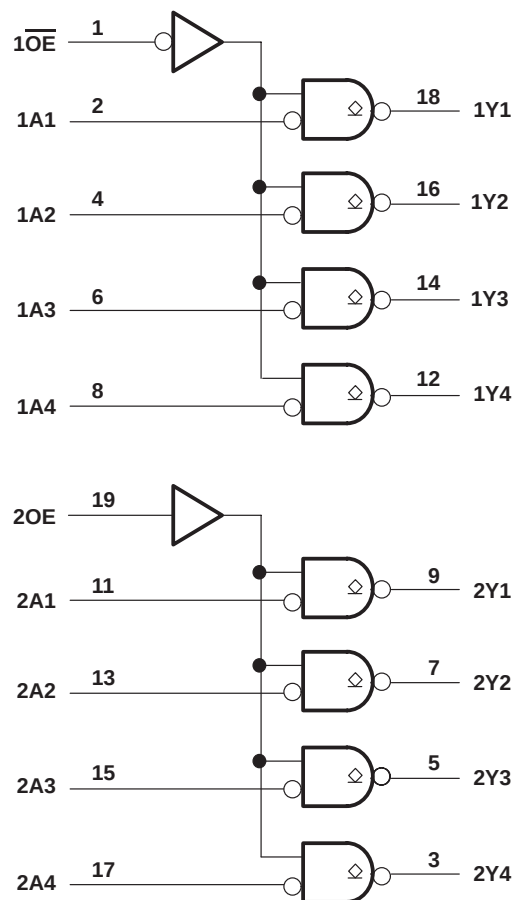
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#### logic symbol†



† 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 7 V      |
| Voltage range applied to any output in the disabled or power-off state, $V_O$ | –0.5 V to 5.5 V    |
| Voltage range applied to any output in the high state, $V_O$                  | –0.5 V to $V_{CC}$ |
| Input clamp current, $I_{IK}$ ( $V_I < 0$ )                                   | –30 mA             |
| Current into any output in the low state, $I_O$                               | 128 mA             |
| Operating free-air temperature range                                          | –40°C to 85°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.

NOTE 1: The input negative-voltage ratings may be exceeded if the input clamp-current ratings are observed.

**recommended operating conditions (see Note 2)**

|                     |                                | MIN | NOM | MAX | UNIT |
|---------------------|--------------------------------|-----|-----|-----|------|
| V <sub>CC</sub>     | Supply voltage                 | 4.5 | 5   | 5.5 | V    |
| V <sub>IH</sub>     | High-level input voltage       | 2   |     |     | V    |
| V <sub>IL</sub>     | Low-level input voltage        |     |     | 0.8 | V    |
| V <sub>OH</sub>     | High-level output voltage      |     |     | 5.5 | V    |
| I <sub>IK</sub>     | Input clamp current            |     |     | –18 | mA   |
| I <sub>OL</sub>     | Low-level output current       |     |     | 64  | mA   |
| Δt/ΔV <sub>CC</sub> | Power-up ramp rate             | 2   |     |     | μs/V |
| T <sub>A</sub>      | Operating free-air temperature | –40 |     | 85  | °C   |

NOTE 2: Unused or floating inputs must be held high or low.

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

| PARAMETER       | TEST CONDITIONS                            |                                                                    | MIN                                    | TYP <sup>†</sup> | MAX  | UNIT |
|-----------------|--------------------------------------------|--------------------------------------------------------------------|----------------------------------------|------------------|------|------|
| V <sub>IK</sub> | V <sub>CC</sub> = 4.5 V,                   | I <sub>I</sub> = –18 mA                                            |                                        |                  | –1.2 | V    |
| I <sub>OH</sub> | V <sub>CC</sub> = 4.5 V,                   | V <sub>OH</sub> = 5.5 V                                            |                                        |                  | 0.1  | mA   |
| V <sub>OL</sub> | V <sub>CC</sub> = 4.5 V,                   | I <sub>OL</sub> = 64 mA                                            | 0.42                                   | 0.55             |      | V    |
| I <sub>OZ</sub> | V <sub>CC</sub> = 0 to 2.3 V (power up),   | V <sub>O</sub> = 2.7 V, $\overline{\text{OE}}$ = 0.8 V or OE = 2 V |                                        |                  | 50   | μA   |
| I <sub>OZ</sub> | V <sub>CC</sub> = 1.8 V to 0 (power down), | V <sub>O</sub> = 2.7 V, $\overline{\text{OE}}$ = 0.8 V or OE = 2 V |                                        |                  | 50   | μA   |
| I <sub>I</sub>  | V <sub>CC</sub> = 5.5 V,                   | V <sub>I</sub> = 7 V                                               |                                        |                  | 0.1  | mA   |
| I <sub>IH</sub> | V <sub>CC</sub> = 5.5 V,                   | V <sub>I</sub> = 2.7 V                                             |                                        |                  | 20   | μA   |
| I <sub>IL</sub> | V <sub>CC</sub> = 5.5 V,                   | V <sub>I</sub> = 0.5 V                                             |                                        |                  | –1   | mA   |
| I <sub>CC</sub> | V <sub>CC</sub> = 5.5 V,                   | Outputs open                                                       | Outputs high                           |                  | 34   | mA   |
|                 |                                            |                                                                    | Outputs low                            |                  | 77   |      |
|                 |                                            |                                                                    | OE and $\overline{\text{OE}}$ inactive |                  | 10   |      |
| C <sub>i</sub>  | V <sub>CC</sub> = 5 V,                     | V <sub>I</sub> = 2.5 V or 0.5 V                                    |                                        | 6                |      | pF   |
| C <sub>o</sub>  | V <sub>CC</sub> = 5 V,                     | V <sub>O</sub> = 2.5 V or 0.5 V                                    |                                        | 4                |      | pF   |

<sup>†</sup> All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

**switching characteristics over recommended range of supply voltage, C<sub>L</sub> = 50 pF (unless otherwise noted) (see Note 3)**

| PARAMETER        | FROM<br>(INPUT)          | TO<br>(OUTPUT) | V <sub>CC</sub> = 5 V,<br>T <sub>A</sub> = 25°C |      |      | T <sub>A</sub> = –40°C<br>to 85°C |      | T <sub>A</sub> = 0°C<br>to 70°C |      | UNIT |
|------------------|--------------------------|----------------|-------------------------------------------------|------|------|-----------------------------------|------|---------------------------------|------|------|
|                  |                          |                | MIN                                             | TYP  | MAX  | MIN                               | MAX  | MIN                             | MAX  |      |
| t <sub>PLH</sub> | A                        | Y              | 6.9                                             | 8.3  | 9.6  | 6.5                               | 11.2 | 6.6                             | 10.1 | ns   |
| t <sub>PHL</sub> |                          |                | 2.4                                             | 4.2  | 6    | 1.9                               | 7    | 2                               | 6.6  |      |
| t <sub>PLH</sub> | 2OE                      | Y              | 11                                              | 14.8 | 17.9 | 10.4                              | 21.3 | 10.8                            | 19.7 | ns   |
| t <sub>PHL</sub> |                          |                | 2.9                                             | 4.6  | 6.2  | 2.6                               | 7.5  | 2.6                             | 6.9  |      |
| t <sub>PLH</sub> | 1 $\overline{\text{OE}}$ | Y              | 11.4                                            | 13.9 | 16.1 | 8.9                               | 19.9 | 10                              | 18   | ns   |
| t <sub>PHL</sub> |                          |                | 4.4                                             | 6.1  | 7.8  | 4                                 | 9.2  | 4                               | 8.5  |      |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

**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> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN64BCT757DW     | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN64BCT757DWE4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN64BCT757DWG4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN64BCT757DWR    | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN64BCT757DWRE4  | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN64BCT757DWRG4  | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

<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.

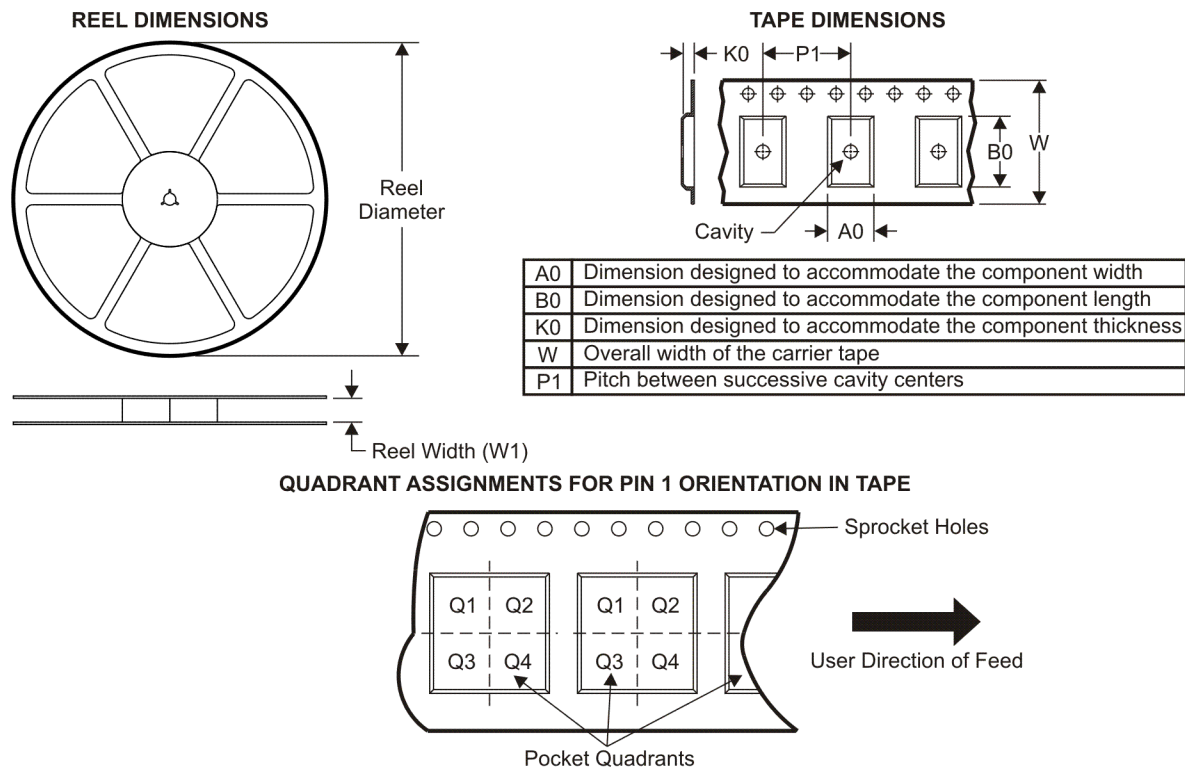
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**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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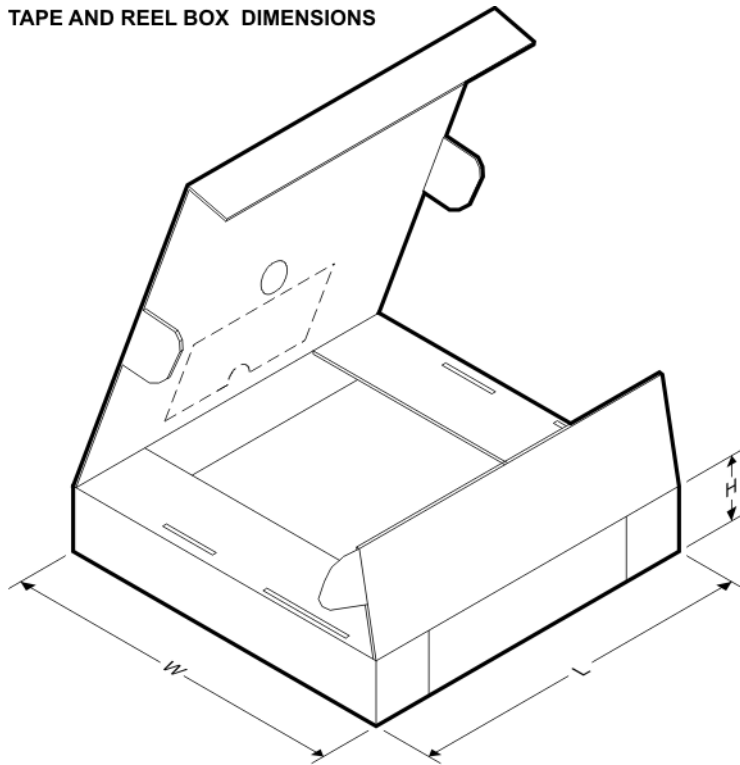
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**TAPE AND REEL INFORMATION**


\*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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN64BCT757DWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.0    | 2.7     | 12.0    | 24.0   | Q1            |
| SN64BCT757DWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.1    | 2.65    | 12.0    | 24.0   | Q1            |

## TAPE AND REEL BOX DIMENSIONS

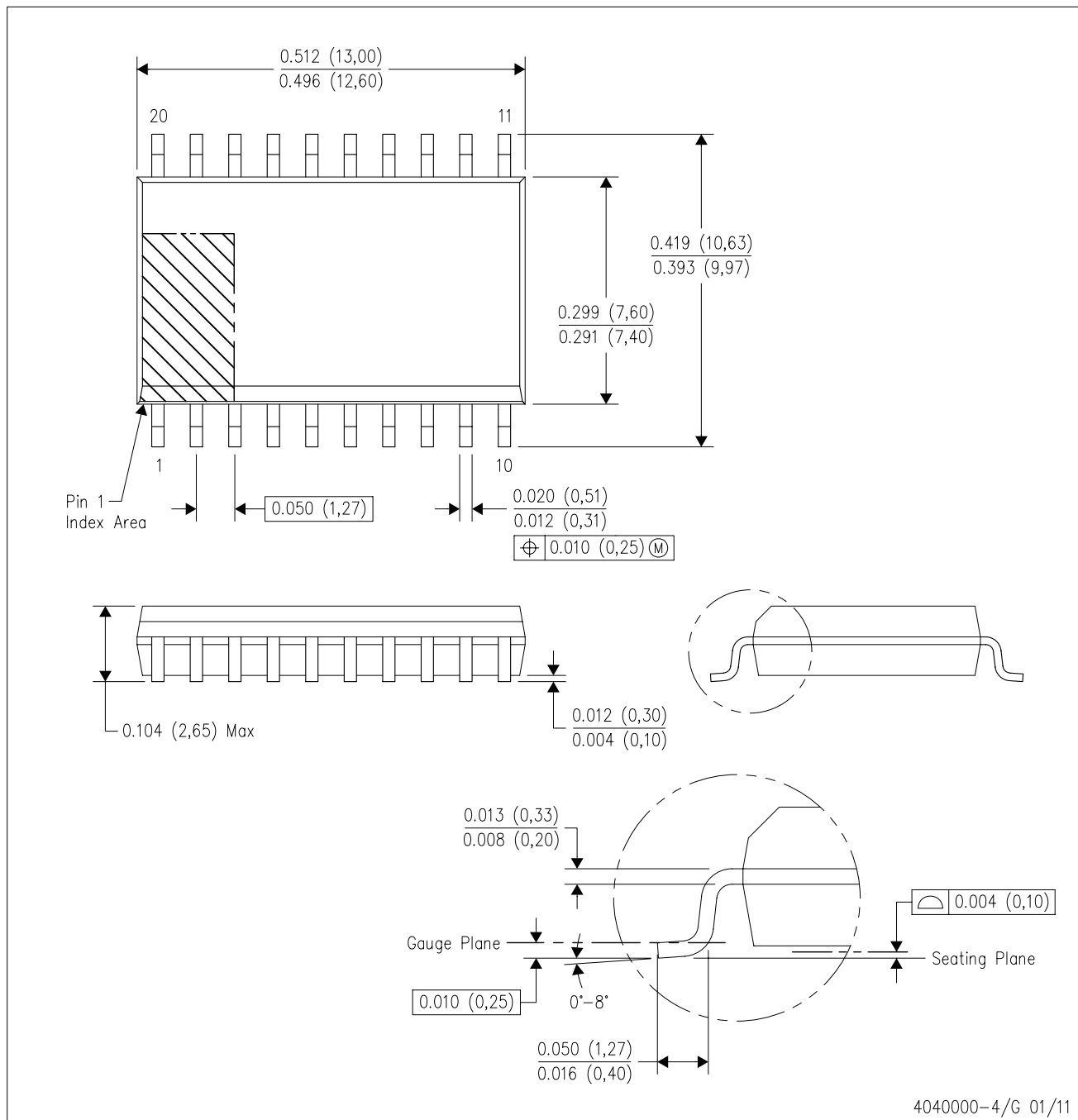


\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN64BCT757DWR | SOIC         | DW              | 20   | 2000 | 346.0       | 346.0      | 41.0        |
| SN64BCT757DWR | SOIC         | DW              | 20   | 2000 | 346.0       | 346.0      | 41.0        |

DW (R-PDSO-G20)

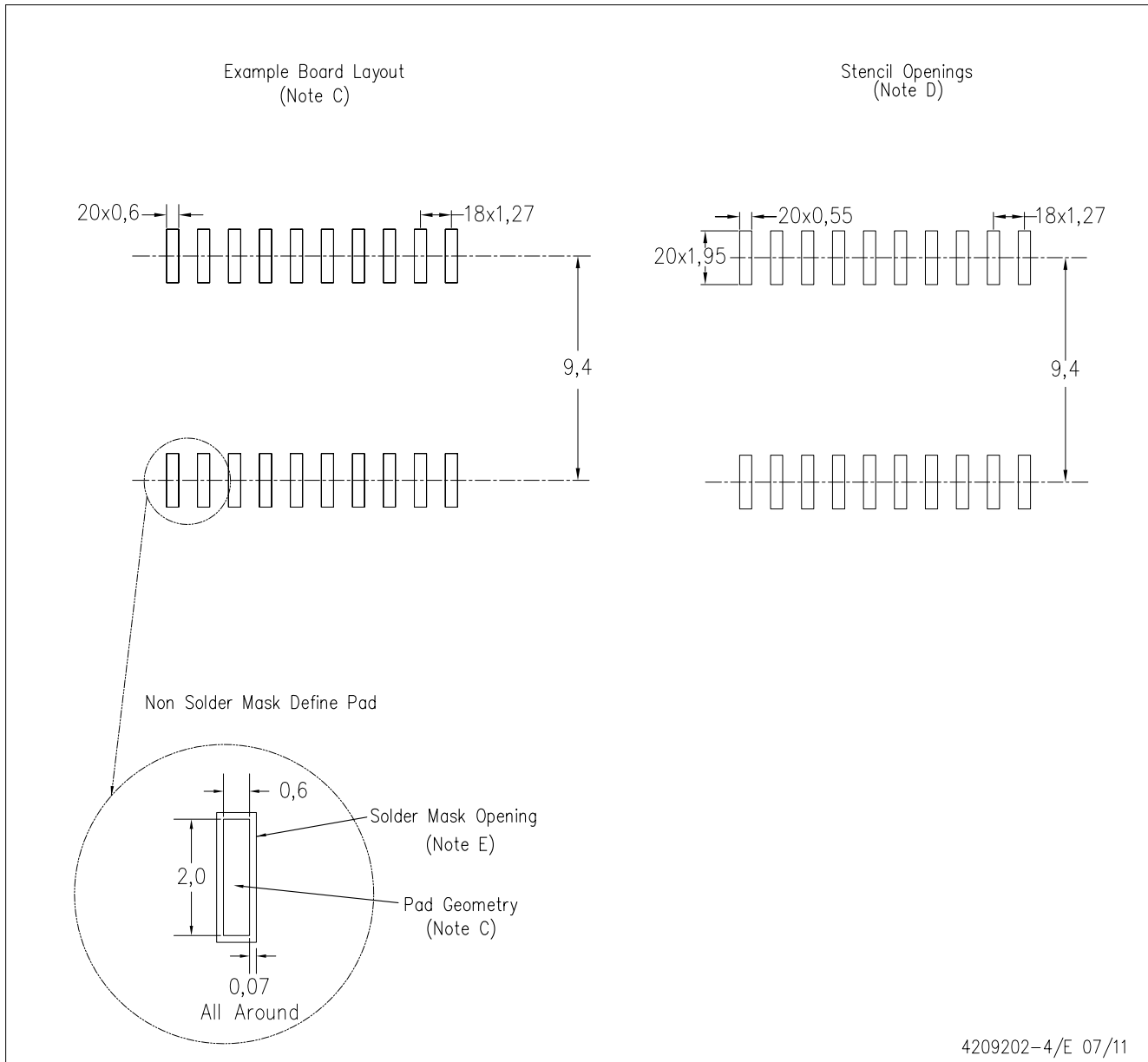
PLASTIC SMALL OUTLINE



- 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



- 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.

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