

SN54HC253, SN74HC253 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

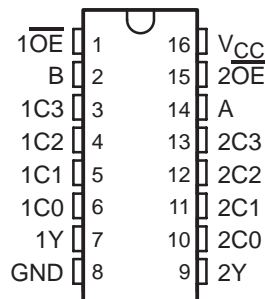
- 3-State Version of 'HC153
- Wide Operating Voltage Range of 2 V to 6 V
- High-Current Inverting Outputs Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80- μ A Max I_{CC}
- Typical $t_{pd} = 9$ ns
- ± 6 -mA Output Drive at 5 V
- Low Input Current of 1 μ A Max
- Permit Multiplexing From n Lines to One Line
- Perform Parallel-to-Serial Conversion

description/ordering information

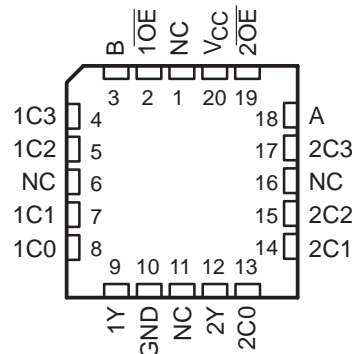
Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate output-control inputs are provided for each of the two 4-line sections.

The 3-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (in the high-impedance state), the low impedance of the single enabled output drives the bus line to a high or low logic level. Each output has its own output-enable (\overline{OE}) input. The outputs are disabled when their respective \overline{OE} is high.

SN54HC253 ... J OR W PACKAGE
SN74HC253 ... D, DB, N, OR NS PACKAGE
(TOP VIEW)



SN54HC253 ... FK PACKAGE
(TOP VIEW)



NC – No internal connection

ORDERING INFORMATION

| T_A | PACKAGE† | | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|-----------|--------------|-----------------------|------------------|
| -40°C to 85°C | PDIP – N | Tube of 25 | SN74HC253N | SN74HC253N |
| | SOIC – D | Tube of 40 | SN74HC253D | HC253 |
| | | Reel of 2500 | SN74HC253DR | |
| | | Reel of 250 | SN74HC253DT | |
| | SOP – NS | Reel of 2000 | SN74HC253NSR | HC253 |
| -55°C to 125°C | SSOP – DB | Reel of 2000 | SN74HC253DBR | HC253 |
| | CDIP – J | Tube of 25 | SNJ54HC253J | SNJ54HC253J |
| | CFP – W | Tube of 150 | SNJ54HC253W | SNJ54HC253W |
| | LCCC – FK | Tube of 55 | SNJ54HC253FK | SNJ54HC253FK |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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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.

**TEXAS
INSTRUMENTS**

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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

SN54HC253, SN74HC253 **DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS** **WITH 3-STATE OUTPUTS**

SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

FUNCTION TABLE

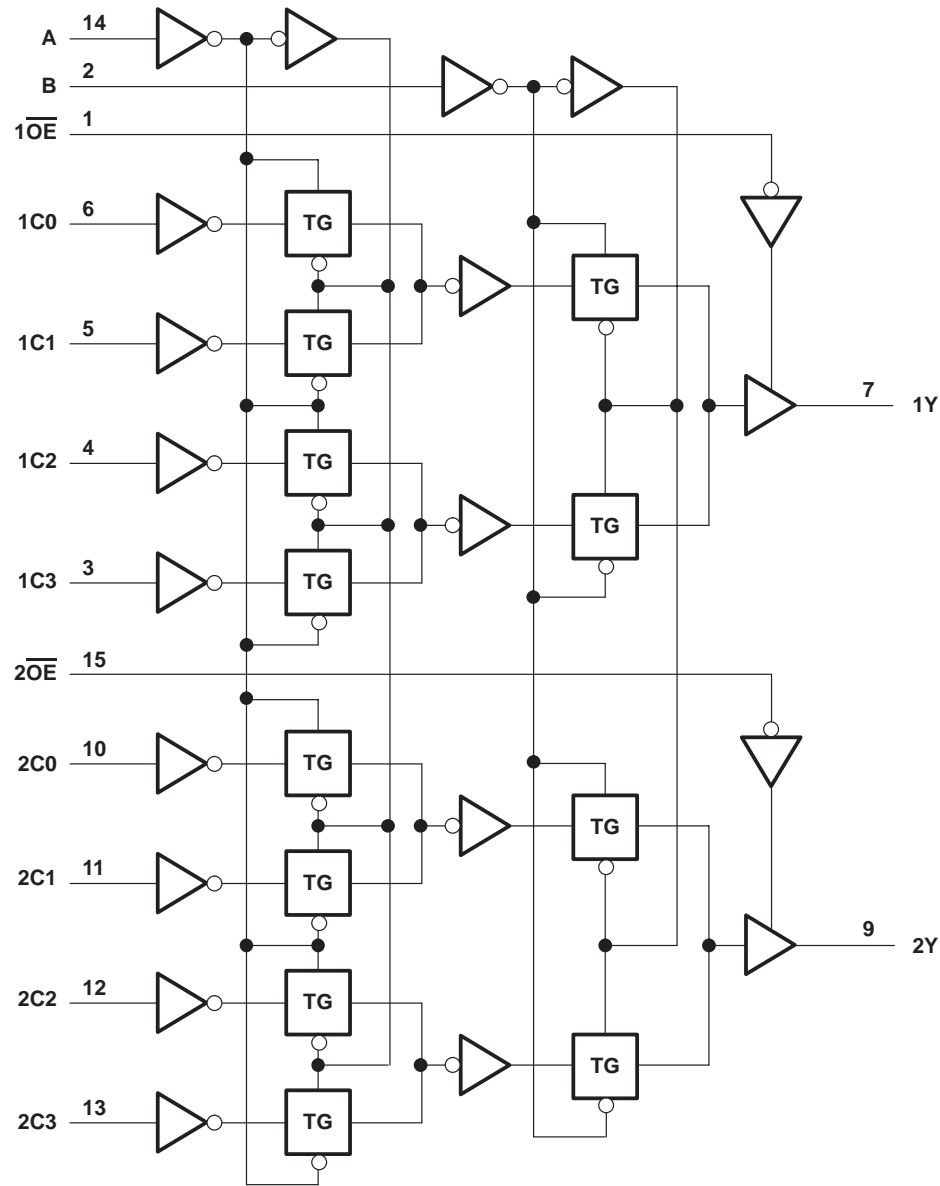
| INPUTS | | | | | | | OUTPUT Y |
|---------|---|------|----|----|----|------------------------|-------------|
| SELECT† | | DATA | | | | $\overline{\text{OE}}$ | |
| B | A | C0 | C1 | C2 | C3 | | |
| X | X | X | X | X | X | H | Z |
| L | L | L | X | X | X | L | L |
| L | L | H | X | X | X | L | H |
| L | H | X | L | X | X | L | L |
| L | H | X | H | X | X | L | H |
| H | L | X | X | L | X | L | L |
| H | L | X | X | H | X | L | H |
| H | H | X | X | X | L | L | L |
| H | H | X | X | X | H | L | H |

† Select inputs A and B are common to both sections.

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SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

logic diagram (positive logic)



Pin numbers shown are for the D, DB, J, N, NS, and W packages.

SN54HC253, SN74HC253

DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

WITH 3-STATE OUTPUTS

SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

| | |
|---|----------------|
| Supply voltage range, V_{CC} | –0.5 V to 7 V |
| Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1) | ±20 mA |
| Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1) | ±20 mA |
| Continuous output current, I_O ($V_O = 0$ to V_{CC}) | ±25 mA |
| Continuous current through V_{CC} or GND | ±50 mA |
| Package thermal impedance, θ_{JA} (see Note 2): D package | 73°C/W |
| DB package | 82°C/W |
| N package | 67°C/W |
| NS package | 64°C/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 package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

| | | | SN54HC253 | | | SN74HC253 | | | UNIT |
|-----------------|---------------------------------|-------------------------|-----------|-----------------|-----|-----------|-----------------|-----|------|
| | | | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} | Supply voltage | | 2 | 5 | 6 | 2 | 5 | 6 | V |
| V _{IH} | High-level input voltage | V _{CC} = 2 V | 1.5 | | | 1.5 | | | V |
| | | V _{CC} = 4.5 V | 3.15 | | | 3.15 | | | |
| | | V _{CC} = 6 V | 4.2 | | | 4.2 | | | |
| V _{IL} | Low-level input voltage | V _{CC} = 2 V | 0.5 | | | 0.5 | | | V |
| | | V _{CC} = 4.5 V | 1.35 | | | 1.35 | | | |
| | | V _{CC} = 6 V | 1.8 | | | 1.8 | | | |
| V _I | Input voltage | | 0 | V _{CC} | | 0 | V _{CC} | | V |
| V _O | Output voltage | | 0 | V _{CC} | | 0 | V _{CC} | | V |
| Δt/Δv | Input transition rise/fall time | V _{CC} = 2 V | 1000 | | | 1000 | | | ns |
| | | V _{CC} = 4.5 V | 500 | | | 500 | | | |
| | | V _{CC} = 6 V | 400 | | | 400 | | | |
| T _A | Operating free-air temperature | | −55 | 125 | | −40 | 85 | | °C |

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

SN54HC253, SN74HC253

DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

WITH 3-STATE OUTPUTS

SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

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

| PARAMETER | TEST CONDITIONS | | V _{CC} | T _A = 25°C | | | SN54HC253 | | SN74HC253 | | UNIT |
|-----------------|---|---------------------------|-----------------|-----------------------|-------|------|-----------|-------|-----------|-------|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| V _{OH} | V _I = V _{IH} or V _{IL} | I _{OH} = –20 µA | 2 V | 1.9 | 1.998 | | 1.9 | | 1.9 | | V |
| | | | 4.5 V | 4.4 | 4.499 | | 4.4 | | 4.4 | | |
| | | | 6 V | 5.9 | 5.999 | | 5.9 | | 5.9 | | |
| | | I _{OH} = –6 mA | 4.5 V | 3.98 | 4.3 | | 3.7 | | 3.84 | | |
| | | I _{OH} = –7.8 mA | 6 V | 5.48 | 5.8 | | 5.2 | | 5.34 | | |
| V _{OL} | V _I = V _{IH} or V _{IL} | I _{OL} = 20 µA | 2 V | | 0.002 | 0.1 | | 0.1 | | 0.1 | V |
| | | | 4.5 V | | 0.001 | 0.1 | | 0.1 | | 0.1 | |
| | | | 6 V | | 0.001 | 0.1 | | 0.1 | | 0.1 | |
| | | I _{OL} = 6 mA | 4.5 V | | 0.17 | 0.26 | | 0.4 | | 0.33 | |
| | | I _{OL} = 7.8 mA | 6 V | | 0.15 | 0.26 | | 0.4 | | 0.33 | |
| I _I | V _I = V _{CC} or 0 | | 6 V | | ±0.1 | ±100 | | ±1000 | | ±1000 | nA |
| I _{OZ} | V _O = V _{CC} or 0 | | 6 V | | ±0.01 | ±0.5 | | ±10 | | ±5 | µA |
| I _{CC} | V _I = V _{CC} or 0, I _O = 0 | | 6 V | | | 8 | | 160 | | 80 | µA |
| C _i | | | 2 V to 6 V | | 3 | 10 | | 10 | | 10 | pF |

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} | T _A = 25°C | | | SN54HC253 | | SN74HC253 | | UNIT |
|------------------|------------------------|-------------|-----------------|-----------------------|-----|-----|-----------|-----|-----------|-----|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t _{pd} | A or B | Any Y | 2 V | | 62 | 150 | | 225 | | 190 | ns |
| | | | 4.5 V | | 19 | 30 | | 45 | | 38 | |
| | | | 6 V | | 16 | 26 | | 38 | | 32 | |
| | Data (Any C) | Y | 2 V | | 54 | 126 | | 210 | | 175 | |
| | | | 4.5 V | | 16 | 28 | | 42 | | 35 | |
| | | | 6 V | | 13 | 23 | | 36 | | 30 | |
| t _{en} | $\overline{\text{OE}}$ | Y | 2 V | | 28 | 100 | | 150 | | 125 | ns |
| | | | 4.5 V | | 11 | 20 | | 30 | | 25 | |
| | | | 6 V | | 9 | 17 | | 26 | | 21 | |
| t _{dis} | $\overline{\text{OE}}$ | Y | 2 V | | 21 | 135 | | 203 | | 170 | ns |
| | | | 4.5 V | | 14 | 30 | | 45 | | 38 | |
| | | | 6 V | | 12 | 35 | | 38 | | 31 | |
| t _t | | Y | 2 V | | 28 | 60 | | 90 | | 75 | ns |
| | | | 4.5 V | | 8 | 12 | | 18 | | 15 | |
| | | | 6 V | | 6 | 10 | | 15 | | 13 | |



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WITH 3-STATE OUTPUTS

SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

switching characteristics over recommended operating free-air temperature range, $C_L = 150 \text{ pF}$ (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V_{CC} | $T_A = 25^\circ\text{C}$ | | | SN54HC253 | | SN74HC253 | | UNIT |
|-----------|-----------------|----------------|----------|--------------------------|-----|-----|-----------|-----|-----------|-----|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t_{pd} | A or B | Any Y | 2 V | | 76 | 235 | | 355 | | 295 | ns |
| | | | 4.5 V | | 23 | 47 | | 71 | | 59 | |
| | | | 6 V | | 20 | 41 | | 60 | | 51 | |
| | Data (Any C) | Y | 2 V | | 68 | 220 | | 335 | | 275 | |
| | | | 4.5 V | | 20 | 44 | | 67 | | 55 | |
| | | | 6 V | | 17 | 38 | | 57 | | 51 | |
| t_{en} | \overline{OE} | Y | 2 V | | 44 | 185 | | 280 | | 230 | ns |
| | | | 4.5 V | | 16 | 37 | | 56 | | 46 | |
| | | | 6 V | | 14 | 32 | | 48 | | 40 | |
| t_t | | Y | 2 V | | 45 | 210 | | 315 | | 265 | ns |
| | | | 4.5 V | | 17 | 42 | | 63 | | 53 | |
| | | | 6 V | | 13 | 36 | | 53 | | 45 | |

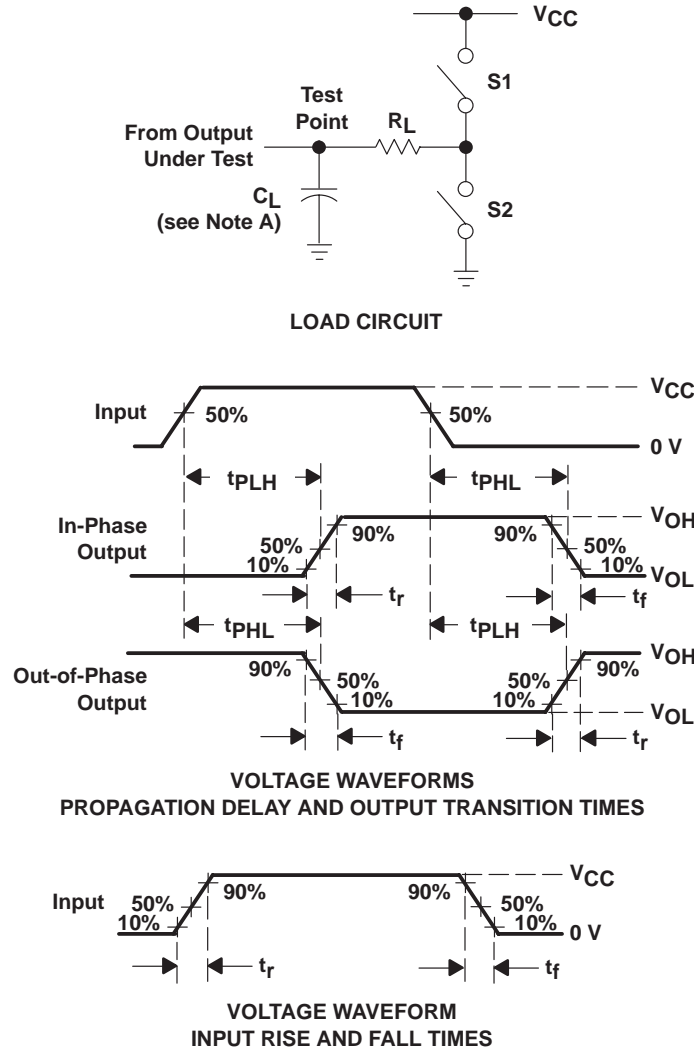
operating characteristics, $T_A = 25^\circ\text{C}$

| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|-----------|---|-----------------|-----|------|
| C_{pd} | Power dissipation capacitance per multiplexer | No load | 45 | pF |

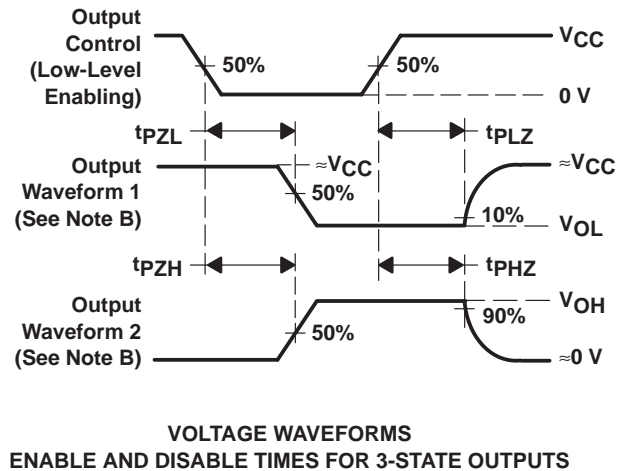
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SCLS133E – DECEMBER 1982 – REVISED SEPTEMBER 2003

PARAMETER MEASUREMENT INFORMATION



| PARAMETER | R_L | C_L | S1 | S2 |
|-------------------|--------------|-----------------|--------|--------|
| t_{en} | 1 k Ω | 50 pF or 150 pF | Open | Closed |
| | | | Closed | Open |
| t_{dis} | 1 k Ω | 50 pF | Open | Closed |
| | | | Closed | Open |
| t_{pd} or t_t | -- | 50 pF or 150 pF | Open | Open |



- NOTES:
- C_L includes probe and test-fixture capacitance.
 - 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.
 - Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O = 50 \Omega$, $t_r = 6$ ns, $t_f = 6$ ns.
 - The outputs are measured one at a time with one input transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .

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) | Op Temp (°C) | Top-Side Markings (4) | Samples |
|------------------|---------------|--------------|--------------------|------|-------------|----------------------------|------------------|----------------------|--------------|------------------------------------|-------------------------|
| 5962-88682012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | Call TI | Call TI | -55 to 125 | 5962-88682012A SNJ54HC 253FK | Samples |
| 5962-8868201EA | ACTIVE | CDIP | J | 16 | 1 | TBD | Call TI | Call TI | -55 to 125 | 5962-8868201EA SNJ54HC253J | Samples |
| SN54HC253J | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | SN54HC253J | Samples |
| SN74HC253D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DBR | ACTIVE | SSOP | DB | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DBRE4 | ACTIVE | SSOP | DB | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DBRG4 | ACTIVE | SSOP | DB | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DG4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DRG4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DT | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DTE4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253DTG4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -40 to 85 | SN74HC253N | Samples |

| 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 |
|------------------|---------------|--------------|--------------------|------|-------------|----------------------------|------------------|----------------------|--------------|--|-------------------------|
| SN74HC253NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | -40 to 85 | SN74HC253N | Samples |
| SN74HC253NSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253NSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SN74HC253NSRG4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HC253 | Samples |
| SNJ54HC253FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | 5962- 88682012A SNJ54HC 253FK | Samples |
| SNJ54HC253J | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-8868201EA SNJ54HC253J | Samples |

(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.

(4) Only one of markings shown within the brackets will appear on the physical device.

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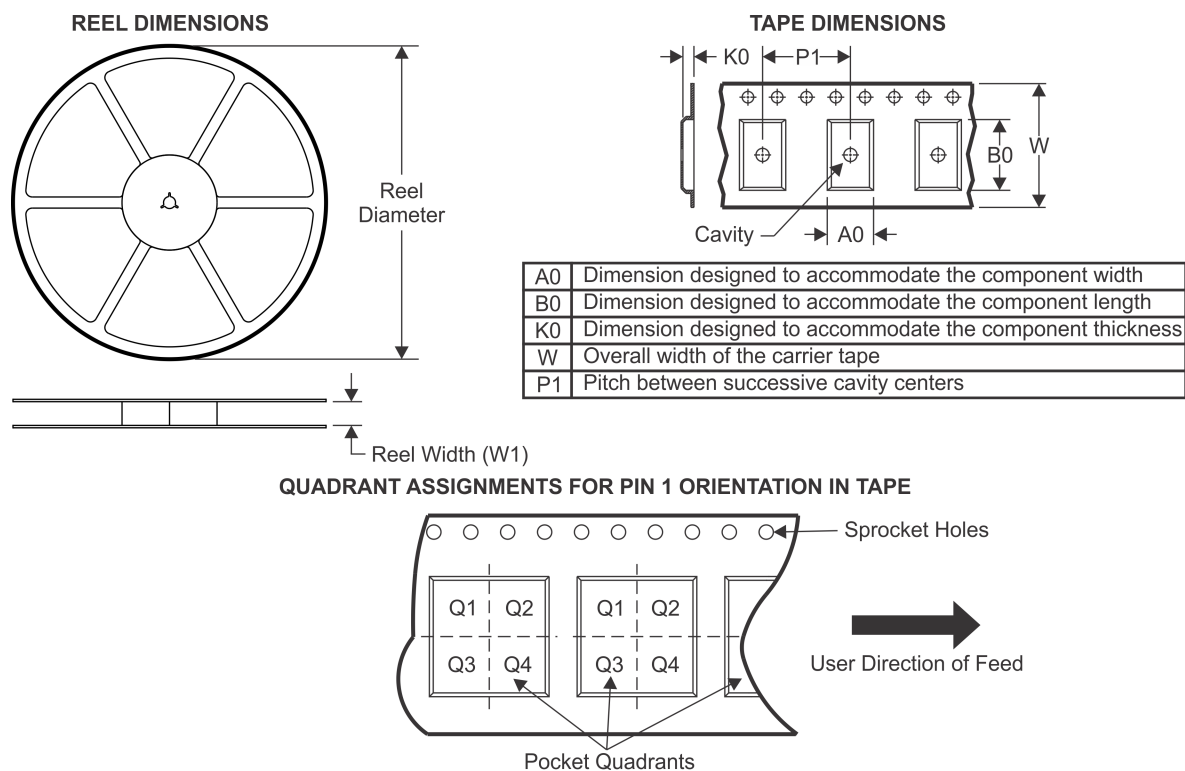
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN54HC253, SN74HC253 :

- Catalog: [SN74HC253](#)
- Automotive: [SN74HC253-Q1](#), [SN74HC253-Q1](#)
- Enhanced Product: [SN74HC253-EP](#), [SN74HC253-EP](#)
- Military: [SN54HC253](#)

NOTE: Qualified Version Definitions:

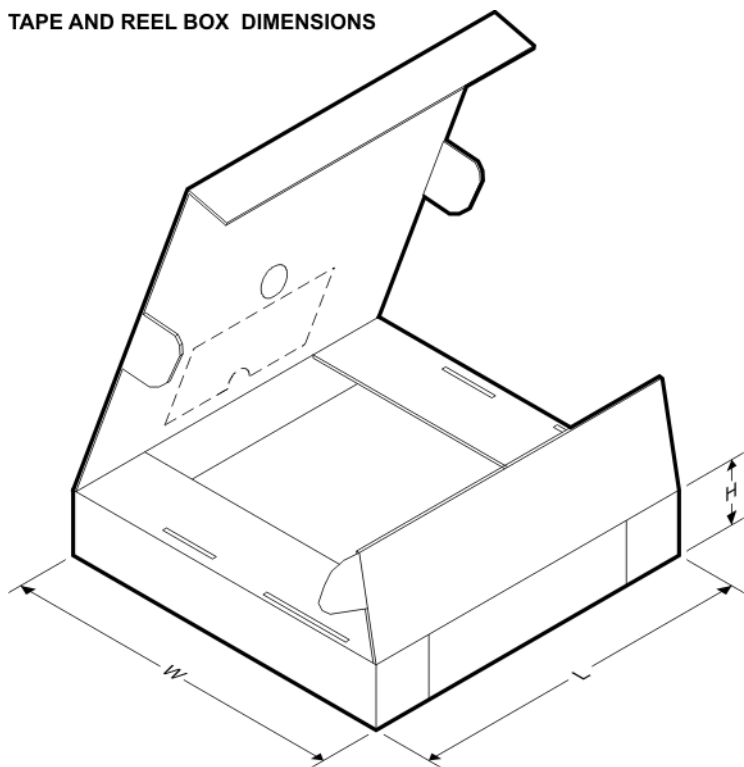
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74HC253DBR | SSOP | DB | 16 | 2000 | 330.0 | 16.4 | 8.2 | 6.6 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74HC253DR | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74HC253NSR | SO | NS | 16 | 2000 | 330.0 | 16.4 | 8.2 | 10.5 | 2.5 | 12.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



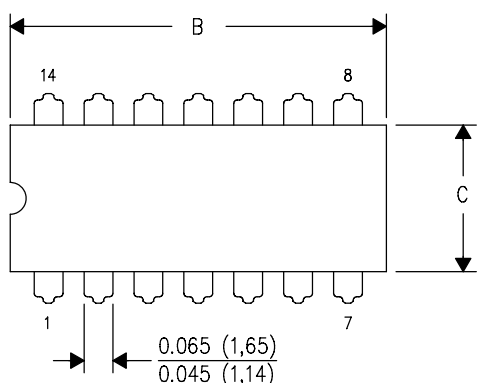
*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74HC253DBR | SSOP | DB | 16 | 2000 | 367.0 | 367.0 | 38.0 |
| SN74HC253DR | SOIC | D | 16 | 2500 | 333.2 | 345.9 | 28.6 |
| SN74HC253NSR | SO | NS | 16 | 2000 | 367.0 | 367.0 | 38.0 |

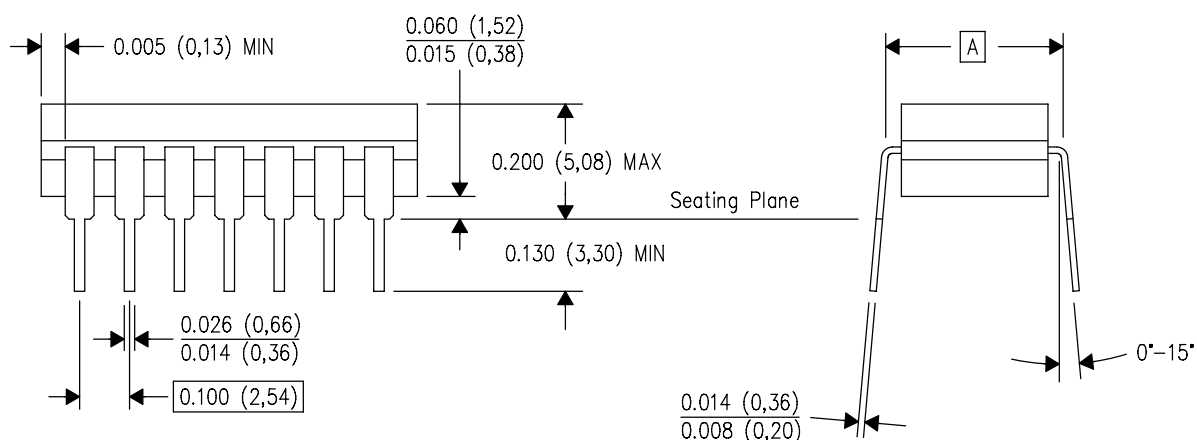
J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| PINS ** DIM | 14 | 16 | 18 | 20 |
|----------------|------------------------|------------------------|------------------------|------------------------|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (26,92) |
| B MIN | — | — | — | — |
| C MAX | 0.300 (7,62) | 0.300 (7,62) | 0.310 (7,87) | 0.300 (7,62) |
| C MIN | 0.245 (6,22) | 0.245 (6,22) | 0.220 (5,59) | 0.245 (6,22) |



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package is hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

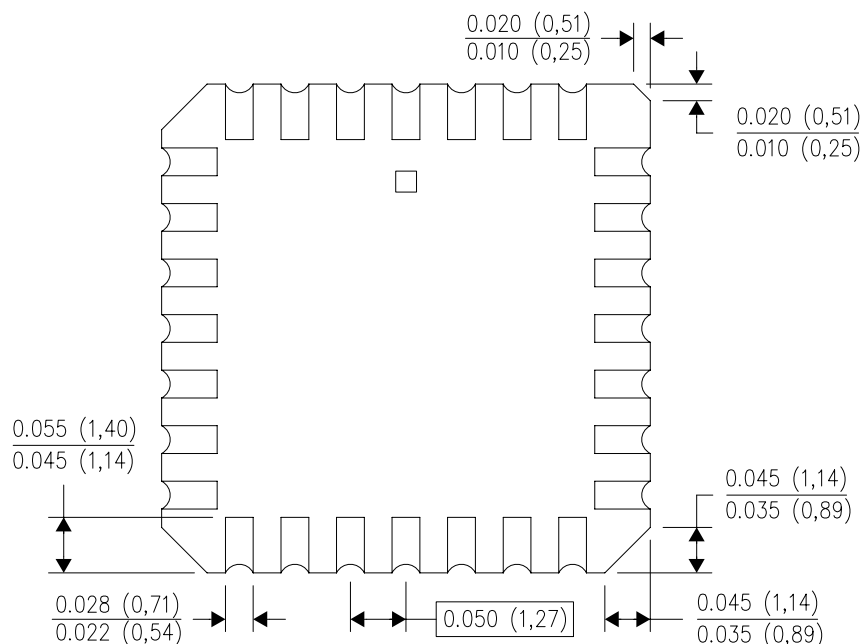
FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



| NO. OF TERMINALS ** | A | | B | |
|---------------------------|------------------|------------------|------------------|------------------|
| | MIN | MAX | MIN | MAX |
| 20 | 0.342 (8,69) | 0.358 (9,09) | 0.307 (7,80) | 0.358 (9,09) |
| 28 | 0.442 (11,23) | 0.458 (11,63) | 0.406 (10,31) | 0.458 (11,63) |
| 44 | 0.640 (16,26) | 0.660 (16,76) | 0.495 (12,58) | 0.560 (14,22) |
| 52 | 0.740 (18,78) | 0.761 (19,32) | 0.495 (12,58) | 0.560 (14,22) |
| 68 | 0.938 (23,83) | 0.962 (24,43) | 0.850 (21,6) | 0.858 (21,8) |
| 84 | 1.141 (28,99) | 1.165 (29,59) | 1.047 (26,6) | 1.063 (27,0) |



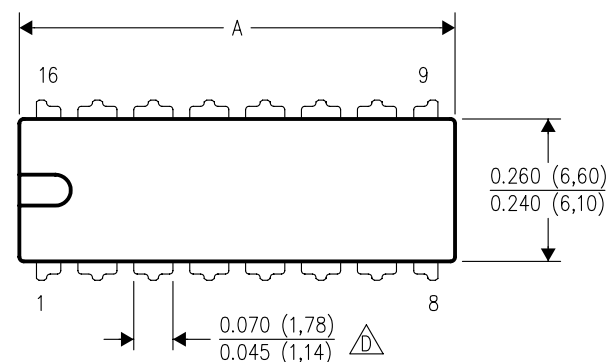
4040140/D 01/11

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a metal lid.
 - Falls within JEDEC MS-004

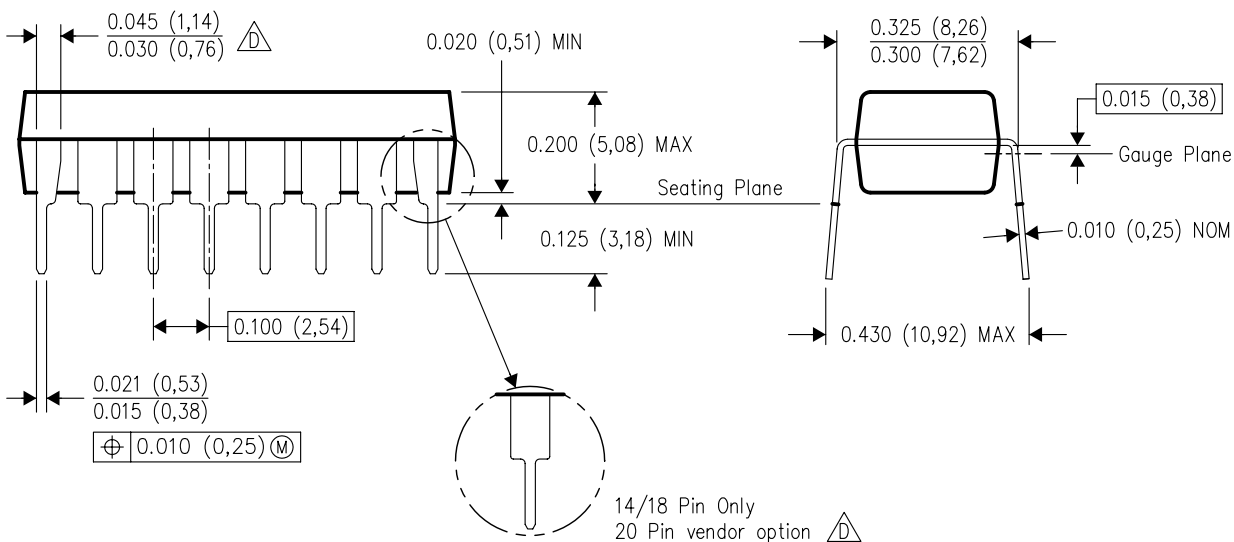
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE





| PINS ** DIM | 14 | 16 | 18 | 20 |
|---------------------|------------------|------------------|------------------|------------------|
| A MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS-001 VARIATION | AA | BB | AC | AD |



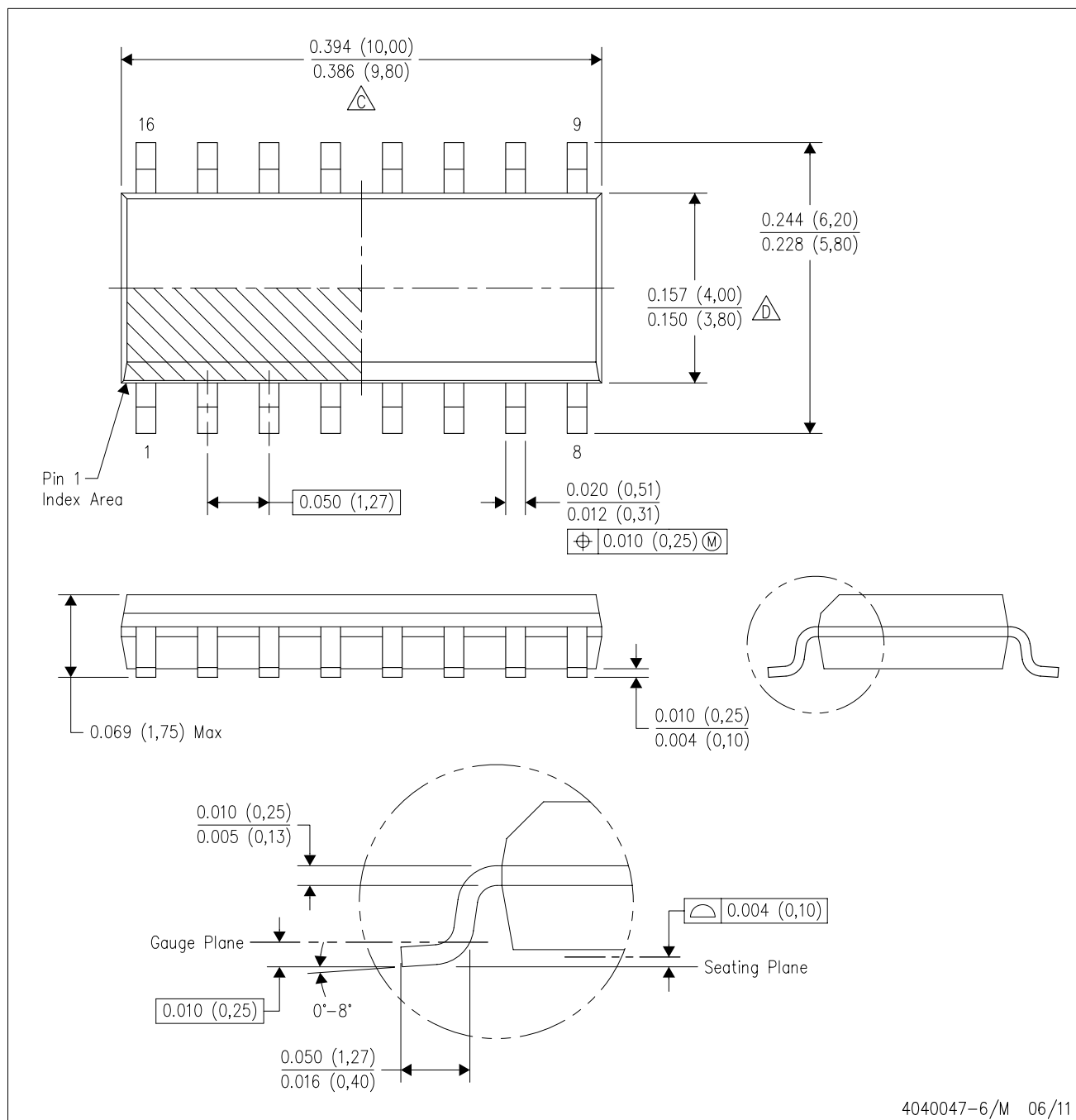
4040049/E 12/2002

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.

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
 D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 E. Reference JEDEC MS-012 variation AC.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



| DIM \ PINS ** | 14 | 16 | 20 | 24 |
|---------------|-------|-------|-------|-------|
| A MAX | 10,50 | 10,50 | 12,90 | 15,30 |
| A MIN | 9,90 | 9,90 | 12,30 | 14,70 |

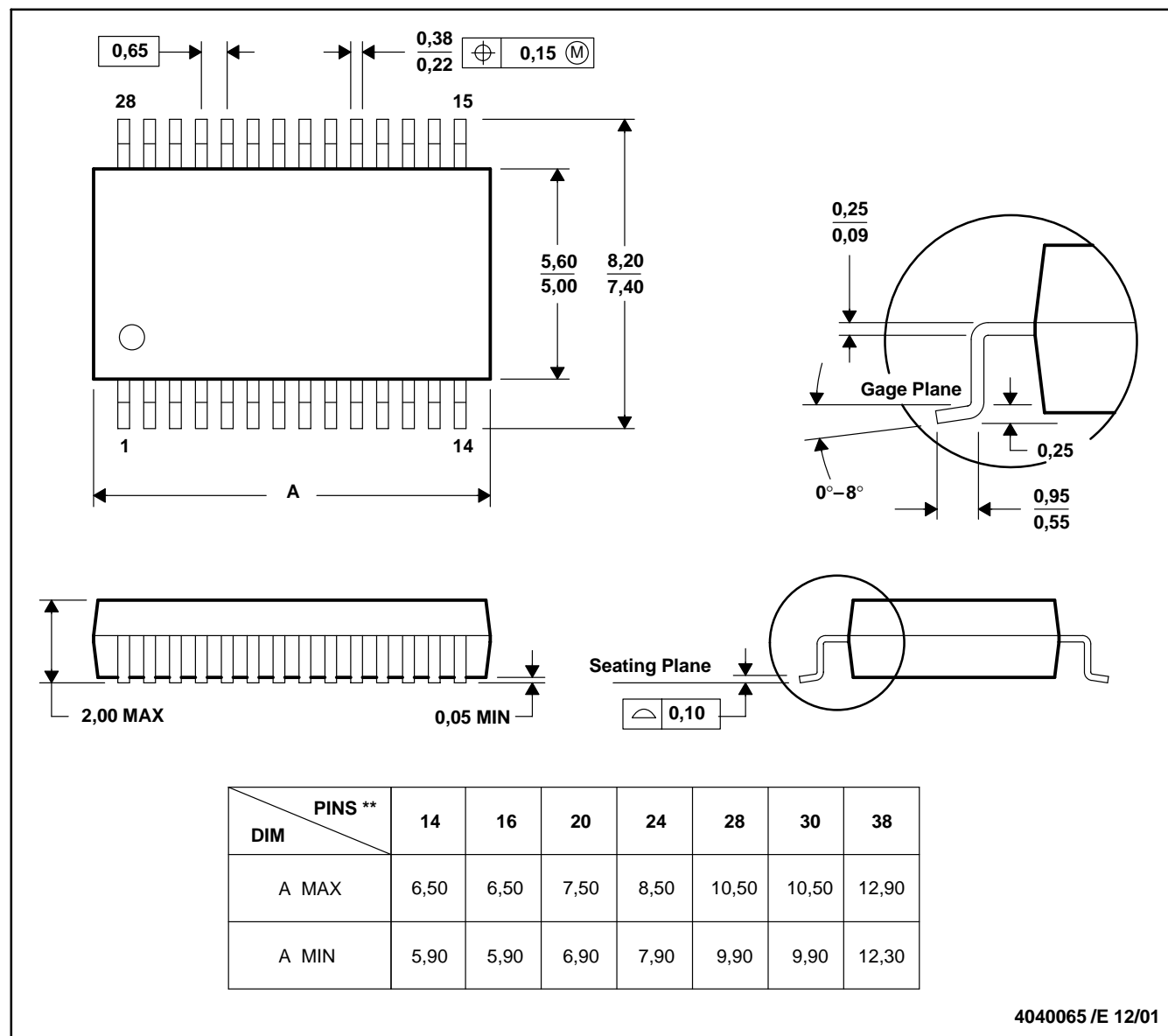
4040062/C 03/03

- 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.

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

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