

# SN54HC132, SN74HC132 QUADRUPLE POSITIVE-NAND GATES WITH SCHMITT-TRIGGER INPUTS

SCLS034F – DECEMBER 1982 – REVISED NOVEMBER 2004

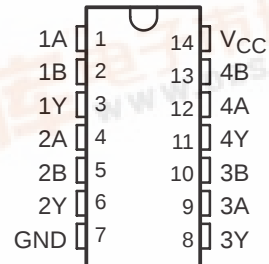
- Wide Operating Voltage Range of 2 V to 6 V
- Outputs Can Drive Up To 10 LSTTL Loads
- Low Power Consumption, 20- $\mu$ A Max  $I_{CC}$
- Typical  $t_{pd} = 14$  ns
- $\pm 4$ -mA Output Drive at 5 V
- Low Input Current of 1  $\mu$ A Max
- Operation From Very Slow Input Transitions
- Temperature-Compensated Threshold Levels
- High Noise Immunity
- Same Pinouts as 'HC00

## description/ordering information

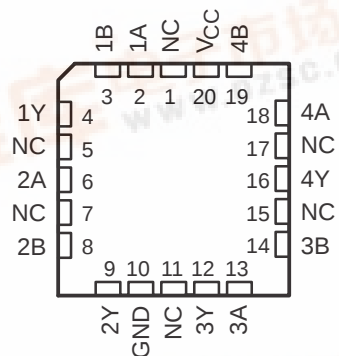
Each circuit functions as a NAND gate, but because of the Schmitt action, it has different input threshold levels for positive- and negative-going signals. The 'HC132 devices perform the Boolean function  $Y = \overline{A \bullet B}$  or  $Y = \overline{A} + \overline{B}$  in positive logic.

These circuits are temperature compensated and can be triggered from the slowest of input ramps and still give clean jitter-free output signals.

SN54HC132 . . . J OR W PACKAGE  
SN74HC132 . . . D, DB, N, NS, OR PW PACKAGE  
(TOP VIEW)



SN54HC132 . . . 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   | SN74HC132N            | SN74HC132N       |
|                |            | Tube of 50   | SN74HC132D            | HC132            |
|                | SOIC – D   | Reel of 2500 | SN74HC132DR           |                  |
|                |            | Reel of 250  | SN74HC132DT           |                  |
|                | SOP – NS   | Reel of 2000 | SN74HC132NSR          | HC132            |
| -55°C to 125°C | SSOP – DB  | Reel of 2000 | SN74HC132DBR          | HC132            |
|                | TSSOP – PW | Tube of 90   | SN74HC132PW           | HC132            |
|                |            | Reel of 2000 | SN74HC132PWR          |                  |
|                |            | Reel of 250  | SN74HC132PWT          |                  |
|                | CDIP – J   | Tube of 25   | SNJ54HC132J           | SNJ54HC132J      |
|                | CFP – W    | Tube of 150  | SNJ54HC132W           | SNJ54HC132W      |
|                | LCCC – FK  | Tube of 55   | SNJ54HC132FK          | SNJ54HC132FK     |

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

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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.

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| INPUTS |   | OUTPUT<br>Y |
|--------|---|-------------|
| A      | B |             |
| H      | H | L           |
| L      | X | H           |
| X      | L | H           |

|                                                                             |                |
|-----------------------------------------------------------------------------|----------------|
| 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)  | $\pm 20$ mA    |
| Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) (see Note 1) | $\pm 20$ mA    |
| Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ )                  | $\pm 25$ mA    |
| Continuous current through $V_{CC}$ or GND                                  | $\pm 50$ mA    |
| Package thermal impedance, $\theta_{JA}$ (see Note 2):                      |                |
| D package                                                                   | 86°C/W         |
| DB package                                                                  | 96°C/W         |
| N package                                                                   | 80°C/W         |
| NS package                                                                  | 76°C/W         |
| PW package                                                                  | 113°C/W        |
| Storage temperature range, $T_{Stg}$                                        | -65°C to 150°C |

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.

|                 |                                | SN54HC132 |     |                 | SN74HC132 |     |                 | UNIT |
|-----------------|--------------------------------|-----------|-----|-----------------|-----------|-----|-----------------|------|
|                 |                                | MIN       | NOM | MAX             | MIN       | NOM | MAX             |      |
| V <sub>CC</sub> | Supply voltage                 | 2         | 5   | 6               | 2         | 5   | 6               | V    |
| V <sub>I</sub>  | Input voltage                  | 0         |     | V <sub>CC</sub> | 0         |     | V <sub>CC</sub> | V    |
| V <sub>O</sub>  | Output voltage                 | 0         |     | V <sub>CC</sub> | 0         |     | V <sub>CC</sub> | V    |
| T <sub>A</sub>  | Operating free-air temperature | -55       |     | 125             | -40       |     | 85              | °C   |

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

# SN54HC132, SN74HC132

## QUADRUPLE POSITIVE-NAND GATES

### WITH SCHMITT-TRIGGER INPUTS

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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 |       |      | SN54HC132 |       | SN74HC132 |       | UNIT |
|-----------------------------------|-----------------------------------------------------------|---------------------------|-----------------|-----------------------|-------|------|-----------|-------|-----------|-------|------|
|                                   |                                                           |                           |                 | MIN                   | TYP   | MAX  | MIN       | MAX   | MIN       | MAX   |      |
| V <sub>T+</sub>                   |                                                           |                           | 2 V             | 0.7                   | 1.2   | 1.5  | 0.7       | 1.5   | 0.7       | 1.5   | V    |
|                                   |                                                           |                           | 4.5 V           | 1.55                  | 2.5   | 3.15 | 1.55      | 3.15  | 1.55      | 3.15  |      |
|                                   |                                                           |                           | 6 V             | 2.1                   | 3.3   | 4.2  | 2.1       | 4.2   | 2.1       | 4.2   |      |
| V <sub>T-</sub>                   |                                                           |                           | 2 V             | 0.3                   | 0.6   | 1    | 0.3       | 1     | 0.3       | 1     | V    |
|                                   |                                                           |                           | 4.5 V           | 0.9                   | 1.6   | 2.45 | 0.9       | 2.45  | 0.9       | 2.45  |      |
|                                   |                                                           |                           | 6 V             | 1.2                   | 2     | 3.2  | 1.2       | 3.2   | 1.2       | 3.2   |      |
| V <sub>T+</sub> - V <sub>T-</sub> |                                                           |                           | 2 V             | 0.2                   | 0.6   | 1.2  | 0.2       | 1.2   | 0.2       | 1.2   | V    |
|                                   |                                                           |                           | 4.5 V           | 0.4                   | 0.9   | 2.1  | 0.4       | 2.1   | 0.4       | 2.1   |      |
|                                   |                                                           |                           | 6 V             | 0.5                   | 1.3   | 2.5  | 0.5       | 2.5   | 0.5       | 2.5   |      |
| V <sub>OH</sub>                   | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>       | I <sub>OH</sub> = -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 <sub>OH</sub> = -4 mA   | 4.5 V           | 3.98                  | 4.3   |      | 3.7       |       | 3.84      |       |      |
|                                   |                                                           | I <sub>OH</sub> = -5.2 mA | 6 V             | 5.48                  | 5.8   |      | 5.2       |       | 5.34      |       |      |
| V <sub>OL</sub>                   | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>       | I <sub>OL</sub> = 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 <sub>OL</sub> = 4 mA    | 4.5 V           |                       | 0.17  | 0.26 |           | 0.4   |           | 0.33  |      |
|                                   |                                                           | I <sub>OL</sub> = 5.2 mA  | 6 V             |                       | 0.15  | 0.26 |           | 0.4   |           | 0.33  |      |
| I <sub>I</sub>                    | V <sub>I</sub> = V <sub>CC</sub> or 0                     |                           | 6 V             |                       | ±0.1  | ±100 |           | ±1000 |           | ±1000 | nA   |
| I <sub>CC</sub>                   | V <sub>I</sub> = V <sub>CC</sub> or 0, I <sub>O</sub> = 0 |                           | 6 V             |                       |       | 2    |           | 40    |           | 20    | µA   |
| C <sub>i</sub>                    |                                                           |                           | 2 V to 6 V      |                       | 3     | 10   |           | 10    |           | 10    | pF   |

switching characteristics over recommended operating free-air temperature range, C<sub>L</sub> = 50 pF (unless otherwise noted) (see Figure 1)

| PARAMETER       | FROM (INPUT) | TO (OUTPUT) | V <sub>CC</sub> | T <sub>A</sub> = 25°C |     |     | SN54HC132 |     | SN74HC132 |     | UNIT |
|-----------------|--------------|-------------|-----------------|-----------------------|-----|-----|-----------|-----|-----------|-----|------|
|                 |              |             |                 | MIN                   | TYP | MAX | MIN       | MAX | MIN       | MAX |      |
| t <sub>pd</sub> | A or B       | Y           | 2 V             |                       | 60  | 120 |           | 186 |           | 156 | ns   |
|                 |              |             | 4.5 V           |                       | 18  | 25  |           | 37  |           | 31  |      |
|                 |              |             | 6 V             |                       | 14  | 21  |           | 32  |           | 27  |      |
| t <sub>t</sub>  |              | Any         | 2 V             |                       | 28  | 75  |           | 110 |           | 95  | ns   |
|                 |              |             | 4.5 V           |                       | 8   | 15  |           | 22  |           | 19  |      |
|                 |              |             | 6 V             |                       | 6   | 13  |           | 19  |           | 16  |      |

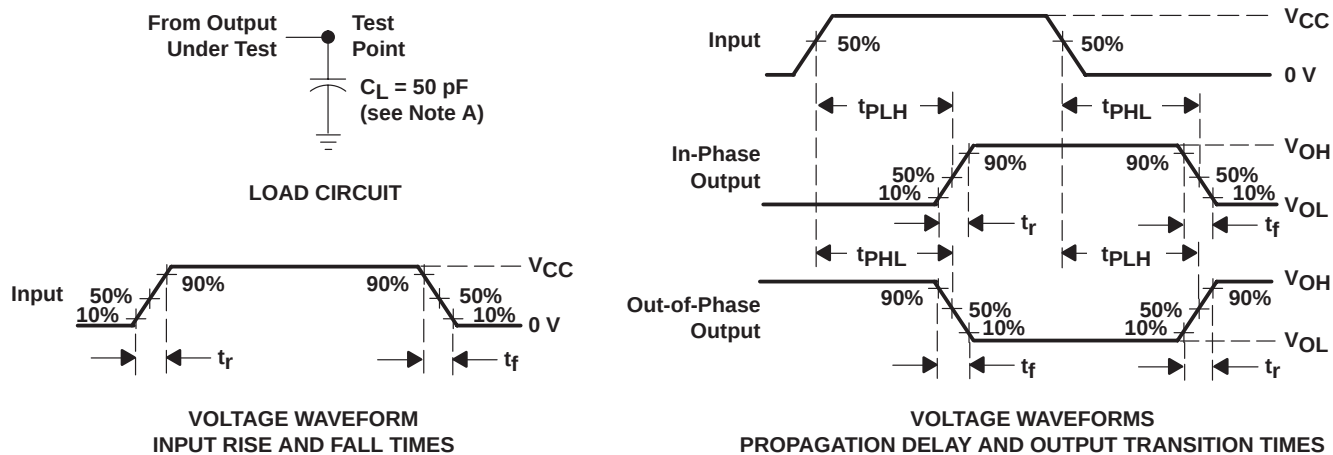
operating characteristics, T<sub>A</sub> = 25°C

| PARAMETER                                              | TEST CONDITIONS | TYP | UNIT |
|--------------------------------------------------------|-----------------|-----|------|
| C <sub>pd</sub> Power dissipation capacitance per gate | No load         | 20  | pF   |

# SN54HC132, SN74HC132 QUADRUPLER POSITIVE-NAND GATES WITH SCHMITT-TRIGGER INPUTS

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## PARAMETER MEASUREMENT INFORMATION



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

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> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-89845022A   | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 5962-8984502CA   | ACTIVE                | CDIP         | J               | 14   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 5962-8984502DA   | ACTIVE                | CFP          | W               | 14   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| 5962-8984502VCA  | ACTIVE                | CDIP         | J               | 14   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 5962-8984502VDA  | ACTIVE                | CFP          | W               | 14   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SN54HC132J       | ACTIVE                | CDIP         | J               | 14   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN74HC132D       | ACTIVE                | SOIC         | D               | 14   | 50          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DBLE    | OBSOLETE              | SSOP         | DB              | 14   |             | TBD                     | Call TI          | Call TI                      |
| SN74HC132DBR     | ACTIVE                | SSOP         | DB              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DBRE4   | ACTIVE                | SSOP         | DB              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DE4     | ACTIVE                | SOIC         | D               | 14   | 50          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DG4     | ACTIVE                | SOIC         | D               | 14   | 50          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DR      | ACTIVE                | SOIC         | D               | 14   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DRE4    | ACTIVE                | SOIC         | D               | 14   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DRG4    | ACTIVE                | SOIC         | D               | 14   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DT      | ACTIVE                | SOIC         | D               | 14   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132DTE4    | ACTIVE                | SOIC         | D               | 14   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132N       | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN74HC132NE4     | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN74HC132NSR     | ACTIVE                | SO           | NS              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132NSRE4   | ACTIVE                | SO           | NS              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PW      | ACTIVE                | TSSOP        | PW              | 14   | 90          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PWE4    | ACTIVE                | TSSOP        | PW              | 14   | 90          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PWLE    | OBSOLETE              | TSSOP        | PW              | 14   |             | TBD                     | Call TI          | Call TI                      |
| SN74HC132PWR     | ACTIVE                | TSSOP        | PW              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PWRE4   | ACTIVE                | TSSOP        | PW              | 14   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PWT     | ACTIVE                | TSSOP        | PW              | 14   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74HC132PWTE4   | ACTIVE                | TSSOP        | PW              | 14   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

| 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> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SNJ54HC132FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ54HC132J      | ACTIVE                | CDIP         | J               | 14   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ54HC132W      | ACTIVE                | CFP          | W               | 14   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SNV54HC132J      | ACTIVE                | CDIP         | J               | 14   |             | TBD                     | Call TI          | Call TI                      |
| SNV54HC132W      | ACTIVE                | CFP          | W               | 14   |             | 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.

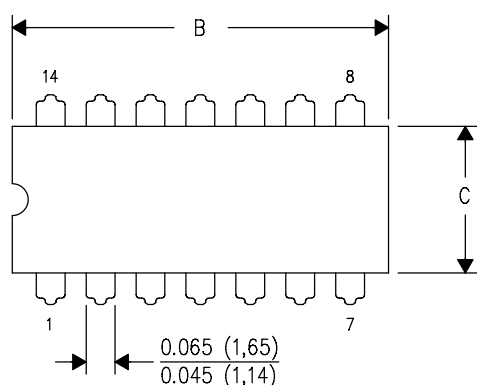
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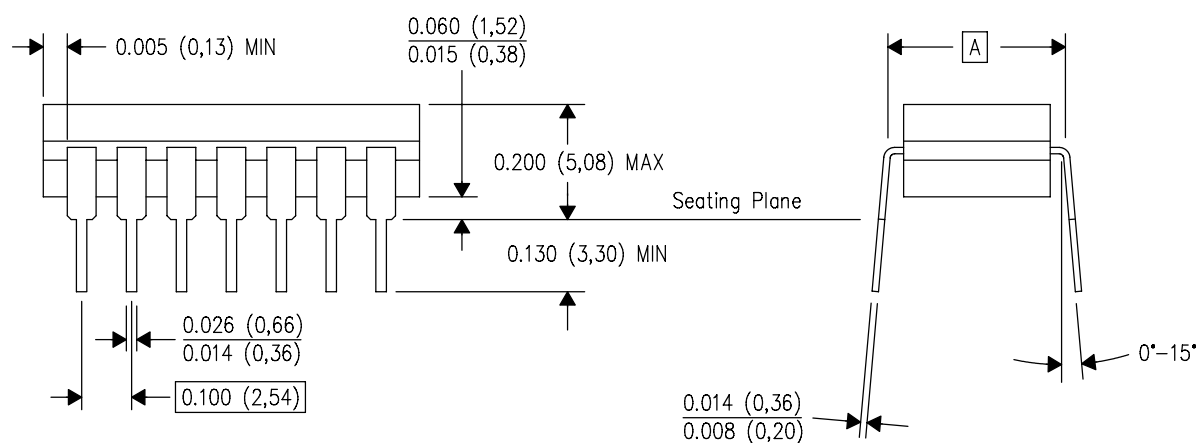
J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



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



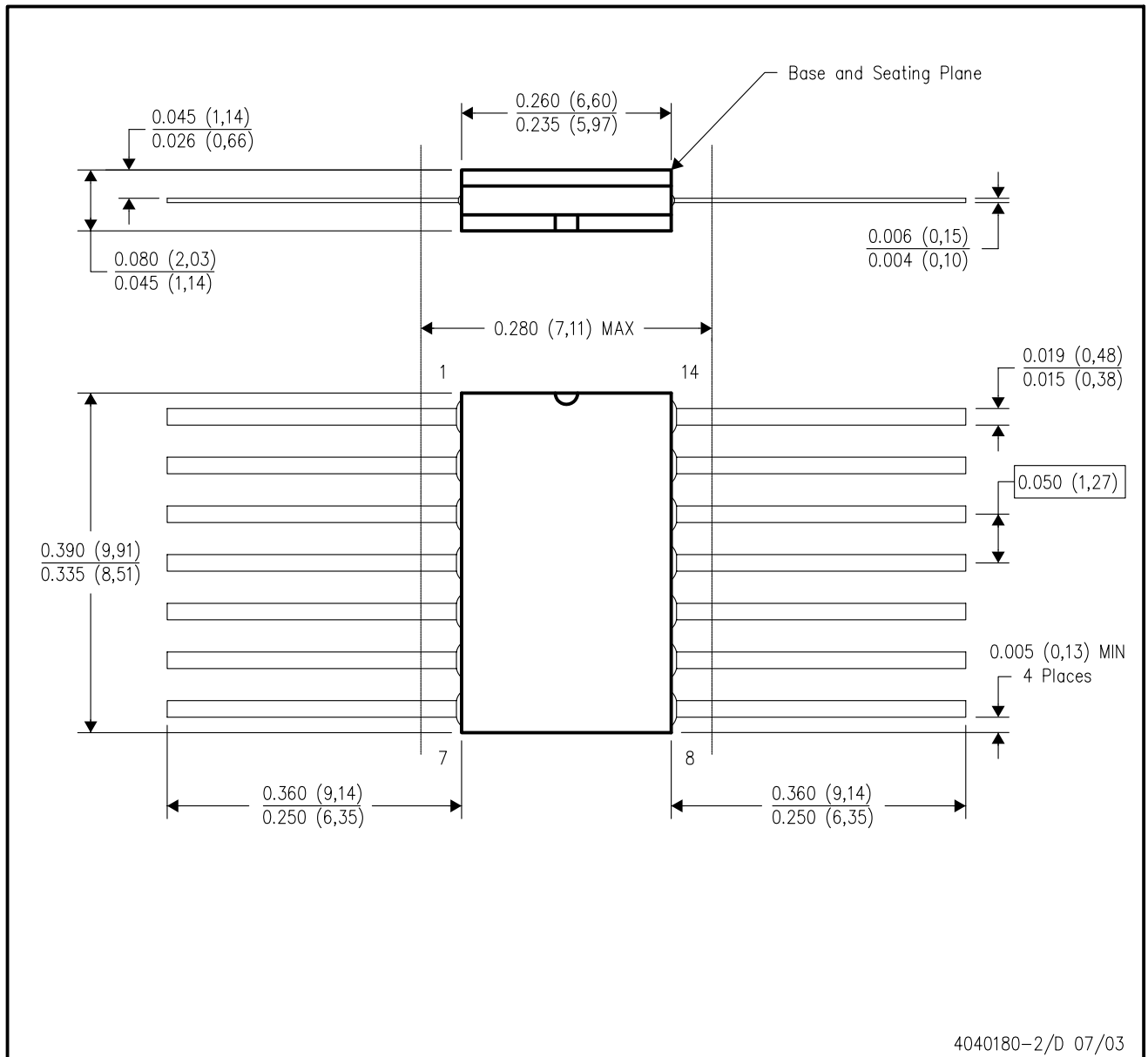
4040083/F 03/03

- 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.

## MECHANICAL DATA

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only.
  - Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB

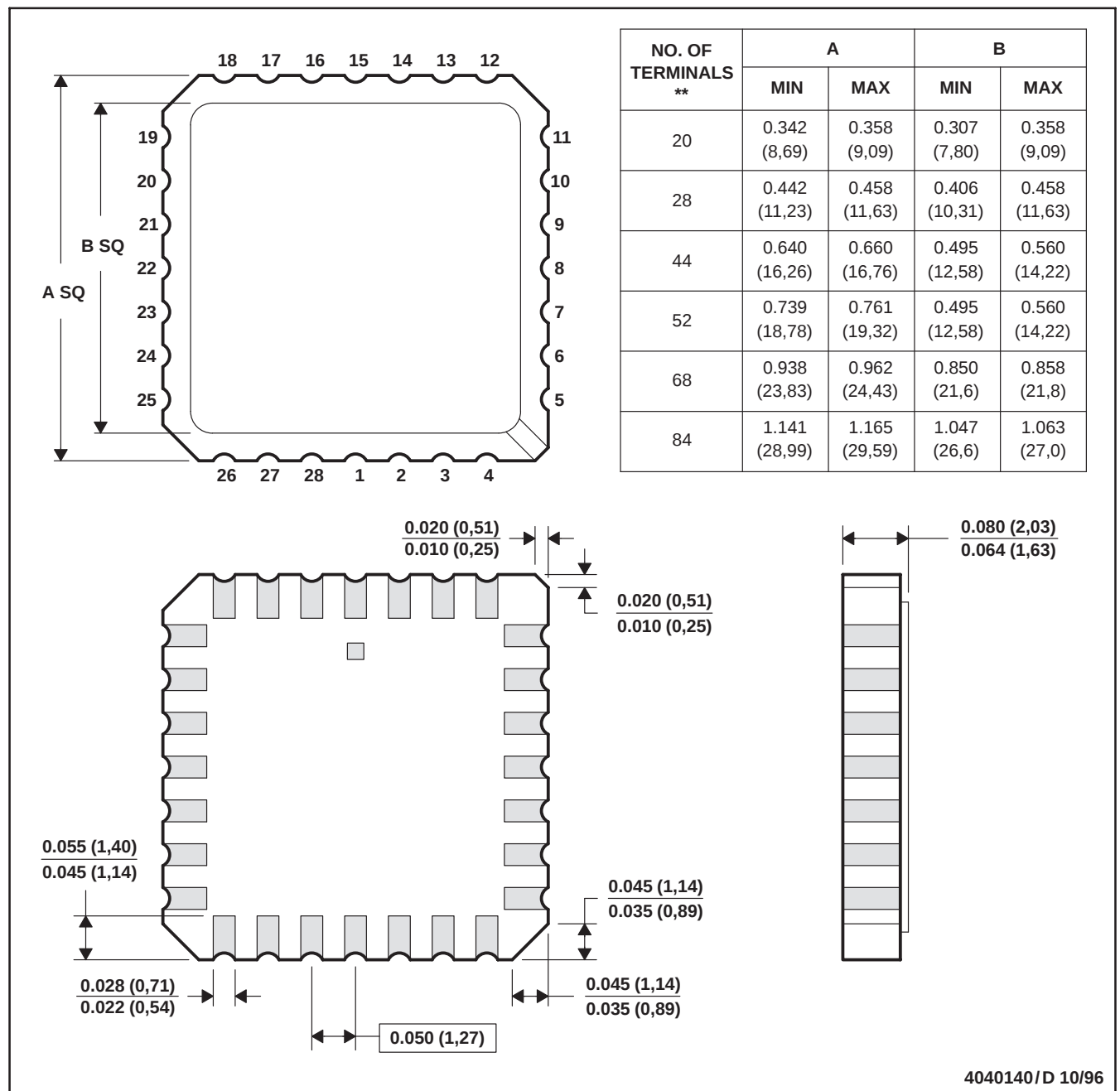
# MECHANICAL DATA

MLCC006B – OCTOBER 1996

FK (S-CQCC-N\*\*)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



4040140/D 10/96

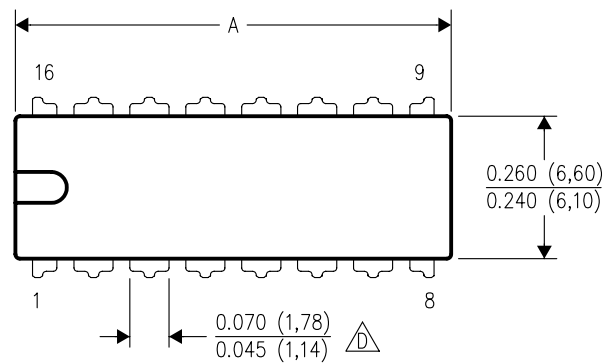
- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a metal lid.
  - D. The terminals are gold plated.
  - E. Falls within JEDEC MS-004

## MECHANICAL DATA

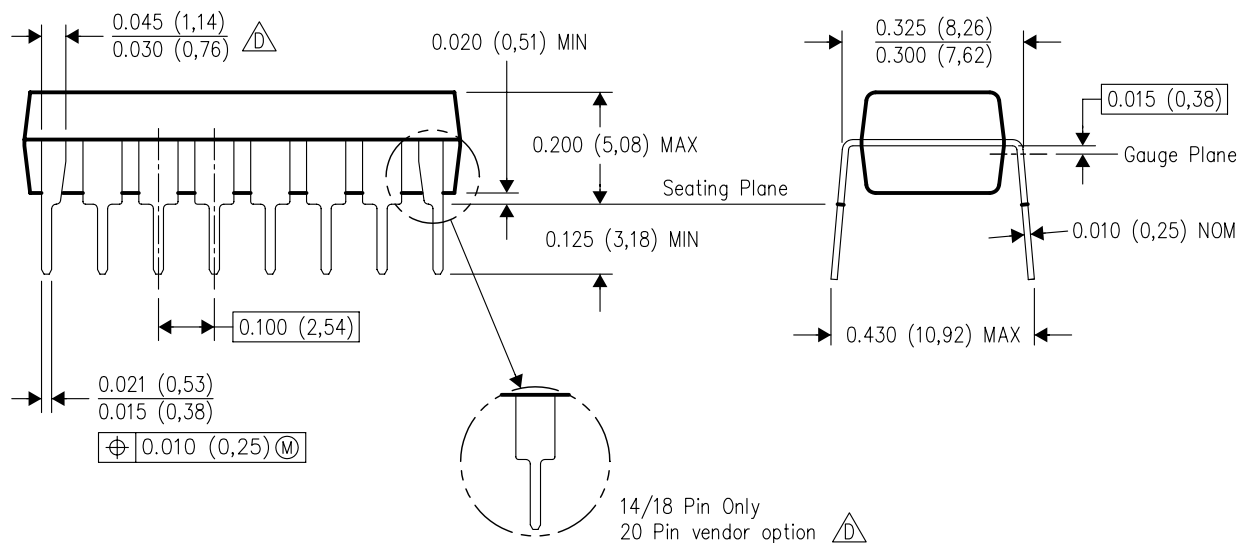
### N (R-PDIP-T\*\*)

16 PINS SHOWN

### PLASTIC DUAL-IN-LINE PACKAGE



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



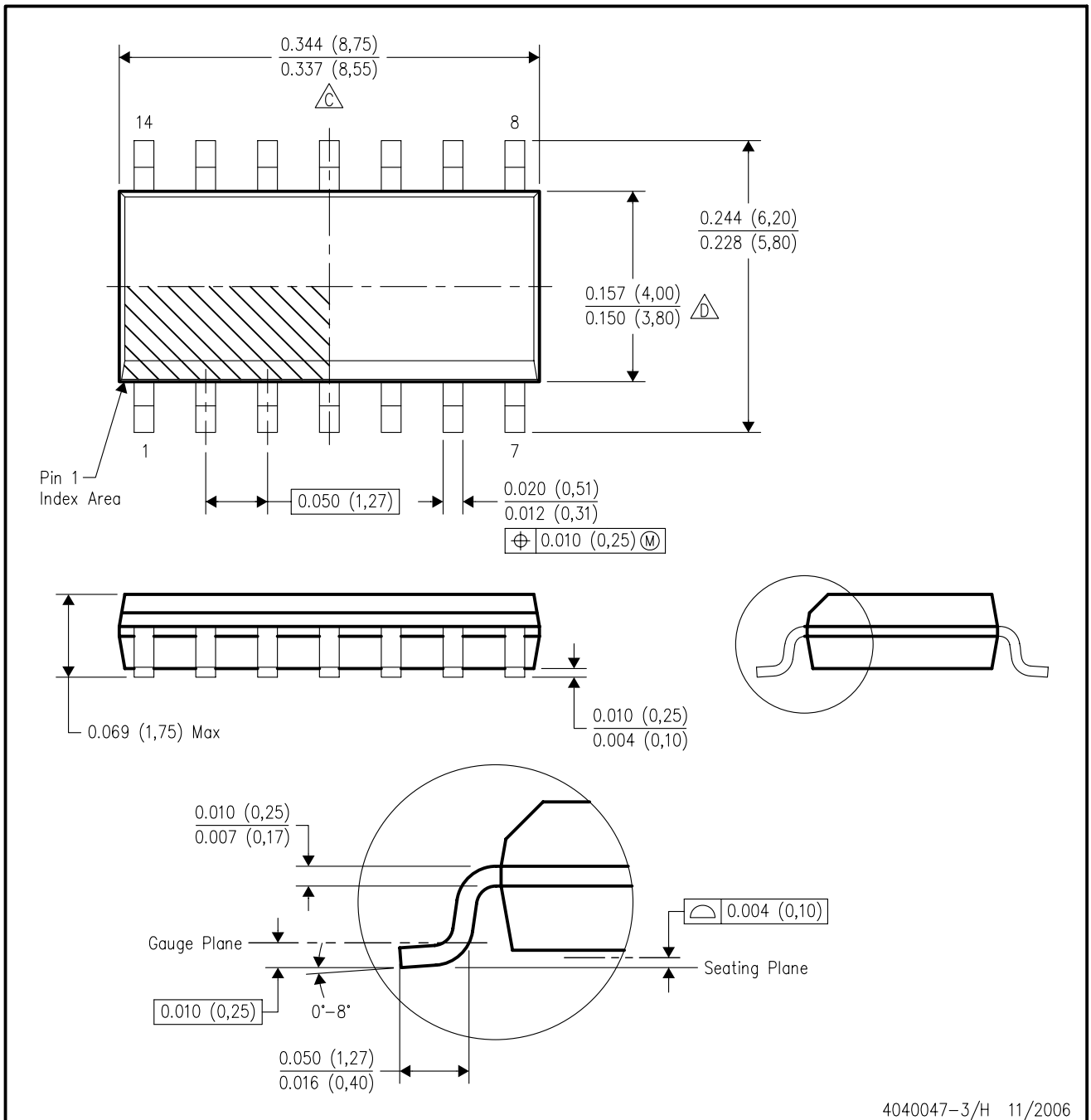
4040049/E 12/2002

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.

## MECHANICAL DATA

### D (R-PDSO-G14)

### PLASTIC SMALL-OUTLINE PACKAGE



4040047-3/H 11/2006

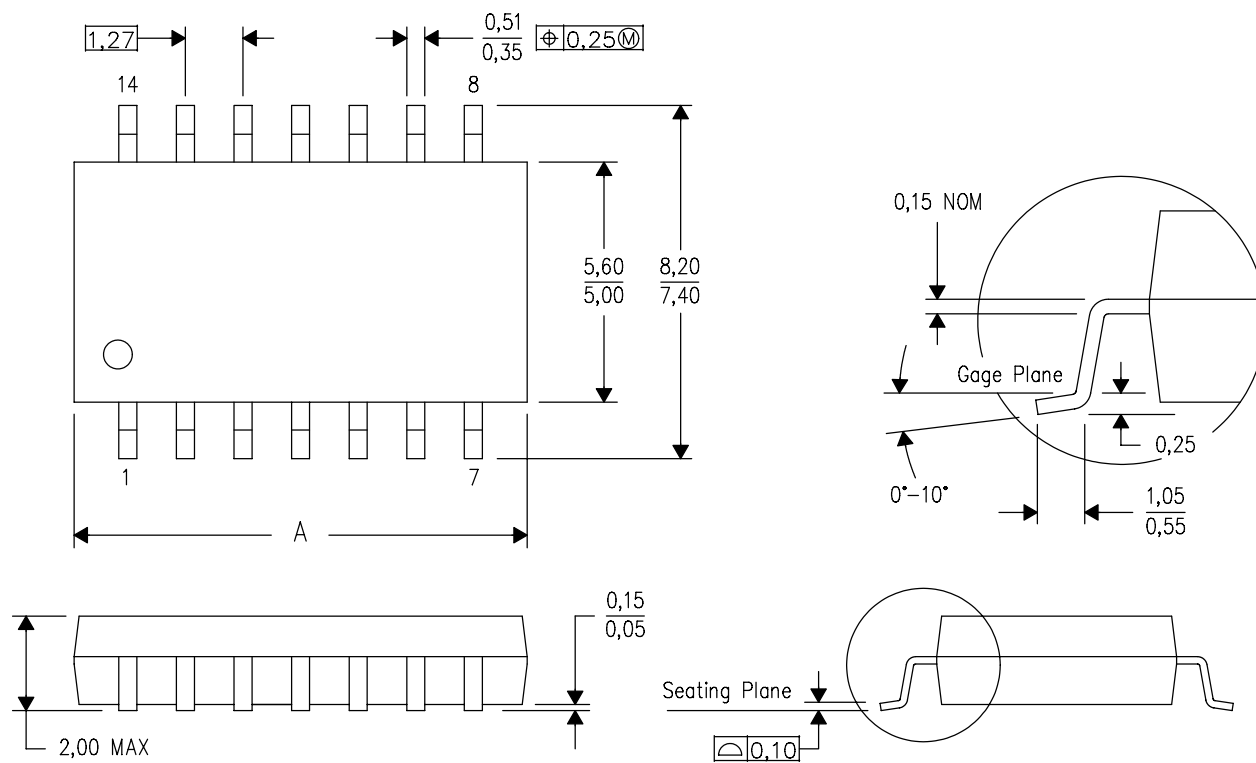
- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
  - E. Reference JEDEC MS-012 variation AB.

## 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.

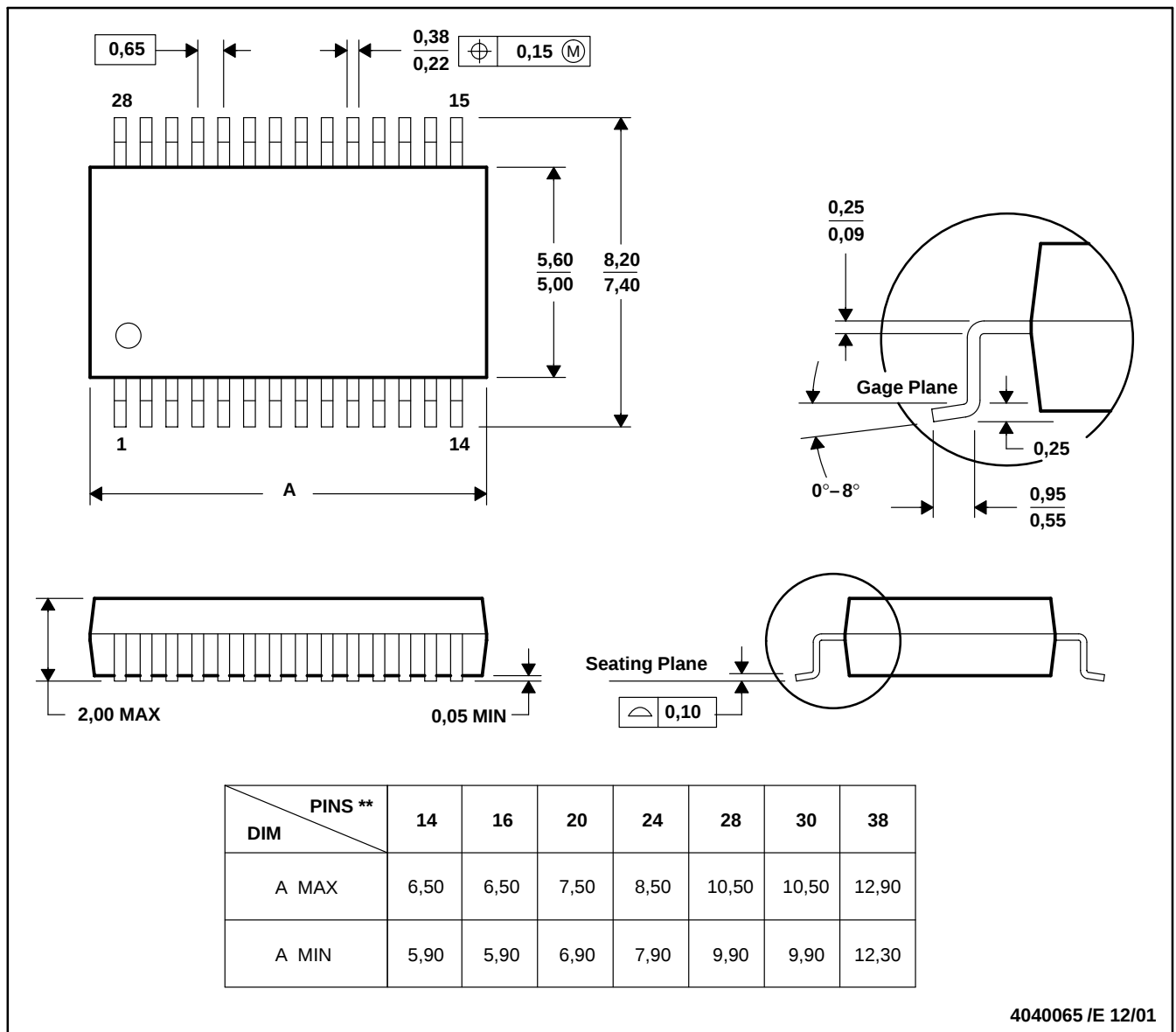
# MECHANICAL DATA

MSS0002E – JANUARY 1995 – REVISED DECEMBER 2001

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

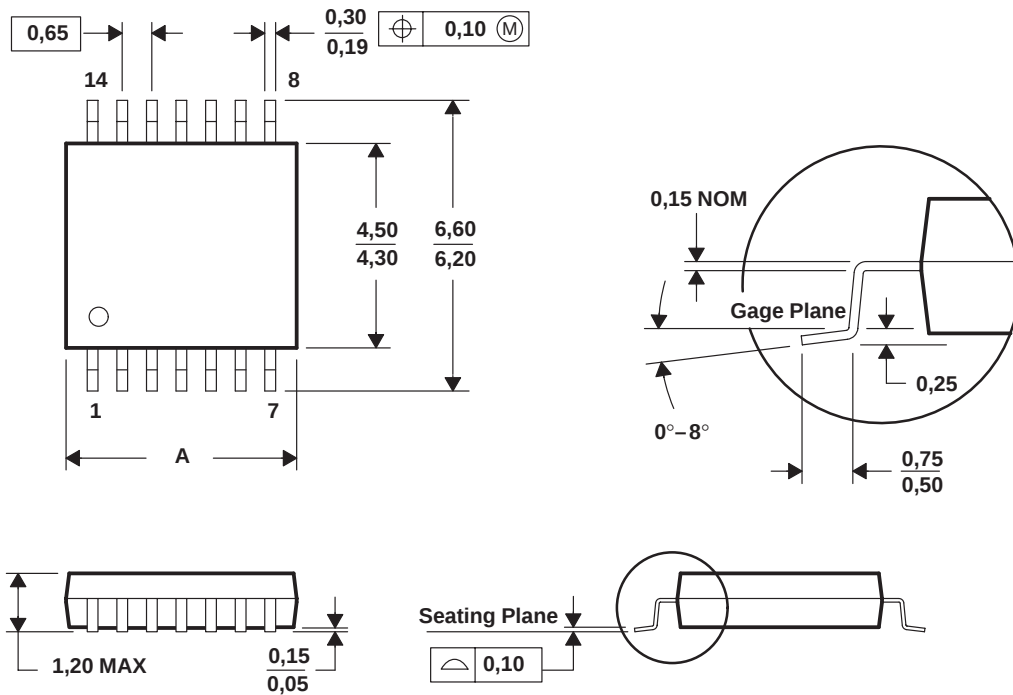
# MECHANICAL DATA

MTSS001C – JANUARY 1995 – REVISED FEBRUARY 1999

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

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



| PINS ** | 8    | 14   | 16   | 20   | 24   | 28   |
|---------|------|------|------|------|------|------|
| DIM     |      |      |      |      |      |      |
| A MAX   | 3,10 | 5,10 | 5,10 | 6,60 | 7,90 | 9,80 |
| A MIN   | 2,90 | 4,90 | 4,90 | 6,40 | 7,70 | 9,60 |

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

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| Digital Control    | <a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a> |
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| Security           | <a href="http://www.ti.com/security">www.ti.com/security</a>             |
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