

# SN5410, SN54LS10, SN54S10, SN7410, SN74LS10, SN74S10 TRIPLE 3-INPUT POSITIVE-NAND GATES

SDLS035A – DECEMBER 1983 – REVISED APRIL 2003

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

## description

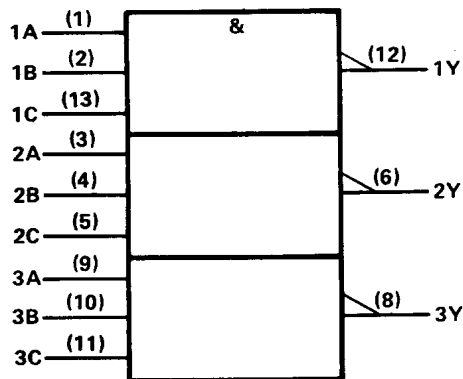
These devices contain three independent 3-input NAND gates.

The SN5410, SN54LS10, and SN54S10 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN7410, SN74LS10, and SN74S10 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE (each gate)

| INPUTS |   |   | OUTPUT |
|--------|---|---|--------|
| A      | B | C | Y      |
| H      | H | H | L      |
| L      | X | X | H      |
| X      | L | X | H      |
| X      | X | L | H      |

## logic symbol†



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

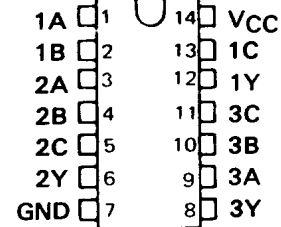
Pin numbers shown are for D, J, and N packages.

## positive logic

$$Y = \overline{A \cdot B \cdot C} \text{ or } Y = \overline{A} + \overline{B} + \overline{C}$$

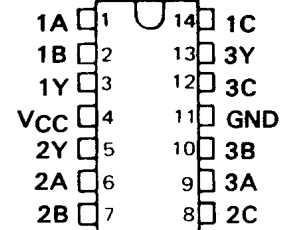
SN5410 . . . J PACKAGE  
SN54LS10, SN54S10 . . . J OR W PACKAGE  
SN7410 . . . N PACKAGE  
SN74LS10, SN74S10 . . . D OR N PACKAGE

(TOP VIEW)



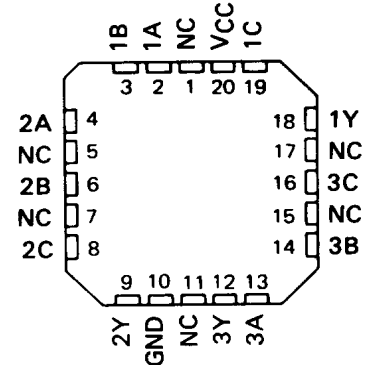
SN5410 . . . W PACKAGE

(TOP VIEW)



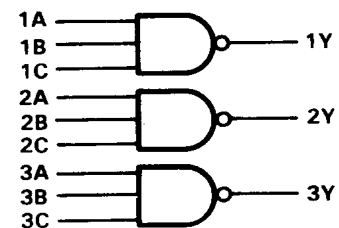
SN54LS10, SN54S10 . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

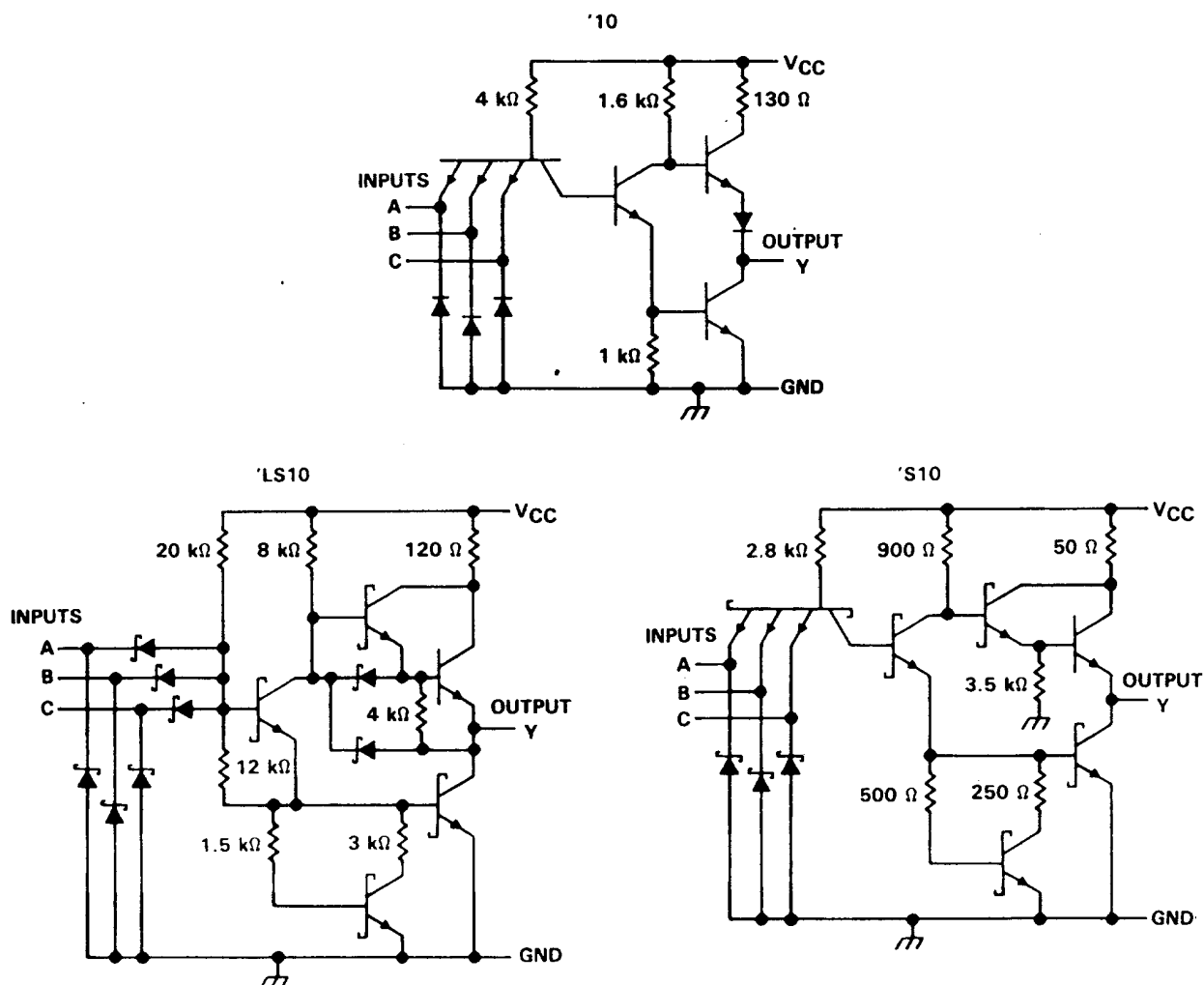
## logic diagram (positive logic)



# SN5410, SN54LS10, SN54S10, SN7410, SN74LS10, SN74S10 TRIPLE 3-INPUT POSITIVE-NAND GATES

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## schematics (each gate)



Resistor values shown are nominal.

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

|                                             |                |
|---------------------------------------------|----------------|
| Supply voltage, $V_{CC}$ (see Note 1)       | 7 V            |
| Input voltage: '10, 'S10                    | 5.5 V          |
| 'LS10                                       | 7 V            |
| Operating free-air temperature range: SN54' | -55°C to 125°C |
| SN74'                                       | 0°C to 70°C    |
| Storage temperature range                   | -65°C to 150°C |

NOTE 1: Voltage values are with respect to network ground terminal.



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# SN5410, SN7410, TRIPLE 3-INPUT POSITIVE-NAND GATES

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## recommended operating conditions

|                                      | SN5410 |     |      | SN7410 |     |      | UNIT |
|--------------------------------------|--------|-----|------|--------|-----|------|------|
|                                      | MIN    | NOM | MAX  | MIN    | NOM | MAX  |      |
| $V_{CC}$ Supply voltage              | 4.5    | 5   | 5.5  | 4.75   | 5   | 5.25 | V    |
| $V_{IH}$ High-level input voltage    | 2      |     |      | 2      |     |      | V    |
| $V_{IL}$ Low-level input voltage     |        |     | 0.8  |        |     | 0.8  | V    |
| $I_{OH}$ High-level output current   |        |     | -0.4 |        |     | -0.4 | mA   |
| $I_{OL}$ Low-level output current    |        |     | 16   |        |     | 16   | mA   |
| $T_A$ Operating free-air temperature | -55    |     | 125  | 0      |     | 70   | °C   |

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

| PARAMETER  | TEST CONDITIONS †                                                       | SN5410 |       |      | SN7410 |       |      | UNIT |
|------------|-------------------------------------------------------------------------|--------|-------|------|--------|-------|------|------|
|            |                                                                         | MIN    | TYP ‡ | MAX  | MIN    | TYP ‡ | MAX  |      |
| $V_{IK}$   | $V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$                             |        |       | -1.5 |        |       | -1.5 | V    |
| $V_{OH}$   | $V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}, I_{OH} = -0.4 \text{ mA}$ | 2.4    | 3.4   |      | 2.4    | 3.4   |      | V    |
| $V_{OL}$   | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 16 \text{ mA}$     |        | 0.2   | 0.4  |        | 0.2   | 0.4  | V    |
| $I_I$      | $V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$                              |        |       | 1    |        |       | 1    | mA   |
| $I_{IH}$   | $V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$                              |        |       | 40   |        |       | 40   | µA   |
| $I_{IL}$   | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$                              |        |       | -1.6 |        |       | -1.6 | mA   |
| $I_{OS} §$ | $V_{CC} = \text{MAX}$                                                   | -20    |       | -55  | -18    |       | -55  | mA   |
| $I_{CCH}$  | $V_{CC} = \text{MAX}, V_I = 0 \text{ V}$                                |        | 3     | 6    |        | 3     | 6    | mA   |
| $I_{CCL}$  | $V_{CC} = \text{MAX}, V_I = 4.5 \text{ V}$                              |        | 9     | 16.5 |        | 9     | 16.5 | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ .

§ Not more than one output should be shorted at a time.

## switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 2)

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | TEST CONDITIONS                         | MIN | TYP | MAX | UNIT |
|-----------|-----------------|----------------|-----------------------------------------|-----|-----|-----|------|
| $t_{PLH}$ | A, B or C       | Y              | $R_L = 400 \Omega, C_L = 15 \text{ pF}$ |     | 11  | 22  | ns   |
| $t_{PHL}$ |                 |                |                                         |     | 7   | 15  | ns   |

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

# SN54LS10, SN74LS10, TRIPLE 3-INPUT POSITIVE-NAND GATES

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## recommended operating conditions

|                                      | SN54LS10 |     |       | SN74LS10 |     |       | UNIT |
|--------------------------------------|----------|-----|-------|----------|-----|-------|------|
|                                      | MIN      | NOM | MAX   | MIN      | NOM | MAX   |      |
| $V_{CC}$ Supply voltage              | 4.5      | 5   | 5.5   | 4.75     | 5   | 5.25  | V    |
| $V_{IH}$ High-level input voltage    | 2        |     |       | 2        |     |       | V    |
| $V_{IL}$ Low-level input voltage     |          |     | 0.7   |          |     | 0.8   | V    |
| $I_{OH}$ High-level output current   |          |     | – 0.4 |          |     | – 0.4 | mA   |
| $I_{OL}$ Low-level output current    |          |     | 4     |          |     | 8     | mA   |
| $T_A$ Operating free-air temperature | – 55     |     | 125   | 0        |     | 70    | °C   |

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

| PARAMETER | TEST CONDITIONS †                                                    | SN54LS10 |      |       | SN74LS10 |      |       | UNIT |
|-----------|----------------------------------------------------------------------|----------|------|-------|----------|------|-------|------|
|           |                                                                      | MIN      | TYP‡ | MAX   | MIN      | TYP‡ | MAX   |      |
| $V_{IK}$  | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$                          |          |      | – 1.5 |          |      | – 1.5 | V    |
| $V_{OH}$  | $V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, I_{OH} = -0.4 \text{ mA}$ | 2.5      | 3.4  |       | 2.7      | 3.4  |       | V    |
| $V_{OL}$  | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$   |          | 0.25 | 0.4   |          |      | 0.4   | V    |
|           | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 8 \text{ mA}$   |          |      |       |          | 0.25 | 0.5   |      |
| $I_I$     | $V_{CC} = \text{MAX}, V_I = 7 \text{ V}$                             |          |      | 0.1   |          |      | 0.1   | mA   |
| $I_{IH}$  | $V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$                           |          |      | 20    |          |      | 20    | µA   |
| $I_{IL}$  | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$                           |          |      | – 0.4 |          |      | – 0.4 | mA   |
| $I_{OS}§$ | $V_{CC} = \text{MAX}$                                                | – 20     |      | – 100 | – 20     |      | – 100 | mA   |
| $I_{CCH}$ | $V_{CC} = \text{MAX}, V_I = 0 \text{ V}$                             |          | 0.6  | 1.2   |          | 0.6  | 1.2   | mA   |
| $I_{CCL}$ | $V_{CC} = \text{MAX}, V_I = 4.5 \text{ V}$                           |          | 1.8  | 3.3   |          | 1.8  | 3.3   | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ .

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

## switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 2)

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | TEST CONDITIONS                                | MIN | TYP | MAX | UNIT |
|-----------|-----------------|----------------|------------------------------------------------|-----|-----|-----|------|
| $t_{PLH}$ | A, B or C       | Y              | $R_L = 2 \text{ k}\Omega, C_L = 15 \text{ pF}$ |     | 9   | 15  | ns   |
| $t_{PHL}$ |                 |                |                                                |     | 10  | 15  | ns   |

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.



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# SN54S10, SN74S10, TRIPLE 3-INPUT POSITIVE-NAND GATES

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## recommended operating conditions

|                                               | SN54S10 |     |     | SN74S10 |     |      | UNIT |
|-----------------------------------------------|---------|-----|-----|---------|-----|------|------|
|                                               | MIN     | NOM | MAX | MIN     | NOM | MAX  |      |
| V <sub>CC</sub> Supply voltage                | 4.5     | 5   | 5.5 | 4.75    | 5   | 5.25 | V    |
| V <sub>IH</sub> High-level input voltage      | 2       |     |     | 2       |     |      | V    |
| V <sub>IL</sub> Low-level input voltage       |         |     | 0.8 |         |     | 0.8  | V    |
| I <sub>OH</sub> High-level output current     |         |     | – 1 |         |     | – 1  | mA   |
| I <sub>OL</sub> Low-level output current      |         |     | 20  |         |     | 20   | mA   |
| T <sub>A</sub> Operating free-air temperature | – 55    |     | 125 | 0       |     | 70   | °C   |

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

| PARAMETER         | TEST CONDITIONS †                                                       | SN54S10 |       |      | SN74S10 |       |      | UNIT |
|-------------------|-------------------------------------------------------------------------|---------|-------|------|---------|-------|------|------|
|                   |                                                                         | MIN     | TYP ‡ | MAX  | MIN     | TYP ‡ | MAX  |      |
| V <sub>IK</sub>   | V <sub>CC</sub> = MIN, I <sub>I</sub> = –18 mA                          |         |       | –1.2 |         |       | –1.2 | V    |
| V <sub>OH</sub>   | V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = –1 mA | 2.5     | 3.4   |      | 2.7     | 3.4   |      | V    |
| V <sub>OL</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 20 mA   |         |       | 0.5  |         |       | 0.5  | V    |
| I <sub>I</sub>    | V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V                           |         |       | 1    |         |       | 1    | mA   |
| I <sub>IH</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V                           |         |       | 50   |         |       | 50   | μA   |
| I <sub>IL</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5 V                           |         |       | –2   |         |       | –2   | mA   |
| I <sub>OS</sub> § | V <sub>CC</sub> = MAX                                                   | –40     |       | –100 | –40     |       | –100 | mA   |
| I <sub>CCH</sub>  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0 V                             |         | 7.5   | 12   |         | 7.5   | 12   | mA   |
| I <sub>CCL</sub>  | V <sub>CC</sub> = MAX, V <sub>I</sub> = 4.5 V                           |         | 15    | 27   |         | 15    | 27   | mA   |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

## switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 2)

| PARAMETER        | FROM<br>(INPUT) | TO<br>(OUTPUT) | TEST CONDITIONS                                | MIN | TYP | MAX | UNIT |
|------------------|-----------------|----------------|------------------------------------------------|-----|-----|-----|------|
| t <sub>PLH</sub> | A, B or C       | Y              | R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 15 pF |     | 3   | 4.5 | ns   |
| t <sub>PHL</sub> |                 |                |                                                |     | 3   | 5   | ns   |
| t <sub>PLH</sub> |                 |                | R <sub>L</sub> = 280 Ω, C <sub>L</sub> = 50 pF |     | 4.5 |     | ns   |
| t <sub>PHL</sub> |                 |                |                                                |     | 5   |     | ns   |

NOTE 2: 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>               |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|--------------------------------------------|
| JM38510/00103BCA | OBSOLETE              | CDIP         | J               | 14   |             | None                    | Call TI          | Call TI                                    |
| JM38510/00103BDA | OBSOLETE              | CFP          | W               | 14   |             | None                    | Call TI          | Call TI                                    |
| JM38510/07005BCA | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/07005BDA | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/30005B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/30005BCA | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/30005BDA | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/30005SCA | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| JM38510/30005SDA | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SN5410J          | OBSOLETE              | CDIP         | J               | 14   |             | None                    | Call TI          | Call TI                                    |
| SN54LS10J        | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SN54S10J         | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SN7410N          | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN7410N3         | OBSOLETE              | PDIP         | N               | 14   |             | None                    | Call TI          | Call TI                                    |
| SN74LS10D        | ACTIVE                | SOIC         | D               | 14   | 50          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS10DR       | ACTIVE                | SOIC         | D               | 14   | 2500        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS10N        | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74LS10N3       | OBSOLETE              | PDIP         | N               | 14   |             | None                    | Call TI          | Call TI                                    |
| SN74LS10NSR      | ACTIVE                | SO           | NS              | 14   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S10D         | ACTIVE                | SOIC         | D               | 14   | 50          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S10N         | ACTIVE                | PDIP         | N               | 14   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74S10N3        | OBSOLETE              | PDIP         | N               | 14   |             | None                    | Call TI          | Call TI                                    |
| SN74S10NSR       | ACTIVE                | SO           | NS              | 14   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SNJ5410J         | OBSOLETE              | CDIP         | J               | 14   |             | None                    | Call TI          | Call TI                                    |
| SNJ5410W         | OBSOLETE              | CFP          | W               | 14   |             | None                    | Call TI          | Call TI                                    |
| SNJ5410WA        | OBSOLETE              | CFP          | WA              | 14   |             | None                    | Call TI          | Call TI                                    |
| SNJ54LS10FK      | ACTIVE                | LCCC         | FK              | 20   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS10J       | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS10W       | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54S10FK       | ACTIVE                | LCCC         | FK              | 20   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54S10J        | ACTIVE                | CDIP         | J               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |
| SNJ54S10W        | ACTIVE                | CFP          | W               | 14   | 1           | None                    | Call TI          | Level-NC-NC-NC                             |

<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.

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**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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

**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" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

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

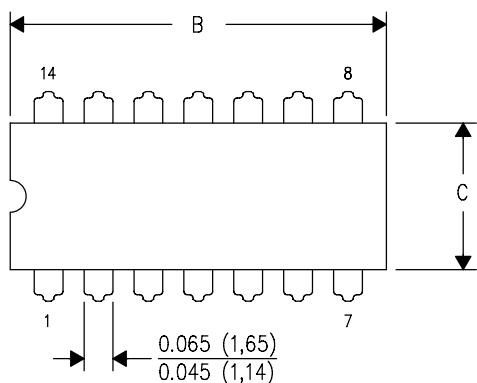
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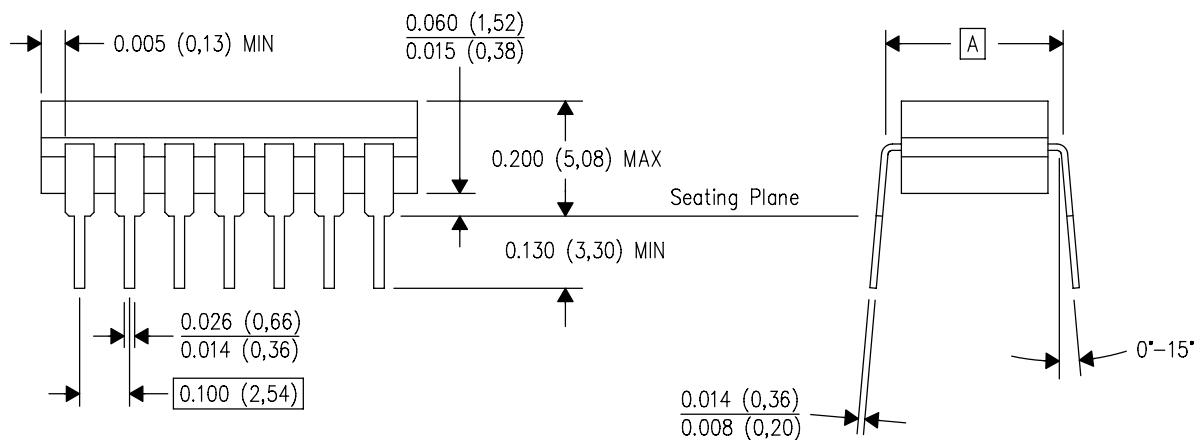
J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



| PINS **<br>DIM | 14                     | 16                     | 18                     | 20                     |
|----------------|------------------------|------------------------|------------------------|------------------------|
| 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)        |



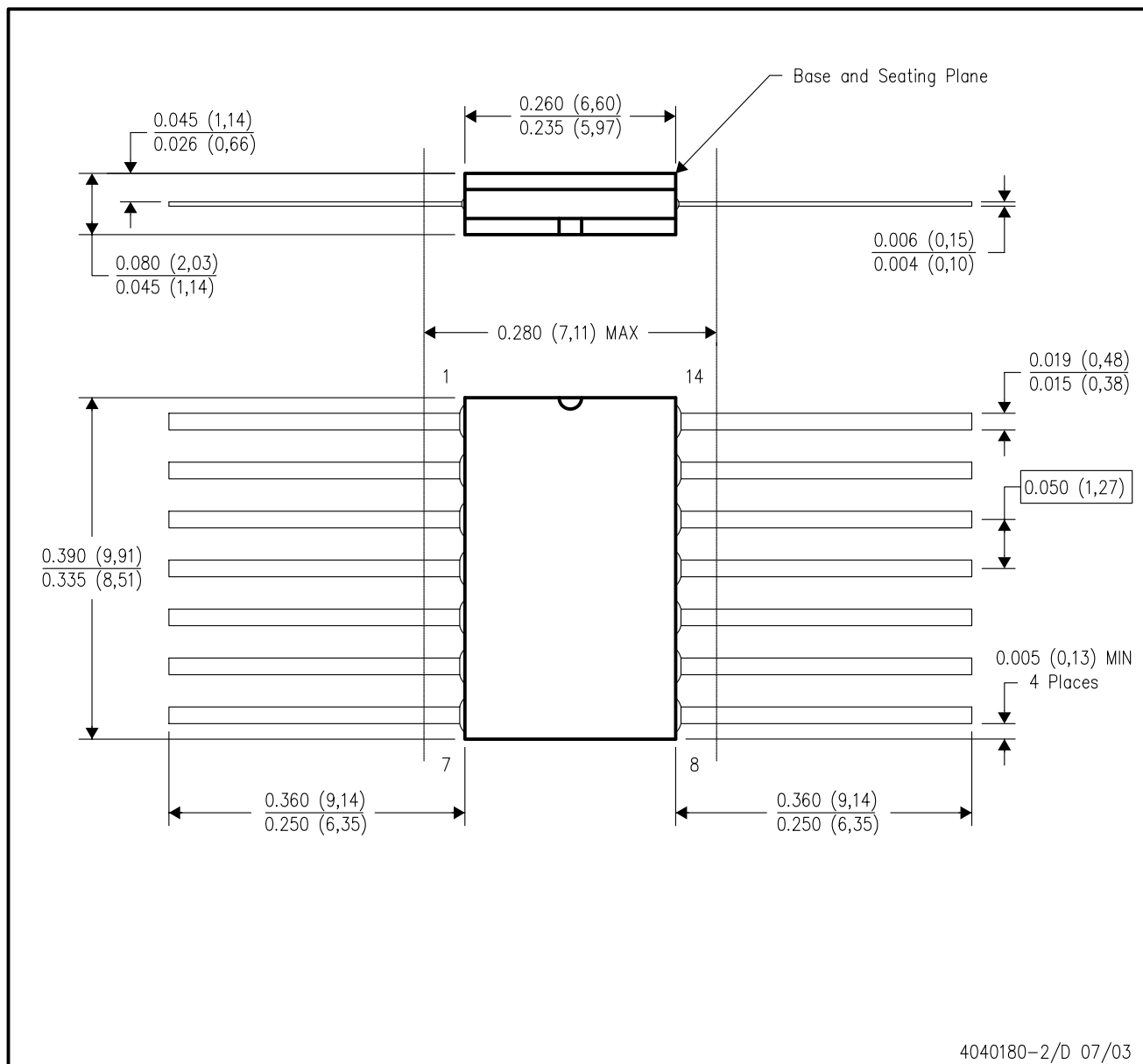
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- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal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



W (R-GDFP-F14)

CERAMIC DUAL FLATPACK

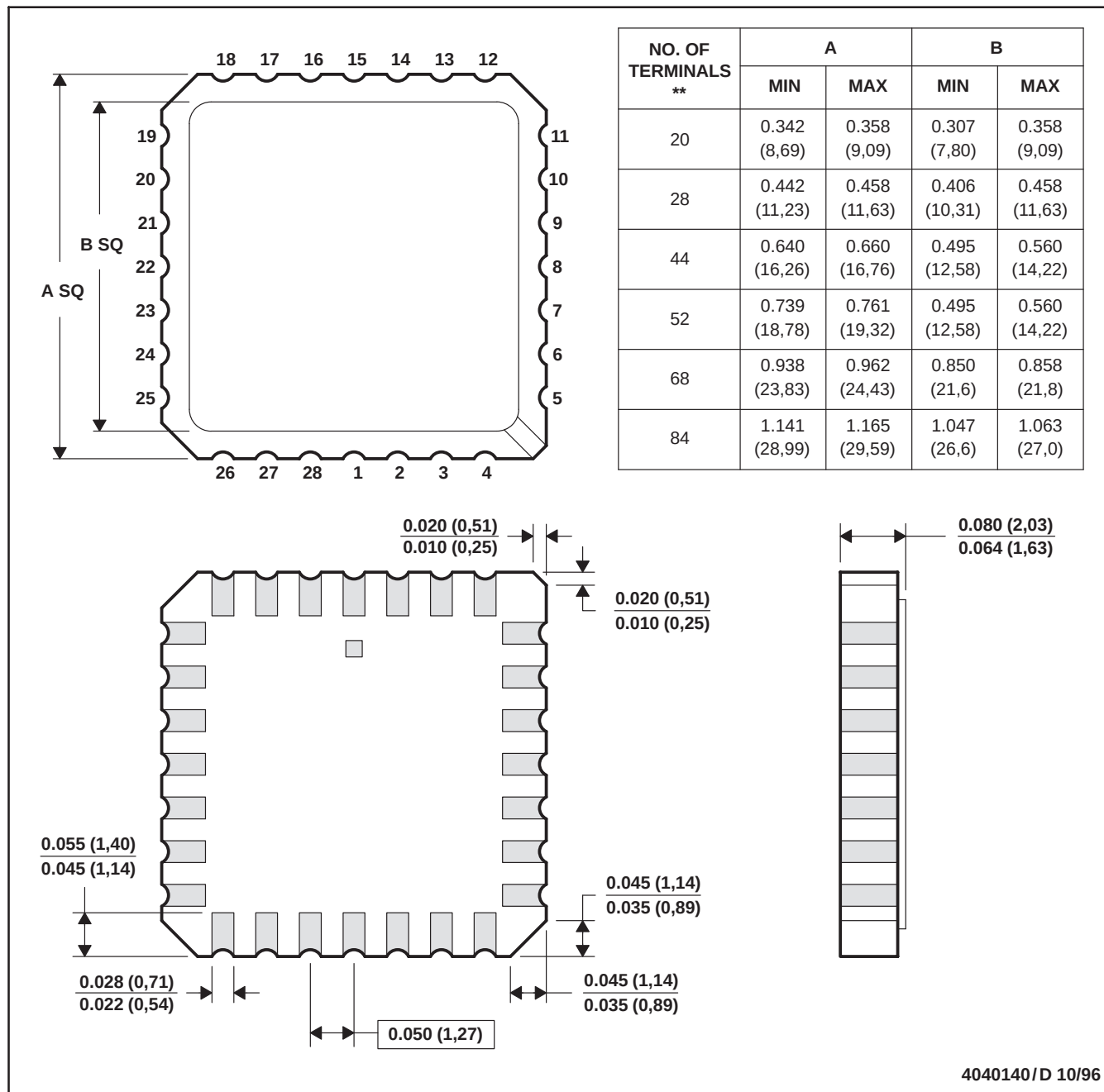


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only.
  - Falls within MIL STD 1835 GDFP1-F14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

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

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN

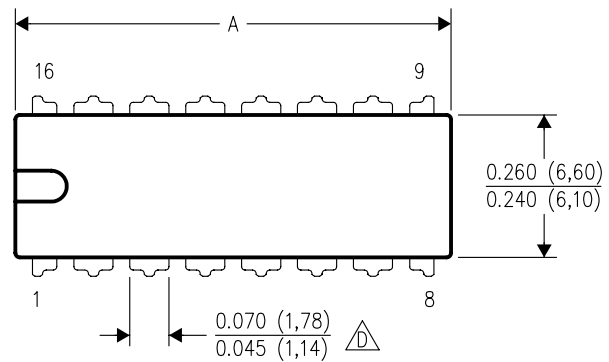


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a metal lid.
  - The terminals are gold plated.
  - Falls within JEDEC MS-004

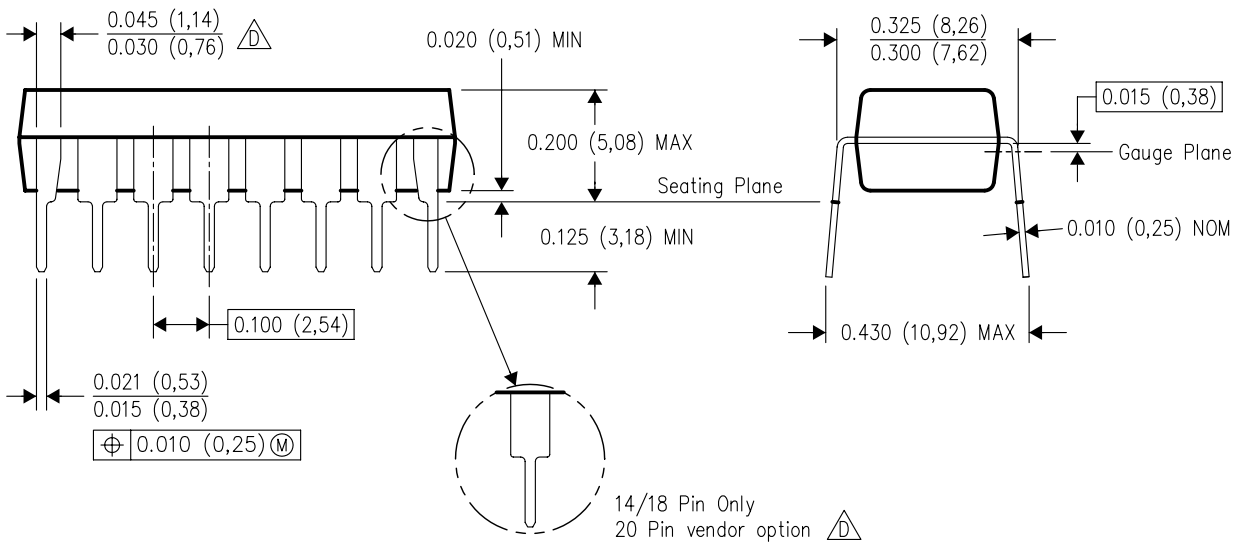
## N (R-PDIP-T\*\*)

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               |



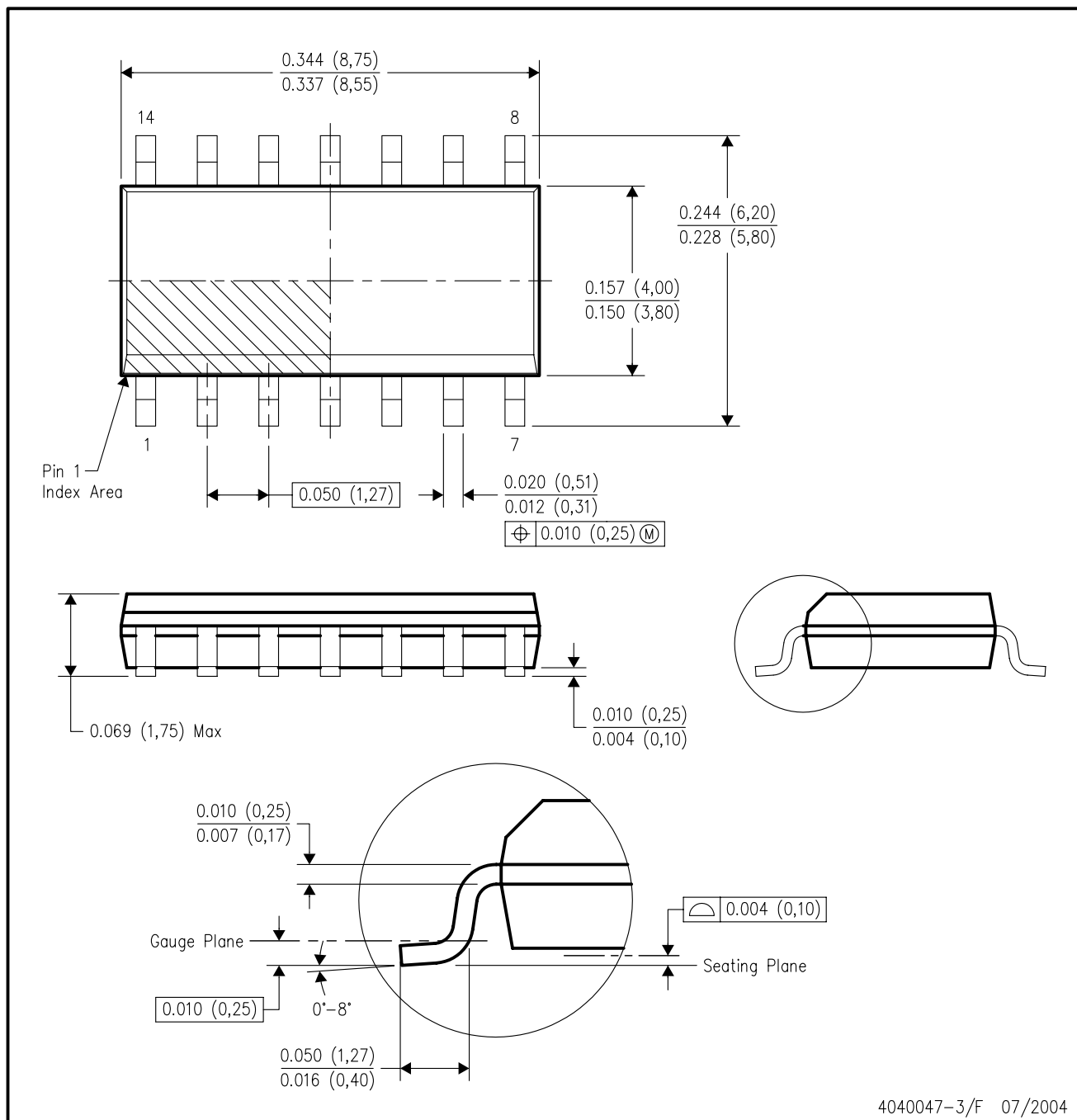
14/18 Pin Only  
20 Pin vendor option

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-G14)

## PLASTIC SMALL-OUTLINE PACKAGE



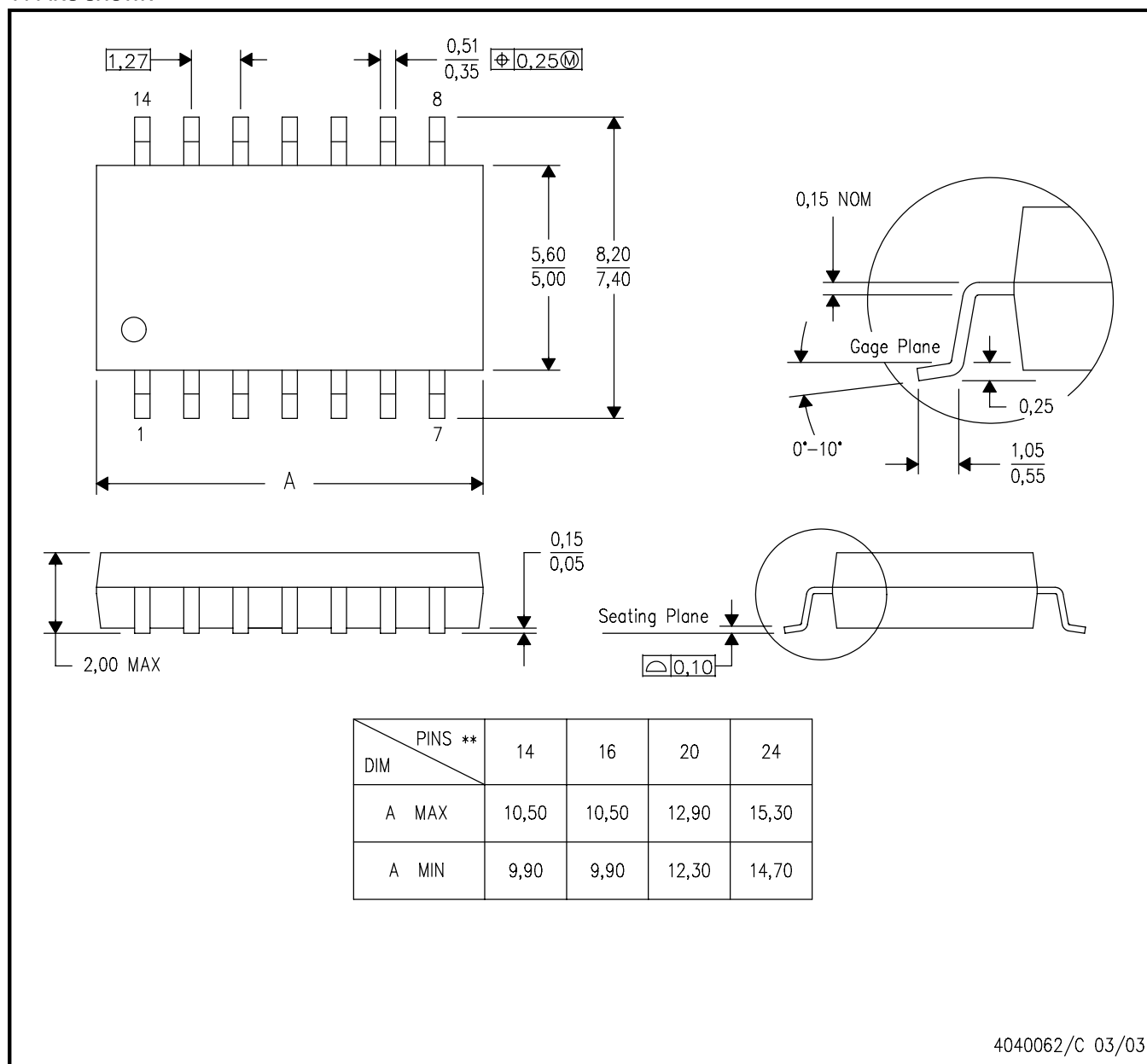
- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-012 variation AB.

# MECHANICAL DATA

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

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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