# SN54HC367, SN74HC367
## HEX BUFFERS AND LINE DRIVERS
## WITH 3-STATE OUTPUTS

- **Wide Operating Voltage Range of 2 V to 6 V**
- **High-Current 3-State Outputs Drive Bus Lines, Buffer Memory Address Registers, or Drive Up To 15 LSTTL Loads**
- **True Outputs**
- **Low Power Consumption, 80-μA Max $I_{CC}$**
- **Typical $t_{pd}$ = 10 ns**
- **±6-mA Output Drive at 5 V**
- **Low Input Current of 1 μA Max**

## description/ordering information

These hex buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The 'HC367 devices are organized as dual 4-line and 2-line buffers/drivers with active-low output-enable (1$\overline{OE}$ and 2$\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes noninverted data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

SN54HC367 . . . J OR W PACKAGE
SN74HC367 . . . D, N, NS, OR PW PACKAGE
(TOP VIEW)

| | | |
|---|---|---|
| 1$\overline{OE}$ | 1 | 16 | $V_{CC}$ |
| 1A1 | 2 | 15 | 2$\overline{OE}$ |
| 1Y1 | 3 | 14 | 2A2 |
| 1A2 | 4 | 13 | 2Y2 |
| 1Y2 | 5 | 12 | 2A1 |
| 1A3 | 6 | 11 | 2Y1 |
| 1Y3 | 7 | 10 | 1A4 |
| GND | 8 | 9 | 1Y4 |

SN54HC367 . . . FK PACKAGE
(TOP VIEW)
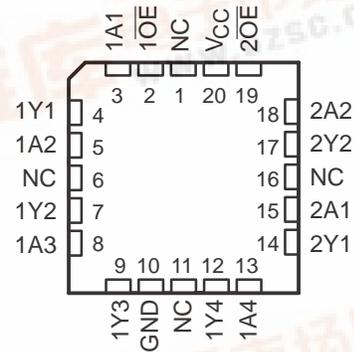
NC – No internal connection

## ORDERING INFORMATION

| $T_A$ | PACKAGE† | | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|---|---|---|---|---|
| −40°C to 85°C | PDIP – N | Tube of 25 | SN74HC367N | SN74HC367N |
| | SOIC – D | Tube of 40 | SN74HC367D | HC367 |
| | | Reel of 2500 | SN74HC367DR | |
| | | Reel of 250 | SN74HC367DT | |
| | SOP – NS | Reel of 2000 | SN74HC367NSR | HC367 |
| | TSSOP – PW | Tube of 90 | SN74HC367PW | HC367 |
| | | Reel of 2000 | SN74HC367PWR | |
| | | Reel of 250 | SN74HC367PWT | |
| −55°C to 125°C | CDIP – J | Tube of 25 | SNJ54HC367J | SNJ54HC367J |
| | CFP – W | Tube of 150 | SNJ54HC367W | SNJ54HC367W |
| | LCCC – FK | Tube of 55 | SNJ54HC367FK | SNJ54HC367FK |

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

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

TEXAS INSTRUMENTS

**FUNCTION TABLE**
**(each buffer/driver)**

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

## logic diagram (positive logic)
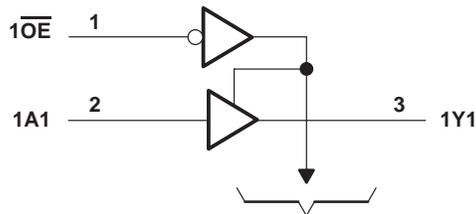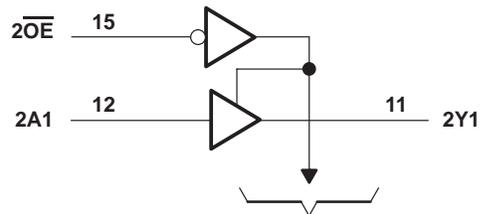


| | |
| --- | --- |
| 1$\overline{\text{OE}}$  1 | 2$\overline{\text{OE}}$  15 |
| 1A1  2 ............ 3  1Y1 | 2A1  12 ............ 11  2Y1 |
| **To Three Other Channels** | **To One Other Channel** |

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

## 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 $V_{CC}$) .............................................. ±35 mA
Continuous current through $V_{CC}$ or GND ........................................................ ±70 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): D package ................................... 73°C/W
N package .................................... 67°C/W
NS package ................................. 64°C/W
PW package ............................... 108°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)

| | | | SN54HC367 | | | SN74HC367 | | | 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 |
| $\Delta t/\Delta v$ | 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.

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

| PARAMETER | TEST CONDITIONS | | $V_{CC}$ | $T_A$ = 25°C | | | SN54HC367 | | SN74HC367 | | 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) | $V_{CC}$ | $T_A = 25°C$ | | | SN54HC367 | | SN74HC367 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{pd}$ | A | Y | 2 V | | 50 | 95 | | 145 | | 120 | ns |
| | | | 4.5 V | | 12 | 19 | | 29 | | 24 | |
| | | | 6 V | | 10 | 16 | | 25 | | 20 | |
| $t_{en}$ | $\overline{OE}$ | Y | 2 V | | 100 | 190 | | 285 | | 238 | ns |
| | | | 4.5 V | | 26 | 38 | | 57 | | 48 | |
| | | | 6 V | | 21 | 32 | | 48 | | 41 | |
| $t_{dis}$ | $\overline{OE}$ | Y | 2 V | | 50 | 175 | | 265 | | 240 | ns |
| | | | 4.5 V | | 21 | 35 | | 53 | | 48 | |
| | | | 6 V | | 19 | 30 | | 45 | | 41 | |
| $t_t$ | | Any | 2 V | | 28 | 60 | | 90 | | 75 | ns |
| | | | 4.5 V | | 8 | 12 | | 18 | | 15 | |
| | | | 6 V | | 6 | 10 | | 15 | | 13 | |

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

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ | $T_A = 25°C$ | | | SN54HC367 | | SN74HC367 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{pd}$ | A | Y | 2 V | | 70 | 120 | | 180 | | 150 | ns |
| | | | 4.5 V | | 17 | 24 | | 36 | | 30 | |
| | | | 6 V | | 14 | 20 | | 31 | | 25 | |
| $t_{en}$ | $\overline{OE}$ | Y | 2 V | | 140 | 230 | | 345 | | 285 | ns |
| | | | 4.5 V | | 30 | 46 | | 69 | | 57 | |
| | | | 6 V | | 28 | 39 | | 59 | | 48 | |
| $t_t$ | | Any | 2 V | | 45 | 210 | | 315 | | 265 | ns |
| | | | 4.5 V | | 17 | 42 | | 63 | | 53 | |
| | | | 6 V | | 13 | 36 | | 53 | | 45 | |

**operating characteristics, $T_A = 25°C$**

| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance per buffer/driver | No load | 35 | pF |

## PARAMETER MEASUREMENT INFORMATION

**LOAD CIRCUIT**
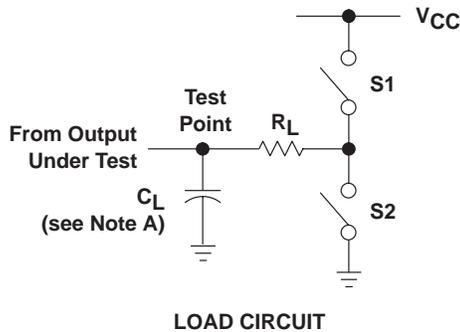
| PARAMETER | | $R_L$ | $C_L$ | S1 | S2 |
|---|---|---|---|---|---|
| $t_{en}$ | $t_{PZH}$ | 1 kΩ | 50 pF or 150 pF | Open | Closed |
| | $t_{PZL}$ | | | Closed | Open |
| $t_{dis}$ | $t_{PHZ}$ | 1 kΩ | 50 pF | Open | Closed |
| | $t_{PLZ}$ | | | Closed | Open |
| $t_{pd}$ or $t_t$ | | -- | 50 pF or 150 pF | Open | Open |

**VOLTAGE WAVEFORMS**
**PROPAGATION DELAY AND OUTPUT TRANSITION TIMES**

**VOLTAGE WAVEFORM**
**INPUT RISE AND FALL TIMES**

**VOLTAGE WAVEFORMS**
**ENABLE AND DISABLE TIMES FOR 3-STATE OUTPUTS**
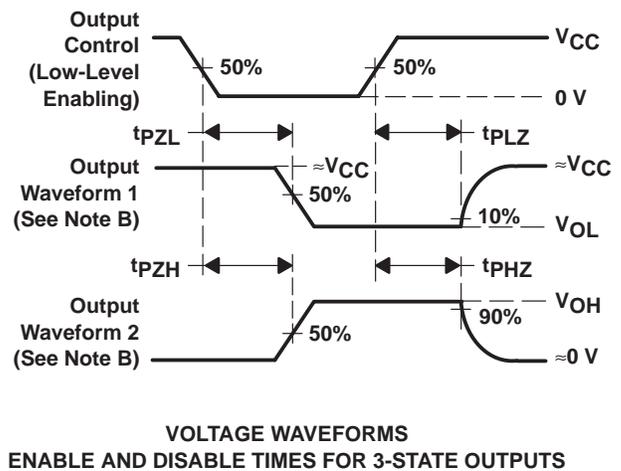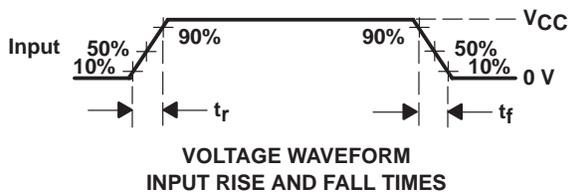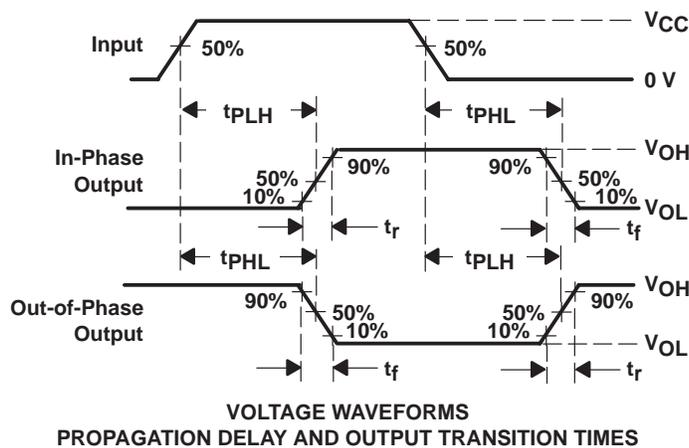
NOTES: A. $C_L$ includes probe and test-fixture capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, $Z_O$ = 50 Ω, $t_r$ = 6 ns, $t_f$ = 6 ns.
D. The outputs are measured one at a time with one input transition per measurement.
E. $t_{PLH}$ and $t_{PHL}$ are the same as $t_{pd}$.
F. $t_{PLZ}$ and $t_{PHZ}$ are the same as $t_{dis}$.
G. $t_{PZL}$ and $t_{PZH}$ are the same as $t_{en}$.

**Figure 1. Load Circuit and Voltage Waveforms**

**TEXAS**
**INSTRUMENTS**

## PACKAGING INFORMATION

| Orderable Device | Status [1] | Package Type | Package Drawing | Pins | Package Qty | Eco Plan [2] | Lead/Ball Finish | MSL Peak Temp [3] |
|---|---|---|---|---|---|---|---|---|
| 85002012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | Call TI | Level-NC-NC-NC |
| 8500201EA | ACTIVE | CDIP | J | 16 | 1 | TBD | Call TI | Level-NC-NC-NC |
| JM38510/65708BEA | ACTIVE | CDIP | J | 16 | 1 | TBD | Call TI | Level-NC-NC-NC |
| JM38510/65708BFA | ACTIVE | CFP | W | 16 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SN54HC367J | ACTIVE | CDIP | J | 16 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SN74HC367D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367DT | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367DTE4 | ACTIVE | SOIC | D | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | Level-NC-NC-NC |
| SN74HC367NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | Level-NC-NC-NC |
| SN74HC367NSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367NSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PW | ACTIVE | TSSOP | PW | 16 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PWE4 | ACTIVE | TSSOP | PW | 16 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PWR | ACTIVE | TSSOP | PW | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PWRE4 | ACTIVE | TSSOP | PW | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PWT | ACTIVE | TSSOP | PW | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74HC367PWTE4 | ACTIVE | TSSOP | PW | 16 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SNJ54HC367FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SNJ54HC367J | ACTIVE | CDIP | J | 16 | 1 | TBD | Call TI | Level-NC-NC-NC |

[1] The marketing status values are defined as follows:
**ACTIVE:** Product device recommended for new designs.
**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.
**OBSOLETE:** TI has discontinued the production of the device.

[2] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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J (R−GDIP−T**)　　　　　　　　　　CERAMIC DUAL IN−LINE PACKAGE

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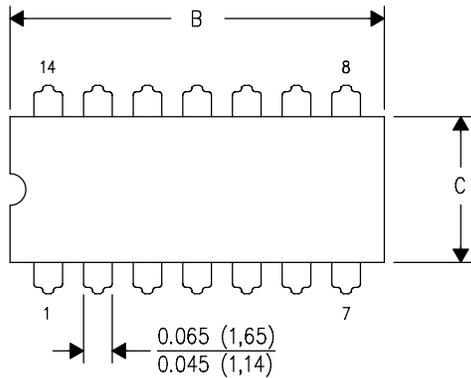
| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B  MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (26,92) |
| B  MIN | —— | —— | —— | —— |
| C  MAX | 0.300 (7,62) | 0.300 (7,62) | 0.310 (7,87)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

B

14　　　　　　8

C

1　　　　　　7

$\dfrac{0.065\ (1,65)}{0.045\ (1,14)}$

0.005 (0,13) MIN

$\dfrac{0.060\ (1,52)}{0.015\ (0,38)}$

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

A

0°−15°

$\dfrac{0.026\ (0,66)}{0.014\ (0,36)}$

0.100 (2,54)

$\dfrac{0.014\ (0,36)}{0.008\ (0,20)}$
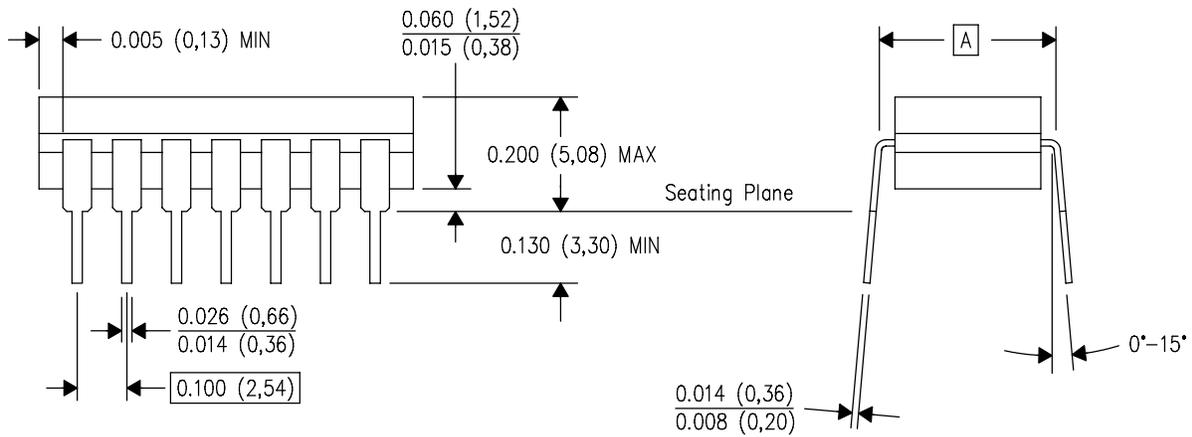
4040083/F 03/03

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.

## W (R−GDFP−F16)                                    CERAMIC DUAL FLATPACK
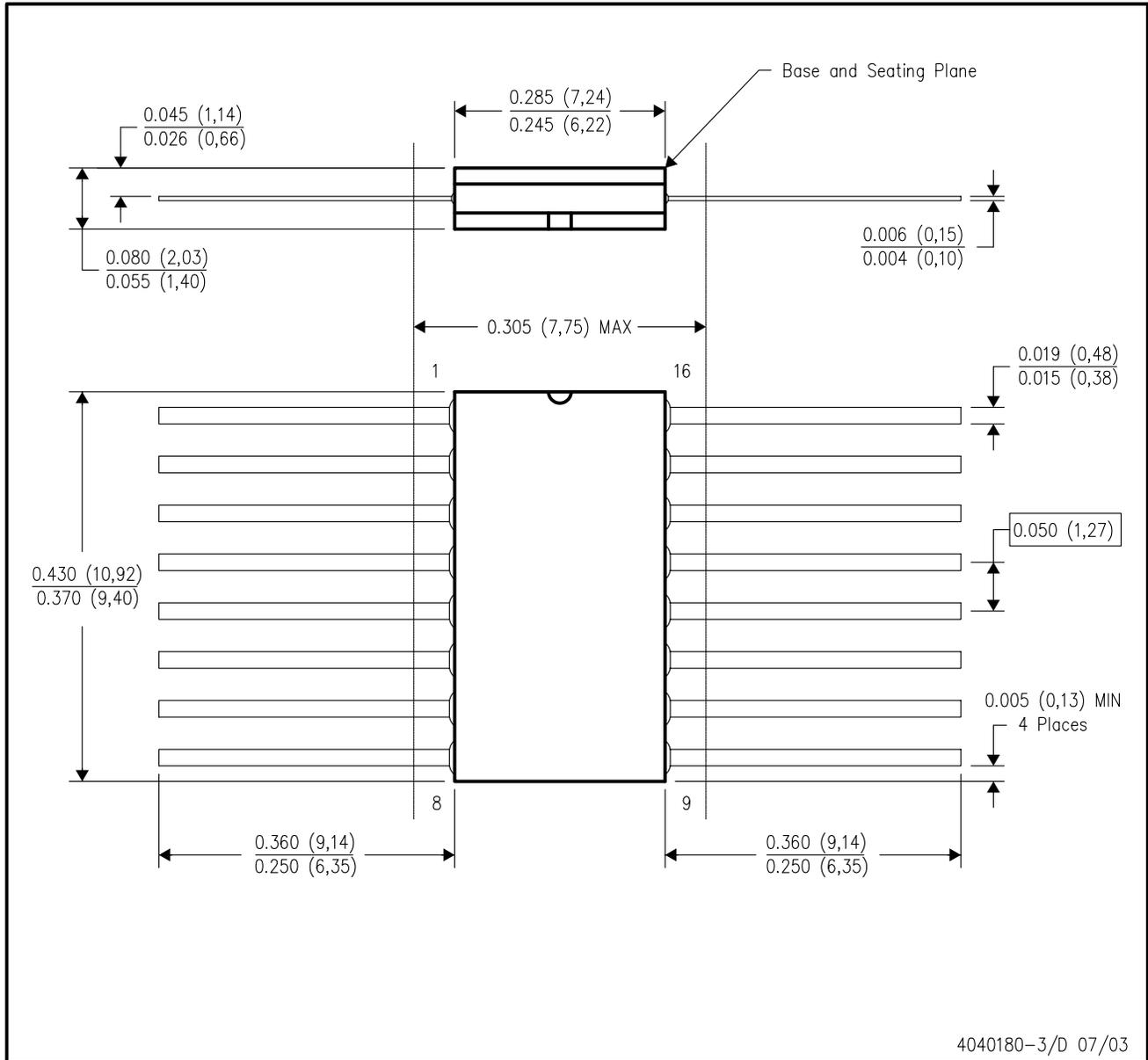
Base and Seating Plane

0.045 (1,14)
0.026 (0,66)

0.285 (7,24)
0.245 (6,22)

0.080 (2,03)
0.055 (1,40)

0.006 (0,15)
0.004 (0,10)

0.305 (7,75) MAX

0.019 (0,48)
0.015 (0,38)

1        16

0.430 (10,92)
0.370 (9,40)

0.050 (1,27)

0.005 (0,13) MIN
4 Places

8        9

0.360 (9,14)
0.250 (6,35)

0.360 (9,14)
0.250 (6,35)

4040180−3/D 07/03

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 ceramic lid using glass frit.
         D.  Index point is provided on cap for terminal identification only.
         E.  Falls within MIL STD 1835 GDFP1−F16 and JEDEC MO−092AC

# MECHANICAL DATA

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

**28 TERMINAL SHOWN**

## LEADLESS CERAMIC CHIP CARRIER
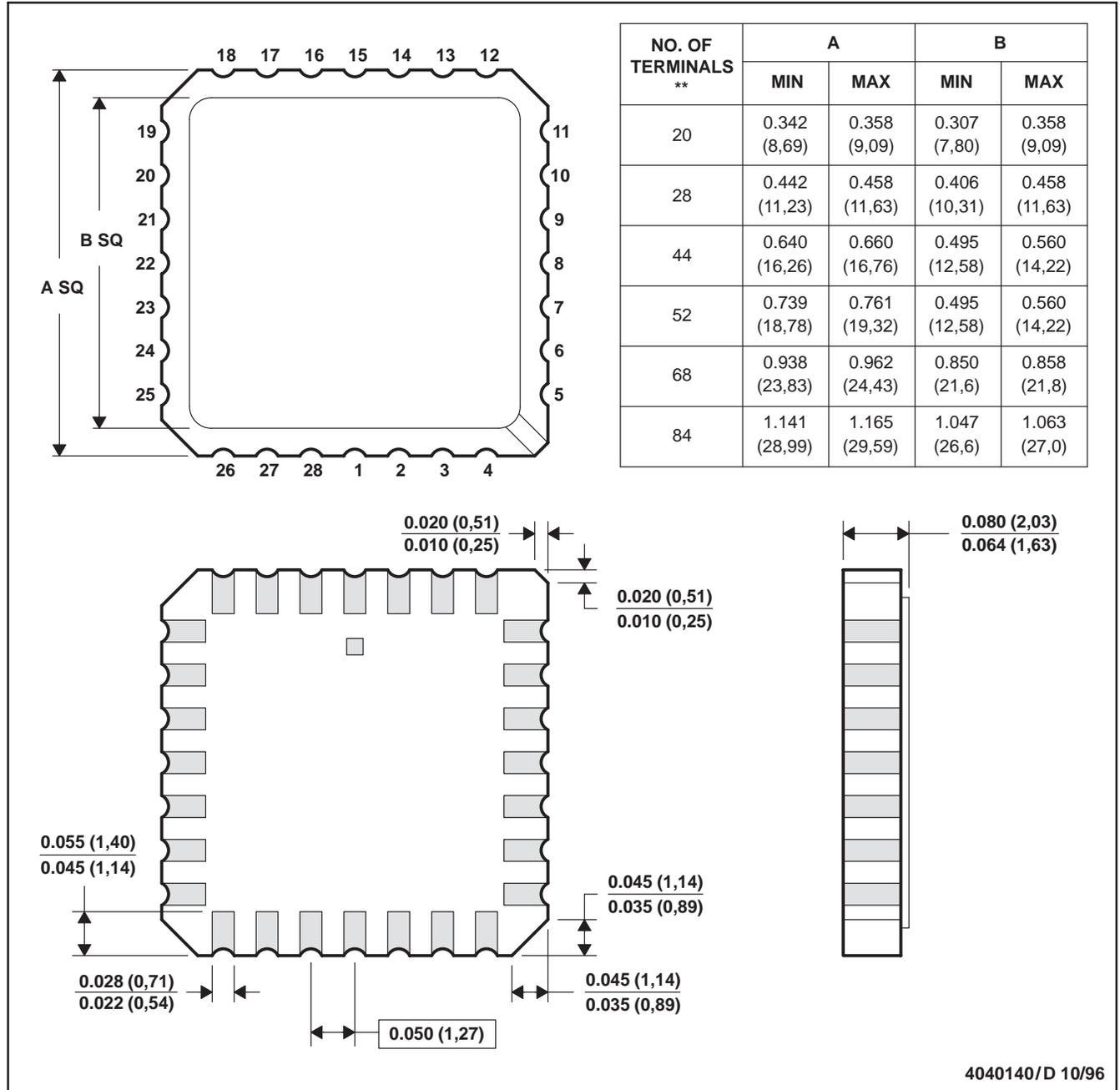
| NO. OF TERMINALS \*\* | A | | B | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| 20 | 0.342 (8,69) | 0.358 (9,09) | 0.307 (7,80) | 0.358 (9,09) |
| 28 | 0.442 (11,23) | 0.458 (11,63) | 0.406 (10,31) | 0.458 (11,63) |
| 44 | 0.640 (16,26) | 0.660 (16,76) | 0.495 (12,58) | 0.560 (14,22) |
| 52 | 0.739 (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) |

B SQ

A SQ

0.020 (0,51) / 0.010 (0,25)

0.020 (0,51) / 0.010 (0,25)

0.080 (2,03) / 0.064 (1,63)

0.055 (1,40) / 0.045 (1,14)

0.045 (1,14) / 0.035 (0,89)

0.028 (0,71) / 0.022 (0,54)

0.045 (1,14) / 0.035 (0,89)

0.050 (1,27)

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

TEXAS
INSTRUMENTS

## N (R−PDIP−T**)
16 PINS SHOWN

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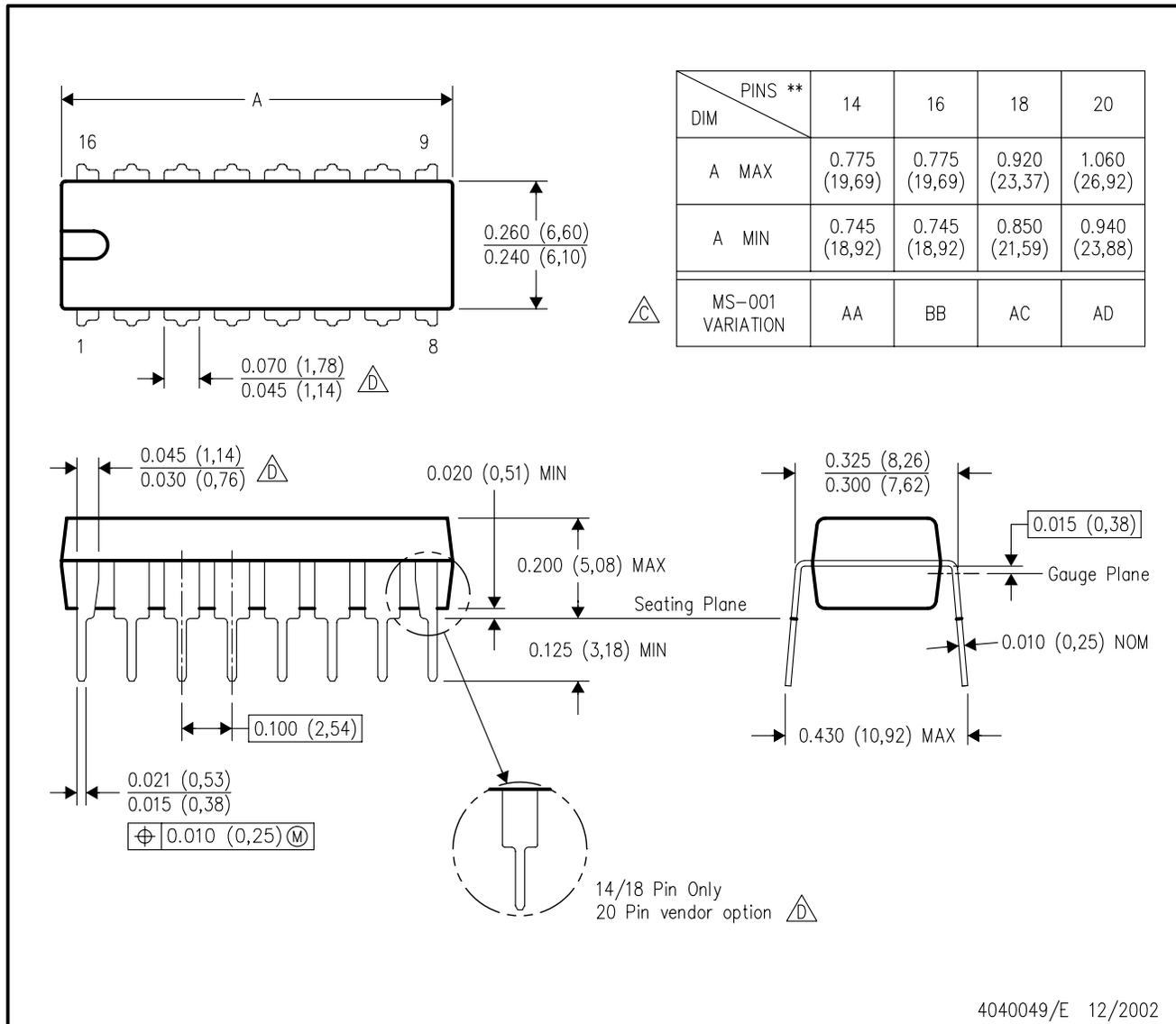
| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A   MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A   MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS−001 VARIATION | AA | BB | AC | AD |

A

16          9

0.260 (6,60)
0.240 (6,10)

1          8

0.070 (1,78)
0.045 (1,14)  /D\

0.045 (1,14)
0.030 (0,76)  /D\

0.020 (0,51) MIN

0.325 (8,26)
0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.010 (0,25) NOM

0.100 (2,54)

0.021 (0,53)
0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

0.430 (10,92) MAX

14/18 Pin Only
20 Pin vendor option  /D\

4040049/E   12/2002

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

## D (R−PDSO−G16)              PLASTIC SMALL−OUTLINE PACKAGE

0.394 (10,00)
0.386 (9,80)

16             9

0.244 (6,20)
0.228 (5,80)

0.157 (4,00)
0.150 (3,80)

1            8

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.069 (1,75) Max

0.010 (0,25)
0.004 (0,10)

0.010 (0,25)
0.007 (0,17)

Gauge Plane

△ 0.004 (0,10)

Seating Plane

0.010 (0,25)   0°–8°

0.050 (1,27)
0.016 (0,40)
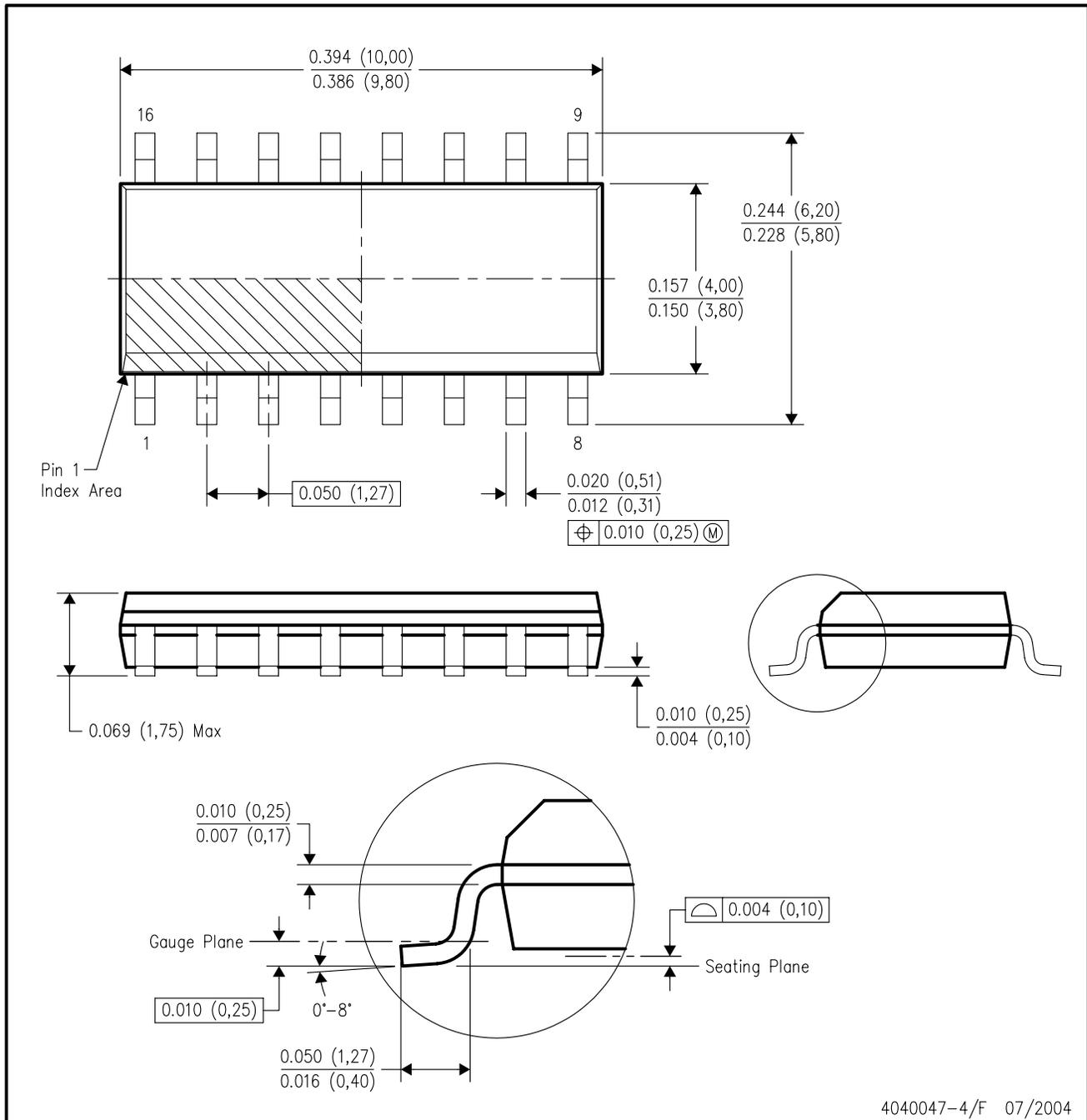
4040047−4/F  07/2004

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

**TEXAS INSTRUMENTS**
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# MECHANICAL DATA

PLASTIC SMALL-OUTLINE PACKAGE

| PINS ** DIM | 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.

TEXAS
INSTRUMENTS

# MECHANICAL DATA

**PW (R-PDSO-G\*\*)**                                        **PLASTIC SMALL-OUTLINE PACKAGE**

**14 PINS SHOWN**
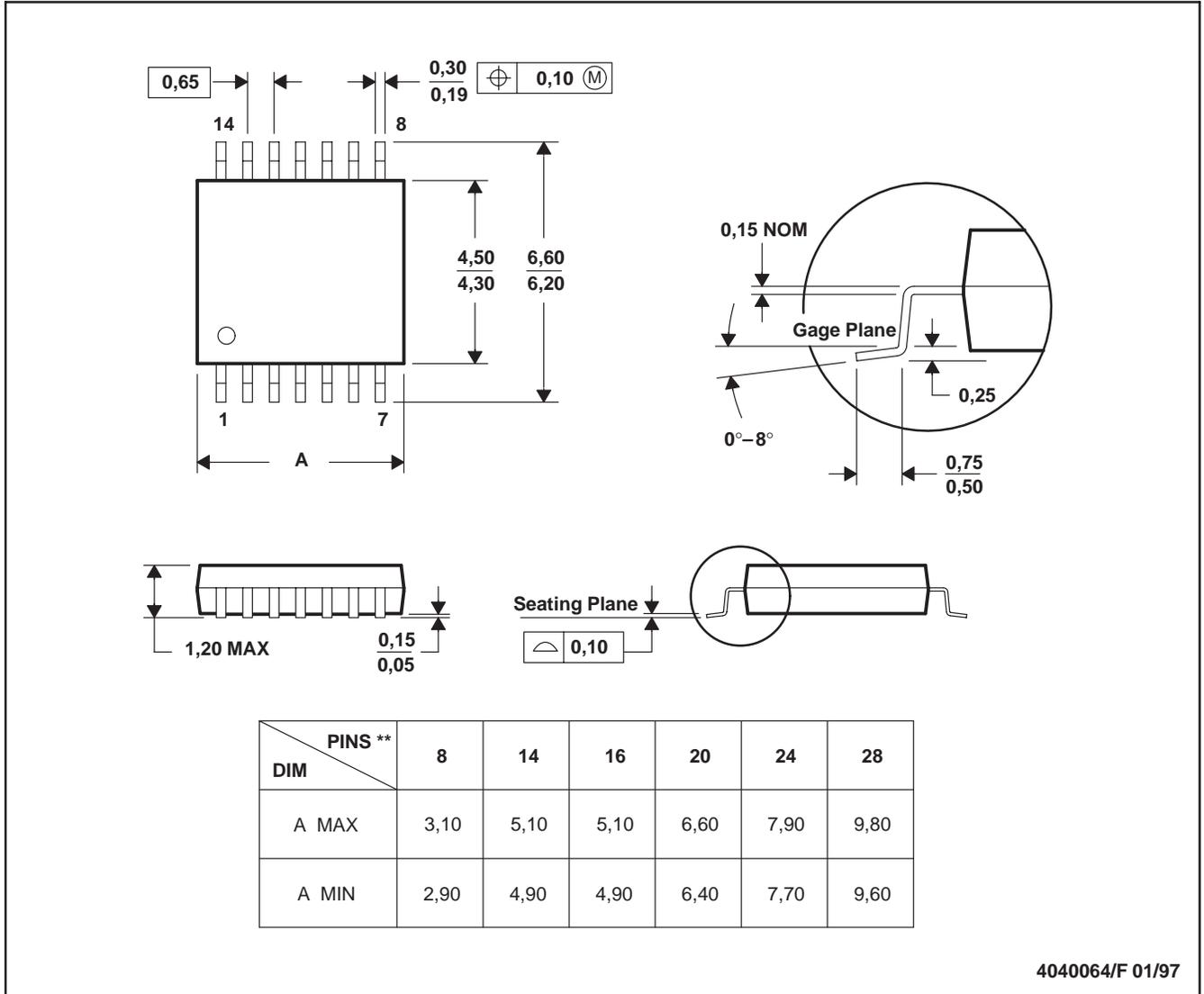


| PINS \*\* DIM | 8 | 14 | 16 | 20 | 24 | 28 |
|---|---|---|---|---|---|---|
| A MAX | 3,10 | 5,10 | 5,10 | 6,60 | 7,90 | 9,80 |
| A MIN | 2,90 | 4,90 | 4,90 | 6,40 | 7,70 | 9,60 |

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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