- **State-of-the-Art *EPIC-*II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**

- **ESD Protection Exceeds 2000 V Per MIL-STD-883, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**

- **Typical $V_{OLP}$ (Output Ground Bounce) < 1 V at $V_{CC}$ = 5 V, $T_A$ = 25°C**

- **High-Drive Outputs (–32-mA $I_{OH}$, 64-mA $I_{OL}$)**

- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK), Ceramic Flat (W) Package, and Plastic (NT) and Ceramic (JT) DIPs**

**SN54ABT543A . . . JT OR W PACKAGE**
**SN74ABT543A . . . DB, DW, NT, OR PW PACKAGE**
**(TOP VIEW)**

```
         ┌────┐  ┌────┐
 LEBA  [ 1    ⌣   24 ]  V_CC
 OEBA  [ 2        23 ]  CEBA
   A1  [ 3        22 ]  B1
   A2  [ 4        21 ]  B2
   A3  [ 5        20 ]  B3
   A4  [ 6        19 ]  B4
   A5  [ 7        18 ]  B5
   A6  [ 8        17 ]  B6
   A7  [ 9        16 ]  B7
   A8  [ 10       15 ]  B8
 CEAB  [ 11       14 ]  LEAB
  GND  [ 12       13 ]  OEAB
         └────────────┘
```
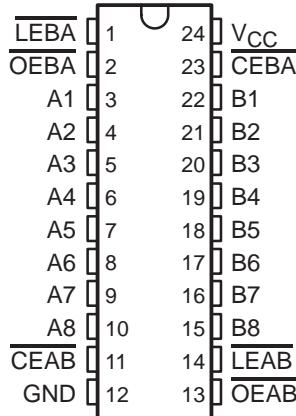
**SN54ABT543A . . . FK PACKAGE**
**(TOP VIEW)**

```
           A1  OEBA LEBA  NC  V_CC CEBA  B1
           4    3    2    1   28   27   26
        ┌─────────────────────────────────┐
  A2 [ 5                              25 ] B2
  A3 [ 6                              24 ] B3
  A4 [ 7                              23 ] B4
  NC [ 8                              22 ] NC
  A5 [ 9                              21 ] B5
  A6 [ 10                             20 ] B6
  A7 [ 11                             19 ] B7
        └─────────────────────────────────┘
           12   13   14   15   16   17   18
           A8  CEAB GND  NC  OEAB LEAB  B8
```
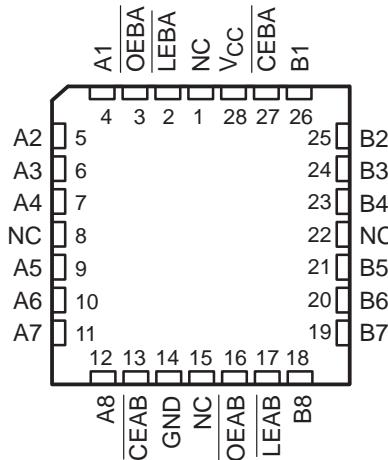
NC – No internal connection

## description

The 'ABT543A octal transceivers contain two sets of D-type latches for temporary storage of data flowing in either direction. Separate latch-enable (LEAB or LEBA) and output-enable (OEAB or OEBA) inputs are provided for each register to permit independent control in either direction of data flow.

The A-to-B enable (CEAB) input must be low to enter data from A or to output data from B. If CEAB is low and LEAB is low, the A-to-B latches are transparent; a subsequent low-to-high transition of LEAB puts the A latches in the storage mode. With CEAB and OEAB both low, the 3-state B outputs are active and reflect the data present at the output of the A latches. Data flow from B to A is similar, but requires using the CEBA, LEBA, and OEBA inputs.

To ensure the high-impedance state during power up or power down, OE should be tied to $V_{CC}$ through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The SN54ABT543A is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT543A is characterized for operation from –40°C to 85°C.

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**TEXAS INSTRUMENTS**

**FUNCTION TABLE[†]**

| INPUTS | | | | OUTPUT |
| --- | --- | --- | --- | --- |
| $\overline{CEAB}$ | $\overline{LEAB}$ | $\overline{OEAB}$ | A | B |
| H | X | X | X | Z |
| X | X | H | X | Z |
| L | H | L | X | $B_0$[‡] |
| L | L | L | L | L |
| L | L | L | H | H |

[†] A-to-B data flow is shown; B-to-A flow control is the same except that it uses $\overline{CEBA}$, $\overline{LEBA}$, and $\overline{OEBA}$.

[‡] Output level before the indicated steady-state input conditions were established

## logic symbol[§]
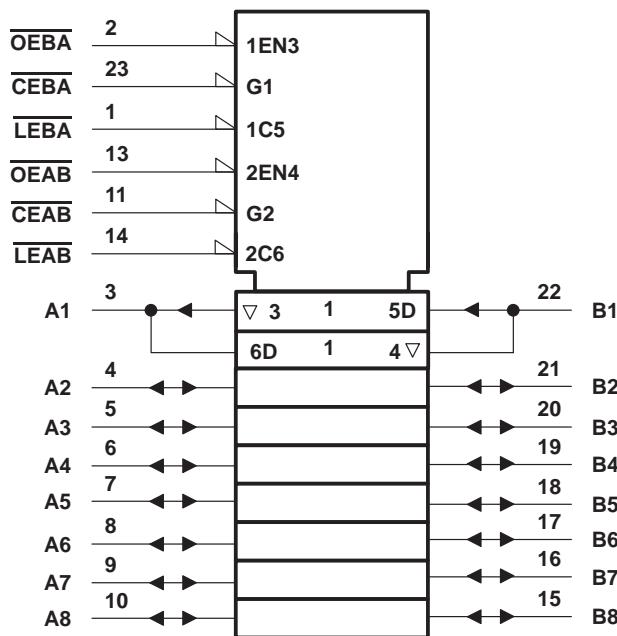


[§] This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the DB, DW, JT, NT, PW, and W packages.

## logic diagram (positive logic)



**To Seven Other Channels**
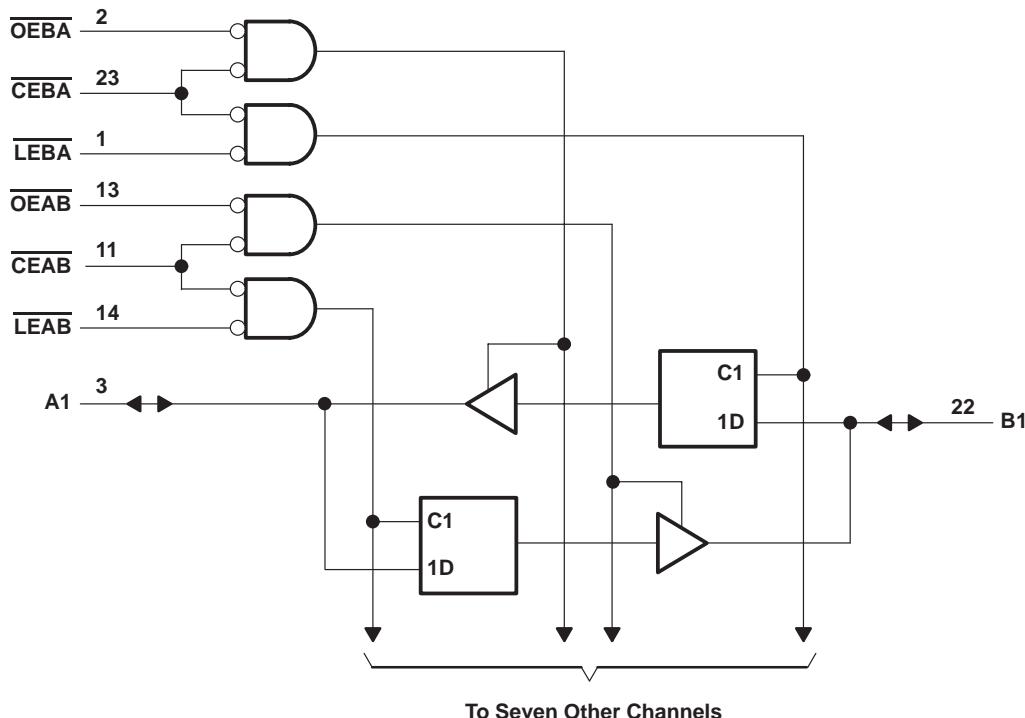
Pin numbers shown are for the DB, DW, JT, NT, PW, and W packages.

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

Supply voltage range, $V_{CC}$ .................................................................. −0.5 V to 7 V
Input voltage range, $V_I$ (except I/O ports) (see Note 1) ................................... −0.5 V to 7 V
Voltage range applied to any output in the high or power-off state, $V_O$ ..................... −0.5 V to 5.5 V
Current into any output in the low state, $I_O$: SN54ABT543A .................................... 96 mA
                                              SN74ABT543A .................................... 128 mA
Input clamp current, $I_{IK}$ ($V_I < 0$) ......................................................... −18 mA
Output clamp current, $I_{OK}$ ($V_O < 0$) ....................................................... −50 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DB package ................................ 104°C/W
                                                     DW package ................................ 81°C/W
                                                     NT package ................................ 67°C/W
                                                     PW package ................................ 120°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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
       2. The package thermal impedance is calculated in accordance with EIA/JEDEC Std JESD51, except for through-hole packages,
          which use a trace length of zero.

## recommended operating conditions (see Note 3)

| | | | SN54ABT543A MIN | SN54ABT543A MAX | SN74ABT543A MIN | SN74ABT543A MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | | 4.5 | 5.5 | 4.5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | | 2 | | 2 | | V |
| $V_{IL}$ | Low-level input voltage | | | 0.8 | | 0.8 | V |
| $V_I$ | Input voltage | | 0 | $V_{CC}$ | 0 | $V_{CC}$ | V |
| $I_{OH}$ | High-level output current | | | −24 | | −32 | mA |
| $I_{OL}$ | Low-level output current | | | 48 | | 64 | mA |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | Outputs enabled | | 5 | | 5 | ns/V |
| $T_A$ | Operating free-air temperature | | −55 | 125 | −40 | 85 | °C |

NOTE 3:   Unused pins (input or I/O) must be held high or low to prevent them from floating.

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

| PARAMETER | | TEST CONDITIONS | | $T_A = 25°C$ MIN | $T_A = 25°C$ TYP[†] | $T_A = 25°C$ MAX | SN54ABT543A MIN | SN54ABT543A MAX | SN74ABT543A MIN | SN74ABT543A MAX | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $V_{IK}$ | | $V_{CC} = 4.5$ V, | $I_I = -18$ mA | | | −1.2 | | −1.2 | | −1.2 | V |
| $V_{OH}$ | | $V_{CC} = 4.5$ V, | $I_{OH} = -3$ mA | 2.5 | | | 2.5 | | 2.5 | | V |
| | | $V_{CC} = 5$ V, | $I_{OH} = -3$ mA | 3 | | | 3 | | 3 | | |
| | | $V_{CC} = 4.5$ V | $I_{OH} = -24$ mA | 2 | | | 2 | | | | |
| | | | $I_{OH} = -32$ mA | 2* | | | | | 2 | | |
| $V_{OL}$ | | $V_{CC} = 4.5$ V | $I_{OL} = 48$ mA | | | 0.55 | | 0.55 | | | V |
| | | | $I_{OL} = 64$ mA | | | 0.55* | | | | 0.55 | |
| $V_{hys}$ | | | | | 100 | | | | | | mV |
| $I_I$ | Control inputs | $V_{CC} = 5.5$ V, | $V_I = V_{CC}$ or GND | | | ±1 | | ±1 | | ±1 | μA |
| | A or B ports | | | | | ±100 | | ±100 | | ±100 | |
| $I_{OZH}$[‡] | | $V_{CC} = 5.5$ V, | $V_O = 2.7$ V | | | 10§ | | 10§ | | 10§ | μA |
| $I_{OZL}$[‡] | | $V_{CC} = 5.5$ V, | $V_O = 0.5$ V | | | −10§ | | −10§ | | −10§ | μA |
| $I_{off}$ | | $V_{CC} = 0$, | $V_I$ or $V_O \le 4.5$ V | | | ±100 | | | | ±100 | μA |
| $I_{CEX}$ | | $V_{CC} = 5.5$ V, $V_O = 5.5$ V | Outputs high | | | 50 | | 50 | | 50 | μA |
| $I_O$[¶] | | $V_{CC} = 5.5$ V, | $V_O = 2.5$ V | −50* | −100 | −180* | −50 | −200 | −50 | −180 | mA |
| $I_{CC}$ | A or B ports | $V_{CC} = 5.5$ V, $I_O = 0$, $V_I = V_{CC}$ or GND | Outputs high | | 1 | 250* | | 350 | | 250 | μA |
| | | | Outputs low | | 24 | 30* | | 34 | | 30 | mA |
| | | | Outputs disabled | | 0.5 | 250* | | 350 | | 250 | μA |
| $\Delta I_{CC}$[#] | | $V_{CC} = 5.5$ V, One input at 3.4 V, Other inputs at $V_{CC}$ or GND | | | | 1.5 | | 1.5 | | 1.5 | mA |
| $C_i$ | Control inputs | $V_I = 2.5$ V or 0.5 V | | | 4 | | | | | | pF |
| $C_{io}$ | A or B ports | $V_O = 2.5$ V or 0.5 V | | | 7 | | | | | | pF |

\* On products compliant to MIL-PRF-38535, this parameter does not apply.
† All typical values are at $V_{CC} = 5$ V.
‡ The parameters $I_{OZH}$ and $I_{OZL}$ include the input leakage current.
§ This data sheet limit may vary among suppliers.
¶ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
# This is the increase in supply current for each input that is at the specified TTL voltage level rather than $V_{CC}$ or GND.

**timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)**

| | | | SN54ABT543A | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | MIN | MAX | |
| | | | MIN | MAX | | | |
| $t_w$ | Pulse duration, $\overline{LEAB}$ or $\overline{LEBA}$ low | | 3.5 | | 3.5 | | ns |
| $t_{su}$ | Setup time | Data before $\overline{LEAB}$ or $\overline{LEBA}$↑ | High | 2.5 | | 2.5 | ns |
| | | | Low | 3 | | 3 | |
| | | Data before $\overline{CEAB}$ or $\overline{CEBA}$↑ | High | 2.5 | | 2.5 | |
| | | | Low | 3 | | 3 | |
| $t_h$ | Hold time | Data after $\overline{LEAB}$ or $\overline{LEBA}$↑ | | 1 | | 1 | ns |
| | | Data after $\overline{CEAB}$ or $\overline{CEBA}$↑ | | 1 | | 1 | |

**timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)**

| | | | SN74ABT543A | | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | MIN | MAX | |
| | | | MIN | MAX | | | |
| $t_w$ | Pulse duration, $\overline{LEAB}$ or $\overline{LEBA}$ low | | 3.5 | | 3.5 | | ns |
| $t_{su}$ | Setup time | Data before $\overline{LEAB}$ or $\overline{LEBA}$↑ | High | 3.5 | | 3.5 | ns |
| | | | Low | 3 | | 3 | |
| | | Data before CEAB or CEBA↑ | High | 3.5 | | 3.5 | |
| | | | Low | 3 | | 3 | |
| $t_h$ | Hold time | Data after $\overline{LEAB}$ or $\overline{LEBA}$↑ | | 0.5 | | 0.5 | ns |
| | | Data after $\overline{CEAB}$ or $\overline{CEBA}$↑ | | 0.5 | | 0.5 | |

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**switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L$ = 50 pF (unless otherwise noted) (see Figure 1)**

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | SN54ABT543A $V_{CC}$ = 5 V, $T_A$ = 25°C | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 1.6† | 4.4 | 4.4 | 1.6† | 5.5 | ns |
| $t_{PHL}$ | | | 1.6 | 4.4 | 5.1 | 1.6 | 6.2 | |
| $t_{PLH}$ | $\overline{LEBA}$ or $\overline{LEAB}$ | A or B | 1.6† | 4.1 | 5.1 | 1.6† | 6.6 | ns |
| $t_{PHL}$ | | | 1.6 | 4.6 | 5.4 | 1.6 | 6.4 | |
| $t_{PZH}$ | $\overline{OEBA}$ or $\overline{OEAB}$ | A or B | 1.4 | 3.9 | 4.1 | 1.4 | 5.1 | ns |
| $t_{PZL}$ | | | 2 | 5 | 4.9 | 2 | 5.8 | |
| $t_{PHZ}$ | $\overline{OEBA}$ or $\overline{OEAB}$ | A or B | 2.5† | 5.9 | 5.8 | 2.5† | 6.9 | ns |
| $t_{PLZ}$ | | | 2.5† | 5.5 | 6.1 | 2.5† | 7.6 | |
| $t_{PZH}$ | $\overline{CEBA}$ or $\overline{CEAB}$ | A or B | 1.4 | 3.9 | 4.7 | 1.4 | 5.6 | ns |
| $t_{PZL}$ | | | 2 | 5 | 5.7 | 2 | 6.2 | |
| $t_{PHZ}$ | CEBA or CEAB | A or B | 3.2† | 5.9 | 6.5 | 3.2† | 7.3 | ns |
| $t_{PLZ}$ | | | 2.5† | 5.5 | 6.7 | 2.5† | 7.8 | |

† This data sheet limit may vary among suppliers.

**switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L$ = 50 pF (unless otherwise noted) (see Figure 1)**

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | SN74ABT543A $V_{CC}$ = 5 V, $T_A$ = 25°C | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 1.8† | 4.4 | 5.9 | 1.8† | 6.9 | ns |
| $t_{PHL}$ | | | 1.9 | 4.4 | 5.9 | 1.9 | 6.9 | |
| $t_{PLH}$ | $\overline{LEBA}$ or $\overline{LEAB}$ | A or B | 1.5† | 4.1 | 5.6 | 1.5† | 6.6 | ns |
| $t_{PHL}$ | | | 2.1 | 4.6 | 6.1 | 2.1 | 7.1 | |
| $t_{PZH}$ | $\overline{OEBA}$ or $\overline{OEAB}$ | A or B | 1.4 | 3.9 | 5.4 | 1.4 | 6.4 | ns |
| $t_{PZL}$ | | | 2.5 | 5 | 6.5 | 2.5 | 7.5 | |
| $t_{PHZ}$ | $\overline{OEBA}$ or $\overline{OEAB}$ | A or B | 2.5† | 5.9 | 7.4 | 2.5† | 8.4 | ns |
| $t_{PLZ}$ | | | 2.5† | 5.5 | 7 | 2.5† | 8 | |
| $t_{PZH}$ | $\overline{CEBA}$ or $\overline{CEAB}$ | A or B | 1.4 | 3.9 | 5.4 | 1.4 | 6.4 | ns |
| $t_{PZL}$ | | | 2.5 | 5 | 6.5 | 2.5 | 7.5 | |
| $t_{PHZ}$ | $\overline{CEBA}$ or $\overline{CEAB}$ | A or B | 2.9† | 5.9 | 7.4 | 2.9† | 8.4 | ns |
| $t_{PLZ}$ | | | 2.4† | 5.5 | 7 | 2.4† | 8 | |

† This data sheet limit may vary among suppliers.

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## PARAMETER MEASUREMENT INFORMATION
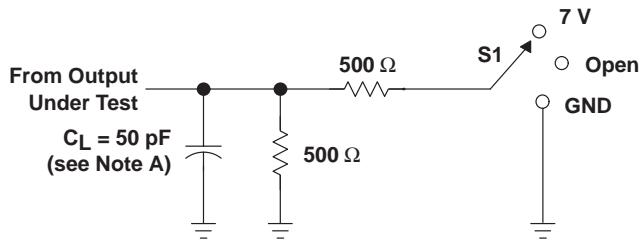
| TEST | S1 |
|------|------|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | 7 V |
| $t_{PHZ}/t_{PZH}$ | Open |

**LOAD CIRCUIT**
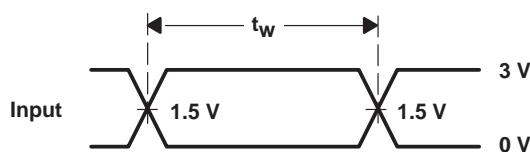
**VOLTAGE WAVEFORMS
PULSE DURATION**
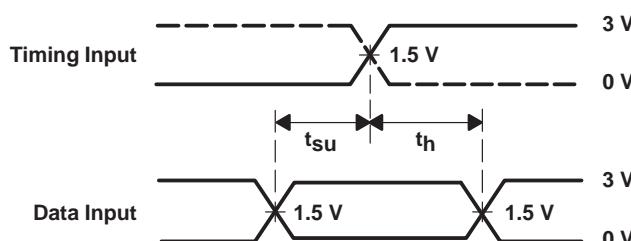
**VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES**
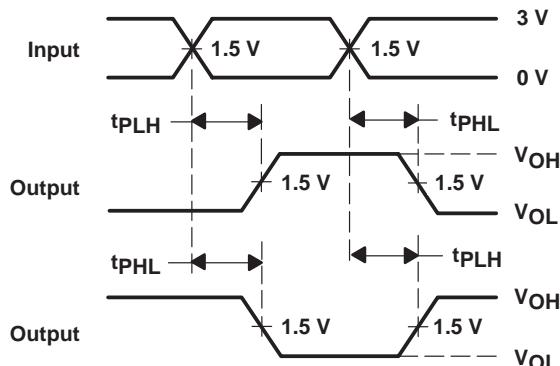
**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS**
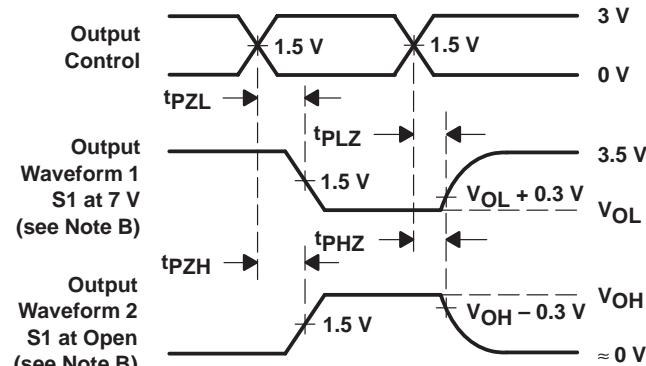
**VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING**

NOTES:  A.  $C_L$ includes probe and jig 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.  All input pulses are supplied by generators having the following characteristics: PRR $\leq$ 10 MHz, $Z_O$ = 50 $\Omega$, $t_r \leq$ 2.5 ns, $t_f \leq$ 2.5 ns.
   D.  The outputs are measured one at a time with one transition per measurement.

**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] |
|---|---|---|---|---|---|---|---|---|
| 5962-9231402Q3A | ACTIVE | LCCC | FK | 28 | 1 | TBD | Call TI | Level-NC-NC-NC |
| 5962-9231402QKA | ACTIVE | CFP | W | 24 | 1 | TBD | Call TI | Level-NC-NC-NC |
| 5962-9231402QLA | ACTIVE | CDIP | JT | 24 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SN74ABT543ADBLE | OBSOLETE | SSOP | DB | 24 | | TBD | Call TI | Call TI |
| SN74ABT543ADBR | ACTIVE | SSOP | DB | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPD | Level-1-260C-UNLIM |
| SN74ABT543ADBRE4 | ACTIVE | SSOP | DB | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPD | Level-1-260C-UNLIM |
| SN74ABT543ADW | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ADWE4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ADWR | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ADWRE4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ANSR | ACTIVE | SO | NS | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ANSRE4 | ACTIVE | SO | NS | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543ANT | ACTIVE | PDIP | NT | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | Level-NC-NC-NC |
| SN74ABT543ANTE4 | ACTIVE | PDIP | NT | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | Level-NC-NC-NC |
| SN74ABT543APW | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543APWE4 | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543APWLE | OBSOLETE | TSSOP | PW | 24 | | TBD | Call TI | Call TI |
| SN74ABT543APWR | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ABT543APWRE4 | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SNJ54ABT543AFK | ACTIVE | LCCC | FK | 28 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SNJ54ABT543AJT | ACTIVE | CDIP | JT | 24 | 1 | TBD | Call TI | Level-NC-NC-NC |
| SNJ54ABT543AW | ACTIVE | CFP | W | 24 | 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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**JT (R-GDIP-T\*\*)**  **CERAMIC DUAL-IN-LINE**
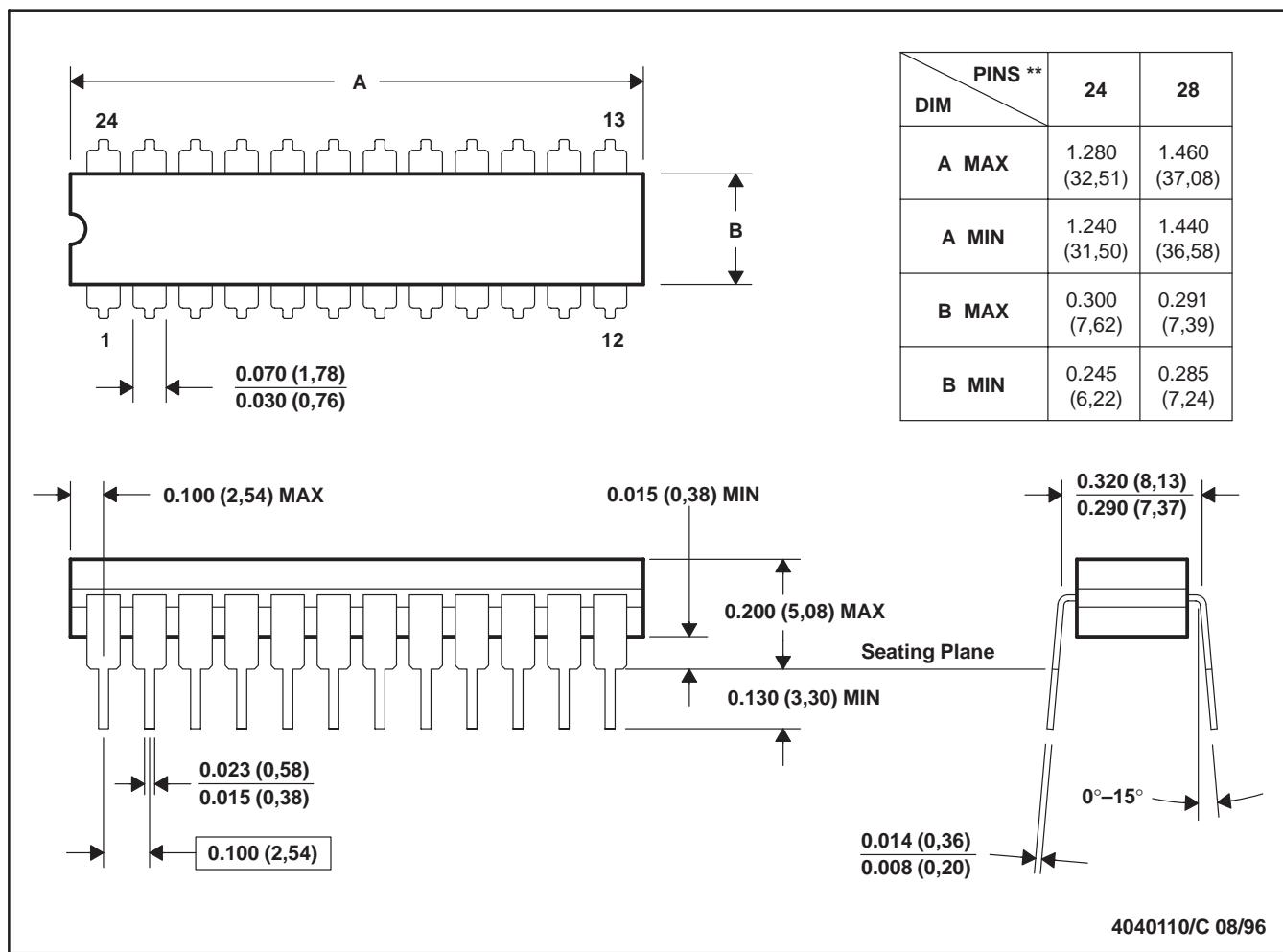
**24 LEADS SHOWN**

| PINS \*\* DIM | 24 | 28 |
|---|---|---|
| A  MAX | 1.280 (32,51) | 1.460 (37,08) |
| A  MIN | 1.240 (31,50) | 1.440 (36,58) |
| B  MAX | 0.300 (7,62) | 0.291 (7,39) |
| B  MIN | 0.245 (6,22) | 0.285 (7,24) |

A

24              13

B

1              12

$\frac{0.070\ (1,78)}{0.030\ (0,76)}$

0.100 (2,54) MAX          0.015 (0,38) MIN

$\frac{0.320\ (8,13)}{0.290\ (7,37)}$

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

$\frac{0.023\ (0,58)}{0.015\ (0,38)}$

0.100 (2,54)

0°–15°

$\frac{0.014\ (0,36)}{0.008\ (0,20)}$

**4040110/C 08/96**

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 ceramic lid using glass frit.
   D.  Index point is provided on cap for terminal identification.
   E.  Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28, and JEDEC MO-058 AA, MO-058 AB

**W (R-GDFP-F24)** <span style="float:right">**CERAMIC DUAL FLATPACK**</span>
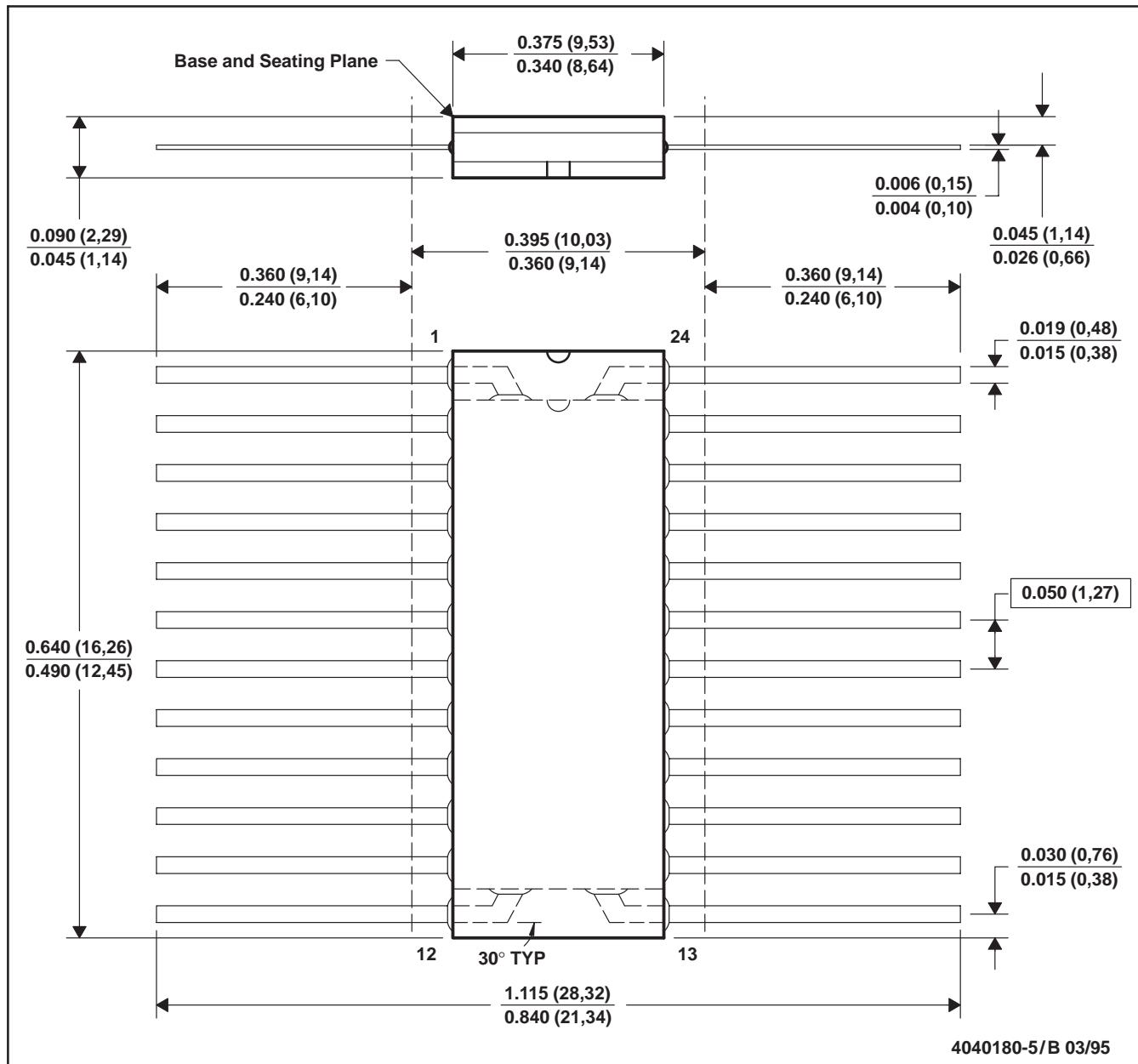
Base and Seating Plane

0.375 (9,53)
0.340 (8,64)

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

0.090 (2,29)
0.045 (1,14)

0.395 (10,03)
0.360 (9,14)

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

0.360 (9,14)
0.240 (6,10)

0.360 (9,14)
0.240 (6,10)

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

1    24

0.050 (1,27)

0.640 (16,26)
0.490 (12,45)

0.030 (0,76)
0.015 (0,38)

12    30° TYP    13

1.115 (28,32)
0.840 (21,34)

4040180-5 / B 03/95

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.  Falls within MIL-STD-1835 GDFP2-F24 and JEDEC MO-070AD
E.  Index point is provided on cap for terminal identification only.

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

**28 TERMINAL SHOWN**

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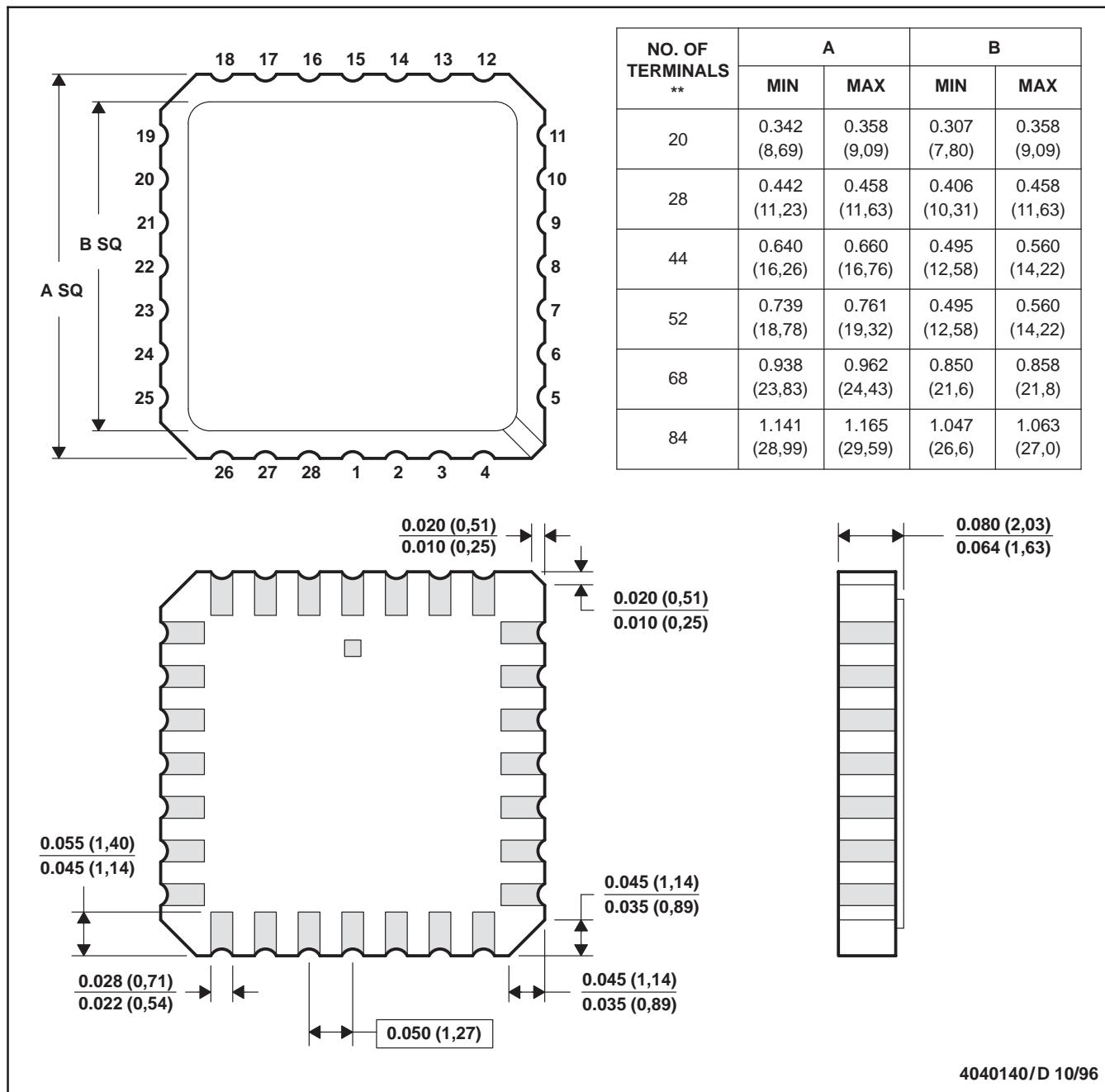
| NO. OF TERMINALS ** | A | | B | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| 20 | 0.342 (8,69) | 0.358 (9,09) | 0.307 (7,80) | 0.358 (9,09) |
| 28 | 0.442 (11,23) | 0.458 (11,63) | 0.406 (10,31) | 0.458 (11,63) |
| 44 | 0.640 (16,26) | 0.660 (16,76) | 0.495 (12,58) | 0.560 (14,22) |
| 52 |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

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

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**NT (R-PDIP-T\*\*)**                                     **PLASTIC DUAL-IN-LINE PACKAGE**

**24 PINS SHOWN**
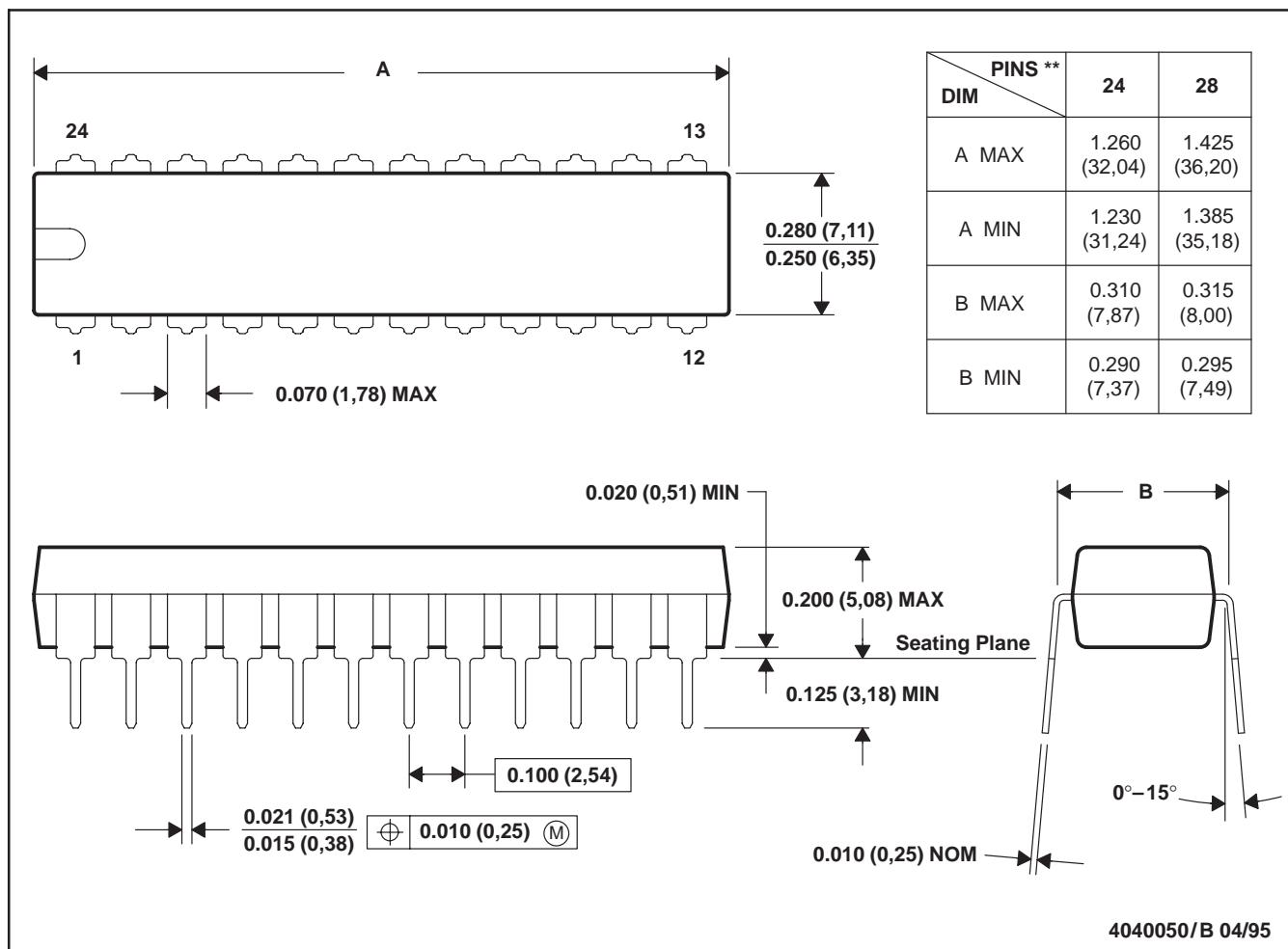
| PINS \*\* DIM | 24 | 28 |
|---|---|---|
| A MAX | 1.260 (32,04) | 1.425 (36,20) |
| A MIN | 1.230 (31,24) | 1.385 (35,18) |
| B MAX | 0.310 (7,87) | 0.315 (8,00) |
| B MIN | 0.290 (7,37) | 0.295 (7,49) |

A

24               13

0.280 (7,11) / 0.250 (6,35)

1               12

0.070 (1,78) MAX

0.020 (0,51) MIN

B

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53) / 0.015 (0,38)   ⊕ 0.010 (0,25) Ⓜ

0°−15°

0.010 (0,25) NOM

4040050/ B 04/95

NOTES:  A.  All linear dimensions are in inches (millimeters).
           B.  This drawing is subject to change without notice.

DW (R−PDSO−G24)                    PLASTIC SMALL−OUTLINE PACKAGE
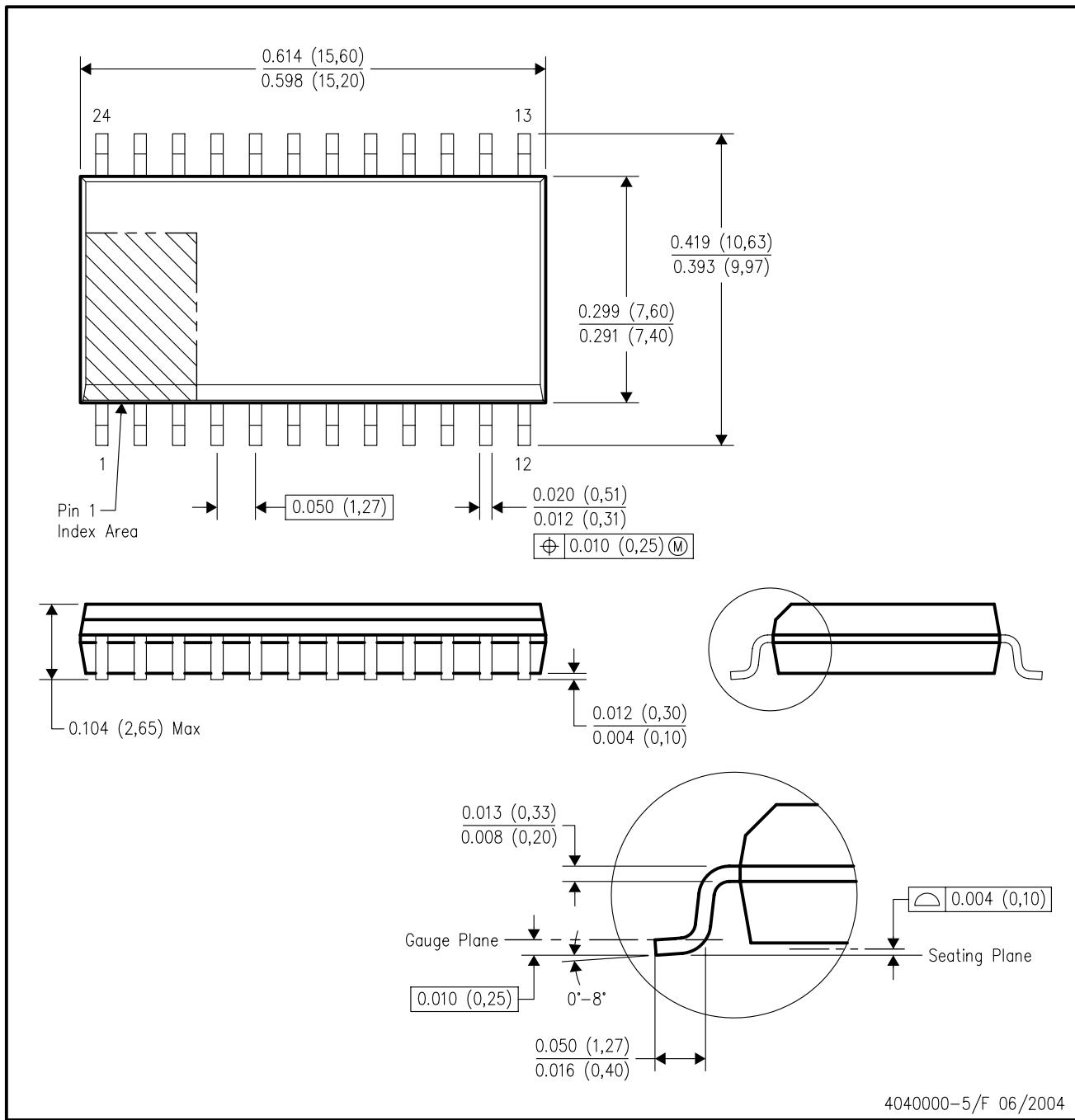
0.614 (15,60)
0.598 (15,20)

24                                                                13

0.419 (10,63)
0.393 (9,97)

0.299 (7,60)
0.291 (7,40)

1                                                                 12

Pin 1
Index Area

0.050 (1,27)

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

⊕ 0.010 (0,25) Ⓜ

0.104 (2,65) Max

0.012 (0,30)
0.004 (0,10)

0.013 (0,33)
0.008 (0,20)

Gauge Plane

⌒ 0.004 (0,10)

Seating Plane

0.010 (0,25)          0°−8°

0.050 (1,27)
0.016 (0,40)

4040000−5/F 06/2004

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−013 variation AD.

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## MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



| PINS **<br>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.

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**DB (R-PDSO-G\*\*)**　　　　　　　　　　　　　　　　　　　**PLASTIC SMALL-OUTLINE**

**28 PINS SHOWN**
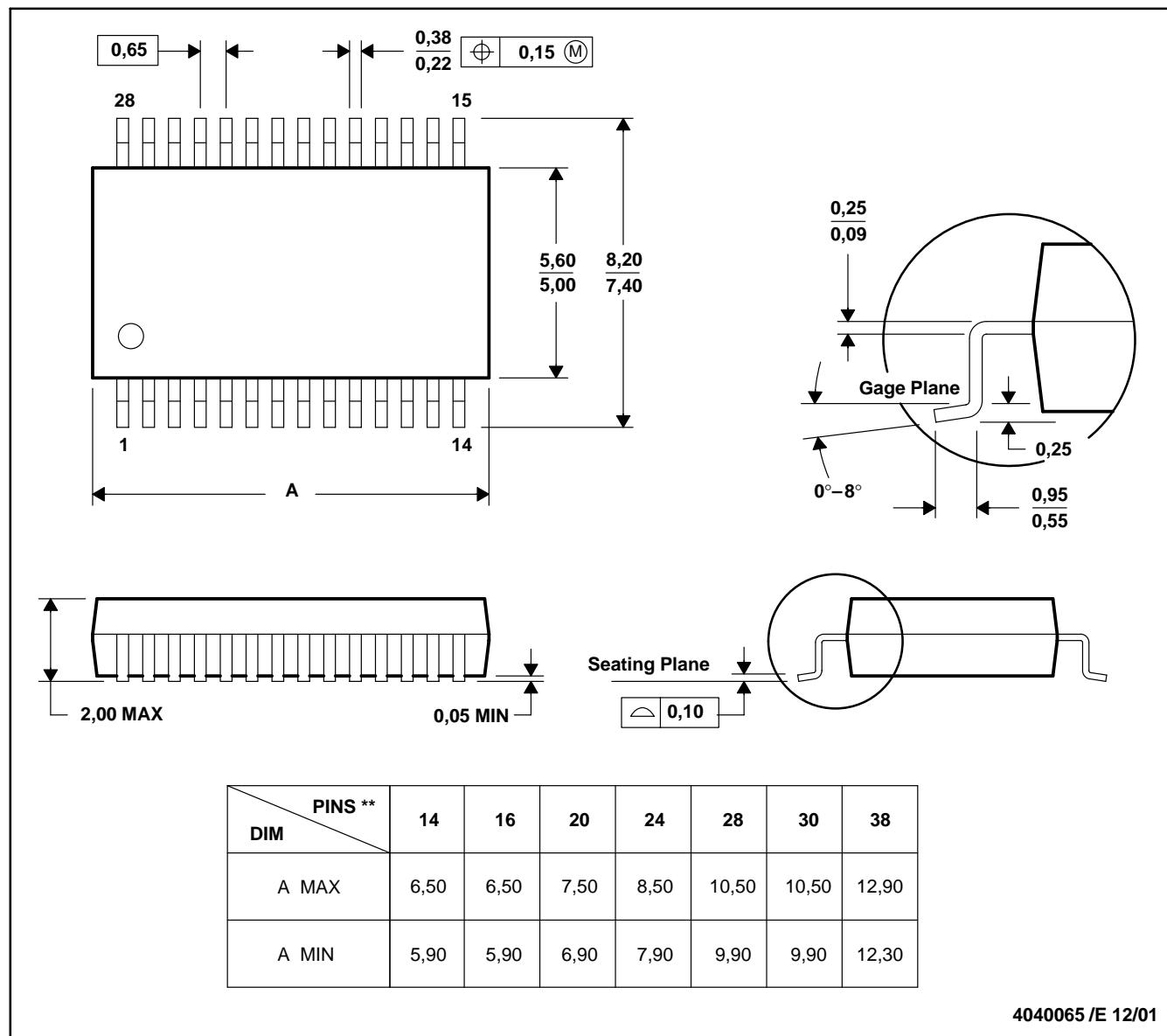


| PINS \*\*<br>DIM | 14 | 16 | 20 | 24 | 28 | 30 | 38 |
|---|---|---|---|---|---|---|---|
| A  MAX | 6,50 | 6,50 | 7,50 | 8,50 | 10,50 | 10,50 | 12,90 |
| A  MIN | 5,90 | 5,90 | 6,90 | 7,90 | 9,90 | 9,90 | 12,30 |

**4040065 /E 12/01**

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

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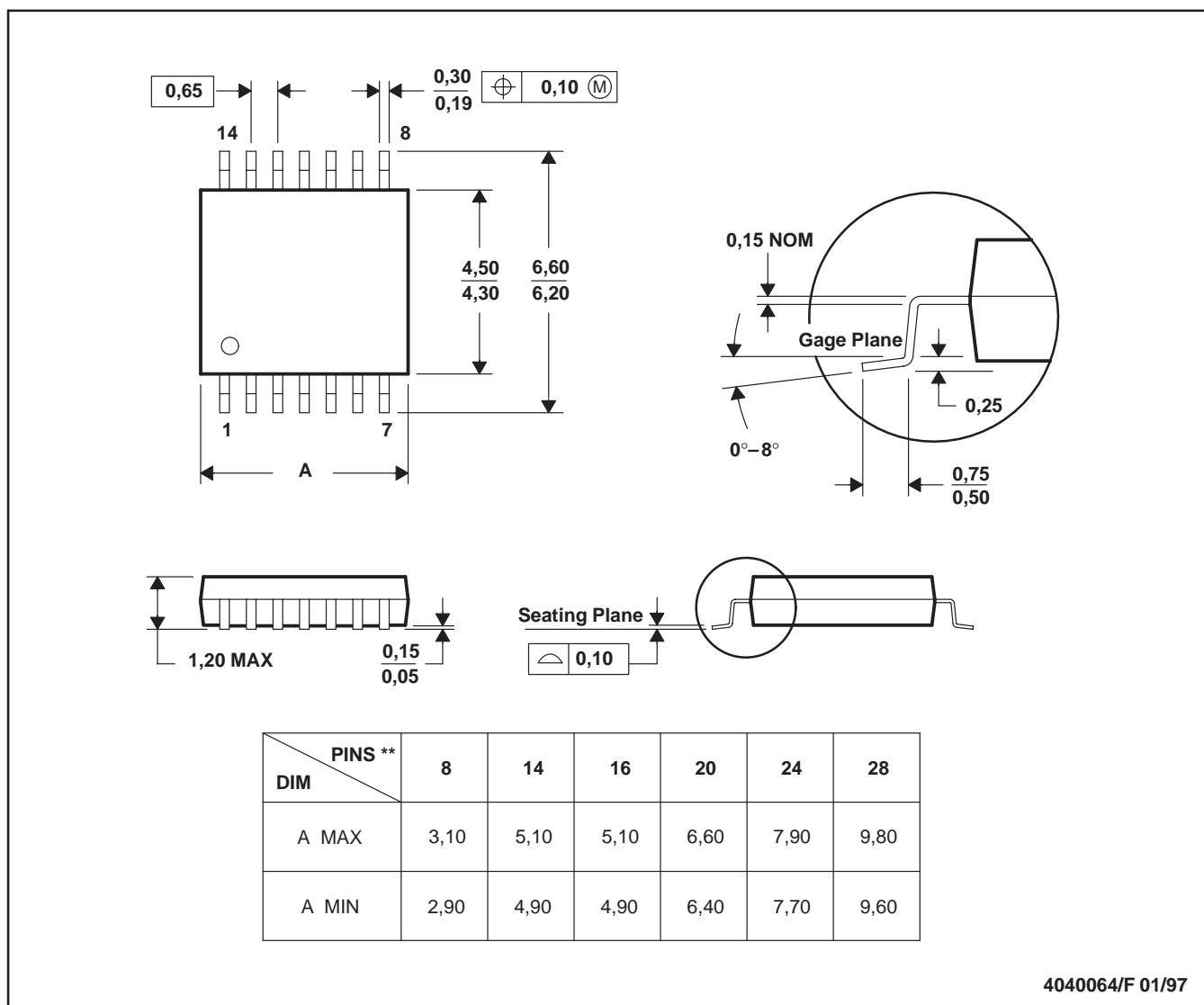
**14 PINS SHOWN**



| PINS **<br>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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