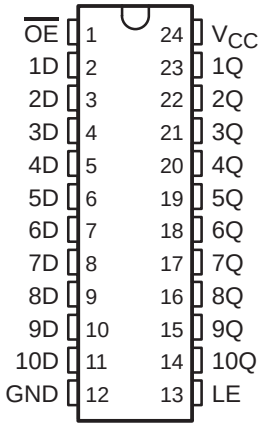
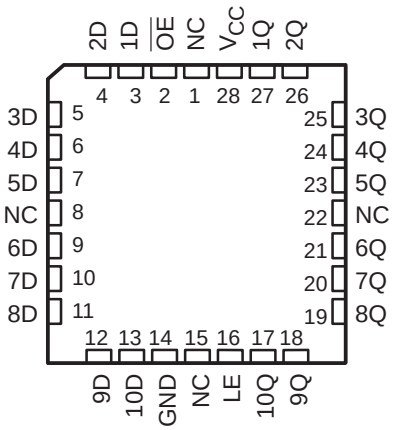
- **State-of-the-Art *EPIC*-II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Typical $V_{OLP}$ (Output Ground Bounce) < 1 V at $V_{CC}$ = 5 V, $T_A$ = 25°C**
- **High-Impedance State During Power Up and Power Down**
- **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**

**SN54ABT841 . . . JT OR W PACKAGE**
**SN74ABT841A . . . DB, DW, NT, OR PW PACKAGE**
**(TOP VIEW)**




**SN54ABT841 . . . FK PACKAGE**
**(TOP VIEW)**




NC – No internal connection

## description

The SN54ABT841 and SN74ABT841A 10-bit latches are designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The ten transparent D-type latches provide true data at their outputs.

A buffered output-enable ($\overline{OE}$) input can be used to place the ten outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without need for interface or pullup components.

$\overline{OE}$ does not affect the internal operations of the latch. Previously stored data can be retained or new data can be entered while the outputs are in the high-impedance state.

When $V_{CC}$ is between 0 and 2.1 V, the device is in the high-impedance state during power up or power down. However, to ensure the high-impedance state above 2.1 V, $\overline{OE}$ 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 SN54ABT841 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT841A is characterized for operation from –40°C to 85°C.

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.

EPIC-IIB is a trademark of Texas Instruments Incorporated.

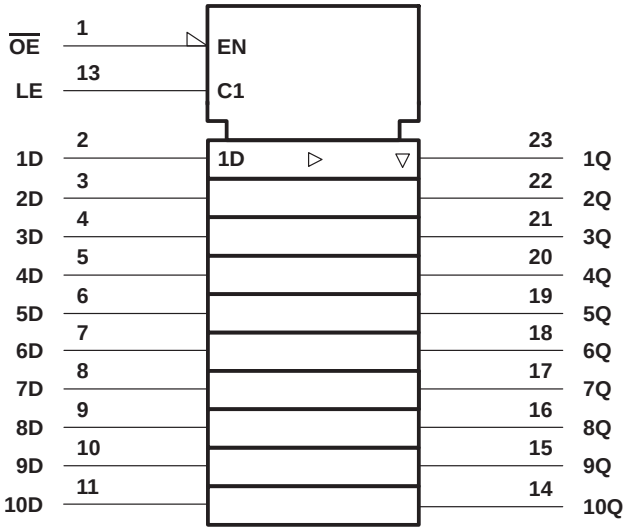
PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 1997, Texas Instruments Incorporated

**FUNCTION TABLE**

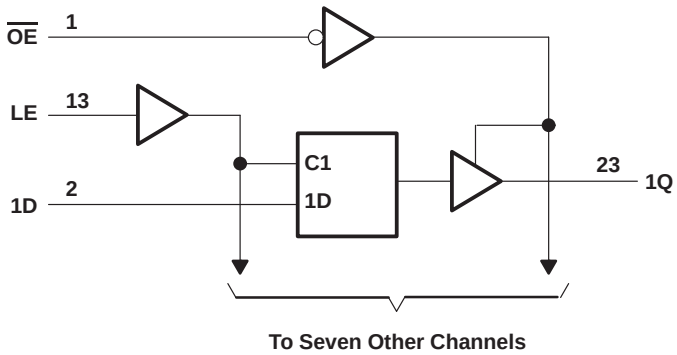
| INPUTS | | | OUTPUT |
|---|---|---|---|
| $\overline{OE}$ | LE | D | Q |
| L | H | H | H |
| L | H | L | L |
| L | L | X | $Q_0$ |
| H | X | X | Z |

## 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)




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, $V_I$ (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, $I_O$: SN54ABT841 . . . . . 96 mA
SN74ABT841A . . . . . 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)

| | | SN54ABT841 | | SN74ABT841A | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| $V_{CC}$ | 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 | | 5 | | 5 | ns/V |
| $\Delta t/\Delta V_{CC}$ | Power-up ramp rate | 200 | | 200 | | μs/V |
| $T_A$ | Operating free-air temperature | –55 | 125 | –40 | 85 | °C |

NOTE 3: Unused inputs 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 | | | SN54ABT841 | | SN74ABT841A | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP† | MAX | MIN | MAX | MIN | MAX | |
| $V_{IK}$ | $V_{CC}$ = 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 |
| $I_I$ | $V_{CC}$ = 0 to 5.5 V, | $V_I$ = $V_{CC}$ or GND | | | ±1 | | ±1 | | ±1 | µA |
| $I_{OZPU}$‡ | $V_{CC}$ = 0 to 2.1 V, $V_O$ = 0.5 V to 2.7 V, $\overline{OE}$ = X | | | | ±50 | | ±50 | | ±50 | µA |
| $I_{OZPD}$‡ | $V_{CC}$ = 2.1 V to 0, $V_O$ = 0.5 V to 2.7 V, $\overline{OE}$ = X | | | | ±50 | | ±50 | | ±50 | µA |
| $I_{OZH}$ | $V_{CC}$ = 2.1 V to 5.5 V, $V_O$ = 2.7 V, $\overline{OE}$ ≥ 2 V | | | | 10 | | 10 | | 10 | µA |
| $I_{OZL}$ | $V_{CC}$ = 2.1 V to 5.5 V, $V_O$ = 0.5 V, $\overline{OE}$ ≥ 2 V | | | | –10 | | –10 | | –10 | µA |
| $I_{off}$ | $V_{CC}$ = 0, | $V_I$ or $V_O$ ≤ 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 | –140 | –180 | –50 | –180 | –50 | –180 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V, $I_O$ = 0, $V_I$ = $V_{CC}$ or GND | Outputs high | | 1** | 250** | | 280 | | 250 | µA |
| | | Outputs low | | 24** | 38¶** | | 45¶ | | 38¶ | mA |
| | | Outputs disabled | | 0.5** | 250** | | 280 | | 250 | µA |
| $\Delta I_{CC}$# | $V_{CC}$ = 5.5 V, One input at 3.4 V, Other inputs at $V_{CC}$ or GND | Outputs enabled | | | 1.5 | | 1.5 | | 1.5 | mA |
| | | Outputs disabled | | | 250** | | 280 | | 250 | µA |
| | | Control inputs | | | 1.5 | | 1.5 | | 1.5 | mA |
| $C_i$ | $V_I$ = 2.5 V or 0.5 V | | | 4 | | | | | | pF |
| $C_o$ | $V_O$ = 2.5 V or 0.5 V | | | 7 | | | | | | pF |

* On products compliant to MIL-PRF-38535, this parameter does not apply.
** These limits apply only to the SN74ABT841A.
† All typical values are at $V_{CC}$ = 5 V.
‡ This parameter is characterized, but not production tested.
§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
¶ This limit may vary among suppliers.
# 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)

| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | SN54ABT841 | | SN74ABT841A | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| $t_w$ | Pulse duration, LE high or low | | 3.3 | | 3.3 | | 3.3 | | ns |
| $t_{su}$ | Setup time, data before LE↓ | High | 2.5 | | 2.5 | | 2.5 | | ns |
| | | Low | 1.5 | | 1.5 | | 1.5 | | |
| $t_h$ | Hold time, data after LE↓ | High | 1.5 | | 1.5 | | 1.5 | | ns |
| | | Low | 1.5 | | 2 | | 1.5 | | |

**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) | SN54ABT841 | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | | MIN | MAX | |
| | | | MIN | TYP | MAX | | | |
| $t_{PLH}$ | D | Q | 1† | 4.1 | 5.5 | 1† | 6.8 | ns |
| $t_{PHL}$ | | | 1.5† | 4 | 5.5 | 1.5† | 6.8 | |
| $t_{PLH}$ | LE | Q | 1.6† | 4.1 | 6.6† | 1.6† | 7.4 | ns |
| $t_{PHL}$ | | | 2† | 4.6 | 6.2 | 2† | 6.8 | |
| $t_{PZH}$ | $\overline{OE}$ | Q | 1 | 3 | 4.9† | 1 | 5.8 | ns |
| $t_{PZL}$ | | | 2.2 | 4.1 | 5.7† | 2.2 | 6.5 | |
| $t_{PHZ}$ | $\overline{OE}$ | Q | 2† | 4.7 | 6.2 | 2† | 7.2 | ns |
| $t_{PLZ}$ | | | 1.5† | 4.6 | 6.1 | 1.5† | 6.6 | |

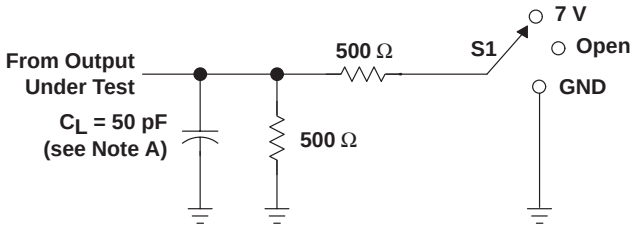
† This data sheet limit may vary among suppliers.

**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) | SN74ABT841A | | | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | | MIN | MAX | |
| | | | MIN | TYP | MAX | | | |
| $t_{PLH}$ | D | Q | 1.4† | 4.1 | 5.5 | 1.4† | 6.2† | ns |
| $t_{PHL}$ | | | 1.5† | 4 | 5.5 | 1.5† | 6.2 | |
| $t_{PLH}$ | LE | Q | 2.1† | 4.1 | 5.9† | 2.1† | 6.5† | ns |
| $t_{PHL}$ | | | 2.4† | 4.6 | 6.2 | 2.4† | 6.7 | |
| $t_{PZH}$ | $\overline{OE}$ | Q | 1 | 3 | 4.7† | 1 | 5.3† | ns |
| $t_{PZL}$ | | | 2.2 | 4.1 | 5.7† | 2.2 | 6.3† | |
| $t_{PHZ}$ | $\overline{OE}$ | Q | 2.6† | 4.7 | 6.2 | 2.6† | 7.1 | ns |
| $t_{PLZ}$ | | | 1.9† | 4.6 | 6.1 | 1.9† | 6.5 | |

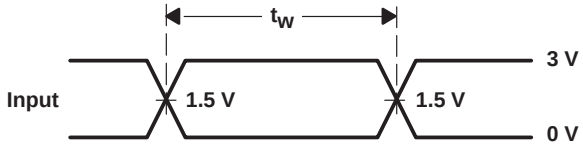
† This data sheet limit may vary among suppliers.

## PARAMETER MEASUREMENT INFORMATION

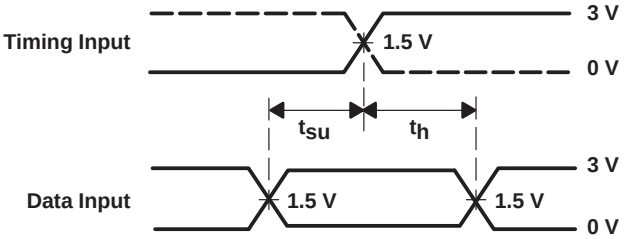



| TEST | S1 |
|---|---|
| $t_{PLH}/t_{PHL}$ | Open |
| $t_{PLZ}/t_{PZL}$ | 7 V |
| $t_{PHZ}/t_{PZH}$ | Open |

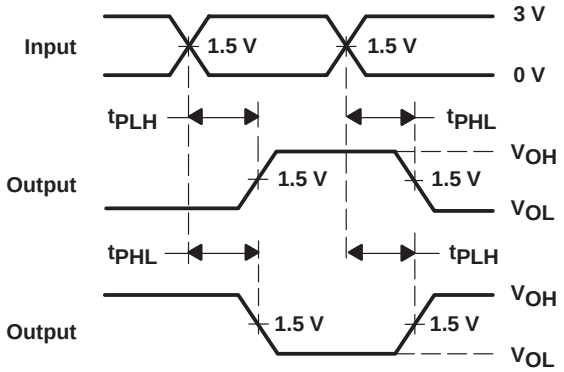
LOAD CIRCUIT



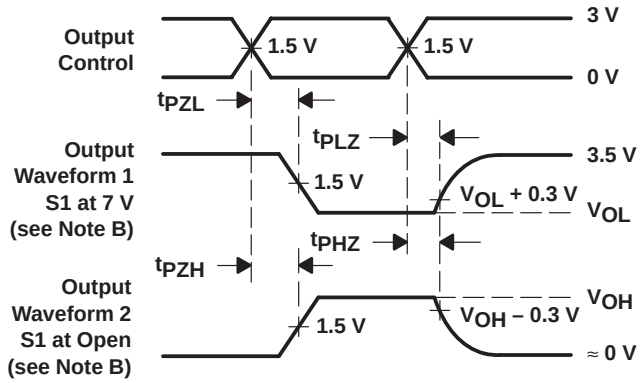

VOLTAGE WAVEFORMS
PULSE DURATION




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 ≤ 10 MHz, $Z_O$ = 50 Ω, $t_r$ ≤ 2.5 ns, $t_f$ ≤ 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 (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5962-9676901QLA | ACTIVE | CDIP | JT | 24 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-9676901QLA SNJ54ABT841JT | Samples |
| SN74ABT841ADBR | ACTIVE | SSOP | DB | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AB841A | Samples |
| SN74ABT841ADBRE4 | ACTIVE | SSOP | DB | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AB841A | Samples |
| SN74ABT841ADW | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT841A | Samples |
| SN74ABT841ADWG4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT841A | Samples |
| SN74ABT841ADWR | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT841A | Samples |
| SN74ABT841APW | ACTIVE | TSSOP | PW | 24 | 60 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AB841A | Samples |
| SN74ABT841APWR | ACTIVE | TSSOP | PW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | AB841A | Samples |
| SNJ54ABT841JT | ACTIVE | CDIP | JT | 24 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-9676901QLA SNJ54ABT841JT | Samples |

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

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

**(4)** There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

**(5)** Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

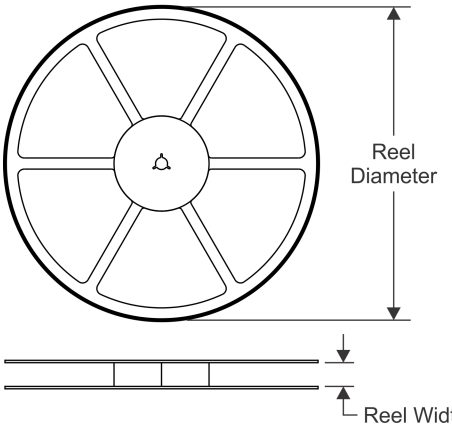
**(6)** Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

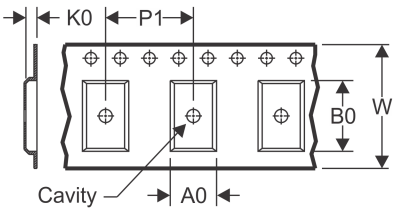
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

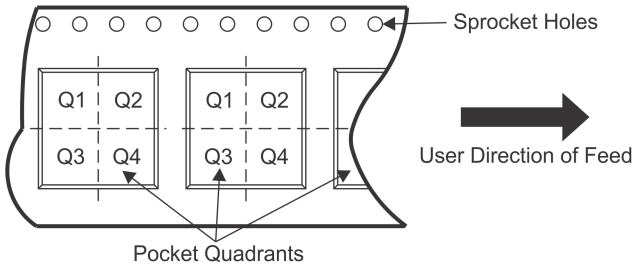



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

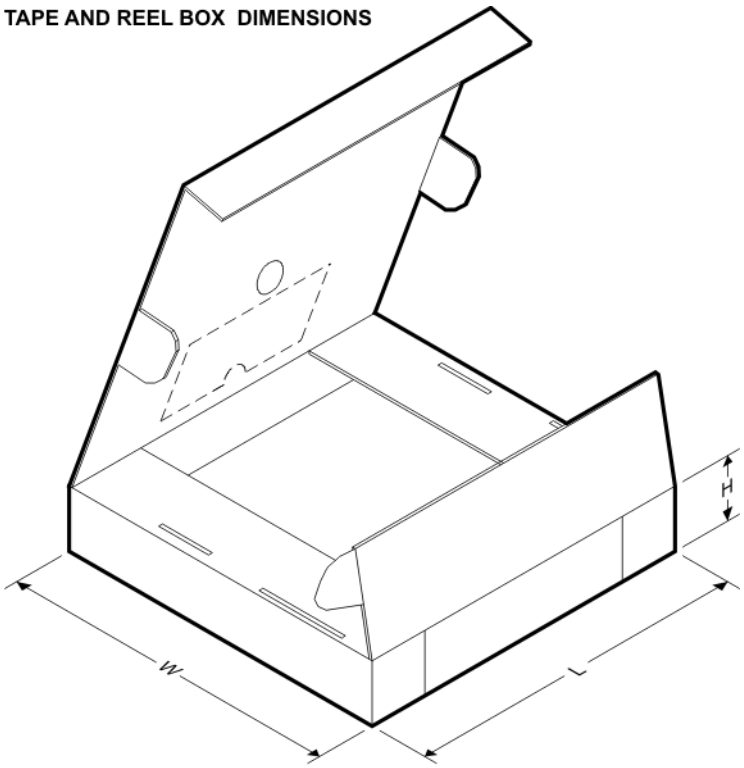
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SN74ABT841ADBR | SSOP | DB | 24 | 2000 | 330.0 | 16.4 | 8.2 | 8.8 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74ABT841ADWR | SOIC | DW | 24 | 2000 | 330.0 | 24.4 | 10.75 | 15.7 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74ABT841APWR | TSSOP | PW | 24 | 2000 | 330.0 | 16.4 | 6.95 | 8.3 | 1.6 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



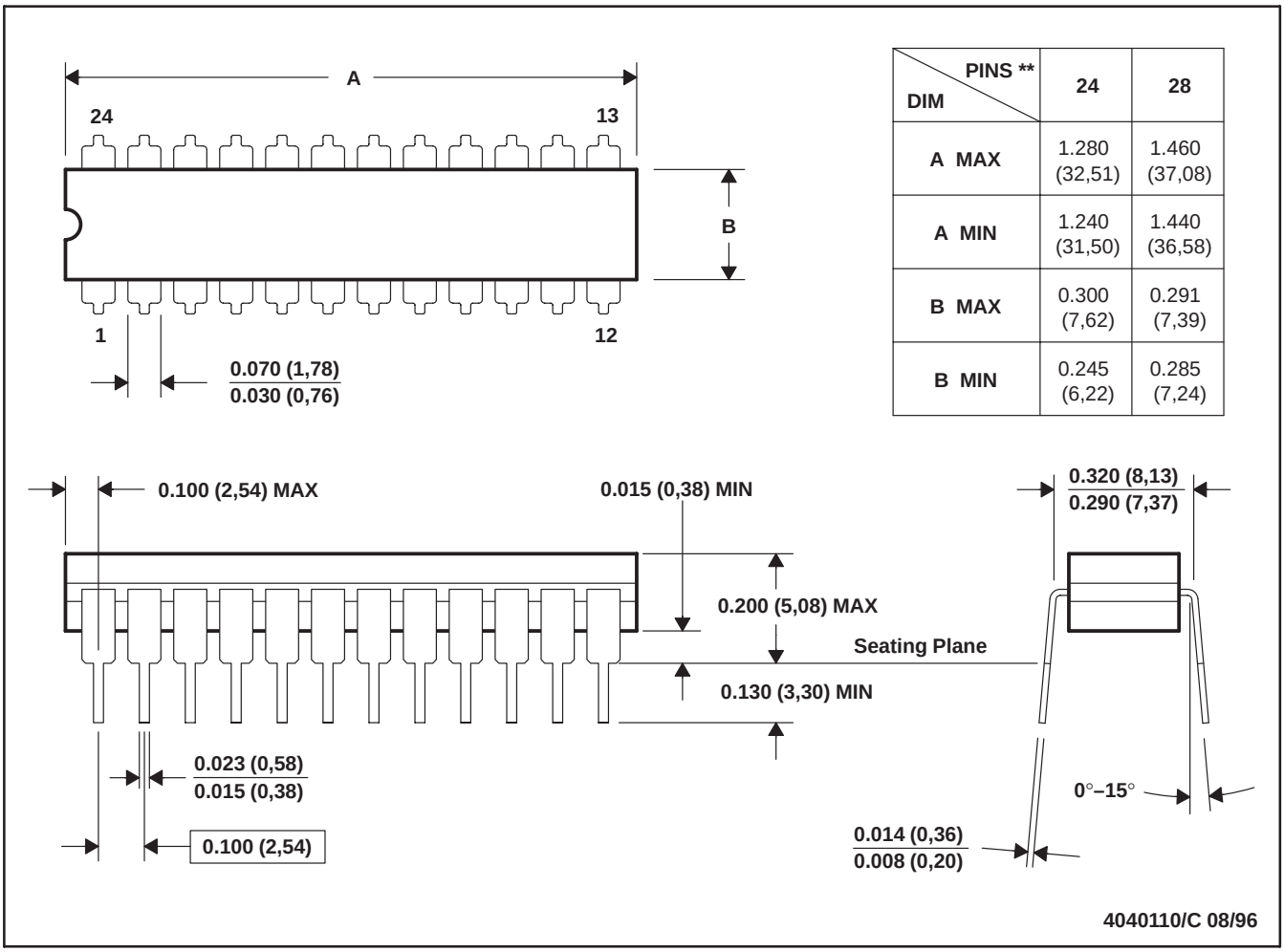

*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN74ABT841ADBR | SSOP | DB | 24 | 2000 | 367.0 | 367.0 | 38.0 |
| SN74ABT841ADWR | SOIC | DW | 24 | 2000 | 350.0 | 350.0 | 43.0 |
| SN74ABT841APWR | TSSOP | PW | 24 | 2000 | 367.0 | 367.0 | 38.0 |

MCER004A – JANUARY 1995 – REVISED JANUARY 1997

**JT (R-GDIP-T**)** **CERAMIC DUAL-IN-LINE**

**24 LEADS SHOWN**




| DIM \ PINS ** | 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) |

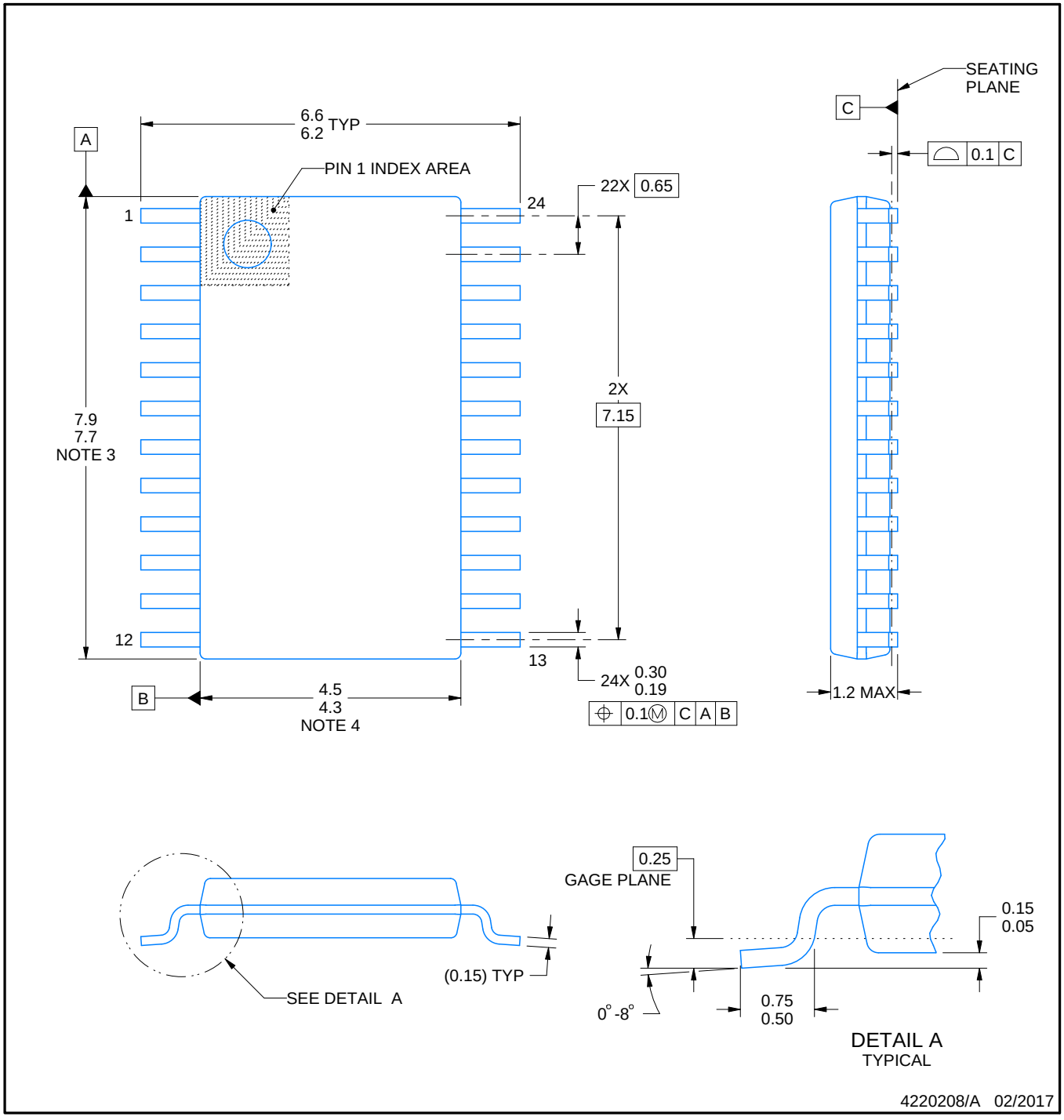
NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification.
E. Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28, and JEDEC MO-058 AA, MO-058 AB

# PACKAGE OUTLINE

## PW0024A

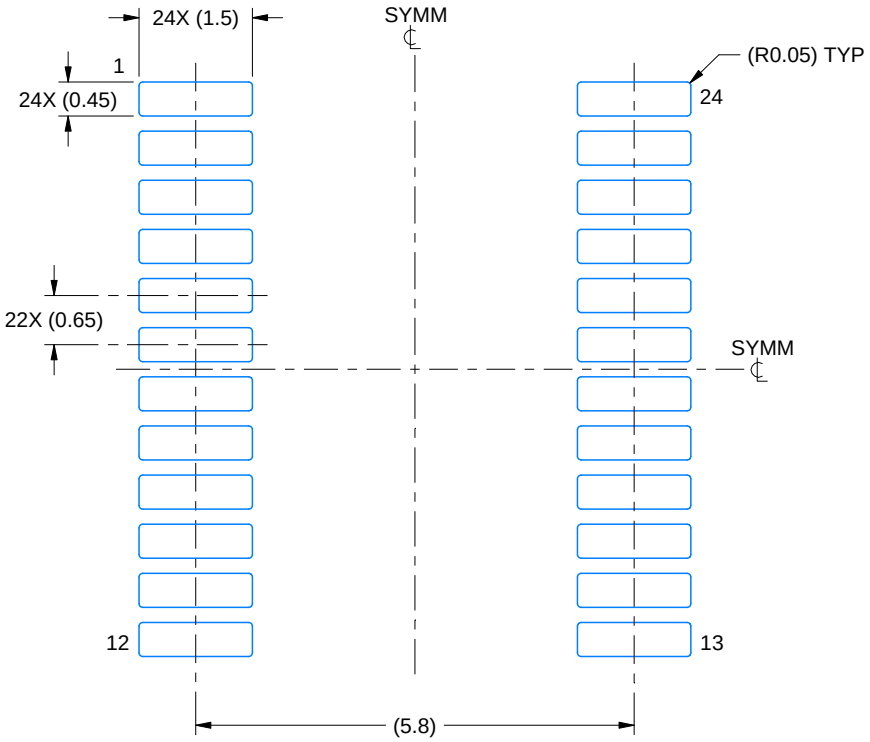
## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

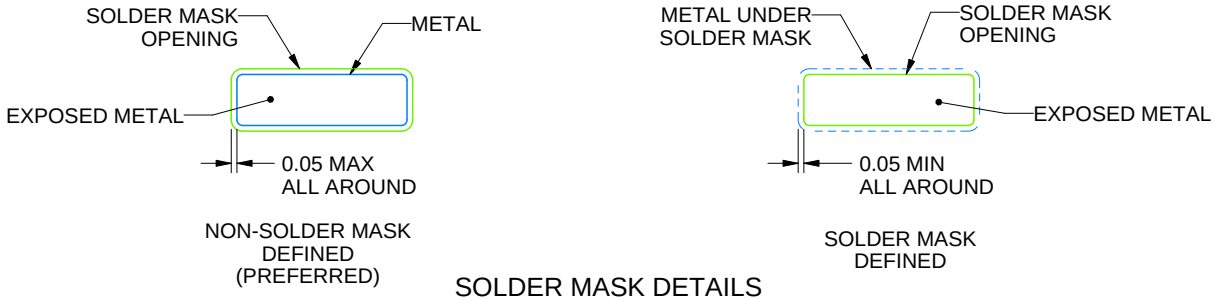



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

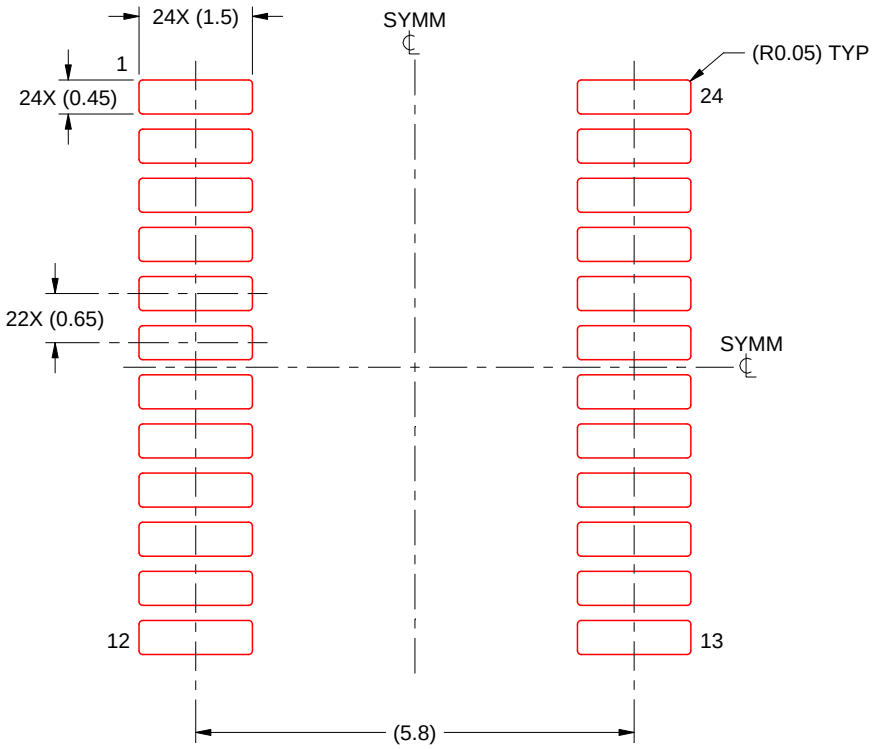



SOLDER MASK DETAILS

4220208/A 02/2017

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



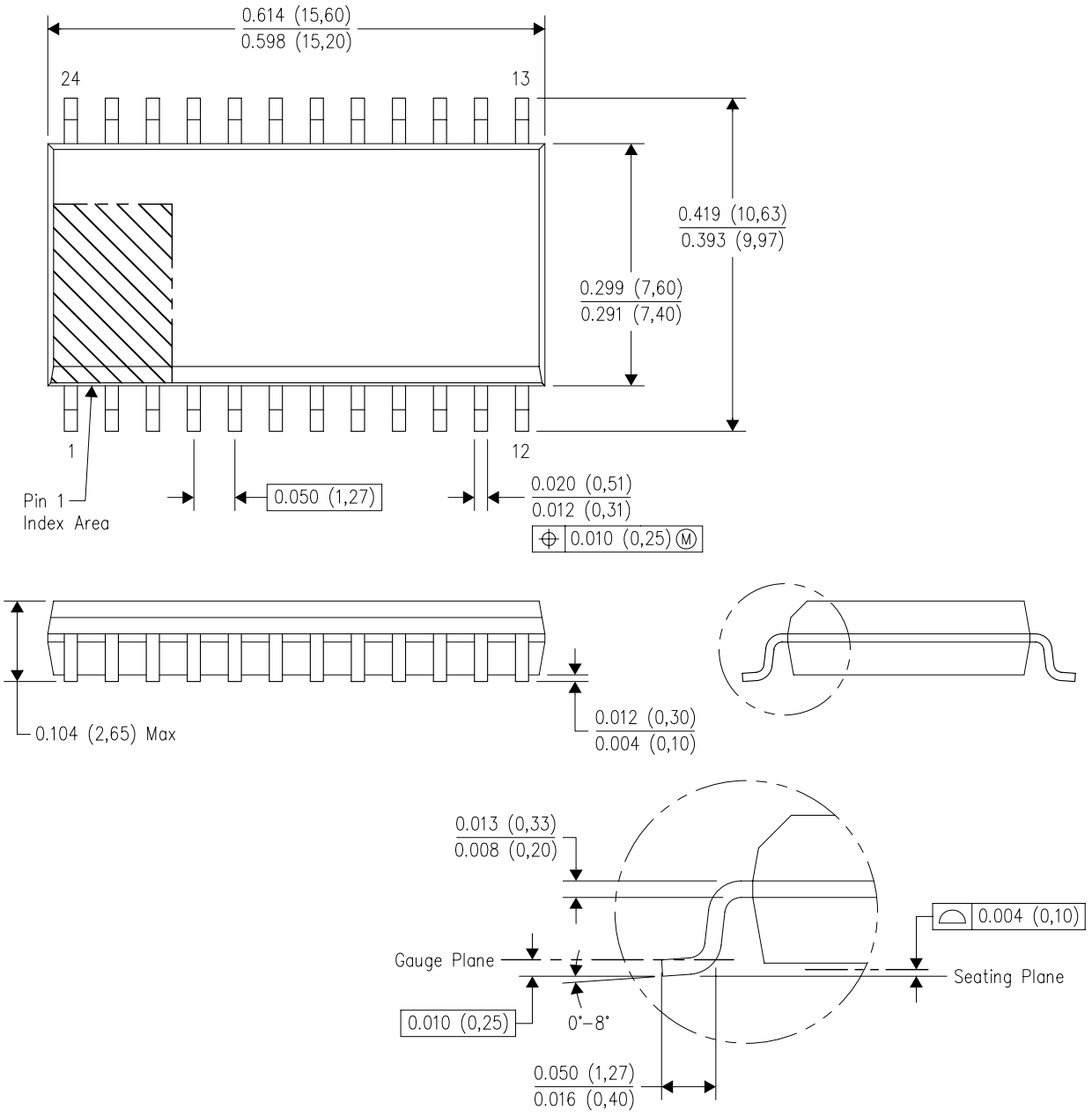

SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220208/A 02/2017

NOTES: (continued)

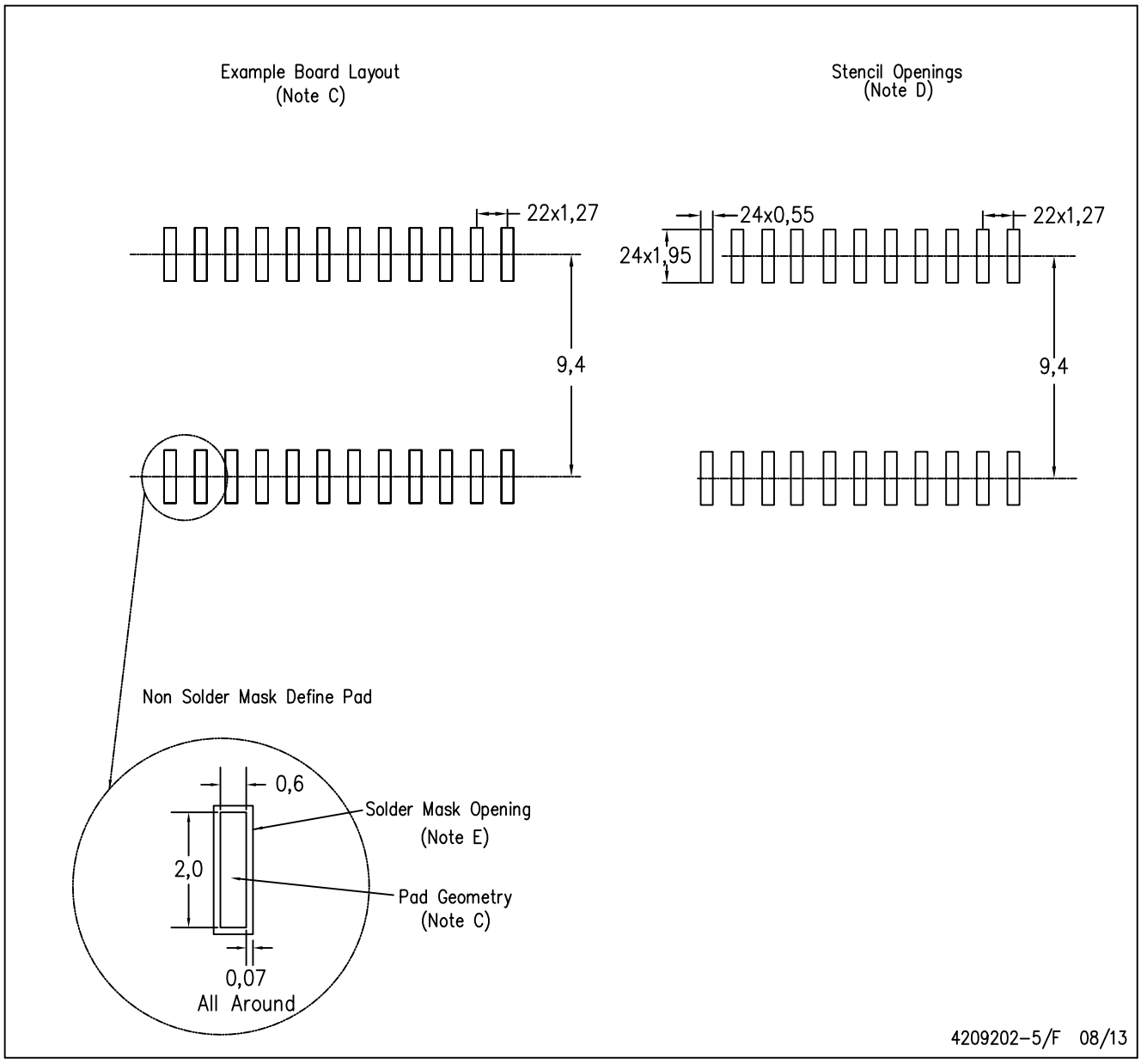
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

DW (R–PDSO–G24) PLASTIC SMALL OUTLINE




NOTES:
A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M–1994.
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.

DW (R–PDSO–G24) PLASTIC SMALL OUTLINE

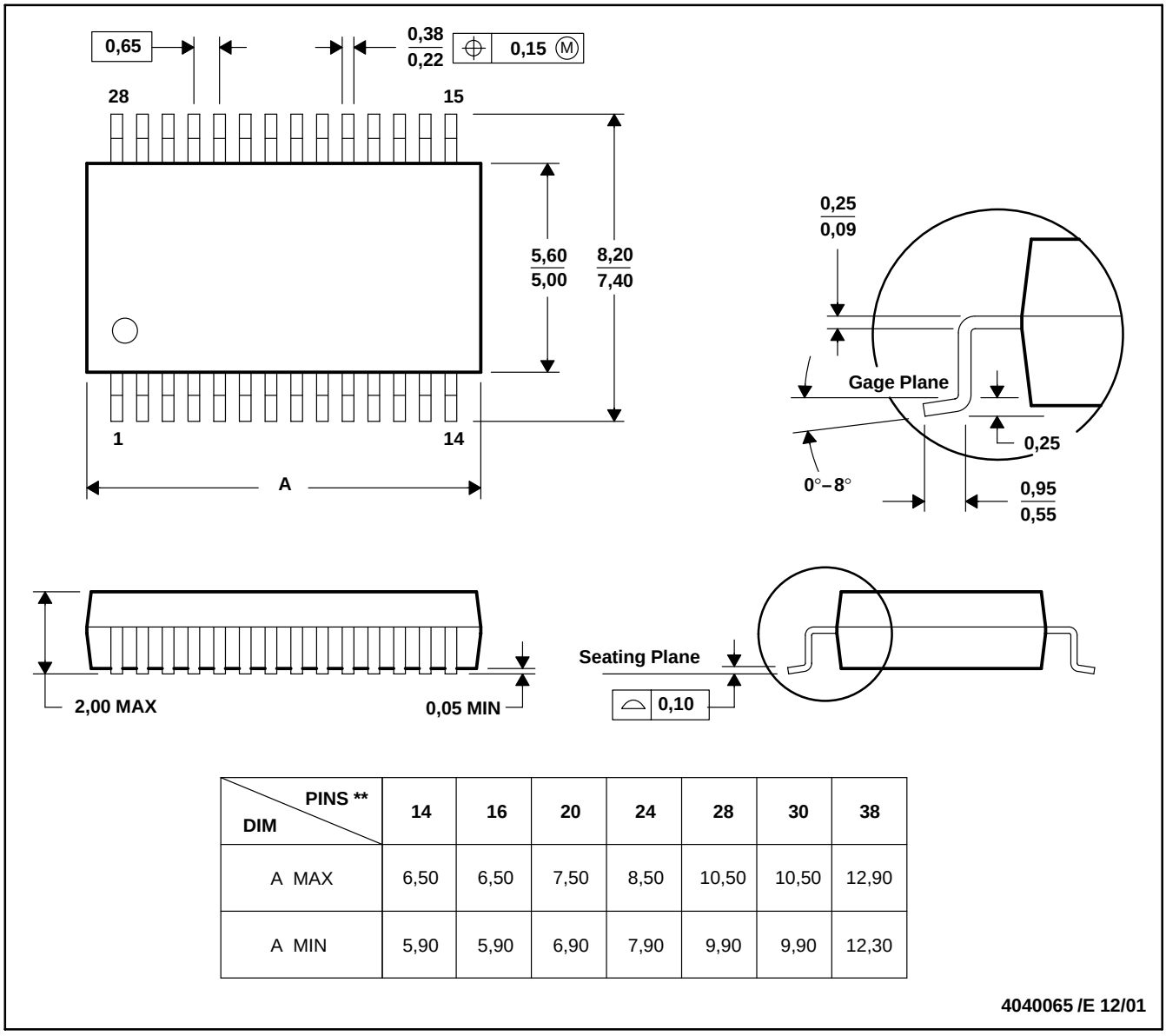



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Refer to IPC7351 for alternate board design.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC–7525
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

MSSO002E – JANUARY 1995 – REVISED DECEMBER 2001

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

**28 PINS SHOWN**




| DIM \ PINS ** | 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

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2019, Texas Instruments Incorporated