

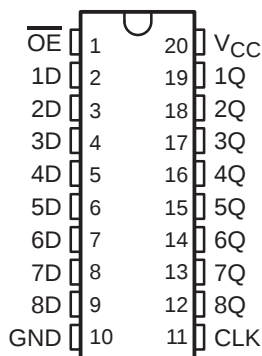
# SN54LVTH574, SN74LVTH574 3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

查询"5962-9583201VRA"供应商

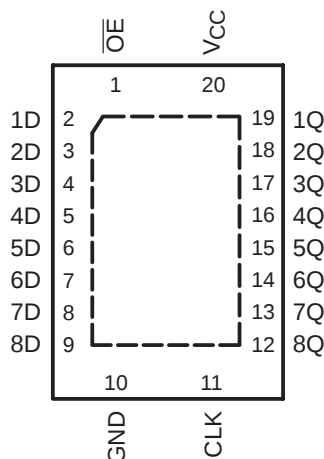
SCBS688G – MAY 1997 – REVISED SEPTEMBER 2003

- Support Mixed-Mode Signal Operation (5-V Input and Output Voltages With 3.3-V  $V_{CC}$ )
- Support Unregulated Battery Operation Down to 2.7 V
- Typical  $V_{OLP}$  (Output Ground Bounce)  $<0.8$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- $I_{off}$  and Power-Up 3-State Support Hot Insertion
- Bus Hold on Data Inputs Eliminates the Need for External Pullup/Pulldown Resistors
- Latch-Up Performance Exceeds 500 mA Per JESD 17
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)

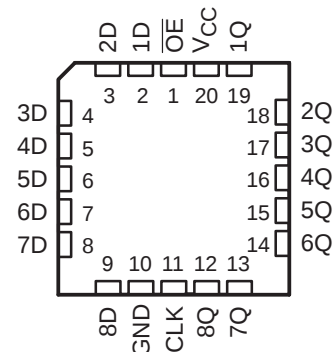
SN54LVTH574... J OR W PACKAGE  
SN74LVTH574... DB, DW, NS,  
OR PW PACKAGE  
(TOP VIEW)



SN74LVTH574... RGY PACKAGE  
(TOP VIEW)



SN54LVTH574... FK PACKAGE  
(TOP VIEW)



## description/ordering information

These octal flip-flops are designed specifically for low-voltage (3.3-V)  $V_{CC}$  operation, but with the capability to provide a TTL interface to a 5-V system environment.

## ORDERING INFORMATION

| $T_A$          | PACKAGE†              |               | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|-----------------------|---------------|-----------------------|------------------|
| -40°C to 85°C  | QFN – RGY             | Tape and reel | SN74LVTH574RGYR       | LXH574           |
|                | SOIC – DW             | Tube          | SN74LVTH574DW         | LVTH574          |
|                |                       | Tape and reel | SN74LVTH574DWR        |                  |
|                | SOP – NS              | Tape and reel | SN74LVTH574NSR        | LVTH574          |
|                | SSOP – DB             | Tape and reel | SN74LVTH574DBR        | LXH574           |
|                | TSSOP – PW            | Tube          | SN74LVTH574PW         | LXH574           |
|                |                       | Tape and reel | SN74LVTH574PWR        |                  |
| -55°C to 125°C | VFBGA – GQN           | Tape and reel | SN74LVTH574GQNR       | LXH574           |
|                | VFBGA – ZQN (Pb-free) |               | SN74LVTH574ZQNR       |                  |
|                | CDIP – J              | Tube          | SNJ54LVTH574J         | SNJ54LVTH574J    |
|                | CFP – W               | Tube          | SNJ54LVTH574W         | SNJ54LVTH574W    |
|                | LCCC – FK             | Tube          | SNJ54LVTH574FK        | SNJ54LVTH574FK   |

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



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.

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.

**TEXAS  
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2003, Texas Instruments Incorporated  
On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

SN54LVTH574, SN74LVTH574  
3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS  
WITH 3-STATE OUTPUTS

SCB9886 "M9629585201V/A" 03/03  
查询 09629585201V/A 供应商

description/ordering information (continued)

The eight flip-flops of the 'LVTH574 devices are edge-triggered D-type flip-flops. On the positive transition of the clock (CLK) input, the Q outputs are set to the logic levels set up at the data (D) inputs.

A buffered output-enable ( $\overline{OE}$ ) input can be used to place the eight 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.

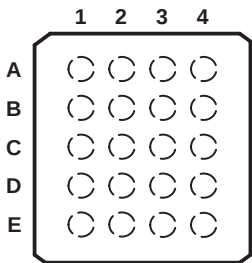
$\overline{OE}$  does not affect the internal operations of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

To ensure the high-impedance state during power up or power down,  $\overline{OE}$  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.

Active bus-hold circuitry is provided to hold unused or floating data inputs at a valid logic level. Use of pullup or pulldown resistors with the bus-hold circuitry is not recommended.

These devices are fully specified for hot-insertion applications using  $I_{off}$  and power-up 3-state. The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the devices when they are powered down. The power-up 3-state circuitry places the outputs in the high-impedance state during power up and power down, which prevents driver conflict.

SN74LVTH574 . . . GQN OR ZQN PACKAGE  
(TOP VIEW)



terminal assignments

|   | 1   | 2               | 3        | 4  |
|---|-----|-----------------|----------|----|
| A | 1D  | $\overline{OE}$ | $V_{CC}$ | 1Q |
| B | 3D  | 3Q              | 2D       | 2Q |
| C | 5D  | 4D              | 5Q       | 4Q |
| D | 7D  | 7Q              | 6D       | 6Q |
| E | GND | 8D              | CLK      | 8Q |

FUNCTION TABLE  
(each flip-flop)

| INPUTS          |            |   | OUTPUT<br>Q |
|-----------------|------------|---|-------------|
| $\overline{OE}$ | CLK        | D |             |
| L               | $\uparrow$ | H | H           |
| L               | $\uparrow$ | L | L           |
| L               | H or L     | X | $Q_0$       |
| H               | X          | X | Z           |

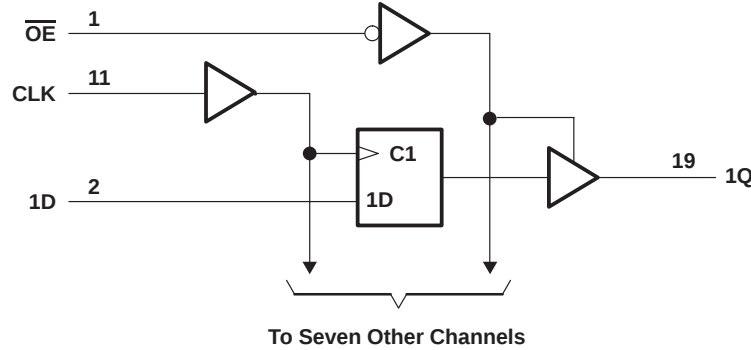
# SN54LVTH574, SN74LVTH574

## 3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

查询"5962-9583201VRA"供应商

SCBS688G – MAY 1997 – REVISED SEPTEMBER 2003

### logic diagram (positive logic)



Pin numbers shown are for the DB, DW, FK, J, NS, PW, RGY, and W packages.

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

|                                                                                                  |                            |
|--------------------------------------------------------------------------------------------------|----------------------------|
| Supply voltage range, $V_{CC}$                                                                   | –0.5 V to 4.6 V            |
| Input voltage range, $V_I$ (see Note 1)                                                          | –0.5 V to 7 V              |
| Voltage range applied to any output in the high-impedance or power-off state, $V_O$ (see Note 1) | –0.5 V to 7 V              |
| Voltage range applied to any output in the high state, $V_O$ (see Note 1)                        | –0.5 V to $V_{CC} + 0.5$ V |
| Current into any output in the low state, $I_O$ : SN54LVTH574                                    | 96 mA                      |
| SN74LVTH574                                                                                      | 128 mA                     |
| Current into any output in the high state, $I_O$ (see Note 2): SN54LVTH574                       | 48 mA                      |
| SN74LVTH574                                                                                      | 64 mA                      |
| Input clamp current, $I_{IK}$ ( $V_I < 0$ )                                                      | –50 mA                     |
| Output clamp current, $I_{OK}$ ( $V_O < 0$ )                                                     | –50 mA                     |
| Package thermal impedance, $\theta_{JA}$ (see Note 3): DB package                                | 70°C/W                     |
| (see Note 3): DW package                                                                         | 58°C/W                     |
| (see Note 3): GQN/ZQN package                                                                    | 78°C/W                     |
| (see Note 3): NS package                                                                         | 60°C/W                     |
| (see Note 3): PW package                                                                         | 83°C/W                     |
| (see Note 4): RGY package                                                                        | 37°C/W                     |
| Storage temperature range, $T_{stg}$                                                             | –65°C to 150°C             |

<sup>†</sup> 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. This current flows only when the output is in the high state and  $V_O > V_{CC}$ .
  3. The package thermal impedance is calculated in accordance with JESD 51-7.
  4. The package thermal impedance is calculated in accordance with JESD 51-5.

SN54LVTH574, SN74LVTH574  
3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS  
WITH 3-STATE OUTPUTS

SCB988 "M" 09629585201V/A 135W 233  
查询 09629585201V/A 供应商

recommended operating conditions (see Note 5)

|                     |                                    | SN54LVTH574     |     | SN74LVTH574 |     | UNIT |
|---------------------|------------------------------------|-----------------|-----|-------------|-----|------|
|                     |                                    | MIN             | MAX | MIN         | MAX |      |
| V <sub>CC</sub>     | Supply voltage                     | 2.7             | 3.6 | 2.7         | 3.6 | 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    |
| V <sub>I</sub>      | Input voltage                      |                 | 5.5 |             | 5.5 | V    |
| I <sub>OH</sub>     | High-level output current          |                 | −24 |             | −32 | mA   |
| I <sub>OL</sub>     | Low-level output current           |                 | 48  |             | 64  | mA   |
| Δt/Δv               | Input transition rise or fall rate | Outputs enabled |     | 10          | 10  | ns/V |
| Δt/ΔV <sub>CC</sub> | Power-up ramp rate                 | 200             |     | 200         |     | μs/V |
| T <sub>A</sub>      | Operating free-air temperature     | −55             | 125 | −40         | 85  | °C   |

NOTE 5: All unused control inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

# SN54LVTH574, SN74LVTH574

## 3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS

### WITH 3-STATE OUTPUTS

查询"5962-9583201VRA"供应商

SCBS688G – MAY 1997 – REVISED SEPTEMBER 2003

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

| PARAMETER                                                        |                         | TEST CONDITIONS                                                                                              |                                  | SN54LVTH574                                          |      |     | SN74LVTH574          |      |     | UNIT |
|------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------|------|-----|----------------------|------|-----|------|
|                                                                  |                         |                                                                                                              |                                  | MIN                                                  | TYP† | MAX | MIN                  | TYP† | MAX |      |
| V <sub>IK</sub>                                                  |                         | V <sub>CC</sub> = 2.7 V, I <sub>I</sub> = -18 mA                                                             |                                  | -1.2                                                 |      |     | -1.2                 |      |     | V    |
| V <sub>OH</sub>                                                  |                         | V <sub>CC</sub> = 2.7 V to 3.6 V, I <sub>OH</sub> = -100 μA                                                  |                                  | V <sub>CC</sub> -0.2                                 |      |     | V <sub>CC</sub> -0.2 |      |     | V    |
|                                                                  |                         | V <sub>CC</sub> = 2.7 V, I <sub>OH</sub> = -8 mA                                                             |                                  | 2.4                                                  |      |     | 2.4                  |      |     |      |
|                                                                  |                         | V <sub>CC</sub> = 3 V                                                                                        | I <sub>OH</sub> = -24 mA         | 2                                                    |      |     |                      |      |     |      |
|                                                                  |                         |                                                                                                              | I <sub>OH</sub> = -32 mA         |                                                      |      |     | 2                    |      |     |      |
| V <sub>OL</sub>                                                  |                         | V <sub>CC</sub> = 2.7 V                                                                                      | I <sub>OL</sub> = 100 μA         | 0.2                                                  |      |     | 0.2                  |      |     | V    |
|                                                                  |                         |                                                                                                              | I <sub>OL</sub> = 24 mA          | 0.5                                                  |      |     | 0.5                  |      |     |      |
|                                                                  |                         |                                                                                                              | V <sub>CC</sub> = 3 V            | I <sub>OL</sub> = 16 mA                              | 0.4  |     |                      | 0.4  |     |      |
|                                                                  |                         | I <sub>OL</sub> = 32 mA                                                                                      |                                  | 0.5                                                  |      |     | 0.5                  |      |     |      |
|                                                                  |                         | I <sub>OL</sub> = 48 mA                                                                                      |                                  | 0.55                                                 |      |     |                      |      |     |      |
|                                                                  |                         | I <sub>OL</sub> = 64 mA                                                                                      |                                  |                                                      |      |     | 0.55                 |      |     |      |
|                                                                  |                         | I <sub>I</sub>                                                                                               | Control inputs                   | V <sub>CC</sub> = 0 or 3.6 V, V <sub>I</sub> = 5.5 V |      | 10  |                      |      | 10  |      |
| V <sub>CC</sub> = 3.6 V, V <sub>I</sub> = V <sub>CC</sub> or GND |                         |                                                                                                              |                                  | ±1                                                   |      |     | ±1                   |      |     |      |
| Data inputs                                                      | V <sub>CC</sub> = 3.6 V |                                                                                                              | V <sub>I</sub> = V <sub>CC</sub> | 1                                                    |      |     | 1                    |      |     |      |
|                                                                  |                         |                                                                                                              | V <sub>I</sub> = 0               | -5                                                   |      |     | -5                   |      |     |      |
| I <sub>off</sub>                                                 |                         | V <sub>CC</sub> = 0, V <sub>I</sub> or V <sub>O</sub> = 0 to 4.5 V                                           |                                  |                                                      |      |     | ±100                 |      |     | μA   |
| I <sub>I</sub> (hold)                                            | Data inputs             | V <sub>CC</sub> = 3 V                                                                                        | V <sub>I</sub> = 0.8 V           | 75                                                   |      |     | 75                   |      |     | μA   |
|                                                                  |                         |                                                                                                              | V <sub>I</sub> = 2 V             | -75                                                  |      |     | -75                  |      |     |      |
|                                                                  |                         | V <sub>CC</sub> = 3.6 V‡, V <sub>I</sub> = 0 to 3.6 V                                                        |                                  |                                                      |      |     | ±500                 |      |     |      |
| I <sub>OZH</sub>                                                 |                         | V <sub>CC</sub> = 3.6 V, V <sub>O</sub> = 3 V                                                                |                                  | 5                                                    |      |     | 5                    |      |     | μA   |
| I <sub>OZL</sub>                                                 |                         | V <sub>CC</sub> = 3.6 V, V <sub>O</sub> = 0.5 V                                                              |                                  | -5                                                   |      |     | -5                   |      |     | μA   |
| I <sub>OZPU</sub>                                                |                         | V <sub>CC</sub> = 0 to 1.5 V, V <sub>O</sub> = 0.5 V to 3 V, OE = don't care                                 |                                  | ±100*                                                |      |     | ±100                 |      |     | μA   |
| I <sub>OZPD</sub>                                                |                         | V <sub>CC</sub> = 1.5 V to 0, V <sub>O</sub> = 0.5 V to 3 V, OE = don't care                                 |                                  | ±100*                                                |      |     | ±100                 |      |     | μA   |
| I <sub>CC</sub>                                                  |                         | V <sub>CC</sub> = 3.6 V, I <sub>O</sub> = 0, V <sub>I</sub> = V <sub>CC</sub> or GND                         | Outputs high                     | 0.19                                                 |      |     | 0.19                 |      |     | mA   |
|                                                                  |                         |                                                                                                              | Outputs low                      | 5                                                    |      |     | 5                    |      |     |      |
|                                                                  |                         |                                                                                                              | Outputs disabled                 | 0.19                                                 |      |     | 0.19                 |      |     |      |
| ΔI <sub>CC</sub> §                                               |                         | V <sub>CC</sub> = 3 V to 3.6 V, One input at V <sub>CC</sub> - 0.6 V, Other inputs at V <sub>CC</sub> or GND |                                  | 0.2                                                  |      |     | 0.2                  |      |     | mA   |
| C <sub>i</sub>                                                   |                         | V <sub>I</sub> = 3 V or 0                                                                                    |                                  | 3                                                    |      |     | 3                    |      |     | pF   |
| C <sub>O</sub>                                                   |                         | V <sub>O</sub> = 3 V or 0                                                                                    |                                  | 7                                                    |      |     | 7                    |      |     | pF   |

\* On products compliant to MIL-PRF-38535, this parameter is not production tested.

† All typical values are at  $V_{CC} = 3.3\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ This is the bus-hold maximum dynamic current. It is the minimum overdrive current required to switch the input from one state to another.

§ This is the increase in supply current for each input that is at the specified TTL voltage level, rather than  $V_{CC}$  or GND.



# SN54LVTH574, SN74LVTH574

## 3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

SCB9886 "M962958520" 3.3V PPA 代理商

timing requirements over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

|                    |                                 | SN54LVTH574                                   |     |                         |     | SN74LVTH574                                   |     |                         |     | UNIT |
|--------------------|---------------------------------|-----------------------------------------------|-----|-------------------------|-----|-----------------------------------------------|-----|-------------------------|-----|------|
|                    |                                 | $V_{CC} = 3.3\text{ V}$<br>$\pm 0.3\text{ V}$ |     | $V_{CC} = 2.7\text{ V}$ |     | $V_{CC} = 3.3\text{ V}$<br>$\pm 0.3\text{ V}$ |     | $V_{CC} = 2.7\text{ V}$ |     |      |
|                    |                                 | MIN                                           | MAX | MIN                     | MAX | MIN                                           | MAX | MIN                     | MAX |      |
| f <sub>clock</sub> | Clock frequency                 | 150                                           |     | 150                     |     | 150                                           |     | 150                     |     | MHz  |
| t <sub>w</sub>     | Pulse duration, CLK high or low | 3.3                                           |     | 3.3                     |     | 3.3                                           |     | 3.3                     |     | ns   |
| t <sub>su</sub>    | Setup time, data before CLK↑    | 2                                             |     | 2.4                     |     | 2                                             |     | 2.4                     |     | ns   |
| t <sub>h</sub>     | Hold time, data after CLK↑      | 0.9                                           |     | 0.9                     |     | 0.3                                           |     | 0                       |     | ns   |

switching characteristics over recommended free-air temperature,  $C_L = 50\text{ pF}$  (unless otherwise noted) (see Figure 1)

| PARAMETER        | FROM<br>(INPUT) | TO<br>(OUTPUT) | SN54LVTH574                        |     |                         |     | SN74LVTH574                        |      |     |                         | UNIT |     |
|------------------|-----------------|----------------|------------------------------------|-----|-------------------------|-----|------------------------------------|------|-----|-------------------------|------|-----|
|                  |                 |                | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     | V <sub>CC</sub> = 2.7 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |      |     | V <sub>CC</sub> = 2.7 V |      |     |
|                  |                 |                | MIN                                | MAX | MIN                     | MAX | MIN                                | TYP† | MAX | MIN                     |      | MAX |
| f <sub>max</sub> |                 |                | 150                                |     | 150                     |     | 150                                |      |     | 150                     |      | MHz |
| t <sub>PLH</sub> | CLK             | Q              | 1.7                                | 4.9 | 5.9                     |     | 1.8                                | 3    | 4.5 | 5.3                     |      | ns  |
| t <sub>PHL</sub> |                 |                | 1.7                                | 4.9 | 5.5                     |     | 1.8                                | 3    | 4.5 | 5.3                     |      |     |
| t <sub>PZH</sub> | OE              | Q              | 1.4                                | 5.1 | 6.5                     |     | 1.5                                | 3.2  | 4.8 | 5.9                     |      | ns  |
| t <sub>PZL</sub> |                 |                | 1.4                                | 5.1 | 6.1                     |     | 1.5                                | 3.5  | 4.8 | 5.9                     |      |     |
| t <sub>PHZ</sub> | OE              | Q              | 1                                  | 5.9 | 6.4                     |     | 2                                  | 3.5  | 4.8 | 5.1                     |      | ns  |
| t <sub>PLZ</sub> |                 |                | 0.8                                | 4.8 | 5.3                     |     | 2                                  | 3.2  | 4.4 | 4.4                     |      |     |

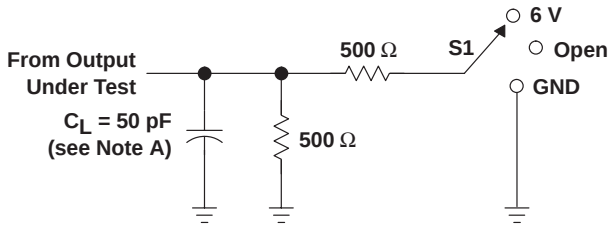
$^\dagger$  All typical values are at  $V_{CC} = 3.3\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

# SN54LVTH574, SN74LVTH574 3.3-V ABT OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

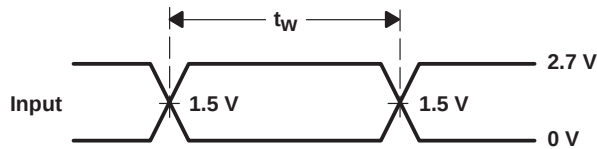
查询"5962-9583201VRA"供应商

SCBS688G – MAY 1997 – REVISED SEPTEMBER 2003

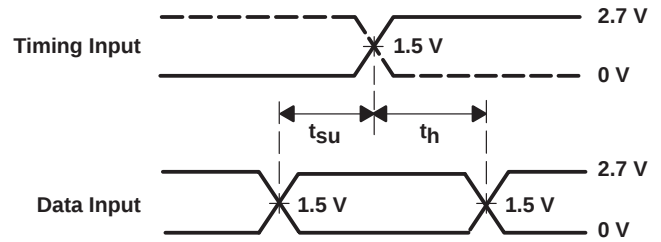
## PARAMETER MEASUREMENT INFORMATION



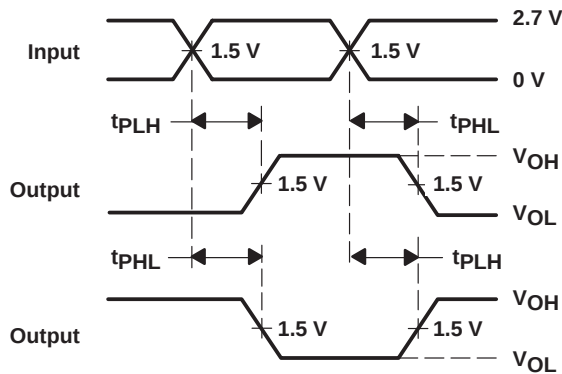
LOAD CIRCUIT



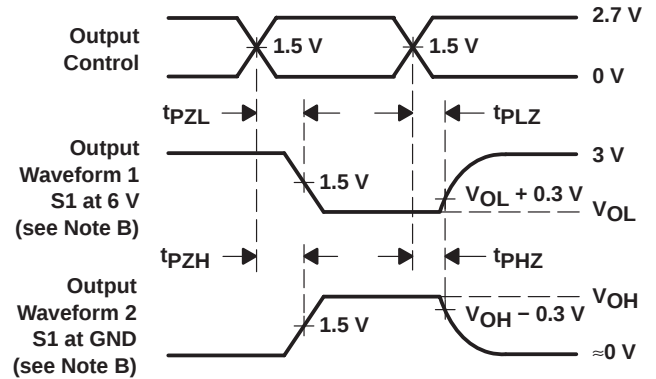
VOLTAGE WAVEFORMS  
PULSE DURATION



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:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .
- D. The outputs are measured one at a time with one transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type         | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|----------------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-9583201Q2A  | ACTIVE                | LCCC                 | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 5962-9583201QRA  | ACTIVE                | CDIP                 | J               | 20   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 5962-9583201QSA  | ACTIVE                | CFP                  | W               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| 5962-9583201VRA  | ACTIVE                | CDIP                 | J               | 20   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 5962-9583201VSA  | ACTIVE                | CFP                  | W               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SN74LVTH574DBLE  | OBSOLETE              | SSOP                 | DB              | 20   |             | TBD                     | Call TI          | Call TI                      |
| SN74LVTH574DBR   | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DBRE4 | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DBRG4 | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DW    | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DWE4  | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DWG4  | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DWR   | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DWRE4 | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574DWRG4 | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574GQNR  | NRND                  | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000        | TBD                     | SNPB             | Level-1-240C-UNLIM           |
| SN74LVTH574NSR   | ACTIVE                | SO                   | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574NSRE4 | ACTIVE                | SO                   | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574NSRG4 | ACTIVE                | SO                   | NS              | 20   | 2000        | TBD                     | Call TI          | Call TI                      |
| SN74LVTH574PW    | ACTIVE                | TSSOP                | PW              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574PWE4  | ACTIVE                | TSSOP                | PW              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574PWG4  | ACTIVE                | TSSOP                | PW              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574PWLE  | OBSOLETE              | TSSOP                | PW              | 20   |             | TBD                     | Call TI          | Call TI                      |
| SN74LVTH574PWR   | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574PWRE4 | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574PWRG4 | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVTH574RGYR  | ACTIVE                | QFN                  | RGY             | 20   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1 YEAR          |

| 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> |
|-------------------|-----------------------|-----------------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN74LVTH574RGYRG4 | ACTIVE                | QFN                   | RGY             | 20   | 1000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1 YEAR          |
| SN74LVTH574ZQNR   | ACTIVE                | BGA MI CROSTAR JUNIOR | ZQN             | 20   | 1000        | Green (RoHS & no Sb/Br) | SNAGCU           | Level-1-260C-UNLIM           |
| SNJ54LVTH574FK    | ACTIVE                | LCCC                  | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ54LVTH574J     | ACTIVE                | CDIP                  | J               | 20   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ54LVTH574W     | ACTIVE                | CFP                   | W               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSELETE:** TI has discontinued the production of the device.

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

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

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

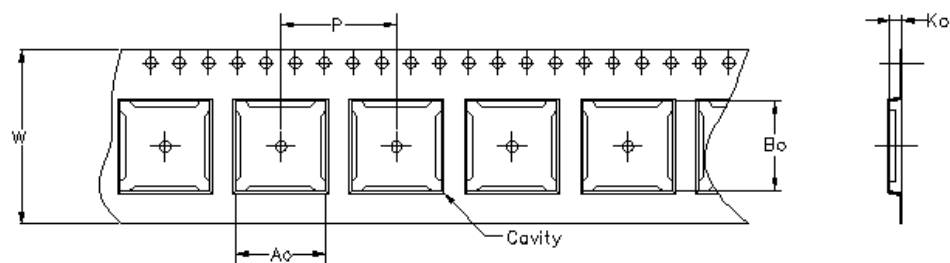
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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

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

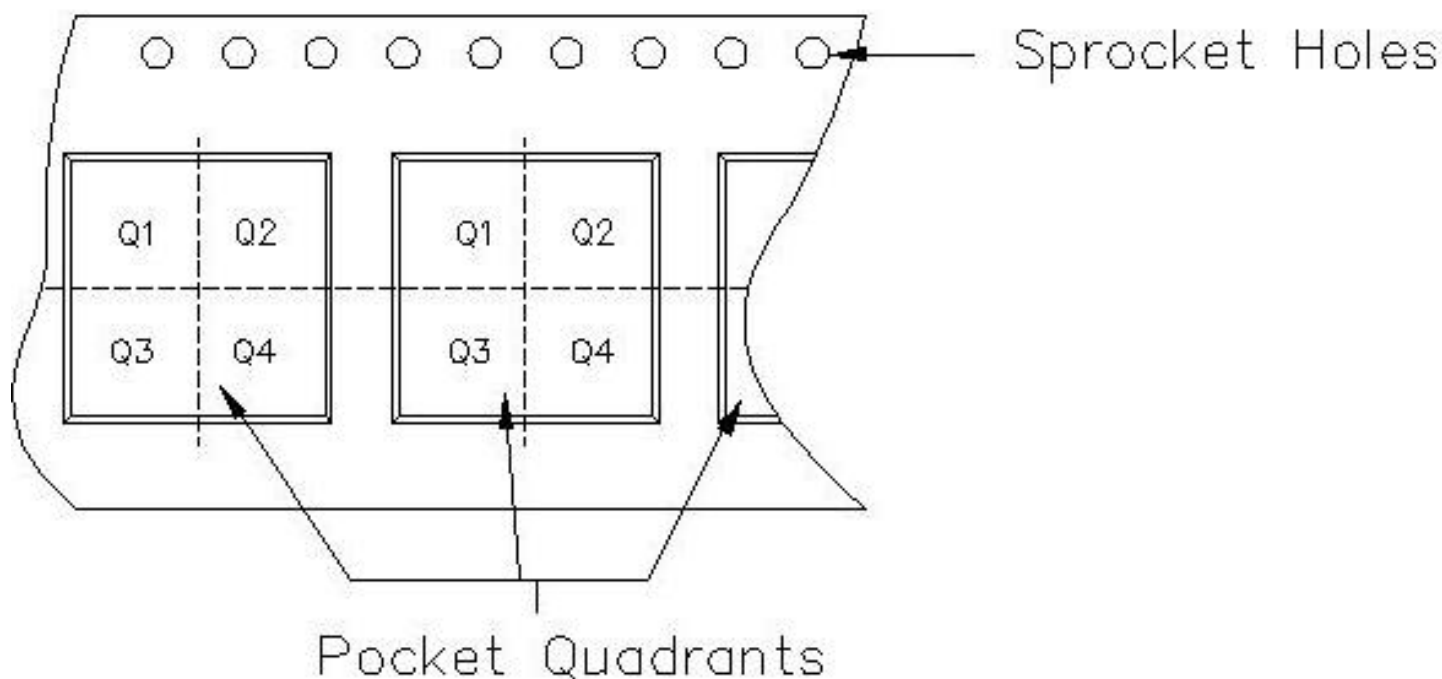
**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. 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.



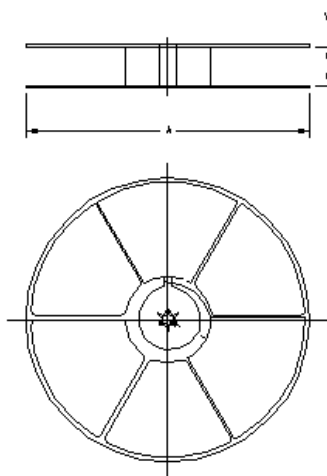
Carrier tape design is defined largely by the component length, width, and thickness.

|                                                                    |
|--------------------------------------------------------------------|
| $A_o$ = Dimension designed to accommodate the component width.     |
| $B_o$ = Dimension designed to accommodate the component length.    |
| $K_o$ = Dimension designed to accommodate the component thickness. |
| $W$ = Overall width of the carrier tape.                           |
| $P$ = Pitch between successive cavity centers.                     |

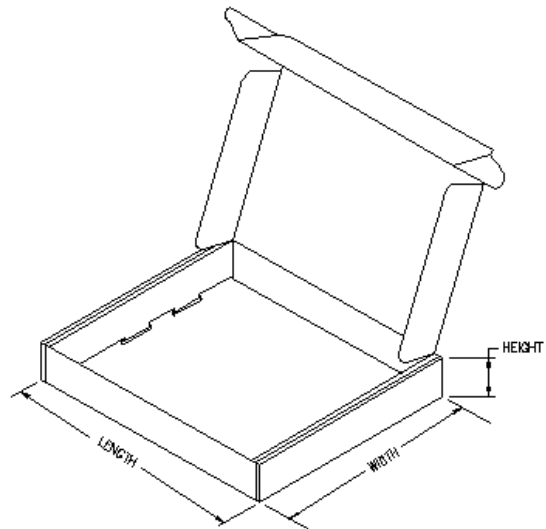


## TAPE AND REEL INFORMATION

| Device          | Package | Pins | Site | Reel<br>Diameter<br>(mm) | Reel<br>Width<br>(mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1<br>(mm) | W<br>(mm) | Pin1<br>Quadrant |
|-----------------|---------|------|------|--------------------------|-----------------------|---------|---------|---------|------------|-----------|------------------|
| SN74LVTH574DBR  | DB      | 20   | MLA  | 330                      | 16                    | 8.2     | 7.5     | 2.5     | 12         | 16        | Q1               |
| SN74LVTH574DWR  | DW      | 20   | MLA  | 330                      | 24                    | 10.8    | 13.0    | 2.7     | 12         | 24        | Q1               |
| SN74LVTH574GQNR | GQN     | 20   | HIJ  | 330                      | 12                    | 3.3     | 4.3     | 1.5     | 8          | 12        | Q1               |
| SN74LVTH574GQNR | GQN     | 20   | TAI  | 330                      | 12                    | 3.3     | 4.3     | 1.6     | 8          | 12        | Q1               |
| SN74LVTH574NSR  | NS      | 20   | MLA  | 330                      | 24                    | 8.2     | 13.0    | 2.5     | 12         | 24        | Q1               |
| SN74LVTH574PWR  | PW      | 20   | MLA  | 330                      | 16                    | 6.95    | 7.1     | 1.6     | 8          | 16        | Q1               |
| SN74LVTH574RGYR | RGY     | 20   | MLA  | 180                      | 12                    | 3.8     | 4.8     | 1.6     | 8          | 12        | Q1               |
| SN74LVTH574ZQNR | ZQN     | 20   | HIJ  | 330                      | 12                    | 3.3     | 4.3     | 1.5     | 8          | 12        | Q1               |
| SN74LVTH574ZQNR | ZQN     | 20   | TAI  | 330                      | 12                    | 3.3     | 4.3     | 1.6     | 8          | 12        | Q1               |


**TAPE AND REEL BOX INFORMATION**

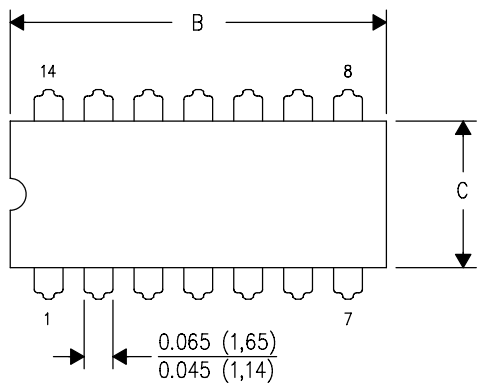
| Device          | Package | Pins | Site | Length (mm) | Width (mm) | Height (mm) |
|-----------------|---------|------|------|-------------|------------|-------------|
| SN74LVTH574DBR  | DB      | 20   | MLA  | 342.9       | 336.6      | 28.58       |
| SN74LVTH574DWR  | DW      | 20   | MLA  | 333.2       | 333.2      | 31.75       |
| SN74LVTH574GQNR | GQN     | 20   | HIJ  | 346.0       | 346.0      | 29.0        |
| SN74LVTH574GQNR | GQN     | 20   | TAI  | 338.1       | 340.5      | 20.64       |
| SN74LVTH574NSR  | NS      | 20   | MLA  | 333.2       | 333.2      | 31.75       |
| SN74LVTH574PWR  | PW      | 20   | MLA  | 342.9       | 336.6      | 28.58       |
| SN74LVTH574RGYR | RGY     | 20   | MLA  | 190.0       | 212.7      | 31.75       |
| SN74LVTH574ZQNR | ZQN     | 20   | HIJ  | 346.0       | 346.0      | 29.0        |
| SN74LVTH574ZQNR | ZQN     | 20   | TAI  | 338.1       | 340.5      | 20.64       |



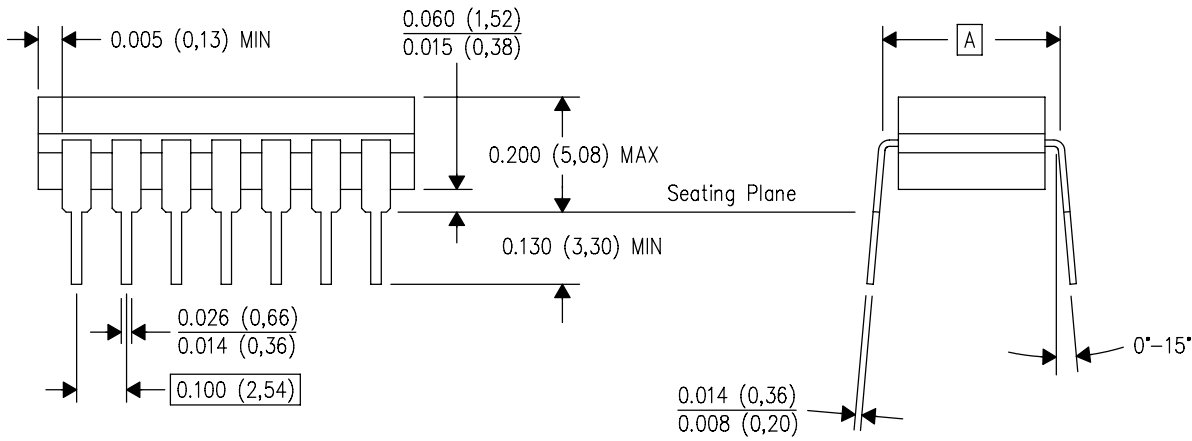
J (R-GDIP-T\*\*)

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)        |

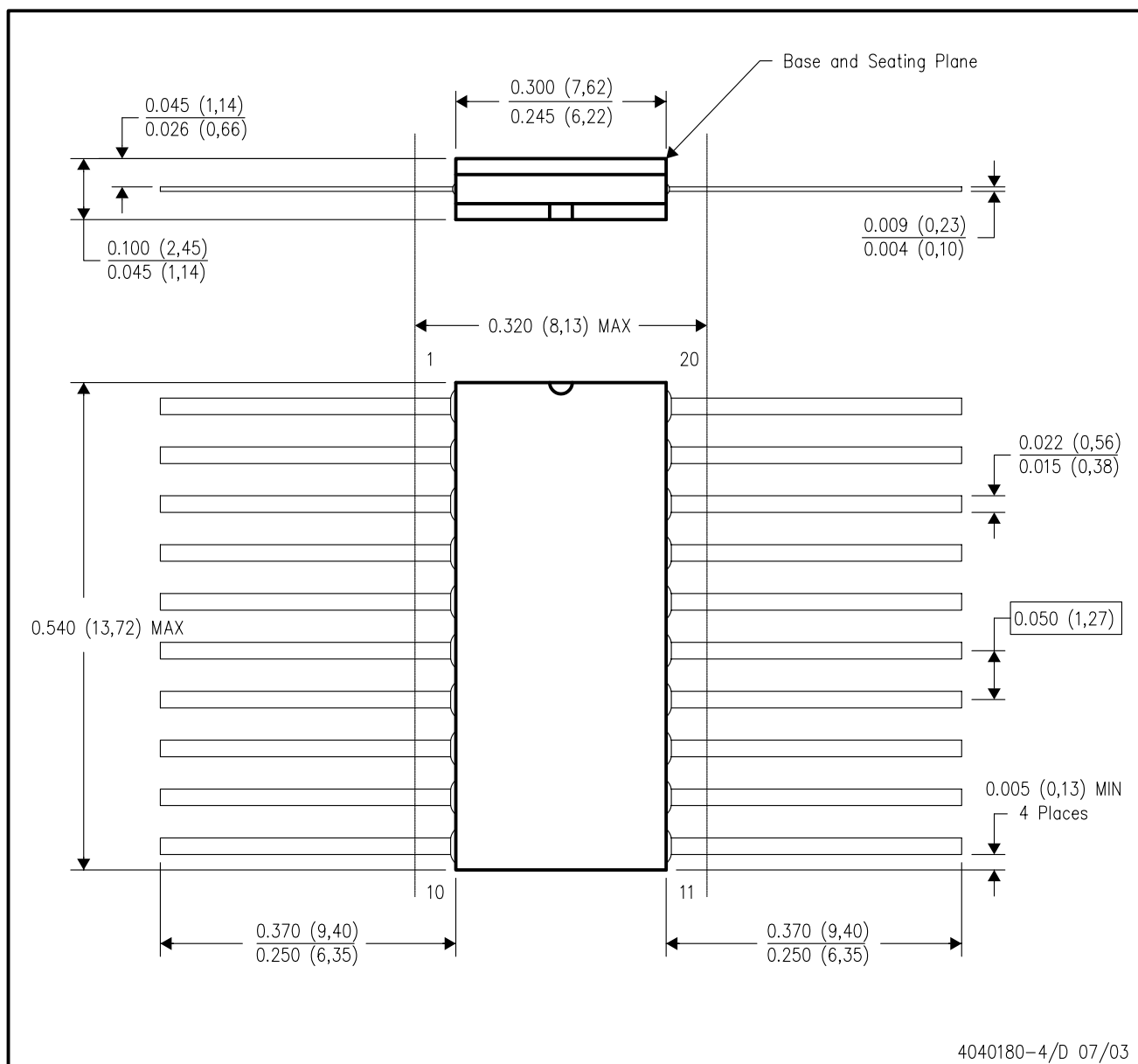


4040083/F 03/03

- 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-F20)

## CERAMIC DUAL FLATPACK

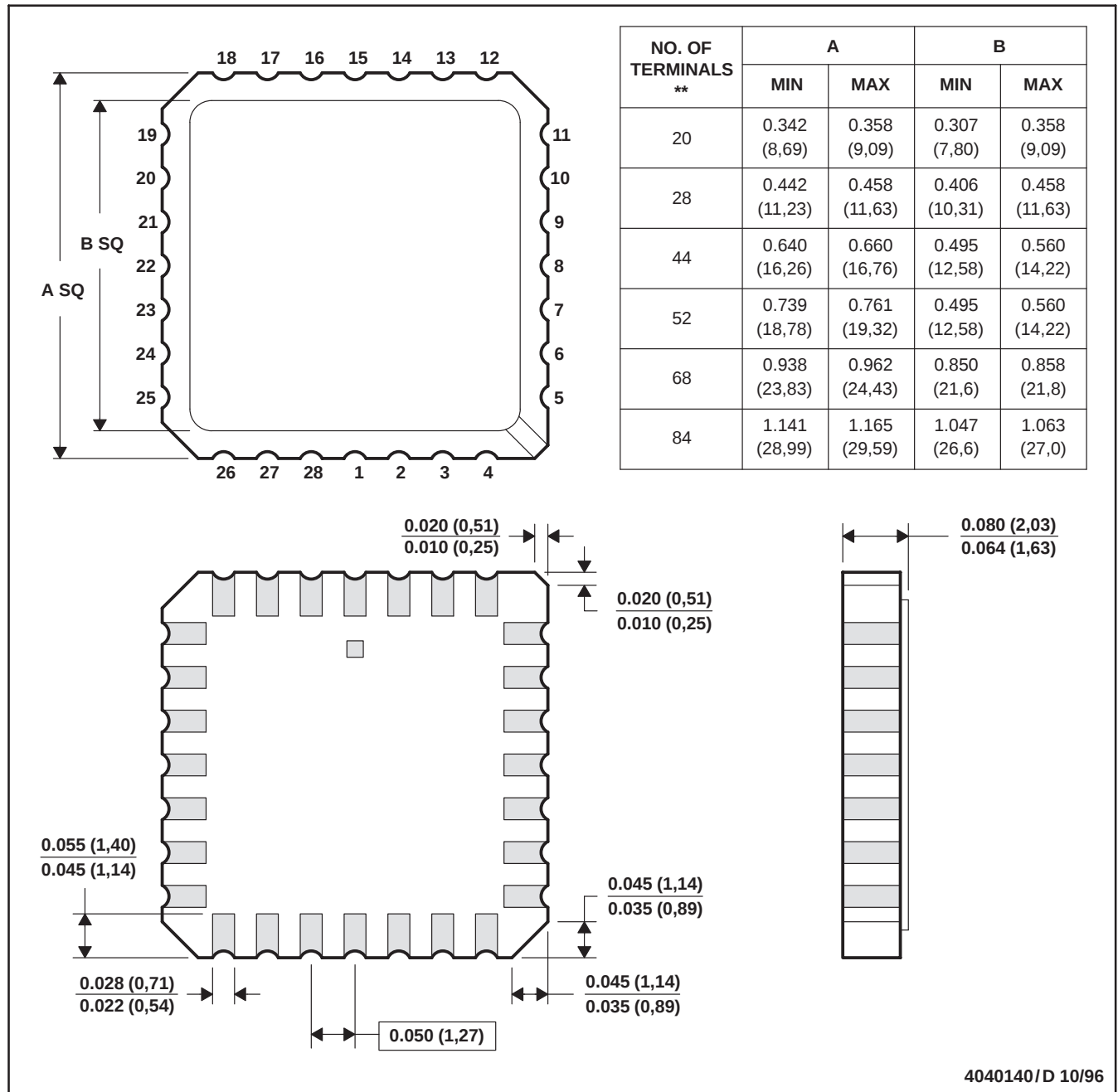


- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within Mil-Std 1835 GDFP2-F20

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

## LEADLESS CERAMIC CHIP CARRIER

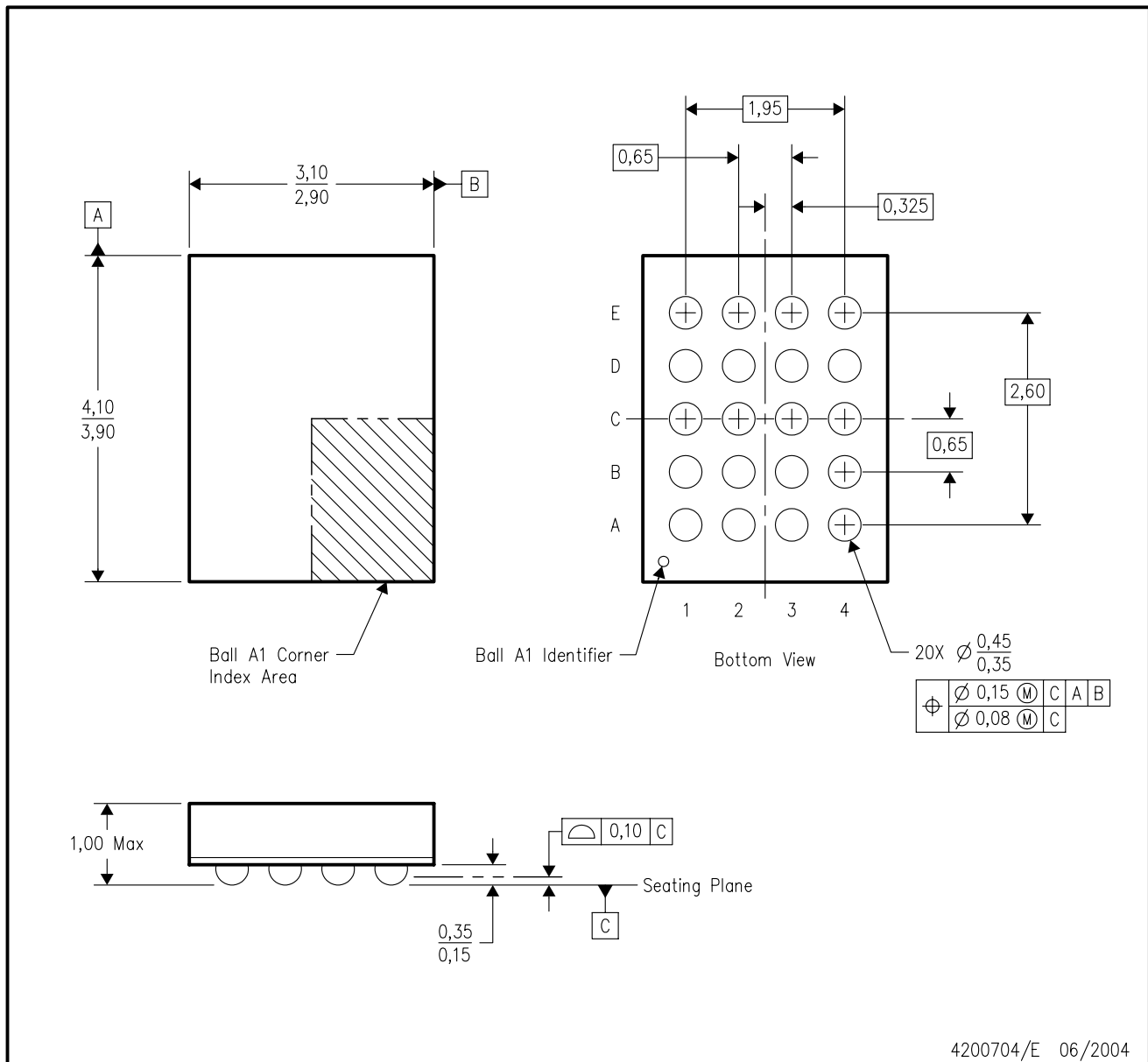
28 TERMINAL SHOWN



- 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

## GQN (R-PBGA-N20)

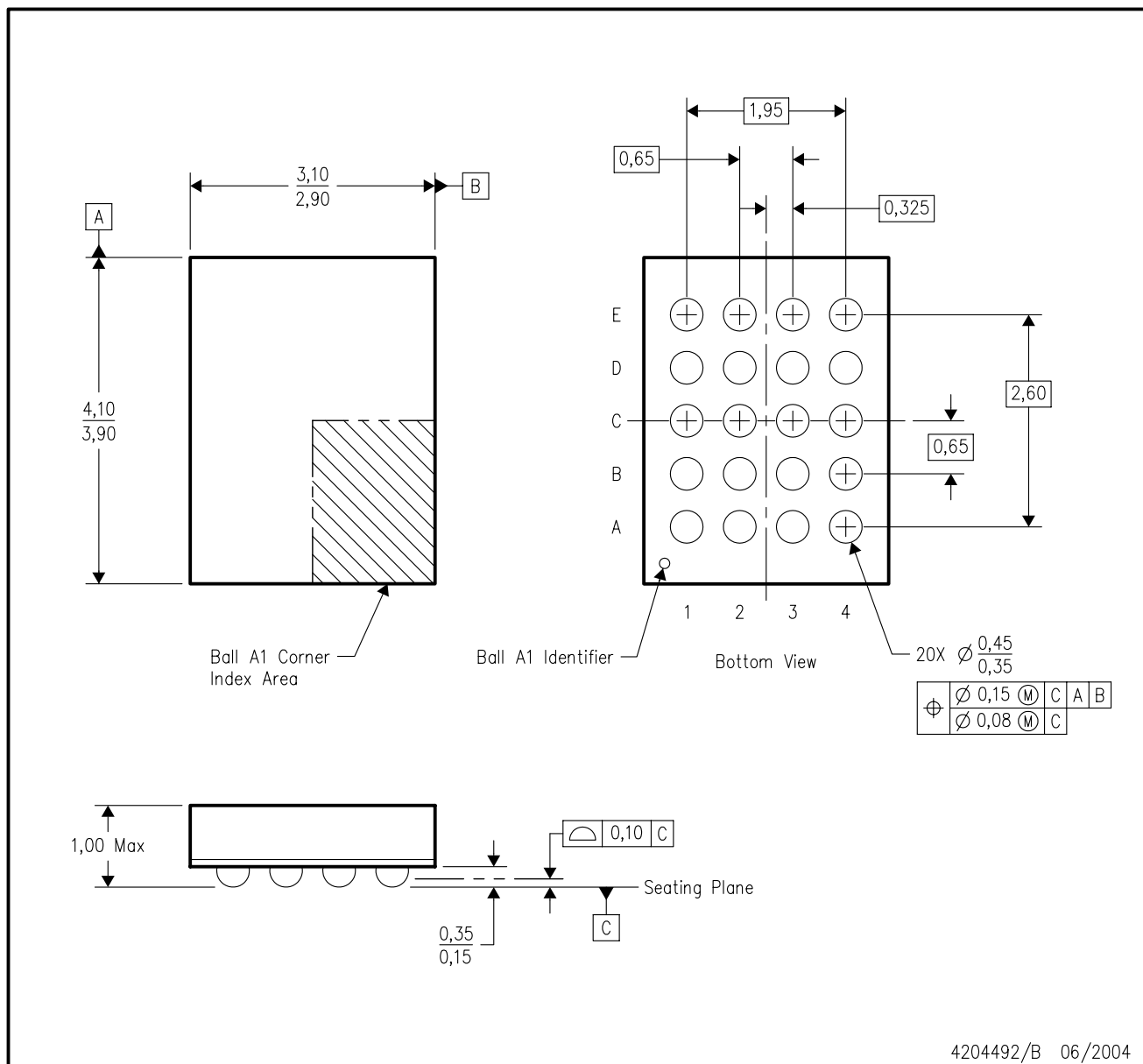
## PLASTIC BALL GRID ARRAY



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Falls within JEDEC MO-225 variation BC.
  - D. This package is tin-lead (SnPb). Refer to the 20 ZQN package (drawing 4204492) for lead-free.

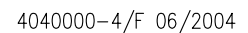
## ZQN (R-PBGA-N20)

## PLASTIC BALL GRID ARRAY



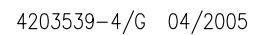
- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Falls within JEDEC MO-225 variation BC.
  - This package is lead-free. Refer to the 20 GQN package (drawing 4200704) for tin-lead (SnPb).

## PLASTIC SMALL-OUTLINE PACKAGE



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 AC.

## PLASTIC QUAD FLATPACK



NOTES:

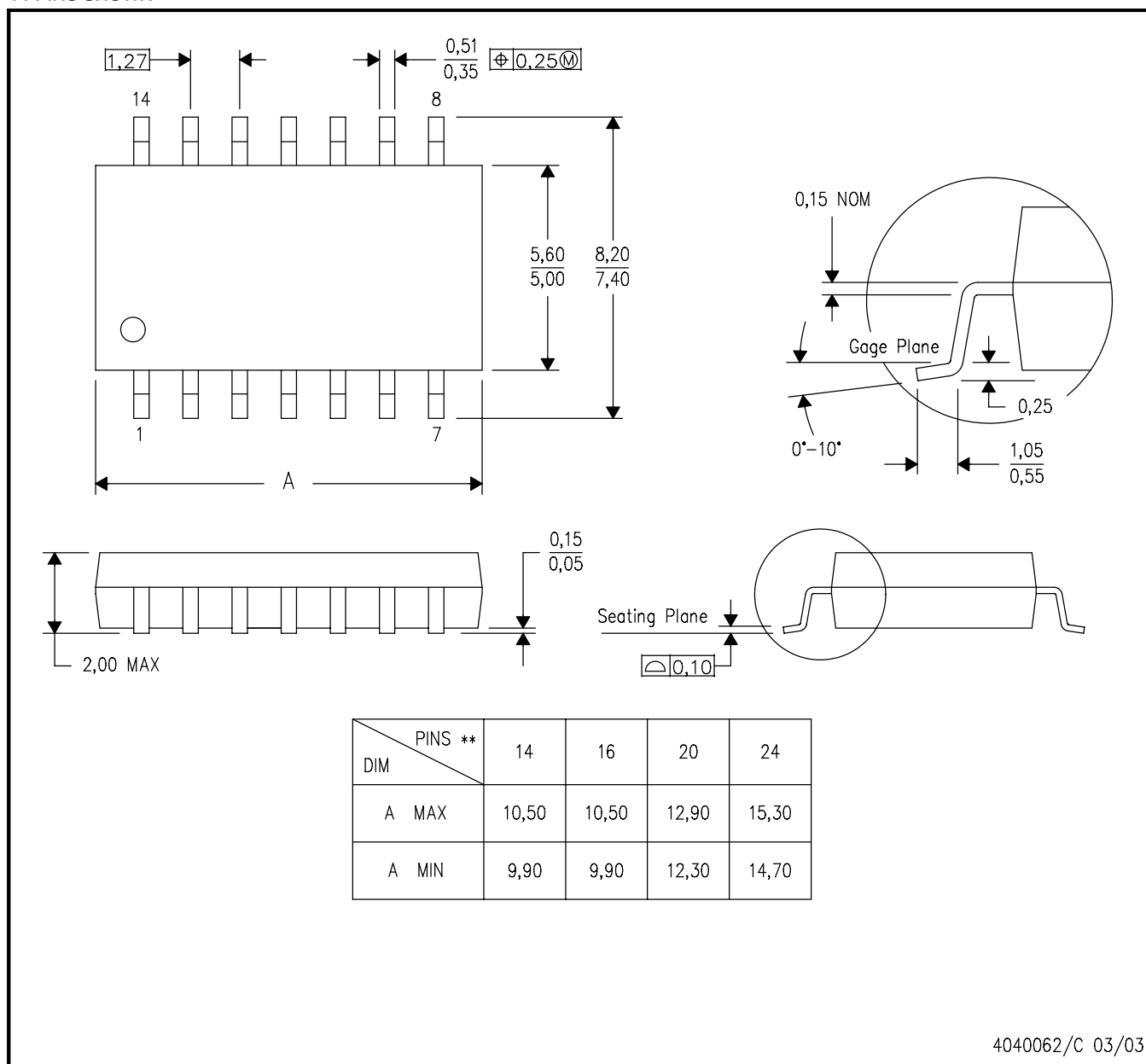
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
- B. This drawing is subject to change without notice.
- C. QFN (Quad Flatpack No-Lead) package configuration.
-  D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
-  E. Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated.  
The Pin 1 identifiers are either a molded, marked, or metal feature.
- F. Package complies to JEDEC MO-241 variation BC.

# MECHANICAL DATA

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

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

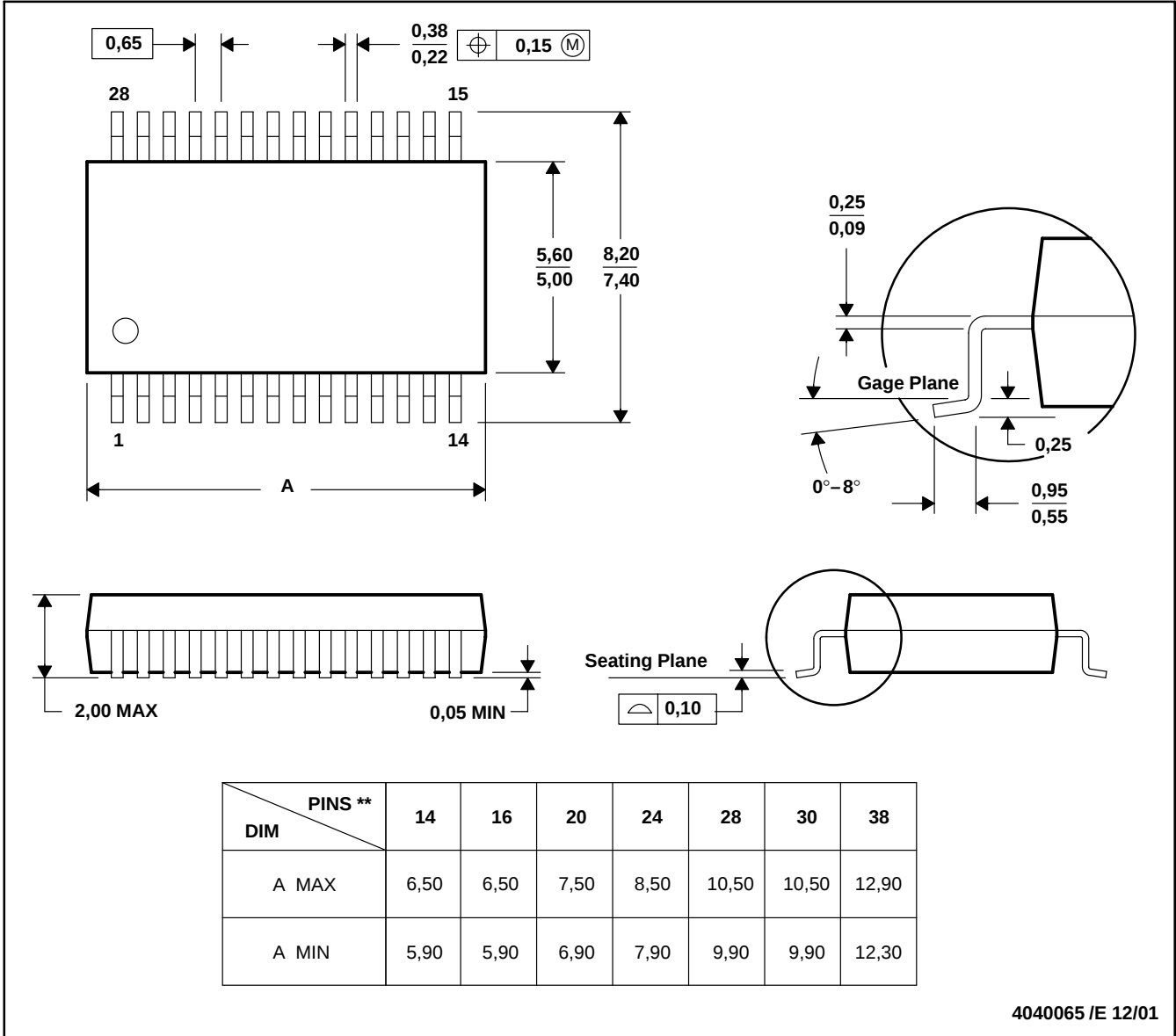


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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

PLASTIC SMALL-OUTLINE

28 PINS SHOWN

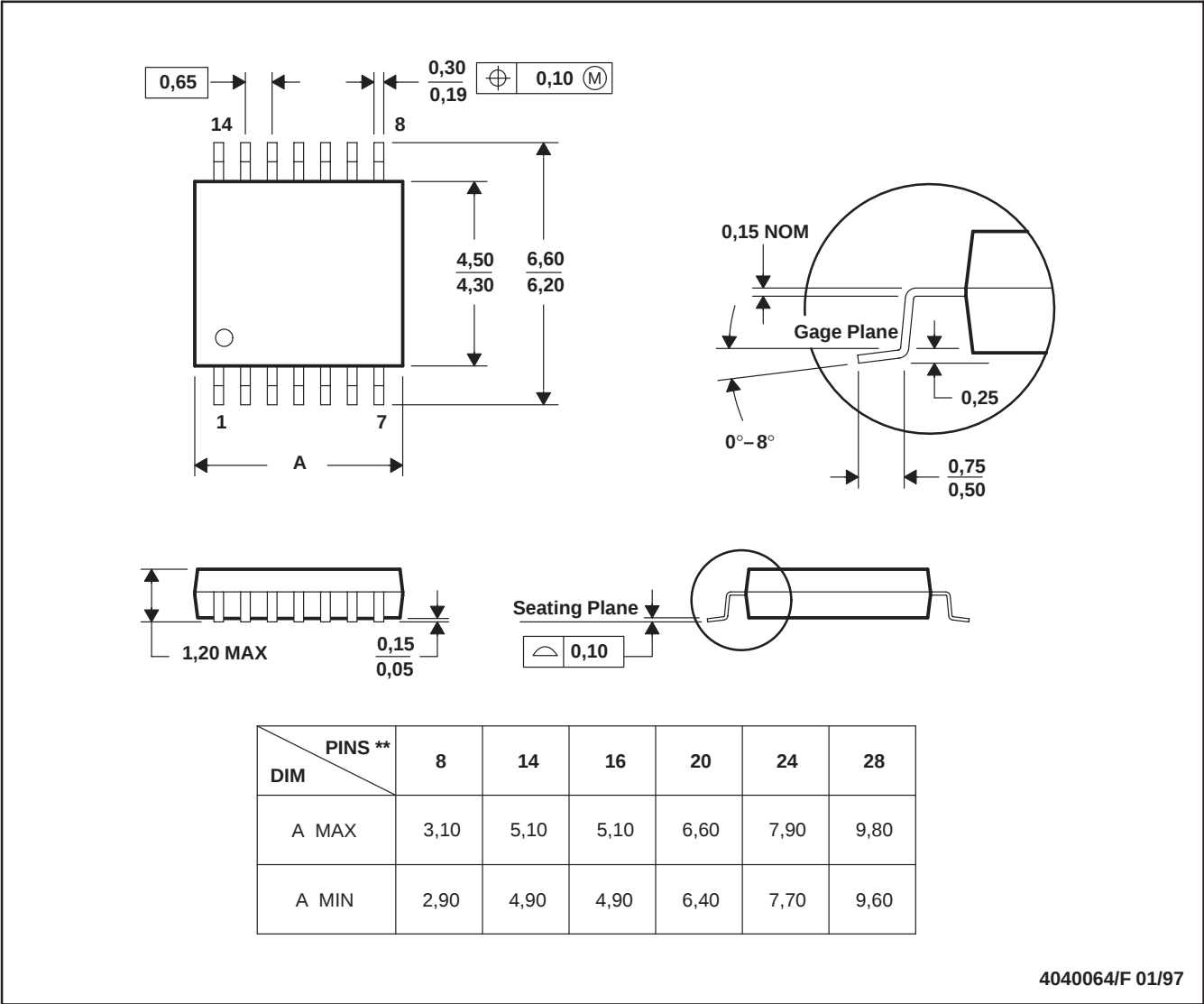


- NOTES: A. All linear dimensions are in millimeters.  
B. This drawing is subject to change without notice.  
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
D. Falls within JEDEC MO-150

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

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
B. This drawing is subject to change without notice.  
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
D. Falls within JEDEC MO-153

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

|                  |                                                                    |
|------------------|--------------------------------------------------------------------|
| Amplifiers       | <a href="http://amplifier.ti.com">amplifier.ti.com</a>             |
| Data Converters  | <a href="http://dataconverter.ti.com">dataconverter.ti.com</a>     |
| DSP              | <a href="http://dsp.ti.com">dsp.ti.com</a>                         |
| Interface        | <a href="http://interface.ti.com">interface.ti.com</a>             |
| Logic            | <a href="http://logic.ti.com">logic.ti.com</a>                     |
| Power Mgmt       | <a href="http://power.ti.com">power.ti.com</a>                     |
| Microcontrollers | <a href="http://microcontroller.ti.com">microcontroller.ti.com</a> |
| RFID             | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>               |
| Low Power        | <a href="http://www.ti.com/lpw">www.ti.com/lpw</a>                 |
| Wireless         |                                                                    |

### Applications

|                    |                                                                          |
|--------------------|--------------------------------------------------------------------------|
| Audio              | <a href="http://www.ti.com/audio">www.ti.com/audio</a>                   |
| Automotive         | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>         |
| Broadband          | <a href="http://www.ti.com/broadband">www.ti.com/broadband</a>           |
| Digital Control    | <a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a> |
| Military           | <a href="http://www.ti.com/military">www.ti.com/military</a>             |
| Optical Networking | <a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a> |
| Security           | <a href="http://www.ti.com/security">www.ti.com/security</a>             |
| Telephony          | <a href="http://www.ti.com/telephony">www.ti.com/telephony</a>           |
| Video & Imaging    | <a href="http://www.ti.com/video">www.ti.com/video</a>                   |
| Wireless           | <a href="http://www.ti.com/wireless">www.ti.com/wireless</a>             |