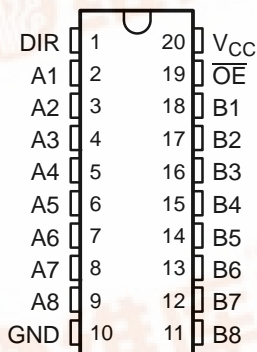


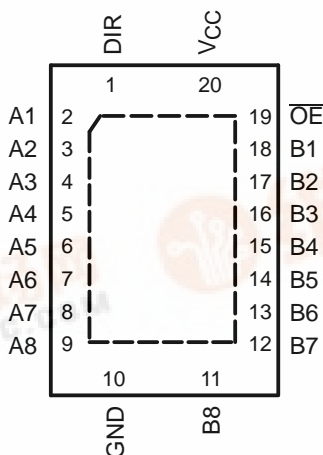
## FEATURES

- Operate From 1.65 V to 3.6 V
- Inputs Accept Voltages to 5.5 V
- Max  $t_{pd}$  of 6.3 ns at 3.3 V
- Typical  $V_{OLP}$  (Output Ground Bounce)  $<0.8$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot)  $>2$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- Support Mixed-Mode Signal Operation on All Ports (5-V Input/Output Voltage With 3.3-V  $V_{CC}$ )
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Bus Hold on Data Inputs Eliminates the Need for External Pullup/Pulldown Resistors
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)

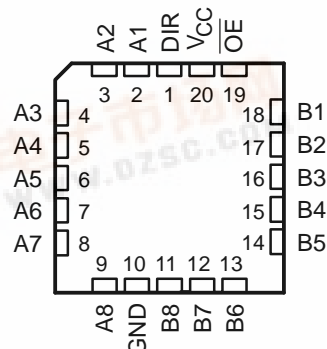
SN54LVCH245A . . . J OR W PACKAGE  
 SN74LVCH245A . . . DB, DGV, DW, NS,  
 OR PW PACKAGE  
 (TOP VIEW)



SN74LVCH245A . . . RGY PACKAGE  
 (TOP VIEW)



SN54LVCH245A . . . FK PACKAGE  
 (TOP VIEW)



## DESCRIPTION/ORDERING INFORMATION

The SN54LVCH245A octal bus transceiver is designed for 2.7-V to 3.6-V  $V_{CC}$  operation, and the SN74LVCH245A octal bus transceiver is designed for 1.65-V to 3.6-V  $V_{CC}$  operation.

Inputs can be driven from either 3.3-V or 5-V devices. This feature allows the use of these devices as translators in a mixed 3.3-V/5-V system environment.

These devices are designed for asynchronous communication between data buses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ( $\overline{OE}$ ) input can be used to disable the device so the buses are effectively isolated.

These devices are fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current backflow through the devices when they are powered down.

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. The bus-hold circuitry is part of the input circuit and is not disabled by  $\overline{OE}$  or DIR.



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 the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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 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.



# SN54LVCH245A, SN74LVCH245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

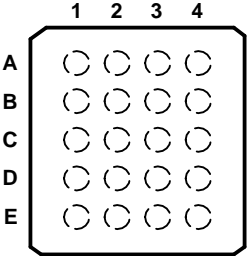
SGS0083C NL54LVCH245A DECEMBER 2005

## ORDERING INFORMATION

| T <sub>A</sub> | PACKAGE <sup>(1)</sup> |              | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|------------------------|--------------|-----------------------|------------------|
| –40°C to 85°C  | QFN – RGY              | Reel of 1000 | SN74LVCH245ARGYR      | LCH245A          |
|                | SOIC – DW              | Tube of 25   | SN74LVCH245ADW        | LVCH245A         |
|                |                        | Reel of 2000 | SN74LVCH245ADWR       |                  |
|                | SOP – NS               | Reel of 2000 | SN74LVCH245ANSR       | LVCH245A         |
|                | SSOP – DB              | Reel of 2000 | SN74LVCH245ADBR       | LCH245A          |
|                | TSSOP – PW             | Tube of 70   | SN74LVCH245APW        | LCH245A          |
|                |                        | Reel of 2000 | SN74LVCH245APWR       |                  |
|                |                        | Reel of 250  | SN74LVCH245APWT       |                  |
|                | TVSOP – DGV            | Reel of 2000 | SN74LVCH245ADGVR      | LCH245A          |
| –55°C to 125°C | VFBGA – GQN            | Reel of 1000 | SN74LVCH245AGQNR      | LCH245A          |
|                | VFBGA – ZQN (Pb-free)  |              | SN74LVCH245AZQNR      |                  |
|                | CDIP – J               | Tube of 20   | SNJ54LVCH245AJ        | SNJ54LVCH245AJ   |
|                | CFP – W                | Tube of 85   | SNJ54LVCH245AW        | SNJ54LVCH245AW   |
|                | LCCC – FK              | Tube of 55   | SNJ54LVCH245AFK       | SNJ54LVCH245AFK  |

(1) 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).

**GQN OR ZQN PACKAGE  
(TOP VIEW)**

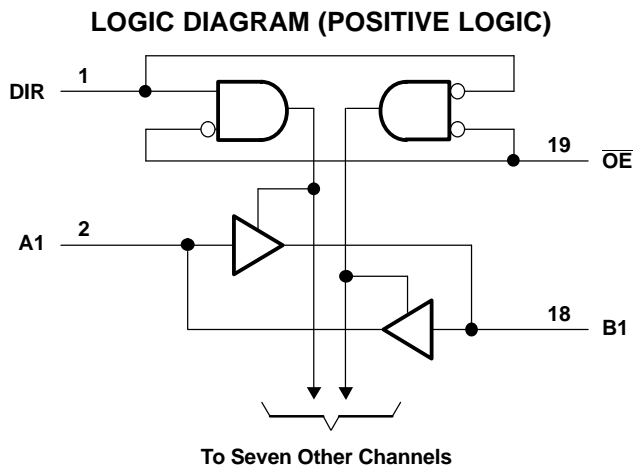


**TERMINAL ASSIGNMENTS**

|          | 1   | 2   | 3               | 4                      |
|----------|-----|-----|-----------------|------------------------|
| <b>A</b> | A1  | DIR | V <sub>CC</sub> | $\overline{\text{OE}}$ |
| <b>B</b> | A3  | B2  | A2              | B1                     |
| <b>C</b> | A5  | A4  | B4              | B3                     |
| <b>D</b> | A7  | B6  | A6              | B5                     |
| <b>E</b> | GND | A8  | B8              | B7                     |

**FUNCTION TABLE**

| INPUTS                 |     | OPERATION       |
|------------------------|-----|-----------------|
| $\overline{\text{OE}}$ | DIR |                 |
| L                      | L   | B data to A bus |
| L                      | H   | A data to B bus |
| H                      | X   | Isolation       |



### Absolute Maximum Ratings<sup>(1)</sup>

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

|                  |   |                                | MIN  | MAX                   | UNIT |
|------------------|---|--------------------------------|------|-----------------------|------|
| V <sub>CC</sub>  | Supply voltage range  |                                | −0.5 | 6.5                   | V    |
| V <sub>I</sub>   | Input voltage range <sup>(2)</sup>  |                                | −0.5 | 6.5                   | V    |
| V <sub>O</sub>   | Voltage range applied to any output in the high-impedance or power-off state <sup>(2)</sup> |                                | −0.5 | 6.5                   | V    |
| V <sub>O</sub>   | Voltage range applied to any output in the high or low state <sup>(2)(3)</sup>              |                                | −0.5 | V <sub>CC</sub> + 0.5 | V    |
| I <sub>IK</sub>  | Input clamp current   | V <sub>I</sub> < 0             |      | −50                   | mA   |
| I <sub>OK</sub>  | Output clamp current  | V <sub>O</sub> < 0             |      | −50                   | mA   |
| I <sub>O</sub>   | Continuous output current   |                                |      | ±50                   | mA   |
|                  | Continuous current through V <sub>CC</sub> or GND   |                                |      | ±100                  | mA   |
| θ <sub>JA</sub>  | Package thermal impedance   | DB package <sup>(4)</sup>      |      | 70                    | °C/W |
|                  |   | DGV package <sup>(4)</sup>     |      | 92                    |      |
|                  |   | DW package <sup>(4)</sup>      |      | 58                    |      |
|                  |   | GQN/ZQN package <sup>(4)</sup> |      | 78                    |      |
|                  |   | NS package <sup>(4)</sup>      |      | 60                    |      |
|                  |   | PW package <sup>(4)</sup>      |      | 83                    |      |
|                  |   | RGY package <sup>(5)</sup>     |      | 37                    |      |
| T <sub>stg</sub> | Storage temperature range   |                                | −65  | 150                   | °C   |

- (1) 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.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of  $V_{CC}$  is provided in the recommended operating conditions table.
- (4) The package thermal impedance is calculated in accordance with JESD 51-7.
- (5) The package thermal impedance is calculated in accordance with JESD 51-5.

# SN54LVCH245A, SN74LVCH245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCS008C NUS411995-11 V245A DECEMBER 2005  
查询“SN54LVCH245A”供应商

## Recommended Operating Conditions<sup>(1)</sup>

|                 |                                    |                                    | SN54LVCH245A |                 | SN74LVCH245A           |                 | UNIT |
|-----------------|------------------------------------|------------------------------------|--------------|-----------------|------------------------|-----------------|------|
|                 |                                    |                                    | MIN          | MAX             | MIN                    | MAX             |      |
| V <sub>CC</sub> | Supply voltage                     | Operating                          | 2            | 3.6             | 1.65                   | 3.6             | V    |
|                 |                                    | Data retention only                | 1.5          |                 | 1.5                    |                 |      |
| V <sub>IH</sub> | High-level input voltage           | V <sub>CC</sub> = 1.65 V to 1.95 V |              |                 | 0.65 × V <sub>CC</sub> |                 | V    |
|                 |                                    | V <sub>CC</sub> = 2.3 V to 2.7 V   |              |                 | 1.7                    |                 |      |
|                 |                                    | V <sub>CC</sub> = 2.7 V to 3.6 V   | 2            |                 | 2                      |                 |      |
| V <sub>IL</sub> | Low-level input voltage            | V <sub>CC</sub> = 1.65 V to 1.95 V |              |                 | 0.35 × V <sub>CC</sub> |                 | V    |
|                 |                                    | V <sub>CC</sub> = 2.3 V to 2.7 V   |              |                 | 0.7                    |                 |      |
|                 |                                    | V <sub>CC</sub> = 2.7 V to 3.6 V   |              | 0.8             | 0.8                    |                 |      |
| V <sub>I</sub>  | Input voltage                      |                                    | 0            | 5.5             | 0                      | 5.5             | V    |
| V <sub>O</sub>  | Output voltage                     | High or low state                  | 0            | V <sub>CC</sub> | 0                      | V <sub>CC</sub> | V    |
|                 |                                    | 3-state                            | 0            | 5.5             | 0                      | 5.5             |      |
| I <sub>OH</sub> | High-level output current          | V <sub>CC</sub> = 1.65 V           |              |                 |                        | −4              | mA   |
|                 |                                    | V <sub>CC</sub> = 2.3 V            |              |                 |                        | −8              |      |
|                 |                                    | V <sub>CC</sub> = 2.7 V            |              | −12             |                        | −12             |      |
|                 |                                    | V <sub>CC</sub> = 3 V              |              | −24             |                        | −24             |      |
| I <sub>OL</sub> | Low-level output current           | V <sub>CC</sub> = 1.65 V           |              |                 |                        | 4               | mA   |
|                 |                                    | V <sub>CC</sub> = 2.3 V            |              |                 |                        | 8               |      |
|                 |                                    | V <sub>CC</sub> = 2.7 V            |              | 12              |                        | 12              |      |
|                 |                                    | V <sub>CC</sub> = 3 V              |              | 24              |                        | 24              |      |
| Δt/Δv           | Input transition rise or fall rate |                                    |              | 10              |                        | 10              | ns/V |
| T <sub>A</sub>  | Operating free-air temperature     |                                    | −55          | 125             | −40                    | 85              | °C   |

(1) 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.

## Electrical Characteristics

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

| PARAMETER                      |                | TEST CONDITIONS   | V <sub>CC</sub> | SN54LVCH245A |                          |      | SN74LVCH245A             |                    |      | UNIT |
|--------------------------------|----------------|---|-----------------|--------------|--------------------------|------|--------------------------|--------------------|------|------|
|                                |                |   |                 | MIN          | TYP <sup>(1)</sup>       | MAX  | MIN                      | TYP <sup>(1)</sup> | MAX  |      |
| V <sub>OH</sub>                |                | I <sub>OH</sub> = –100 µA   | 1.65 V to 3.6 V |              |                          |      | V <sub>CC</sub><br>– 0.2 |                    |      | V    |
|                                |                |   | 2.7 V to 3.6 V  |              | V <sub>CC</sub><br>– 0.2 |      |                          |                    |      |      |
|                                |                | I <sub>OH</sub> = –4 mA   | 1.65 V          |              |                          |      | 1.2                      |                    |      |      |
|                                |                | I <sub>OH</sub> = –8 mA   | 2.3 V           |              |                          |      | 1.7                      |                    |      |      |
|                                |                | I <sub>OH</sub> = –12 mA  | 2.7 V           |              | 2.2                      |      | 2.2                      |                    |      |      |
|                                |                |   | 3 V             |              | 2.4                      |      | 2.4                      |                    |      |      |
|                                |                | I <sub>OH</sub> = –24 mA  | 3 V             |              | 2.2                      |      | 2.2                      |                    |      |      |
| V <sub>OL</sub>                |                | I <sub>OL</sub> = 100 µA  | 1.65 V to 3.6 V |              |                          |      |                          |                    | 0.2  | V    |
|                                |                |   | 2.7 V to 3.6 V  |              |                          | 0.2  |                          |                    |      |      |
|                                |                | I <sub>OL</sub> = 4 mA  | 1.65 V          |              |                          |      |                          |                    | 0.45 |      |
|                                |                | I <sub>OL</sub> = 8 mA  | 2.3 V           |              |                          |      |                          |                    | 0.7  |      |
|                                |                | I <sub>OL</sub> = 12 mA   | 2.7 V           |              |                          | 0.4  |                          |                    | 0.4  |      |
|                                |                | I <sub>OL</sub> = 24 mA   | 3 V             |              |                          | 0.55 |                          |                    | 0.55 |      |
| I <sub>I</sub>                 | Control inputs | V <sub>I</sub> = 0 to 5.5 V   | 3.6 V           |              |                          | ±5   |                          |                    | ±5   | µA   |
| I <sub>off</sub>               |                | V <sub>I</sub> or V <sub>O</sub> = 5.5 V  | 0               |              |                          |      |                          |                    | ±10  | µA   |
| I <sub>I(hold)</sub>           |                | V <sub>I</sub> = 0.58 V   | 1.65 V          |              |                          |      | 25                       |                    |      | µA   |
|                                |                | V <sub>I</sub> = 1.07 V   |                 |              |                          |      | –25                      |                    |      |      |
|                                |                | V <sub>I</sub> = 0.7 V  | 2.3 V           |              |                          |      | 45                       |                    |      |      |
|                                |                | V <sub>I</sub> = 1.7 V  |                 |              |                          |      | –45                      |                    |      |      |
|                                |                | V <sub>I</sub> = 0.8 V  | 3 V             |              | 75                       |      | 75                       |                    |      |      |
|                                |                | V <sub>I</sub> = 2 V  |                 |              | –75                      |      | –75                      |                    |      |      |
|                                |                | V <sub>I</sub> = 0 to 3.6 V <sup>(2)</sup>                                      | 3.6 V           |              |                          | ±500 |                          |                    | ±500 |      |
| I <sub>OZ</sub> <sup>(3)</sup> |                | V <sub>O</sub> = 0 V or (V <sub>CC</sub> to 5.5 V)                              | 2.3 V to 3.6 V  |              |                          | ±15  |                          |                    | ±5   | µA   |
| I <sub>CC</sub>                |                | V <sub>I</sub> = V <sub>CC</sub> or GND   | 3.6 V           |              |                          | 10   |                          |                    | 10   | µA   |
|                                |                | 3.6 V ≤ V <sub>I</sub> ≤ 5.5 V <sup>(4)</sup>                                   |                 |              |                          | 10   |                          |                    | 10   |      |
| ΔI <sub>CC</sub>               |                | One input at V <sub>CC</sub> – 0.6 V,<br>Other inputs at V <sub>CC</sub> or GND | 2.7 V to 3.6 V  |              |                          | 500  |                          |                    | 500  | µA   |
| C <sub>i</sub>                 | Control inputs | V <sub>I</sub> = V <sub>CC</sub> or GND   | 3.3 V           |              | 4                        | 12   |                          | 4                  |      | pF   |
| C <sub>io</sub>                | A or B port    | V <sub>O</sub> = V <sub>CC</sub> or GND   | 3.3 V           |              | 5.5                      | 12   |                          | 5.5                |      | pF   |

(1) All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.

(2) This is the bus-hold maximum dynamic current required to switch the input from one state to another.

(3) For the total leakage current in an I/O port, please consult the I<sub>I(hold)</sub> specification for the input voltage condition 0 V < V<sub>I</sub> < V<sub>CC</sub>, and the I<sub>OZ</sub> specification for the input voltage conditions V<sub>I</sub> = 0 V or V<sub>I</sub> = V<sub>CC</sub> to 5.5 V. The bus-hold current, at input voltage greater than V<sub>CC</sub>, is negligible.

(4) This applies in the disabled state only.

# SN54LVCH245A, SN74LVCH245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SGS0083C NL54LVCH245A DECEMBER 2005  
[查看“SN54LVCH245A”SPN 供应商](#)

## Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 1](#))

| PARAMETER        | FROM<br>(INPUT) | TO<br>(OUTPUT) | SN54LVCH245A            |     |                                    |     | UNIT |
|------------------|-----------------|----------------|-------------------------|-----|------------------------------------|-----|------|
|                  |                 |                | V <sub>CC</sub> = 2.7 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     |      |
|                  |                 |                | MIN                     | MAX | MIN                                | MAX |      |
| t <sub>pd</sub>  | A or B          | B or A         | 8                       |     | 1                                  | 7   | ns   |
| t <sub>en</sub>  | $\overline{OE}$ | A or B         | 9.5                     |     | 1                                  | 8.5 | ns   |
| t <sub>dis</sub> | $\overline{OE}$ | A or B         | 8.5                     |     | 1                                  | 7.5 | ns   |

## Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 1](#))

| PARAMETER          | FROM<br>(INPUT) | TO<br>(OUTPUT) | SN74LVCH245A                        |     |                                    |     |                         |     |                                    |     | UNIT |
|--------------------|-----------------|----------------|-------------------------------------|-----|------------------------------------|-----|-------------------------|-----|------------------------------------|-----|------|
|                    |                 |                | V <sub>CC</sub> = 1.8 V<br>± 0.15 V |     | V <sub>CC</sub> = 2.5 V<br>± 0.2 V |     | V <sub>CC</sub> = 2.7 V |     | V <sub>CC</sub> = 3.3 V<br>± 0.3 V |     |      |
|                    |                 |                | MIN                                 | MAX | MIN                                | MAX | MIN                     | MAX | MIN                                | MAX |      |
| t <sub>pd</sub>    | A or B          | B or A         | (1)                                 | (1) | (1)                                | (1) | 7.3                     |     | 1.5                                | 6.3 | ns   |
| t <sub>en</sub>    | $\overline{OE}$ | A or B         | (1)                                 | (1) | (1)                                | (1) | 9.5                     |     | 1.5                                | 8.5 | ns   |
| t <sub>dis</sub>   | $\overline{OE}$ | A or B         | (1)                                 | (1) | (1)                                | (1) | 8.5                     |     | 1.7                                | 7.5 | ns   |
| t <sub>sk(o)</sub> |                 |                |                                     |     |                                    |     |                         |     | 1                                  |     | ns   |

(1) This information was not available at the time of publication.

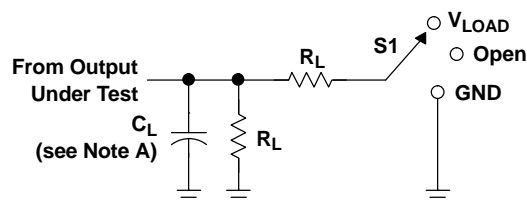
## Operating Characteristics

T<sub>A</sub> = 25°C

| PARAMETER       |  |                  | TEST<br>CONDITIONS | V <sub>CC</sub> = 1.8 V | V <sub>CC</sub> = 2.5 V | V <sub>CC</sub> = 3.3 V | UNIT |
|-----------------|--|------------------|--------------------|-------------------------|-------------------------|-------------------------|------|
|                 |  |                  |                    | TYP                     | TYP                     | TYP                     |      |
| C <sub>pd</sub> | Power dissipation capacitance<br>per transceiver | Outputs enabled  | f = 10 MHz         | (1)                     | (1)                     | 47                      | pF   |
|                 |  | Outputs disabled |                    | (1)                     | (1)                     | 2                       |      |

(1) This information was not available at the time of publication.

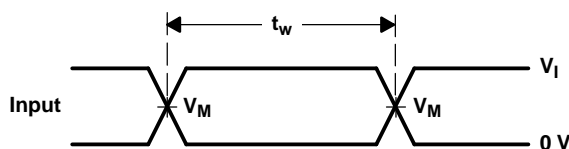
## PARAMETER MEASUREMENT INFORMATION



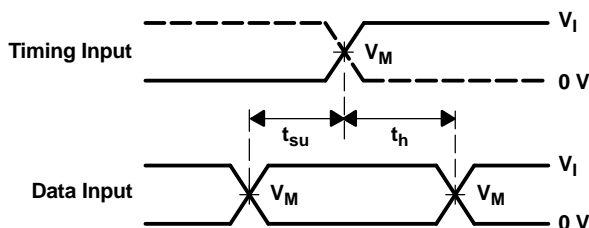
LOAD CIRCUIT

| TEST              | S1         |
|-------------------|------------|
| $t_{PLH}/t_{PHL}$ | Open       |
| $t_{PLZ}/t_{PZL}$ | $V_{LOAD}$ |
| $t_{PHZ}/t_{PZH}$ | GND        |

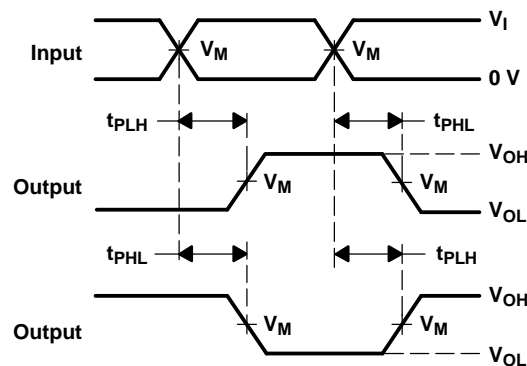
| $V_{CC}$                         | INPUTS   |                      | $V_M$      | $V_{LOAD}$        | $C_L$ | $R_L$        | $V_{\Delta}$ |
|----------------------------------|----------|----------------------|------------|-------------------|-------|--------------|--------------|
|                                  | $V_I$    | $t_r/t_f$            |            |                   |       |              |              |
| $1.8\text{ V} \pm 0.15\text{ V}$ | $V_{CC}$ | $\leq 2\text{ ns}$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30 pF | 1 k $\Omega$ | 0.15 V       |
| $2.5\text{ V} \pm 0.2\text{ V}$  | $V_{CC}$ | $\leq 2\text{ ns}$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30 pF | 500 $\Omega$ | 0.15 V       |
| 2.7 V                            | 2.7 V    | $\leq 2.5\text{ ns}$ | 1.5 V      | 6 V               | 50 pF | 500 $\Omega$ | 0.3 V        |
| $3.3\text{ V} \pm 0.3\text{ V}$  | 2.7 V    | $\leq 2.5\text{ ns}$ | 1.5 V      | 6 V               | 50 pF | 500 $\Omega$ | 0.3 V        |



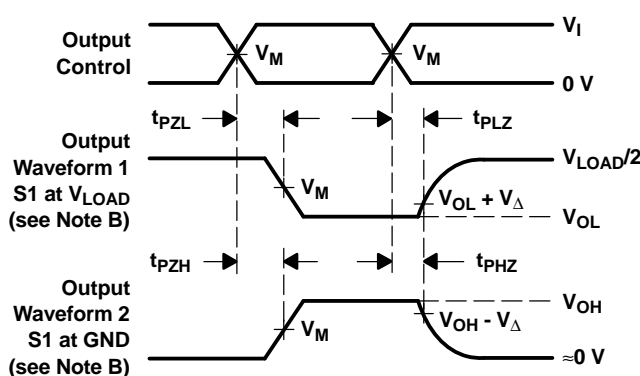
VOLTAGE WAVEFORMS  
PULSE DURATION



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:
- $C_L$  includes probe and jig capacitance.
  - 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.
  - All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10\text{ MHz}$ ,  $Z_O = 50\ \Omega$ .
  - The outputs are measured one at a time with, one transition per measurement.
  - $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
  - $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .
  - 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> |
|--------------------|-----------------------|----------------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-9754301Q2A    | ACTIVE                | LCCC                 | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 5962-9754301QRA    | ACTIVE                | CDIP                 | J               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| 5962-9754301QSA    | ACTIVE                | CFP                  | W               | 20   | 1           | TBD                     | Call TI          | N / A for Pkg Type           |
| 5962-9754301V2A    | ACTIVE                | LCCC                 | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 5962-9754301VRA    | ACTIVE                | CDIP                 | J               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| 5962-9754301VSA    | ACTIVE                | CFP                  | W               | 20   | 1           | TBD                     | Call TI          | N / A for Pkg Type           |
| SN74LVCH245ADBLE   | OBSOLETE              | SSOP                 | DB              | 20   |             | TBD                     | Call TI          | Call TI                      |
| SN74LVCH245ADBR    | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADBRE4  | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADBRG4  | ACTIVE                | SSOP                 | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADGVR   | ACTIVE                | TVSOP                | DGV             | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADGVRE4 | ACTIVE                | TVSOP                | DGV             | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADGVRG4 | ACTIVE                | TVSOP                | DGV             | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADW     | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADWE4   | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADWG4   | ACTIVE                | SOIC                 | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADWR    | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADWRE4  | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ADWRG4  | ACTIVE                | SOIC                 | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245AGQNR   | NRND                  | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000        | TBD                     | SNPB             | Level-1-240C-UNLIM           |
| SN74LVCH245ANSR    | ACTIVE                | SO                   | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ANSRE4  | ACTIVE                | SO                   | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ANSRG4  | ACTIVE                | SO                   | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APW     | ACTIVE                | TSSOP                | PW              | 20   | 1           | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWE4   | ACTIVE                | TSSOP                | PW              | 20   | 1           | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWG4   | ACTIVE                | TSSOP                | PW              | 20   | 1           | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWLE   | OBSOLETE              | TSSOP                | PW              | 20   |             | TBD                     | Call TI          | Call TI                      |



| 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> |
|--------------------|-----------------------|----------------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN74LVCH245APWR    | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWRE4  | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWRG4  | ACTIVE                | TSSOP                | PW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWT    | ACTIVE                | TSSOP                | PW              | 20   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWTE4  | ACTIVE                | TSSOP                | PW              | 20   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245APWTG4  | ACTIVE                | TSSOP                | PW              | 20   | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LVCH245ARGYR   | ACTIVE                | VQFN                 | RGY             | 20   | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1 YEAR          |
| SN74LVCH245ARGYRG4 | ACTIVE                | VQFN                 | RGY             | 20   | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1 YEAR          |
| SN74LVCH245AZQNR   | ACTIVE                | BGA MICROSTAR JUNIOR | ZQN             | 20   | 1000        | Green (RoHS & no Sb/Br) | SNAGCU           | Level-1-260C-UNLIM           |
| SN74LVCH245AZXYR   | ACTIVE                | BGA MICROSTAR JUNIOR | ZXY             | 20   | 2500        | Green (RoHS & no Sb/Br) | SNAGCU           | Level-1-260C-UNLIM           |
| SNJ54LVCH245AFK    | ACTIVE                | LCCC                 | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ54LVCH245AJ     | ACTIVE                | CDIP                 | J               | 20   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SNJ54LVCH245AW     | ACTIVE                | CFP                  | W               | 20   | 1           | TBD                     | Call TI          | 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.

**OBSOLETE:** 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.

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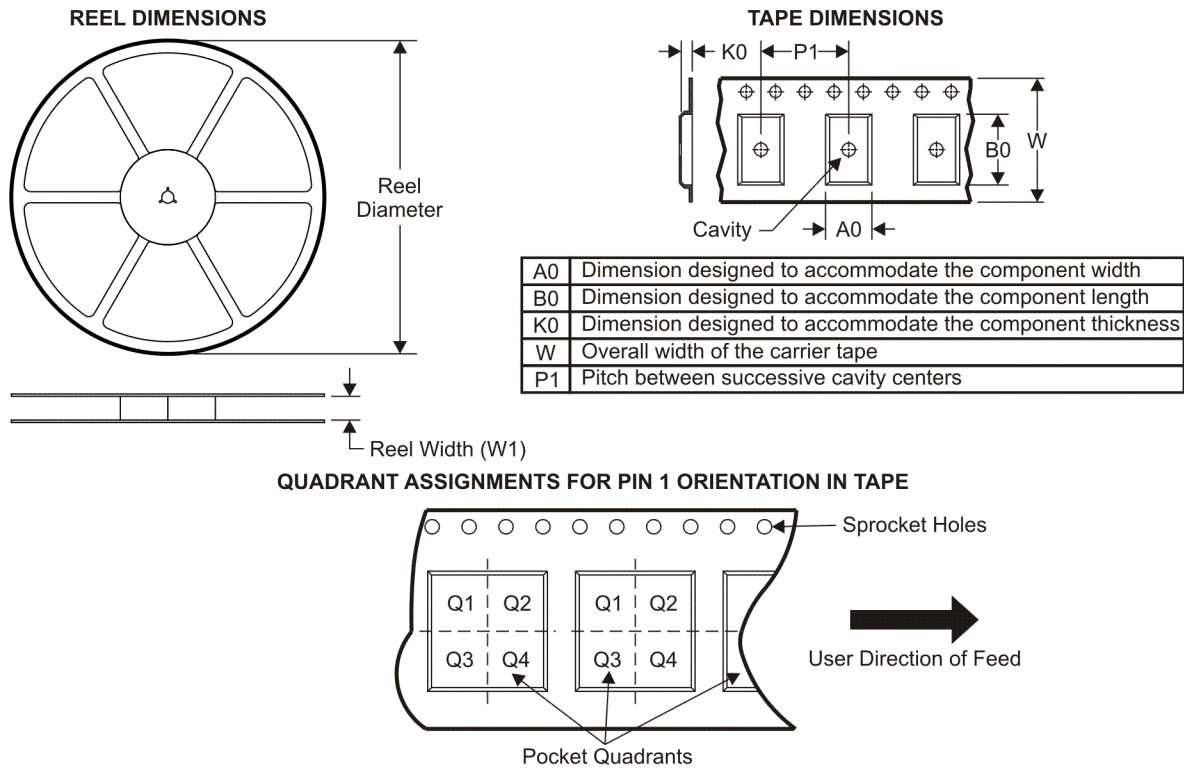
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**OTHER QUALIFIED VERSIONS OF SN54LVCH245A, SN54LVCH245A-SP, SN74LVCH245A :**

- Automotive: [SN74LVCH245A-Q1](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

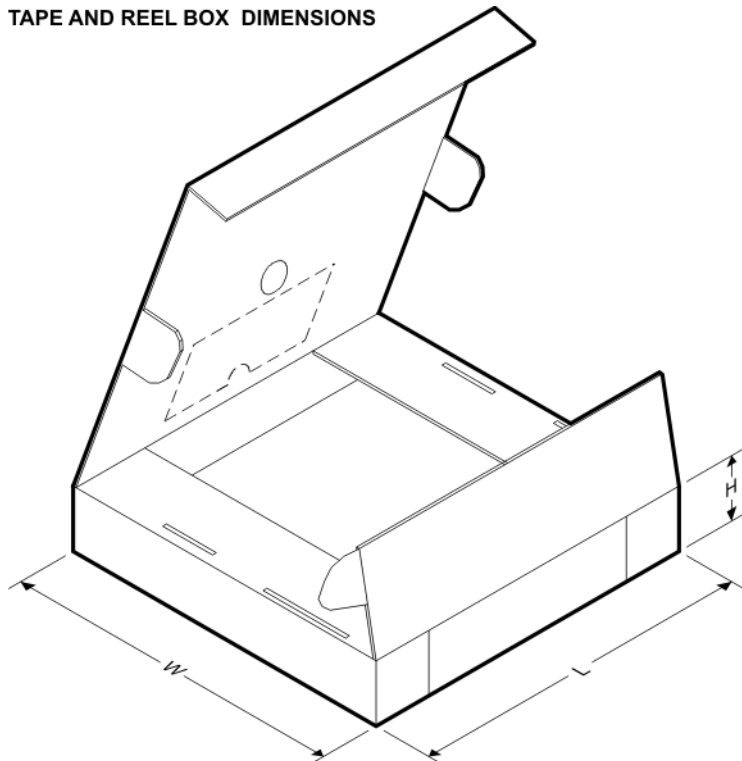
**TAPE AND REEL INFORMATION**


\*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 |
|------------------|----------------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVCH245ADBR  | SSOP                 | DB              | 20   | 2000 | 330.0              | 16.4               | 8.2     | 7.5     | 2.5     | 12.0    | 16.0   | Q1            |
| SN74LVCH245ADGVR | TVSOP                | DGV             | 20   | 2000 | 330.0              | 12.4               | 6.9     | 5.6     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LVCH245ADWR  | SOIC                 | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.0    | 2.7     | 12.0    | 24.0   | Q1            |
| SN74LVCH245AGQNR | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000 | 330.0              | 12.4               | 3.3     | 4.3     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LVCH245AGQNR | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000 | 330.0              | 12.4               | 3.3     | 4.3     | 1.5     | 8.0     | 12.0   | Q1            |
| SN74LVCH245ANSR  | SO                   | NS              | 20   | 2000 | 330.0              | 24.4               | 8.2     | 13.0    | 2.5     | 12.0    | 24.0   | Q1            |
| SN74LVCH245APWR  | TSSOP                | PW              | 20   | 2000 | 330.0              | 16.4               | 6.95    | 7.1     | 1.6     | 8.0     | 16.0   | Q1            |
| SN74LVCH245APWT  | TSSOP                | PW              | 20   | 250  | 330.0              | 16.4               | 6.95    | 7.1     | 1.6     | 8.0     | 16.0   | Q1            |
| SN74LVCH245ARGYR | VQFN                 | RGY             | 20   | 3000 | 330.0              | 12.4               | 3.8     | 4.8     | 1.6     | 8.0     | 12.0   | Q1            |
| SN74LVCH245AZQNR | BGA MICROSTAR JUNIOR | ZQN             | 20   | 1000 | 330.0              | 12.4               | 3.3     | 4.3     | 1.5     | 8.0     | 12.0   | Q1            |
| SN74LVCH245AZQNR | BGA MICROSTAR        | ZQN             | 20   | 1000 | 330.0              | 12.4               | 3.3     | 4.3     | 1.6     | 8.0     | 12.0   | Q1            |

| 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 |
|------------------|----------------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
|                  | R JUNIOR             |                 |      |      |                    |                    |         |         |         |         |        |               |
| SN74LVCH245AZXYR | BGA MICROSTAR JUNIOR | ZXY             | 20   | 2500 | 330.0              | 12.4               | 2.8     | 3.3     | 1.0     | 4.0     | 12.0   | Q2            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device           | Package Type         | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|------------------|----------------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVCH245ADBR  | SSOP                 | DB              | 20   | 2000 | 346.0       | 346.0      | 33.0        |
| SN74LVCH245ADGVR | TVSOP                | DGV             | 20   | 2000 | 346.0       | 346.0      | 29.0        |
| SN74LVCH245ADWR  | SOIC                 | DW              | 20   | 2000 | 346.0       | 346.0      | 41.0        |
| SN74LVCH245AGQNR | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000 | 340.5       | 338.1      | 20.6        |
| SN74LVCH245AGQNR | BGA MICROSTAR JUNIOR | GQN             | 20   | 1000 | 346.0       | 346.0      | 29.0        |
| SN74LVCH245ANSR  | SO                   | NS              | 20   | 2000 | 346.0       | 346.0      | 41.0        |
| SN74LVCH245APWR  | TSSOP                | PW              | 20   | 2000 | 346.0       | 346.0      | 33.0        |
| SN74LVCH245APWT  | TSSOP                | PW              | 20   | 250  | 346.0       | 346.0      | 33.0        |
| SN74LVCH245ARGYR | VQFN                 | RGY             | 20   | 3000 | 346.0       | 346.0      | 29.0        |
| SN74LVCH245AZQNR | BGA MICROSTAR JUNIOR | ZQN             | 20   | 1000 | 346.0       | 346.0      | 29.0        |

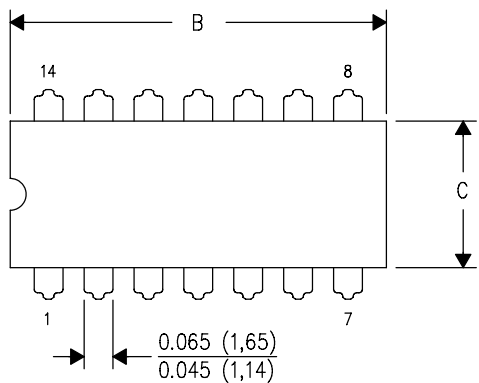
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| Device           | Package Type            | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|------------------|-------------------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVCH245AZQNR | BGA MICROSTAR<br>JUNIOR | ZQN             | 20   | 1000 | 340.5       | 338.1      | 20.6        |
| SN74LVCH245AZXYR | BGA MICROSTAR<br>JUNIOR | ZXY             | 20   | 2500 | 340.5       | 338.1      | 20.6        |

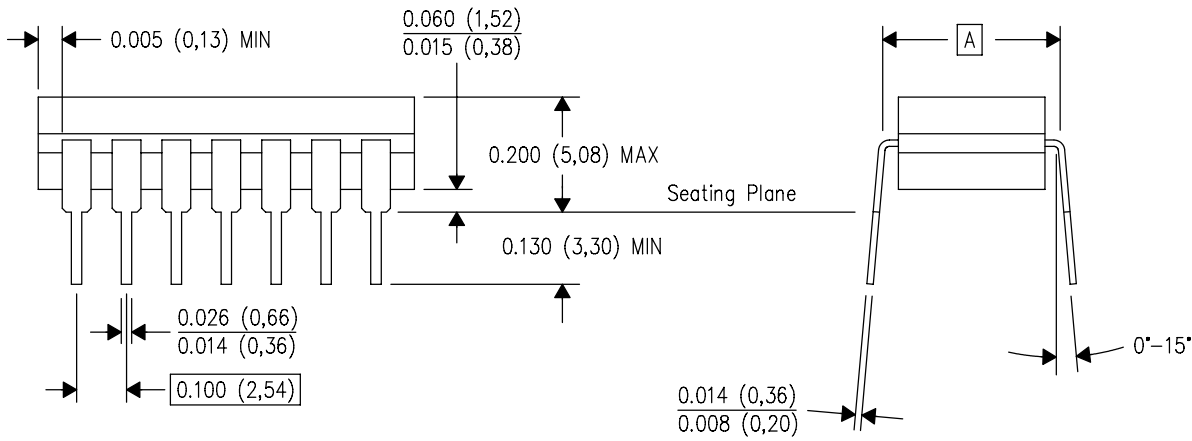
J (R-GDIP-T\*\*)

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)        |

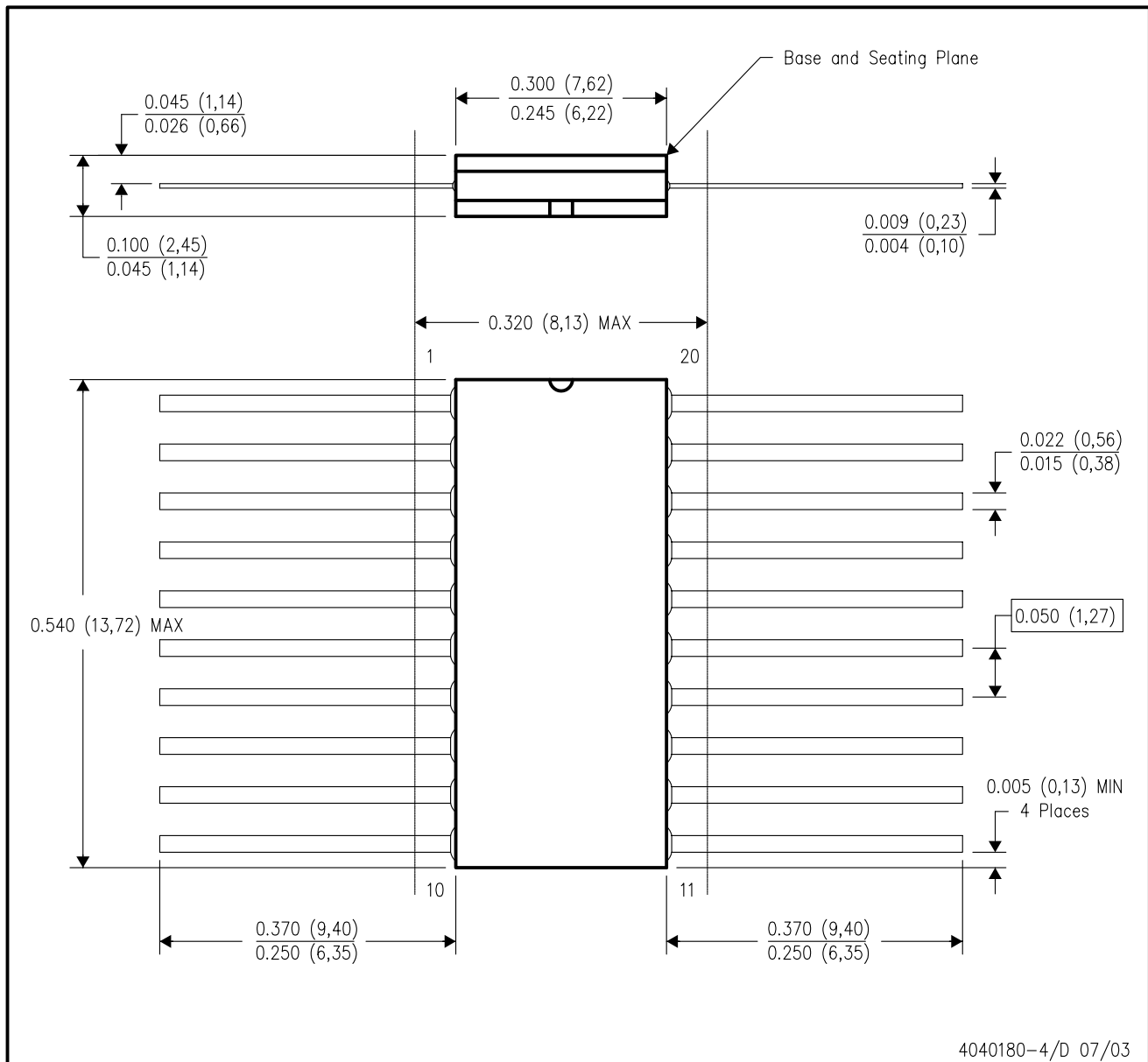


4040083/F 03/03

- 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

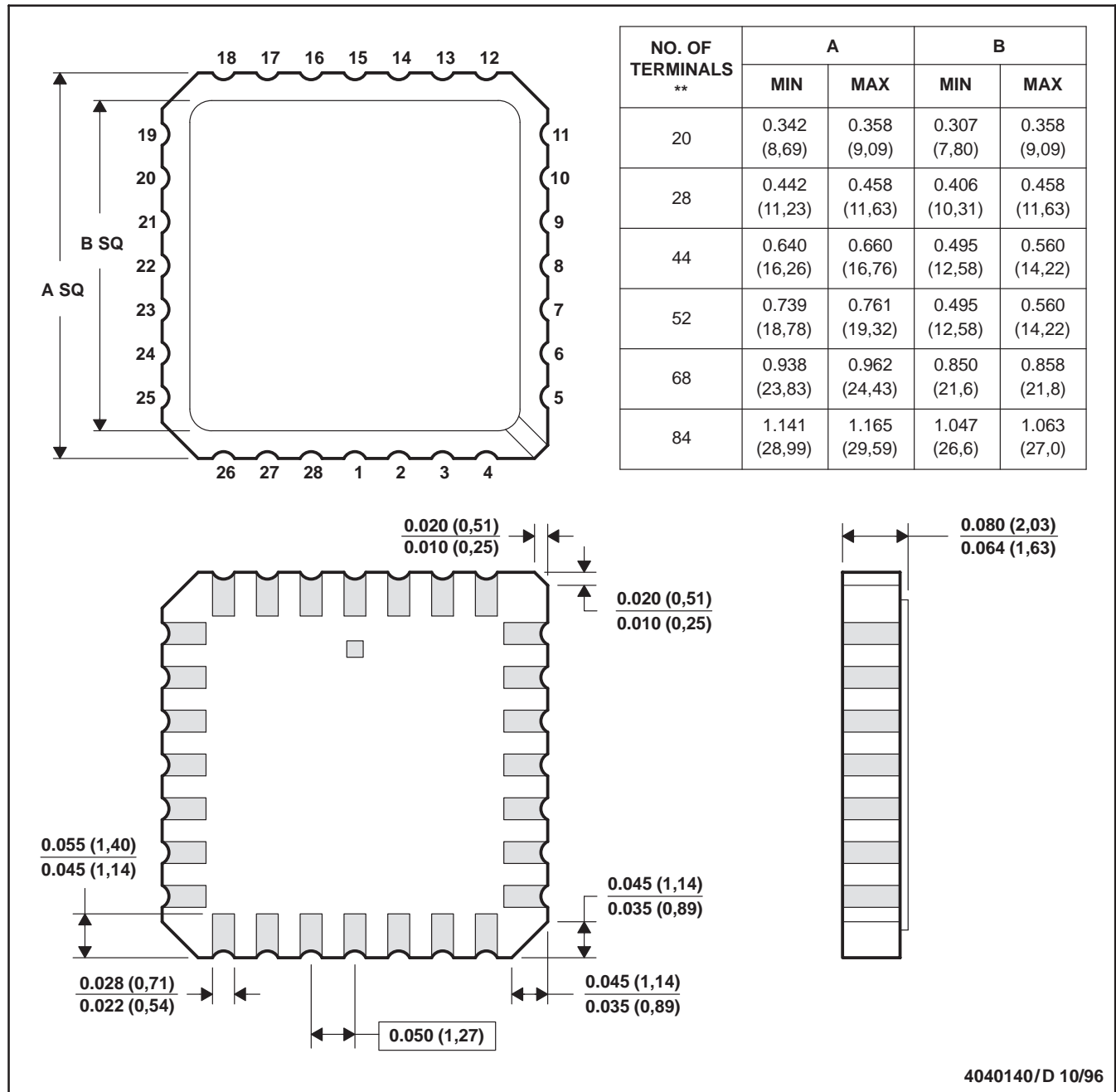


- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within Mil-Std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

**FK (S-CQCC-N<sup>\*\*</sup>)**

## LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN

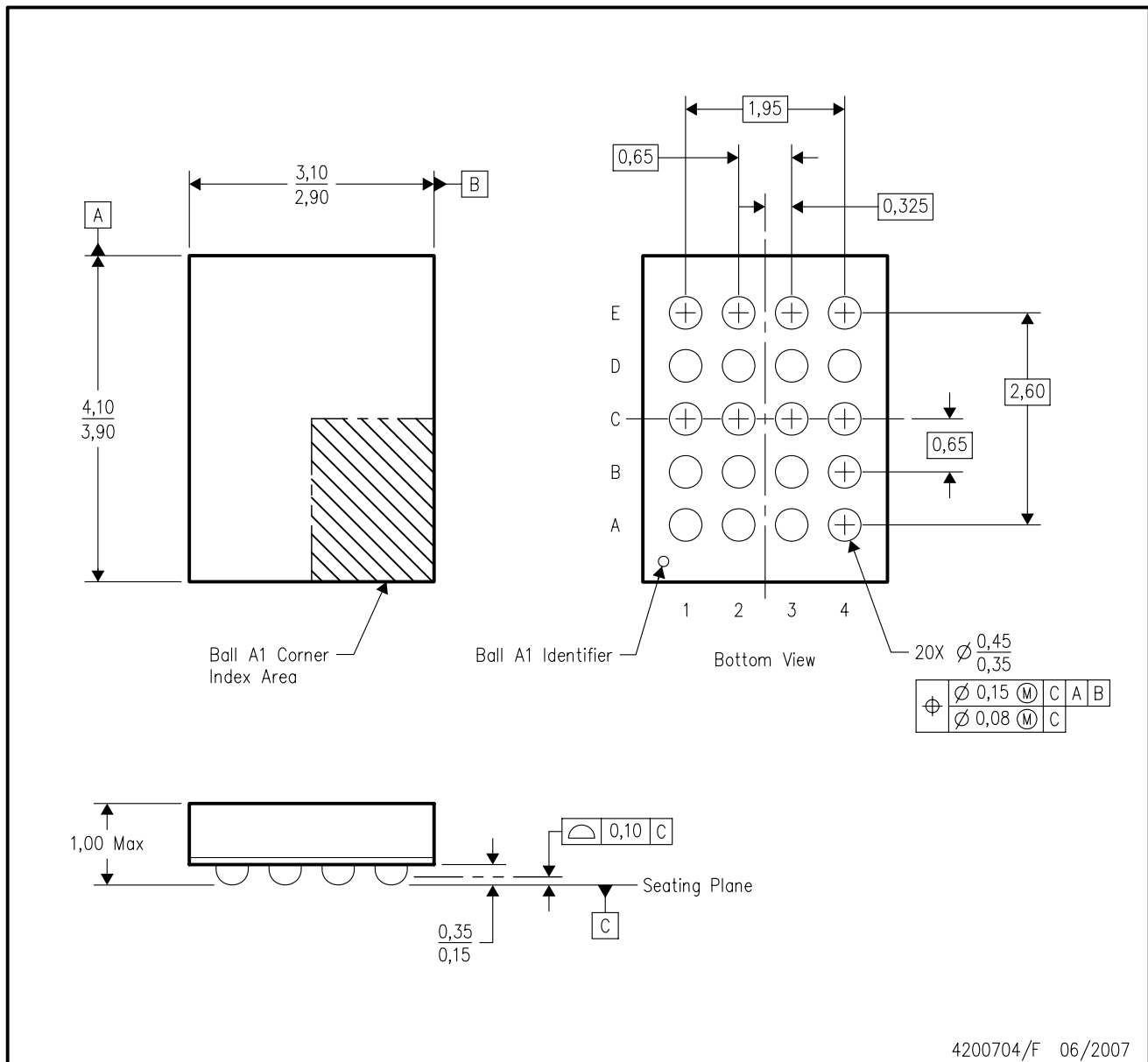


- NOTES: A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.  
C. This package can be hermetically sealed with a metal lid.  
D. The terminals are gold plated.  
E. Falls within JEDEC MS-004



## GQN (R-PBGA-N20)

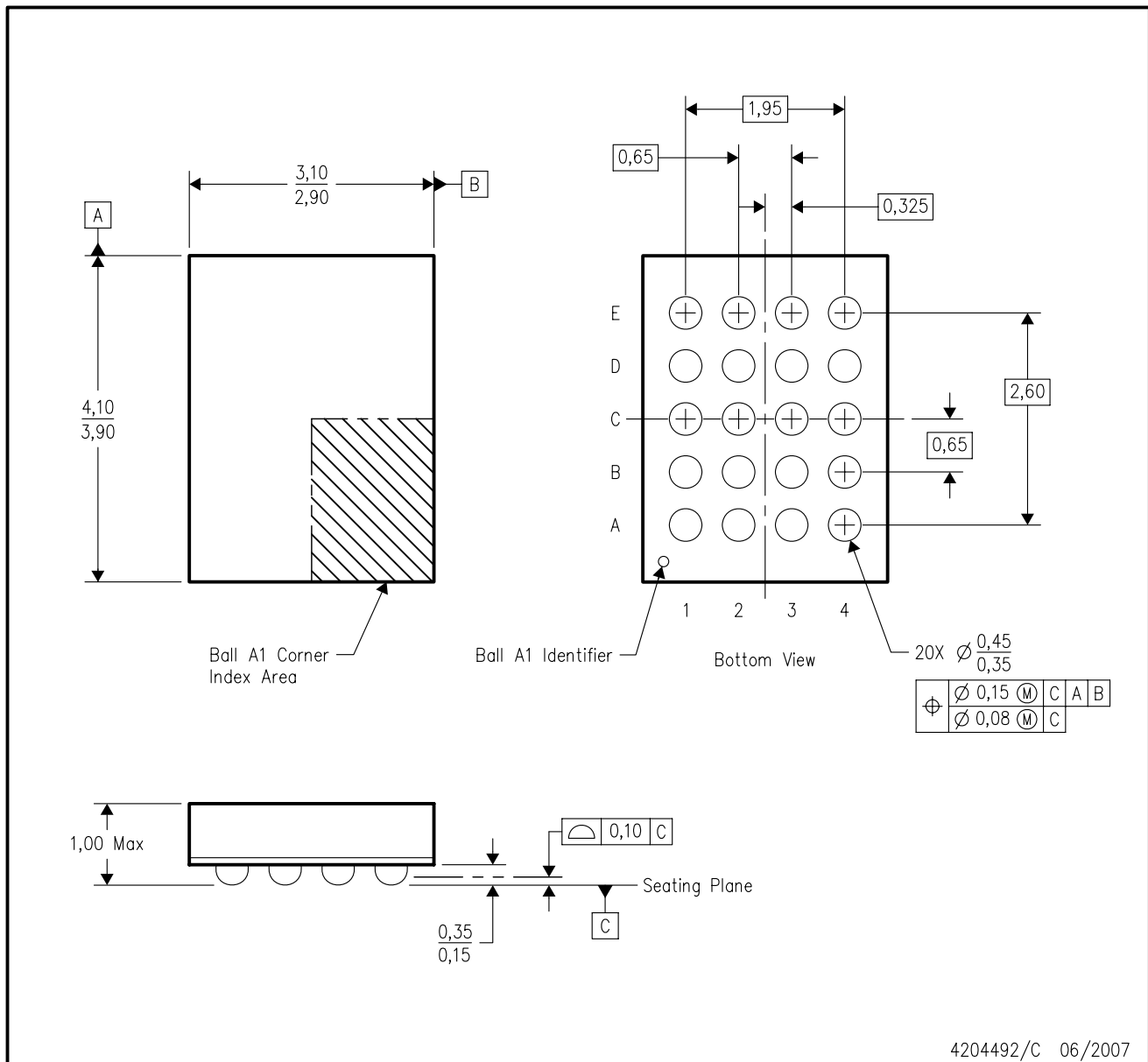
## PLASTIC BALL GRID ARRAY



- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - Falls within JEDEC MO-285 variation BC-2.
  - This package is tin-lead (SnPb). Refer to the 20 ZQN package (drawing 4204492) for lead-free.

## ZQN (R-PBGA-N20)

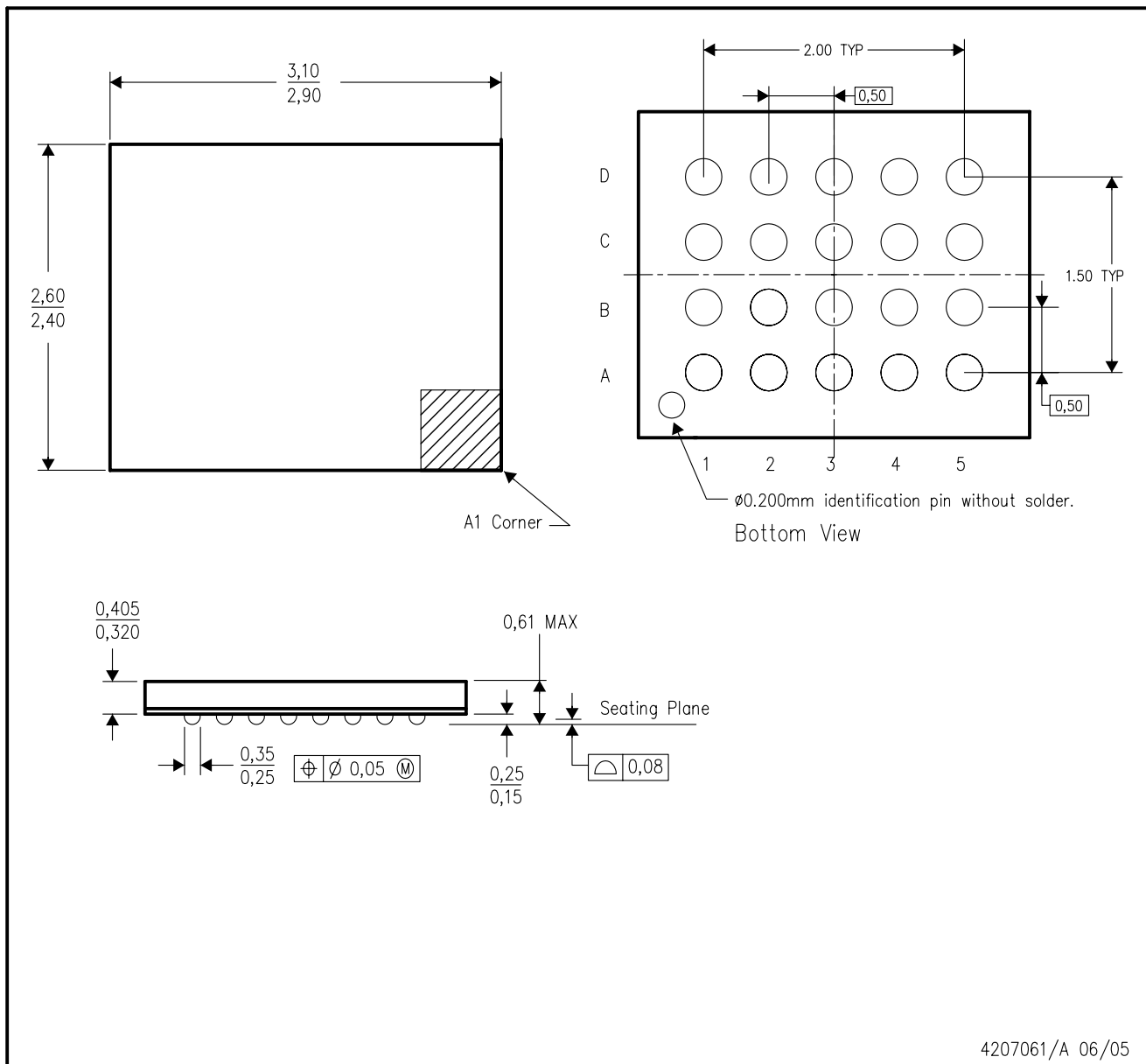
## PLASTIC BALL GRID ARRAY



- NOTES:
- 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. Falls within JEDEC MO-285 variation BC-2.
  - D. This package is lead-free. Refer to the 20 GQN package (drawing 4200704) for tin-lead (SnPb).

## ZXY (S-PBGA-N20)

## PLASTIC BALL GRID ARRAY

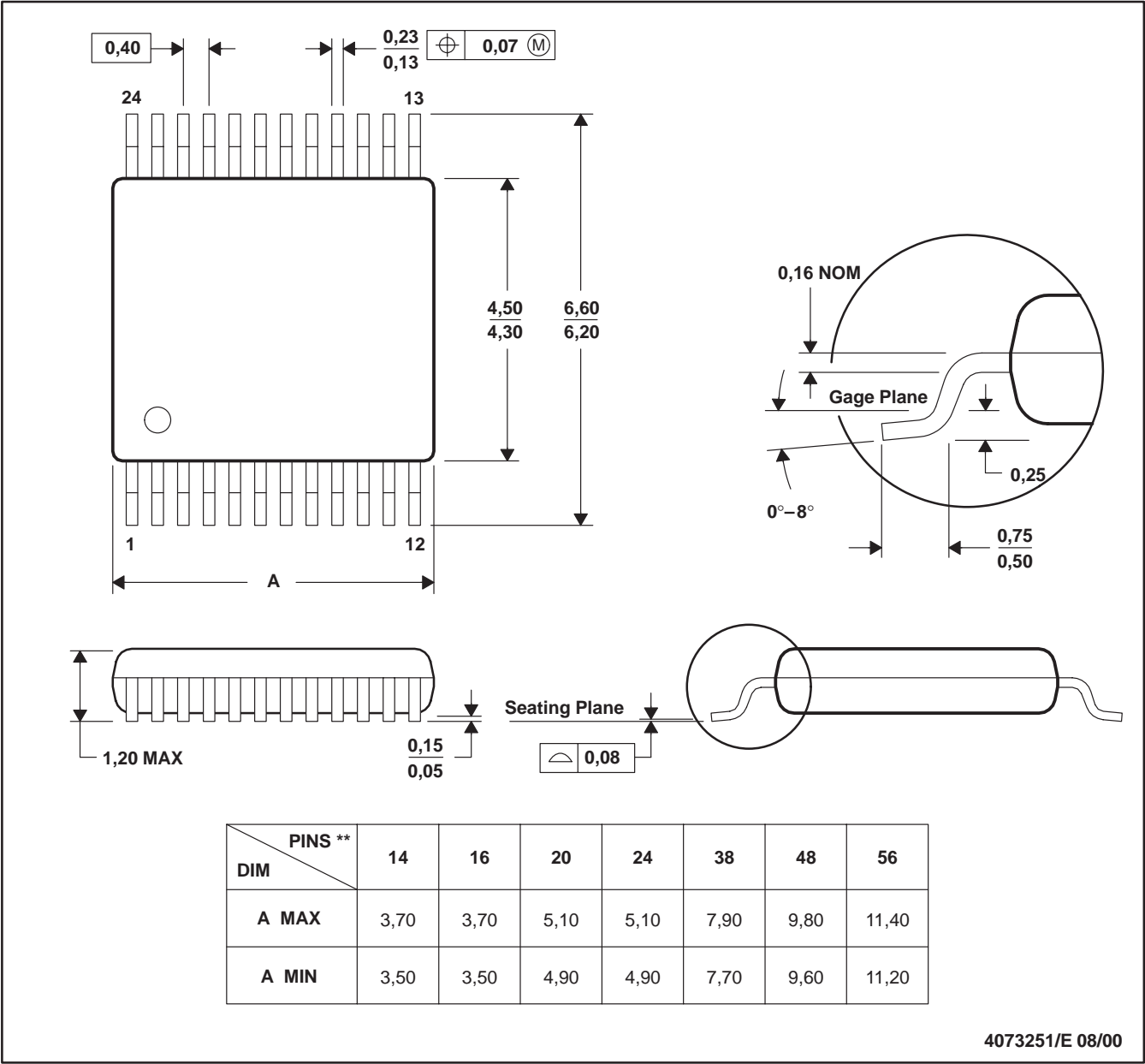


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. This package is a lead-free solder ball design.

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

PLASTIC SMALL-OUTLINE

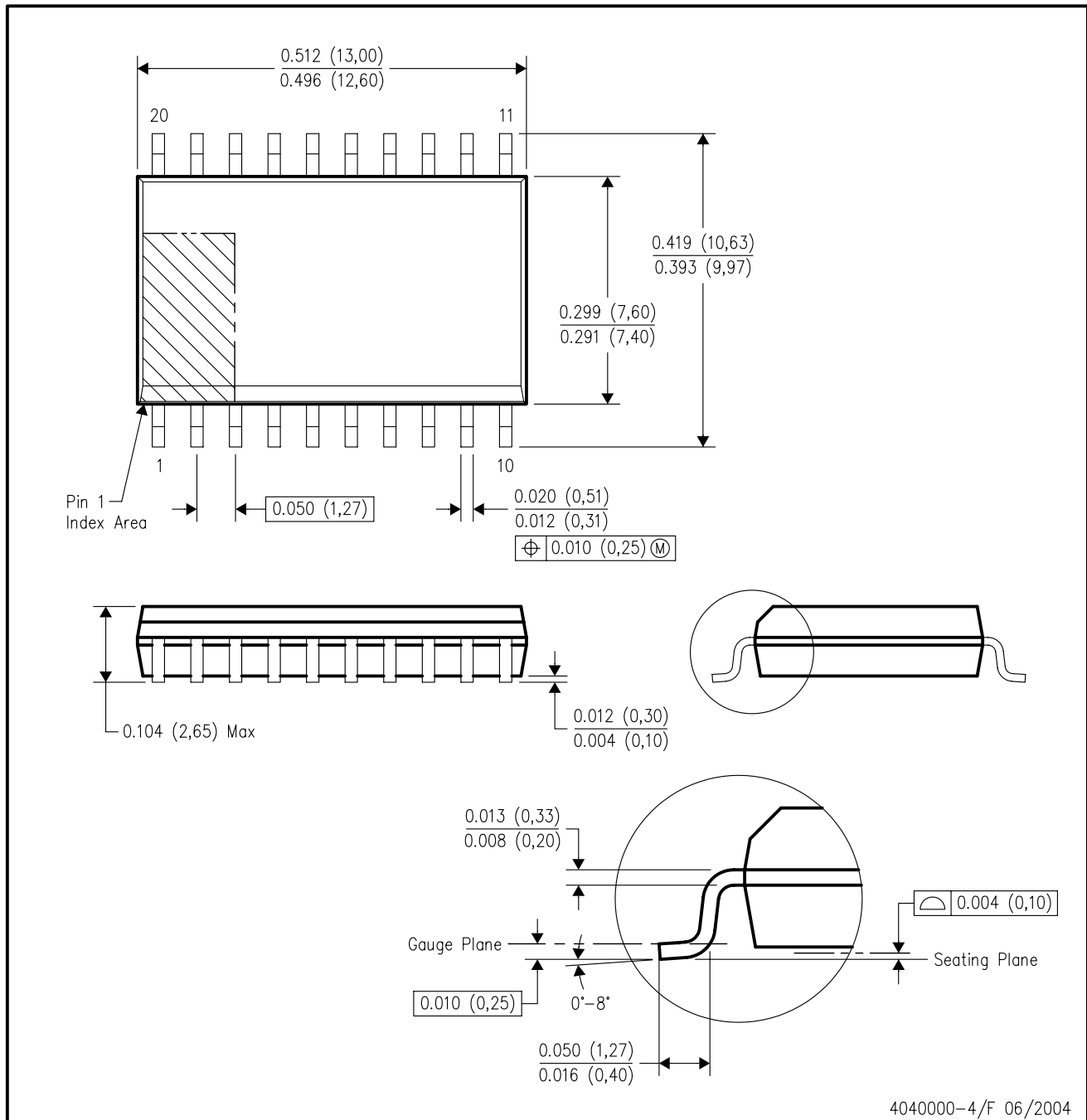
24 PINS SHOWN



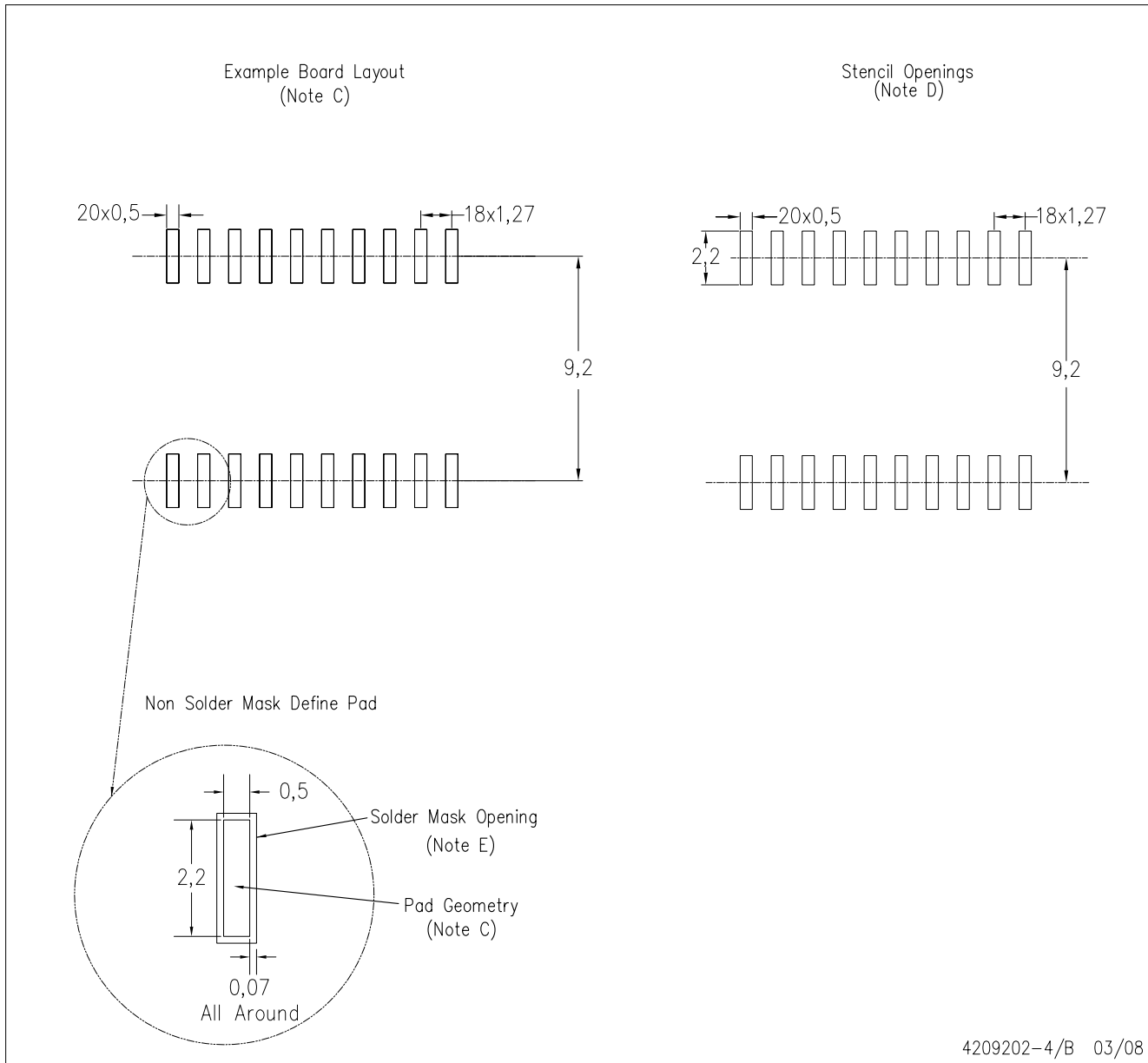
- NOTES: A. All linear dimensions are in millimeters.  
B. This drawing is subject to change without notice.  
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.  
D. Falls within JEDEC: 24/48 Pins – MO-153  
14/16/20/56 Pins – MO-194

## DW (R-PDSO-G20)

## PLASTIC SMALL-OUTLINE PACKAGE



DW (R-PDSO-G20)

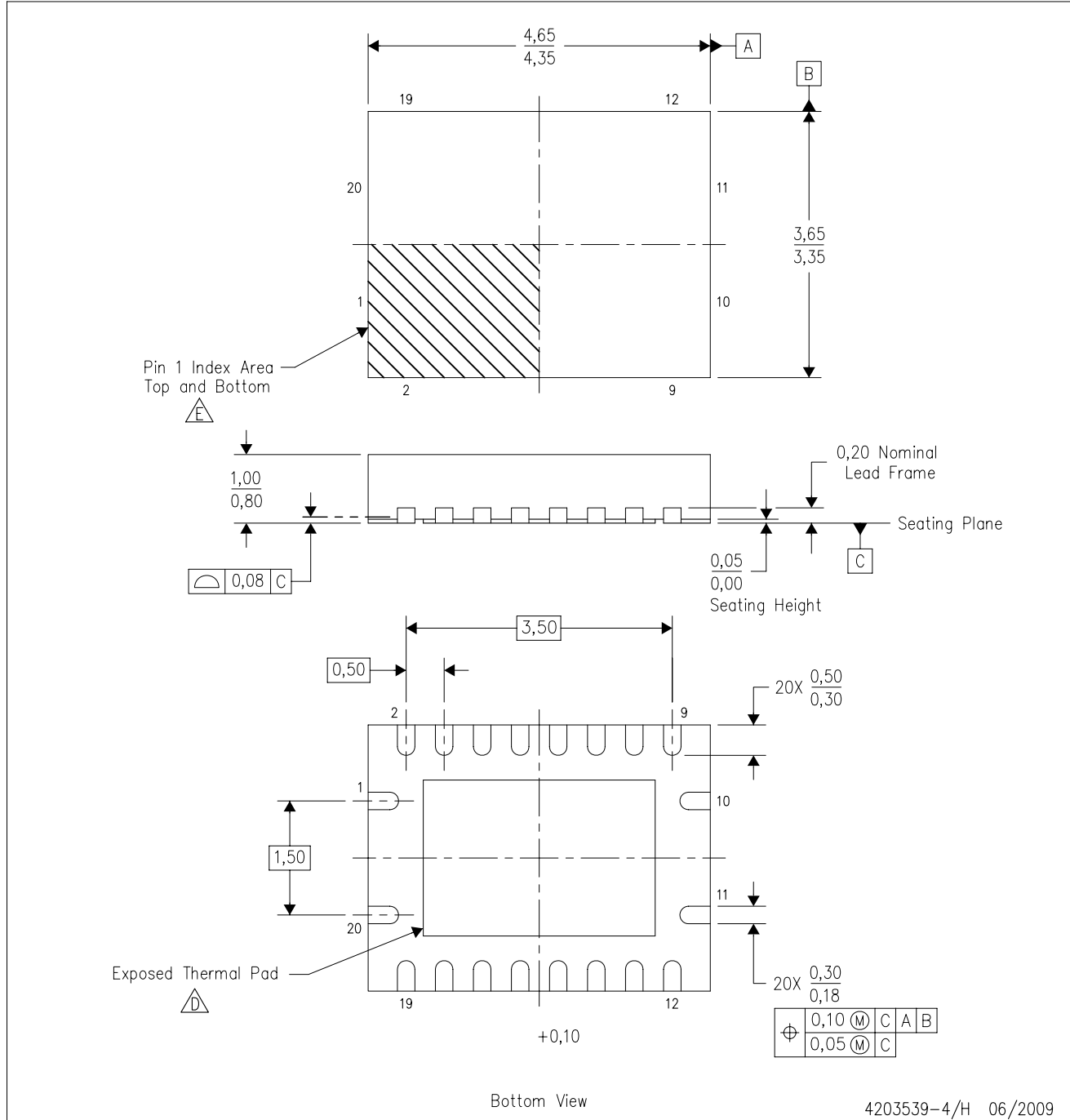


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - D. Laser cutting apertures with trapezoidal walls and also 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.

[查询"SN54LVCH245A-SP"供应商](#)

RGY (R-PVQFN-N20)

PLASTIC QUAD FLATPACK NO-LEAD



4203539-4/H 06/2009

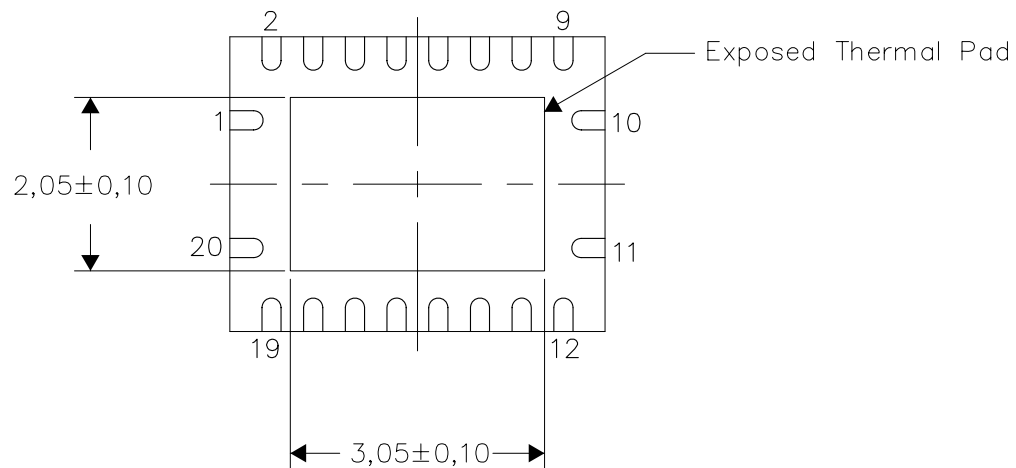
- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. QFN (Quad Flatpack No-Lead) package configuration.
  - D. The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.
  - 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.

## THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at [www.ti.com](http://www.ti.com).

The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

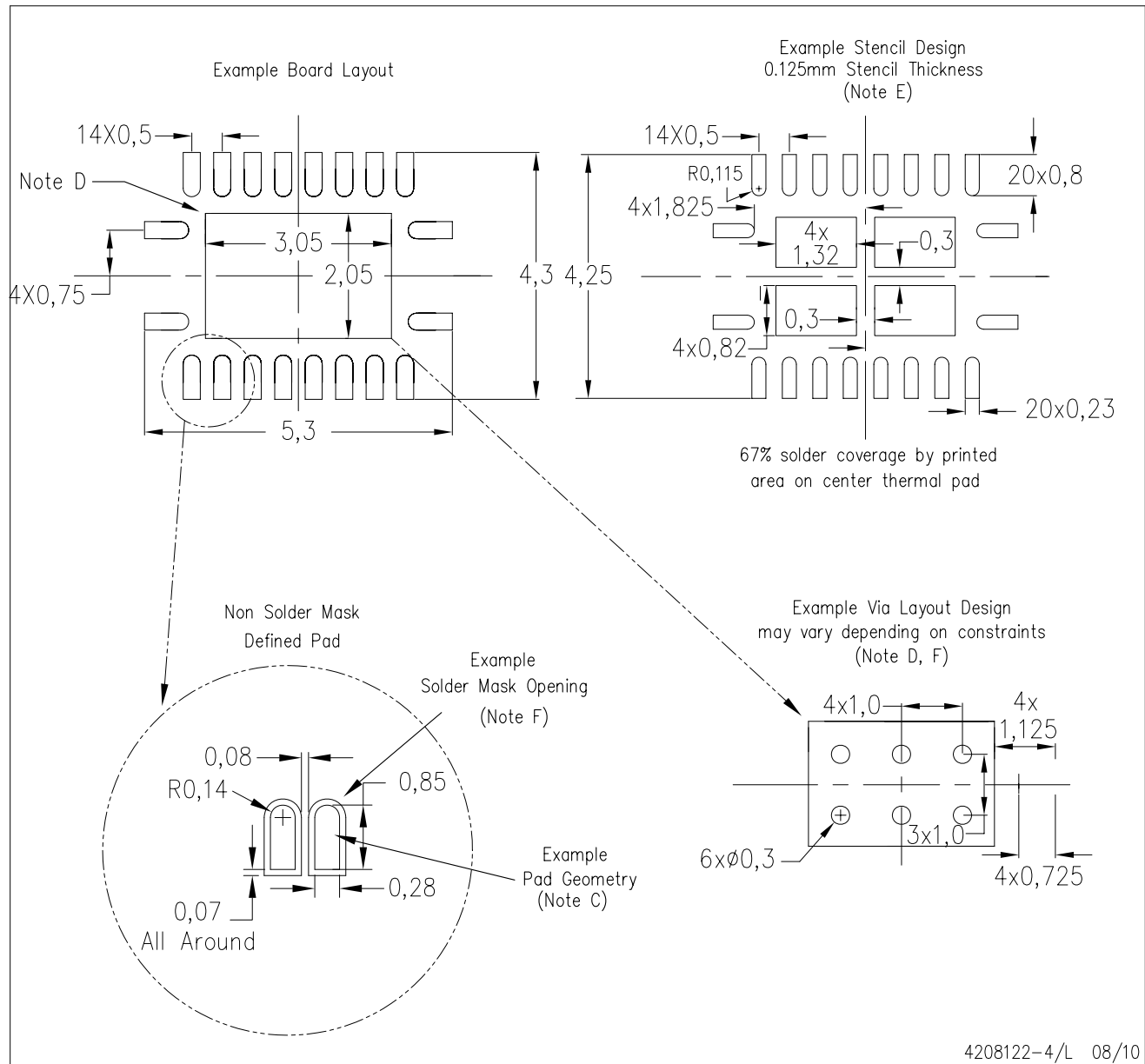
NOTE: All linear dimensions are in millimeters

## Exposed Thermal Pad Dimensions



RGY (R-PVQFN-N20)

PLASTIC QUAD FLATPACK NO-LEAD



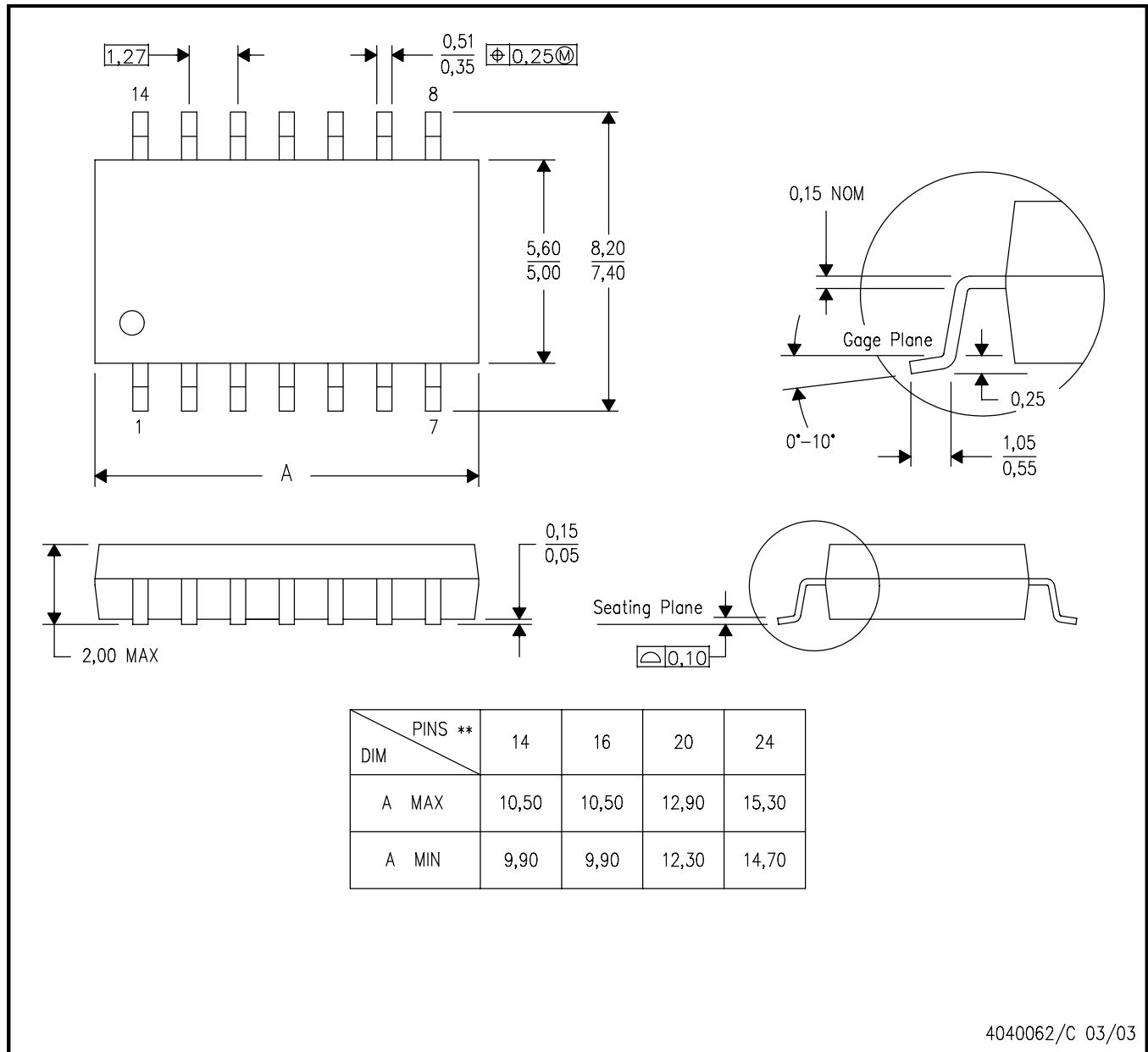
- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Publication IPC-7351 is recommended for alternate designs.
  - This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at [www.ti.com](http://www.ti.com) <<http://www.ti.com>>.
  - 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 for stencil design considerations.
  - Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.

## MECHANICAL DATA

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

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

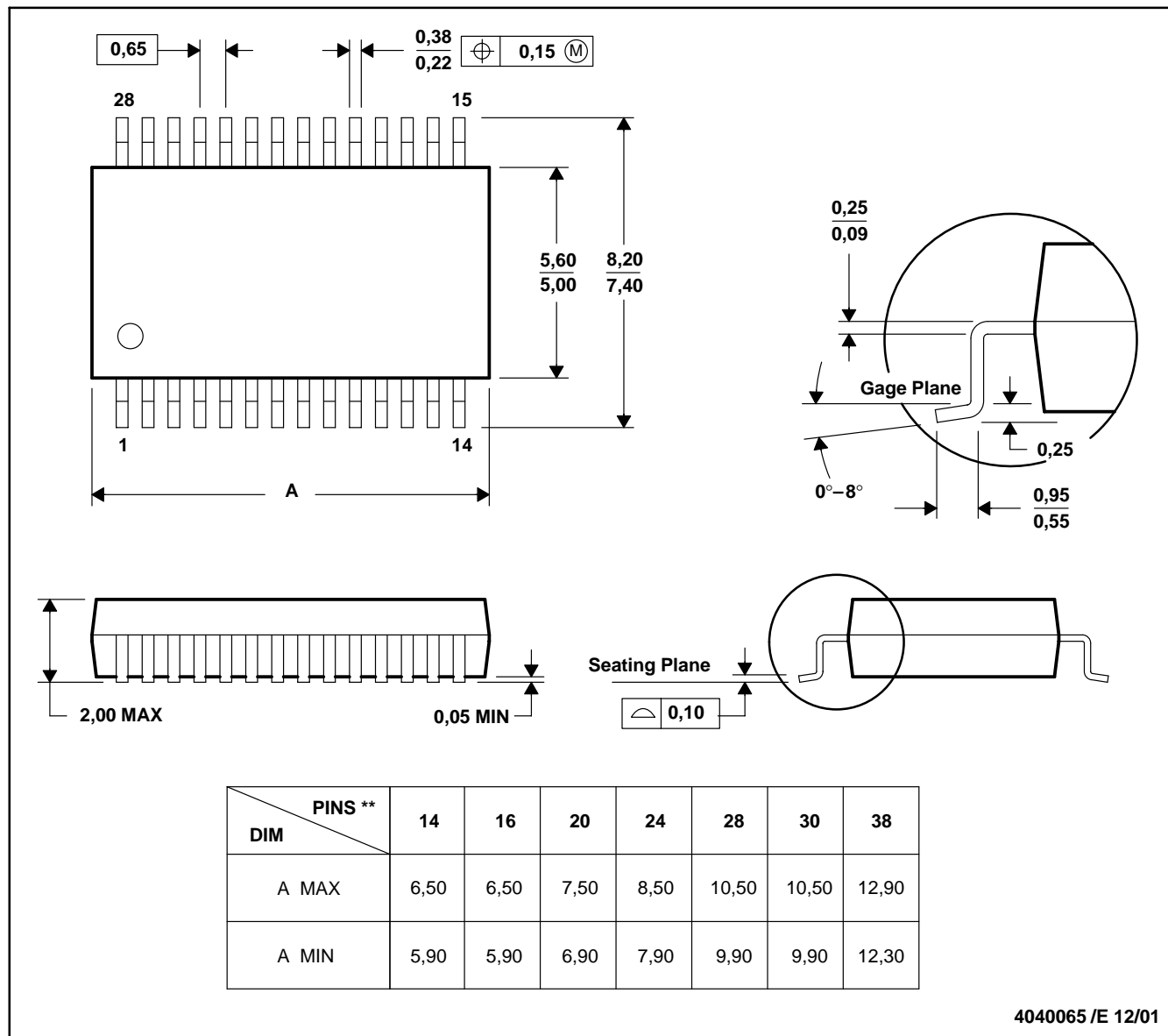


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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

PLASTIC SMALL-OUTLINE

28 PINS SHOWN

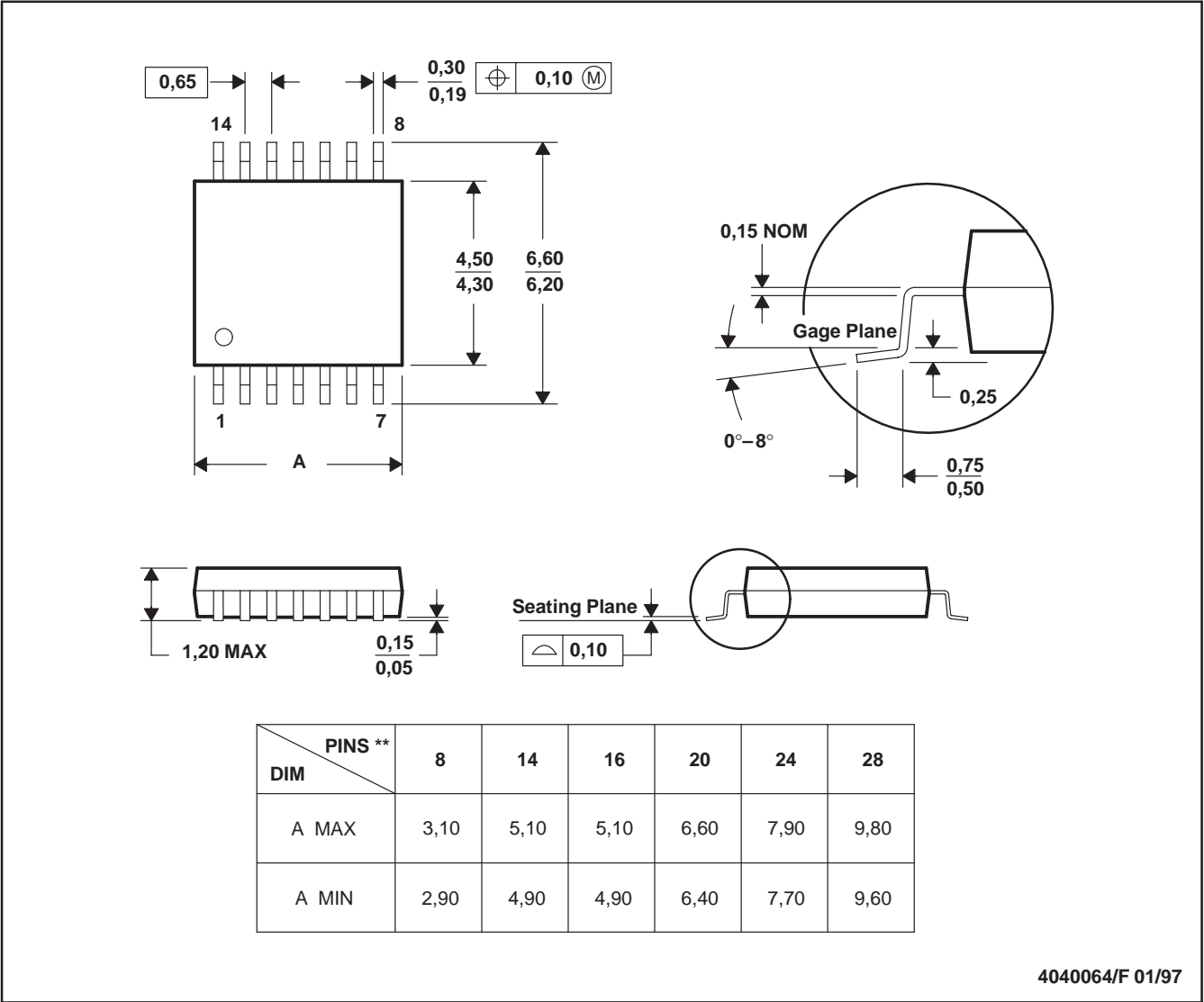


- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-150

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

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