

SN74LVC125A Quadruple Bus Buffer Gate With 3-State Outputs

1 Features

- 3-State Outputs
- Separate \overline{OE} for all 4 buffers
- Operates From 1.65 V to 3.6 V
- Specified From -40°C to 85°C and -40°C to 125°C
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 4.8 ns at 3.3 V
- Typical V_{OLP} (Output Ground Bounce) $< 0.8 \text{ V}$ at $V_{CC} = 3.3 \text{ V}$, $T_A = 25^{\circ}\text{C}$
- Typical V_{OHV} (Output V_{OH} Undershoot) $> 2 \text{ V}$ at $V_{CC} = 3.3 \text{ V}$, $T_A = 25^{\circ}\text{C}$
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model
 - 200-V Machine Model
 - 1000-V Charged-Device Model

2 Applications

- Cable Modem Termination Systems
- IP Phones: Wired and Wireless
- Optical Modules
- Optical Networking:
 - EPON or Video Over Fiber
- Point-to-Point Microwave Backhaul
- Power: Telecom DC/DC Modules:
 - Analog or Digital
- Private Branch Exchanges (PBX)
- TETRA Base Stations
- Telecom Base Band Units
- Telecom Shelters:
 - Filter Units
 - Power Distribution Units (PDU)
 - Power Monitoring Units (PMU)
 - Wireless Battery Monitoring
 - Remote Electrical Tilt Units (RET)
 - Remote Radio Units (RRU)
 - Tower Mounted Amplifiers (TMA)
- Vector Signal Analyzers and Generators
- Video Conferencing: IP-Based HD
- WiMAX and Wireless Infrastructure Equipment
- Wireless Communications Testers
- xDSL Modems and DSLAM

3 Description

This quadruple bus buffer gate is designed for 1.65-V to 3.6-V V_{CC} operation.

The SN74LVC125A device features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (OE) input is high.

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

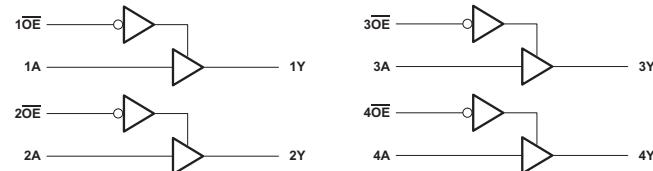
Inputs can be driven from either 3.3-V or 5-V devices. This feature allows the use of this device as a translator in a mixed 3.3-V/5-V system environment.

Device Information⁽¹⁾

| PART NUMBER | PACKAGE (PIN) | BODY SIZE |
|-------------|---------------|--------------------|
| SN74LVC125A | SOIC (14) | 8.65 mm x 3.91 mm |
| | SSOP (14) | 6.20 mm x 5.30 mm |
| | SOP (14) | 10.30 mm x 5.30 mm |
| | TSSOP (14) | 5.00 mm x 4.40 mm |
| | VQFN (14) | 3.50 mm x 3.50 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.

4 Simplified Schematic



An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

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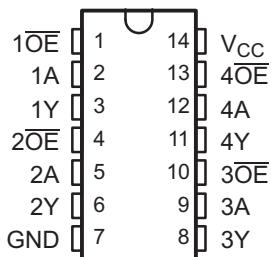
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5 Revision History

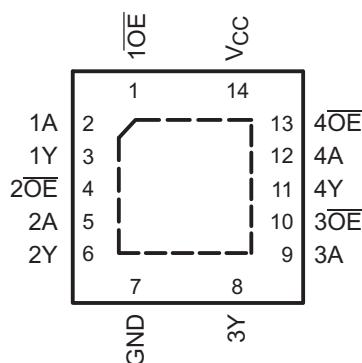
| Changes from Revision P (October 2010) to Revision Q | Page |
|---|------|
| • Added <i>Applications</i> , <i>Device Information</i> table, <i>Pin Functions</i> table, <i>ESD Ratings</i> table, <i>Thermal Information</i> table, <i>Typical Characteristics</i> , <i>Feature Description</i> section, <i>Device Functional Modes</i> , <i>Application and Implementation</i> section, <i>Power Supply Recommendations</i> section, <i>Layout</i> section, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section. | 1 |
| • Deleted <i>Ordering Information</i> table. | 1 |

6 Pin Configuration and Functions

**D, DB, NS, OR PW PACKAGE
(TOP VIEW)**



**RGY PACKAGE
(TOP VIEW)**



Pin Functions

| PIN | | TYPE | DESCRIPTION |
|-----------------|--------------------------|------|---------------|
| NAME | D, DB, NS, PW and RGY | | |
| 1A | 2 | I | Input |
| 1OE | 1 | I | Output enable |
| 1Y | 3 | O | Output |
| 2A | 5 | I | Input |
| 2OE | 4 | I | Output enable |
| 2Y | 6 | O | Output |
| 3A | 9 | I | Input |
| 3OE | 10 | I | Output enable |
| 3Y | 8 | O | Output |
| 4A | 12 | I | Input |
| 4OE | 13 | I | Output enable |
| 4Y | 11 | O | Output |
| GND | 7 | — | Ground |
| V _{cc} | 14 | — | Power pin |

7 Specifications

7.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | MIN | MAX | UNIT |
|-----------|--|--|----------------|------------------|
| V_{CC} | Supply voltage range | –0.5 | 6.5 | V |
| V_I | Input voltage range ⁽²⁾ | –0.5 | 6.5 | V |
| V_O | Output voltage range ⁽²⁾⁽³⁾ | –0.5 | $V_{CC} + 0.5$ | V |
| I_{IK} | Input clamp current | $V_I < 0$ | –50 | mA |
| I_{OK} | Output clamp current | $V_O < 0$ | –50 | mA |
| I_O | Continuous output current | | ±50 | mA |
| | Continuous current through V_{CC} or GND | | ±100 | mA |
| P_{tot} | Power dissipation | $T_A = -40^\circ\text{C}$ to 125°C ⁽⁴⁾⁽⁵⁾ | 500 | mW |
| T_{stg} | Storage temperature range | | –65 | $^\circ\text{C}$ |

- (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) For the D package: above 70°C , the value of P_{tot} derates linearly with 8 mW/K.
- (5) For the DB, NS, and PW packages: above 60°C , the value of P_{tot} derates linearly with 5.5 mW/K.

7.2 ESD Ratings

| PARAMETER | DEFINITION | VALUE | UNIT |
|-------------|--|-------|------|
| $V_{(ESD)}$ | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾ | 2000 | V |
| | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins ⁽²⁾ | 1000 | |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

7.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | T _A = 25°C | | -40°C to 85°C | | -40°C to 125°C | | UNIT | |
|-----------------|------------------------------------|------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------|---|
| | | MIN | MAX | MIN | MAX | MIN | MAX | | |
| V _{CC} | Supply voltage | Operating | 1.65 | 3.6 | 1.65 | 3.6 | 1.65 | 3.6 | V |
| | | Data retention only | 1.5 | | 1.5 | | 1.5 | | |
| V _{IH} | High-level input voltage | V _{CC} = 1.65 V to 1.95 V | 0.65 × V _{CC} | V | |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | | |
| | | V _{CC} = 2.7 V to 3.6 V | 2 | 2 | 2 | 2 | 2 | | |
| V _{IL} | Low-level input voltage | V _{CC} = 1.65 V to 1.95 V | 0.35 × V _{CC} | V | |
| | | V _{CC} = 2.3 V to 2.7 V | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | | |
| | | V _{CC} = 2.7 V to 3.6 V | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | | |
| V _I | Input voltage | 0 | 5.5 | 0 | 5.5 | 0 | 5.5 | V | |
| V _O | Output voltage | 0 | V _{CC} | 0 | V _{CC} | 0 | V _{CC} | V | |
| I _{OH} | High-level output current | V _{CC} = 1.65 V | -4 | -4 | -4 | -4 | -4 | mA | |
| | | V _{CC} = 2.3 V | -8 | -8 | -8 | -8 | -8 | | |
| | | V _{CC} = 2.7 V | -12 | -12 | -12 | -12 | -12 | | |
| | | V _{CC} = 3 V | -24 | -24 | -24 | -24 | -24 | | |
| I _{OL} | Low-level output current | V _{CC} = 1.65 V | 4 | 4 | 4 | 4 | 4 | mA | |
| | | V _{CC} = 2.3 V | 8 | 8 | 8 | 8 | 8 | | |
| | | V _{CC} = 2.7 V | 12 | 12 | 12 | 12 | 12 | | |
| | | V _{CC} = 3 V | 24 | 24 | 24 | 24 | 24 | | |
| Δt/Δv | Input transition rise or fall rate | 8 | | 8 | | 8 | | ns/V | |

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number [SCBA004](#).

7.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | D ⁽²⁾ | DB ⁽²⁾ | NS ⁽²⁾ | PW ⁽²⁾ | RGY ⁽³⁾ | UNIT |
|-------------------------------|--|-------------------|-------------------|-------------------|--------------------|---------|
| | 14 PINS | | | | | |
| R _{θJA} | Junction-to-ambient thermal resistance | 86 | 96 | 76 | 113 | 47 °C/W |

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, [SPRA953](#).
(2) The package thermal impedance is calculated in accordance with JESD 51-7.
(3) The package thermal impedance is calculated in accordance with JESD 51-5.

7.5 Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS | V _{CC} | T _A = 25°C | | | -40°C to 85°C | | -40°C to 125°C | | UNIT | |
|------------------|--|-----------------|-----------------------|-----|-----|-----------------------|-----|-----------------------|-----|------|--|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | | |
| V _{OH} | I _{OH} = -100 µA | 1.65 V to 3.6 V | V _{CC} – 0.2 | | | V _{CC} – 0.2 | | V _{CC} – 0.3 | | V | |
| | I _{OH} = -4 mA | 1.65 V | 1.29 | | | 1.2 | | 1.05 | | | |
| | I _{OH} = -8 mA | 2.3 V | 1.9 | | | 1.7 | | 1.55 | | | |
| | I _{OH} = -12 mA | 2.7 V | 2.2 | | | 2.2 | | 2.05 | | | |
| | | 3 V | 2.4 | | | 2.4 | | 2.25 | | | |
| V _{OL} | I _{OL} = 100 µA | 1.65 V to 3.6 V | 0.1 | | | 0.2 | | 0.3 | | V | |
| | I _{OL} = 4 mA | 1.65 V | 0.24 | | | 0.45 | | 0.6 | | | |
| | I _{OL} = 8 mA | 2.3 V | 0.3 | | | 0.7 | | 0.75 | | | |
| | I _{OL} = 12 mA | 2.7 V | 0.4 | | | 0.4 | | 0.6 | | | |
| | I _{OL} = 24 mA | 3 V | 0.55 | | | 0.55 | | 0.8 | | | |
| I _I | V _I = 5.5 V or GND | 3.6 V | ±1 | | | ±5 | | ±20 | | µA | |
| I _{OZ} | V _O = V _{CC} or GND | 3.6 V | ±1 | | | ±10 | | ±20 | | µA | |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 3.6 V | 1 | | | 10 | | 40 | | µA | |
| ΔI _{CC} | One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND | 2.7 V to 3.6 V | 500 | | | 500 | | 5000 | | µA | |
| C _i | V _I = V _{CC} or GND | 3.3 V | 5 | | | | | | | pF | |

7.6 Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see [Figure 3](#))

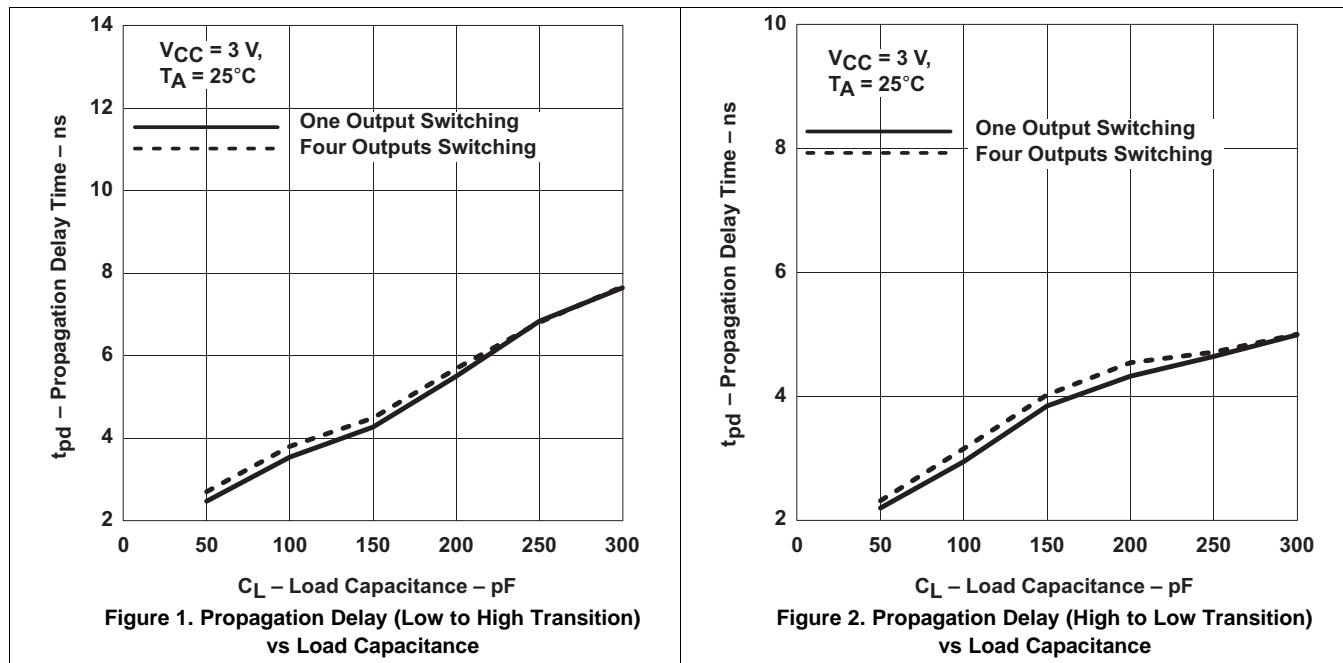
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} | T _A = 25°C | | | -40°C to 85°C | | -40°C to 125°C | | UNIT |
|--------------------|--------------|-------------|-----------------|-----------------------|-----|------|---------------|------|----------------|------|------|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| t _{pd} | A | Y | 1.8 V ± 0.15 V | 1 | 4.5 | 11.8 | 1 | 12.3 | 1 | 13.8 | ns |
| | | | 2.5 V ± 0.2 V | 1 | 2.7 | 5.8 | 1 | 6.3 | 1 | 8.4 | |
| | | | 2.7 V | 1 | 3 | 5.3 | 1 | 5.5 | 1 | 7 | |
| | | | 3.3 V ± 0.3 V | 1 | 2.5 | 4.6 | 1 | 4.8 | 1 | 6 | |
| t _{en} | OE | Y | 1.8 V ± 0.15 V | 1 | 4.3 | 13.8 | 1 | 14.3 | 1 | 15.8 | ns |
| | | | 2.5 V ± 0.2 V | 1 | 2.7 | 6.9 | 1 | 7.4 | 1 | 9.5 | |
| | | | 2.7 V | 1 | 3.3 | 6.4 | 1 | 6.6 | 1 | 8.5 | |
| | | | 3.3 V ± 0.3 V | 1 | 2.4 | 5.2 | 1 | 5.4 | 1 | 7 | |
| t _{dis} | OE | Y | 1.8 V ± 0.15 V | 1 | 4.3 | 10.6 | 1 | 11.1 | 1 | 12.6 | ns |
| | | | 2.5 V ± 0.2 V | 1 | 2.2 | 5.1 | 1 | 5.6 | 1 | 7.7 | |
| | | | 2.7 V | 1 | 2.5 | 4.8 | 1 | 5 | 1 | 6.5 | |
| | | | 3.3 V ± 0.3 V | 1 | 2.4 | 4.4 | 1 | 4.6 | 1 | 6 | |
| t _{sk(o)} | | | 3.3 V ± 0.3 V | | | | 1 | | 1.5 | | ns |

7.7 Operating Characteristics

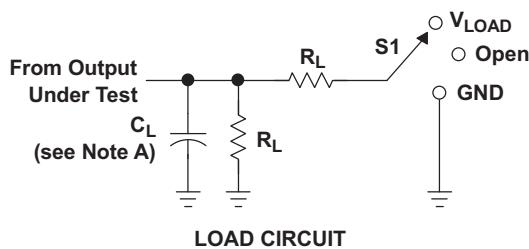
T_A = 25°C

| PARAMETER | | | | TEST CONDITIONS | V _{CC} | TYP | UNIT |
|-----------------|--|--|--|-----------------|-----------------|------|------|
| C _{pd} | Power dissipation capacitance per gate | | | f = 10 MHz | 1.8 V | 7.4 | pF |
| | | | | | 2.5 V | 11.3 | |
| | | | | | 3.3 V | 15 | |

7.8 Typical Characteristics

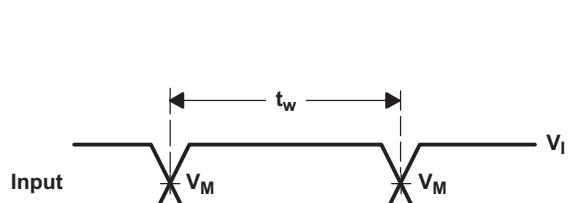


8 Parameter Measurement Information

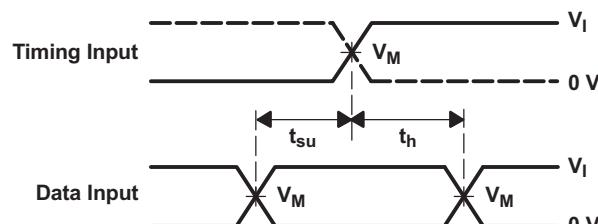


| TEST | S1 |
|-------------------|------------|
| t_{PLH}/t_{PHL} | Open |
| t_{PLZ}/t_{PZL} | V_{LOAD} |
| t_{PHZ}/t_{PZH} | GND |

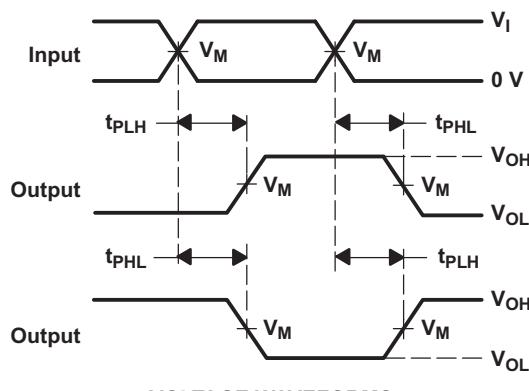
| V_{CC} | INPUTS | | V_M | V_{LOAD} | C_L | R_L | V_Δ |
|------------------------------------|----------|-----------------------|------------|-------------------|-------|--------------|------------|
| | V_I | t_r/t_f | | | | | |
| $1.8 \text{ V} \pm 0.15 \text{ V}$ | V_{CC} | $\leq 2 \text{ ns}$ | $V_{CC}/2$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



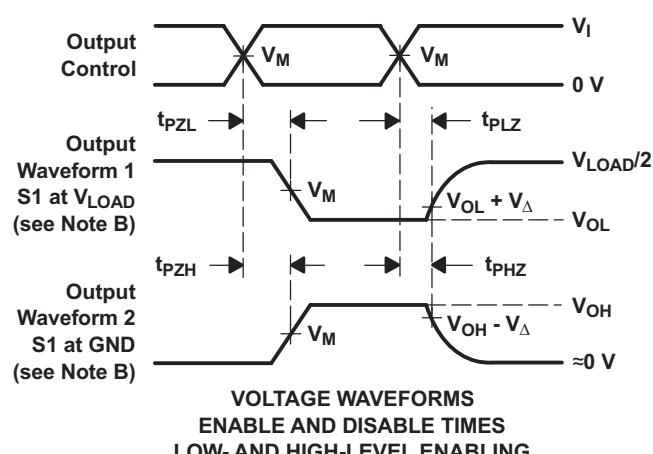
VOLTAGE WAVEFORMS
PULSE DURATION



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.

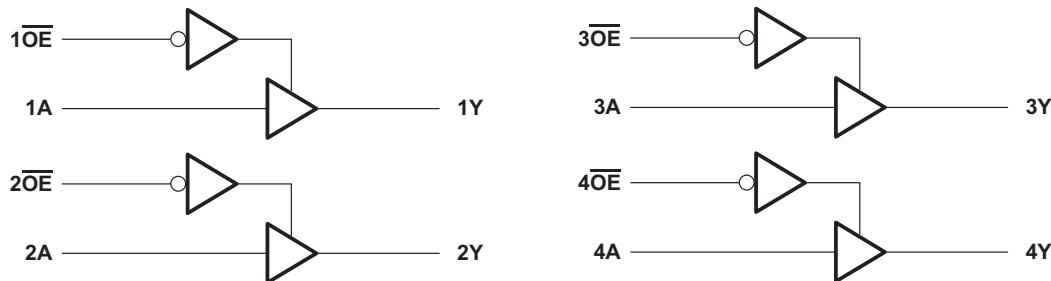
Figure 3. Load Circuit and Voltage Waveforms

9 Detailed Description

9.1 Overview

The SN74LVC125A device is a quadruple bus buffer gate featuring independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (\overline{OE}) input is high. When \overline{OE} is low, the respective gate passes the data from the A input to its Y output. To ensure the high-impedance state during power up or power down, OE should be tied to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

9.2 Functional Block Diagram



9.3 Feature Description

- Wide operating voltage range
 - Operates from 1.65 V to 5.5 V
- Allows down voltage translation
- Inputs accept voltages to 5.5 V

9.4 Device Functional Modes

Table 1. Function Table

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

10 Application and Implementation

NOTE

NOTE
Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

10.1 Application Information

SN74LVC125A is a high drive CMOS device that can be used for a multitude of bus interface type applications where output drive or PCB trace length is a concern. The inputs can accept voltages to 5.5 V at any valid V_{CC} making it ideal for down translation.

10.2 Typical Application

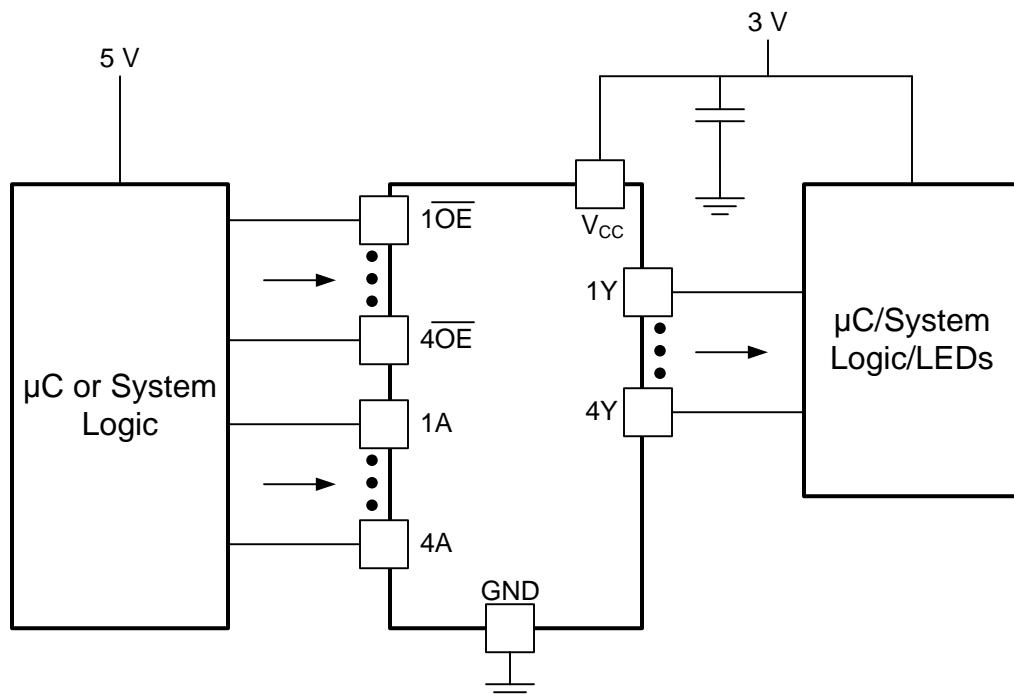


Figure 4. Typical Application Schematic

10.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads so routing and load conditions should be considered to prevent ringing.

10.2.2 Detailed Design Procedure

1. Recommended Input Conditions:

- For rise time and fall time specifications, see $(\Delta t/\Delta V)$ in the *Recommended Operating Conditions* table.
- For specified high and low levels, see $(V_{IH}$ and V_{IL}) in the *Recommended Operating Conditions* table.
- Inputs are overvoltage tolerant allowing them to go as high as $(V_I \text{ max})$ in the *Recommended Operating Conditions* table at any valid V_{CC} .

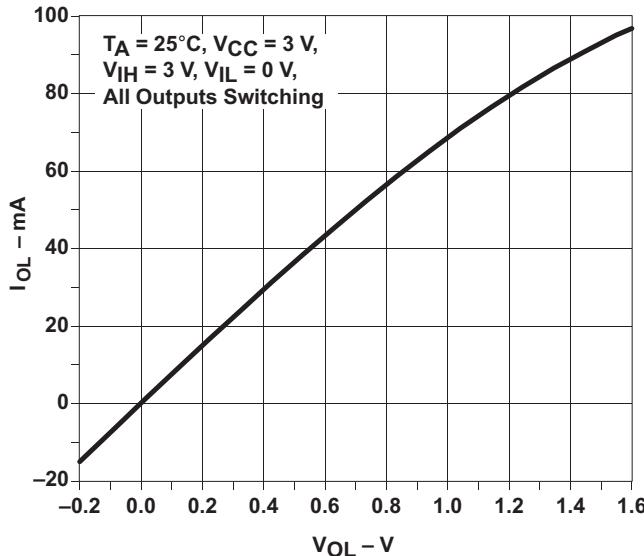
2. Recommend Output Conditions:

- Load currents should not exceed (I_O max) per output and should not exceed (Continuous current through V_{CC} or GND) total current for the part. These limits are located in the [Absolute Maximum Ratings](#) table.

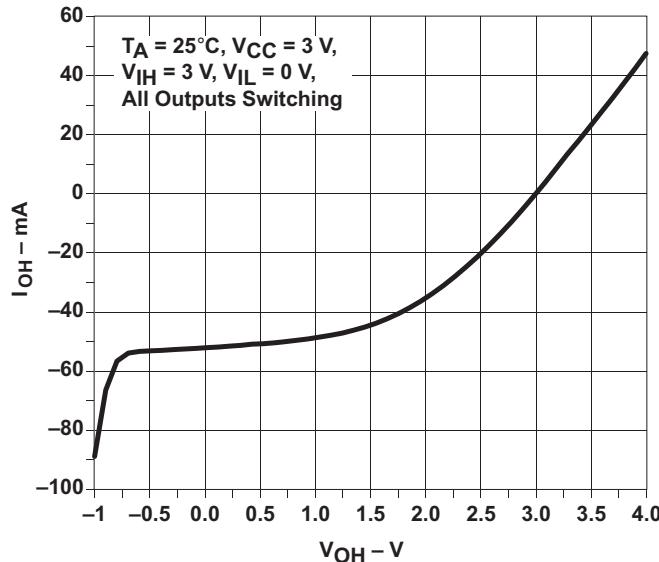
Typical Application (continued)

- Outputs should not be pulled above V_{CC} .
- Series resistors on the output may be used if the user desires to slow the output edge signal or limit the output current.

10.2.3 Application Curves



**Figure 5. Output Drive Current (I_{OL})
vs LOW-level Output Voltage (V_{OL})**



**Figure 6. Output Drive Current (I_{OH})
vs HIGH-level Output Voltage (V_{OH})**

11 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the *Recommended Operating Conditions* table.

Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1 μ F capacitor is recommended. If there are multiple V_{CC} terminals then 0.01 μ F or 0.022 μ F capacitors are recommended for each power terminal. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise. Multiple bypass capacitors may be paralleled to reject different frequencies of noise. The bypass capacitor should be installed as close to the power terminal as possible for the best results.

12 Layout

12.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

Specified in [Figure 7](#) are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or V_{CC} , whichever makes more sense or is more convenient.

12.2 Layout Example

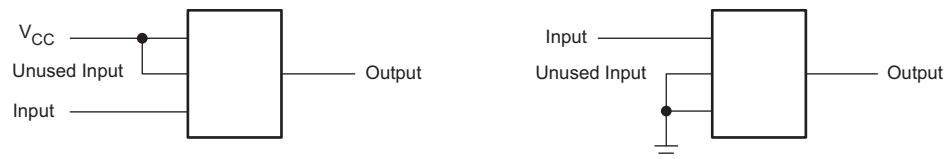


Figure 7. Layout Diagram

13 Device and Documentation Support

13.1 Trademarks

All trademarks are the property of their respective owners.

13.2 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

13.3 Glossary

[SLYZ022 — TI Glossary](#).

This glossary lists and explains terms, acronyms and definitions.

14 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser based versions of this data sheet, refer to the left hand navigation.

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|---|
| SN74LVC125AD | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADBLE | OBsolete | SSOP | DB | 14 | | TBD | Call TI | Call TI | -40 to 125 | | |
| SN74LVC125ADBR | ACTIVE | SSOP | DB | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125ADBRG4 | ACTIVE | SSOP | DB | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125ADE4 | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADG4 | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADR | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU CU SN | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADRE4 | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADRG3 | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU SN | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADRG4 | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADT | ACTIVE | SOIC | D | 14 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ADTG4 | ACTIVE | SOIC | D | 14 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ANSR | ACTIVE | SO | NS | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125ANSRE4 | ACTIVE | SO | NS | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LVC125A | Samples |
| SN74LVC125APW | ACTIVE | TSSOP | PW | 14 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWE4 | ACTIVE | TSSOP | PW | 14 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWG4 | ACTIVE | TSSOP | PW | 14 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWLE | OBsolete | TSSOP | PW | 14 | | TBD | Call TI | Call TI | -40 to 125 | | |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|-------------------|---------------|--------------|-----------------|------|-------------|-------------------------|-------------------------|----------------------|--------------|-------------------------|---|
| SN74LVC125APWR | ACTIVE | TSSOP | PW | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU CU SN | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWRE4 | ACTIVE | TSSOP | PW | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWRG3 | ACTIVE | TSSOP | PW | 14 | 2000 | Green (RoHS & no Sb/Br) | CU SN | Level-1-260C-UNLIM | | LC125A | Samples |
| SN74LVC125APWRG4 | ACTIVE | TSSOP | PW | 14 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWT | ACTIVE | TSSOP | PW | 14 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWTE4 | ACTIVE | TSSOP | PW | 14 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125APWTG4 | ACTIVE | TSSOP | PW | 14 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC125A | Samples |
| SN74LVC125ARGYR | ACTIVE | VQFN | RGY | 14 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC125A | Samples |
| SN74LVC125ARGYRG4 | ACTIVE | VQFN | RGY | 14 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR | -40 to 125 | LC125A | Samples |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

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

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

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

OBsolete: TI has discontinued the production of the device.

(2) 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)

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

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

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

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

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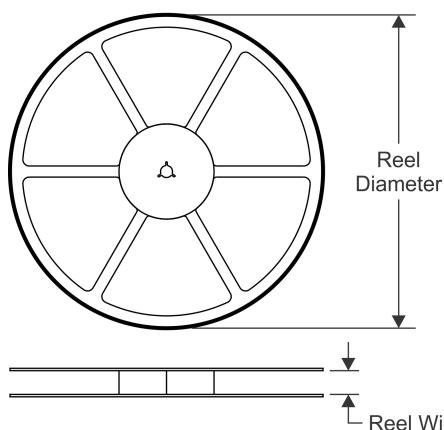
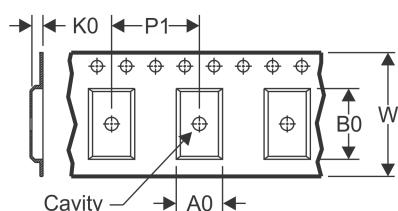
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LVC125A :

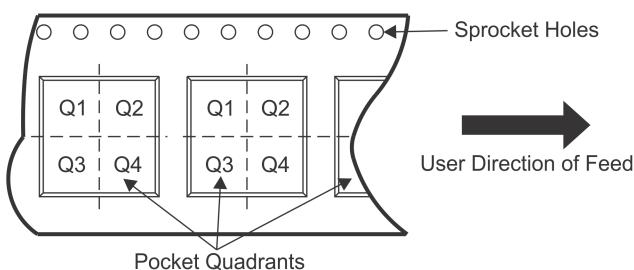
- Automotive: [SN74LVC125A-Q1](#)
- Enhanced Product: [SN74LVC125A-EP](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION
REEL DIMENSIONS

TAPE DIMENSIONS


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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LVC125ADBR | SSOP | DB | 14 | 2000 | 330.0 | 16.4 | 8.2 | 6.6 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 330.0 | 16.8 | 6.5 | 9.5 | 2.3 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADRG3 | SOIC | D | 14 | 2500 | 330.0 | 16.8 | 6.5 | 9.5 | 2.3 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADRG4 | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADRG4 | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC125ADT | SOIC | D | 14 | 250 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LVC125ANSR | SO | NS | 14 | 2000 | 330.0 | 16.4 | 8.2 | 10.5 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74LVC125APWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC125APWRG3 | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC125APWRG4 | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC125APWT | TSSOP | PW | 14 | 250 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC125ARGYR | VQFN | RGY | 14 | 3000 | 330.0 | 12.4 | 3.75 | 3.75 | 1.15 | 8.0 | 12.0 | Q1 |

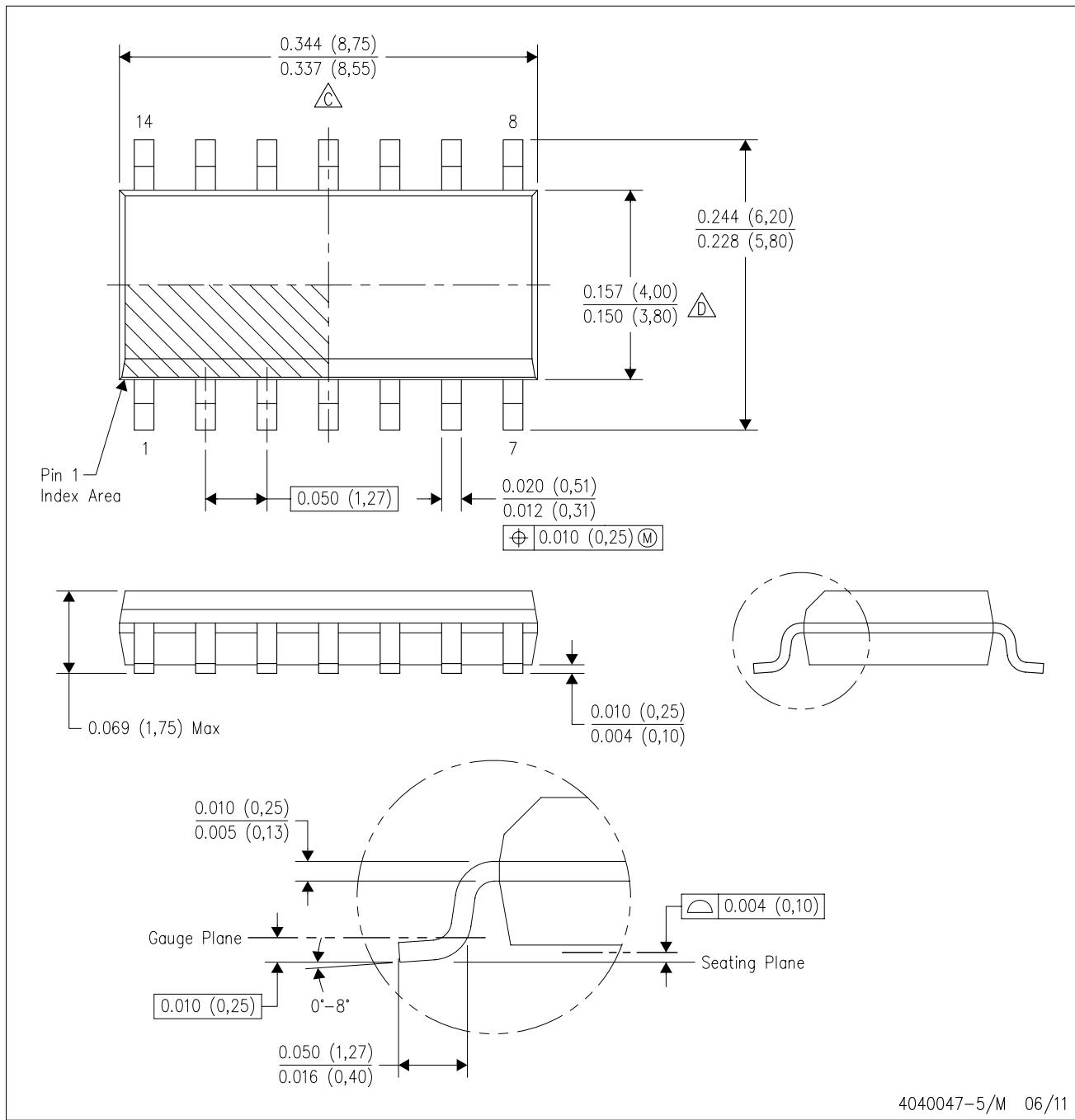
TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LVC125ADBR | SSOP | DB | 14 | 2000 | 367.0 | 367.0 | 38.0 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 364.0 | 364.0 | 27.0 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 367.0 | 367.0 | 38.0 |
| SN74LVC125ADR | SOIC | D | 14 | 2500 | 333.2 | 345.9 | 28.6 |
| SN74LVC125ADRG3 | SOIC | D | 14 | 2500 | 364.0 | 364.0 | 27.0 |
| SN74LVC125ADRG4 | SOIC | D | 14 | 2500 | 333.2 | 345.9 | 28.6 |
| SN74LVC125ADRG4 | SOIC | D | 14 | 2500 | 367.0 | 367.0 | 38.0 |
| SN74LVC125ADT | SOIC | D | 14 | 250 | 367.0 | 367.0 | 38.0 |
| SN74LVC125ANSR | SO | NS | 14 | 2000 | 367.0 | 367.0 | 38.0 |
| SN74LVC125APWR | TSSOP | PW | 14 | 2000 | 364.0 | 364.0 | 27.0 |
| SN74LVC125APWRG3 | TSSOP | PW | 14 | 2000 | 364.0 | 364.0 | 27.0 |
| SN74LVC125APWRG4 | TSSOP | PW | 14 | 2000 | 367.0 | 367.0 | 35.0 |
| SN74LVC125APWT | TSSOP | PW | 14 | 250 | 367.0 | 367.0 | 35.0 |
| SN74LVC125ARGYR | VQFN | RGY | 14 | 3000 | 367.0 | 367.0 | 35.0 |

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

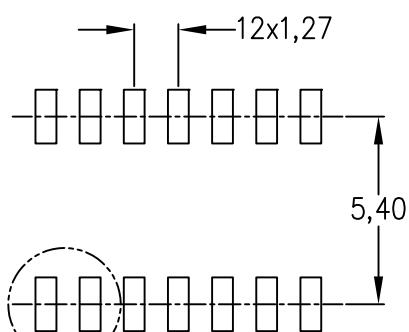
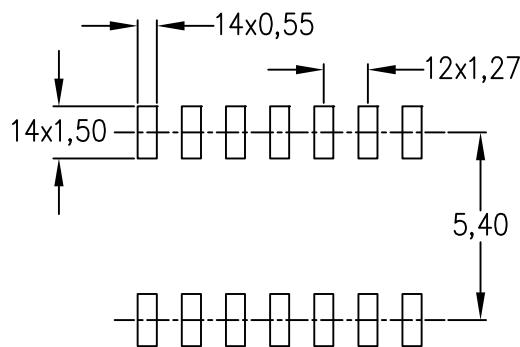
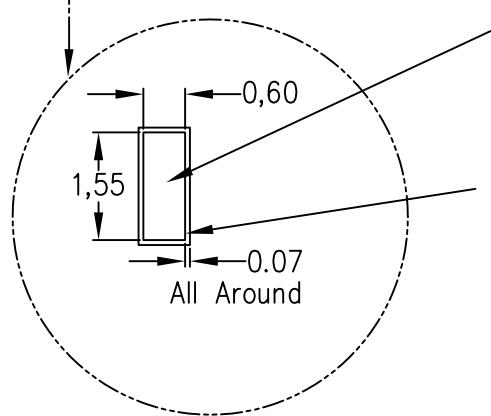
C Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0.15) each side.

D Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0.43) each side.

E Reference JEDEC MS-012 variation AB.

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE

Example Board Layout
(Note C)Stencil Openings
(Note D)Example
Non Soldermask Defined PadExample
Pad Geometry
(See Note C)Example
Solder Mask Opening
(See Note E)

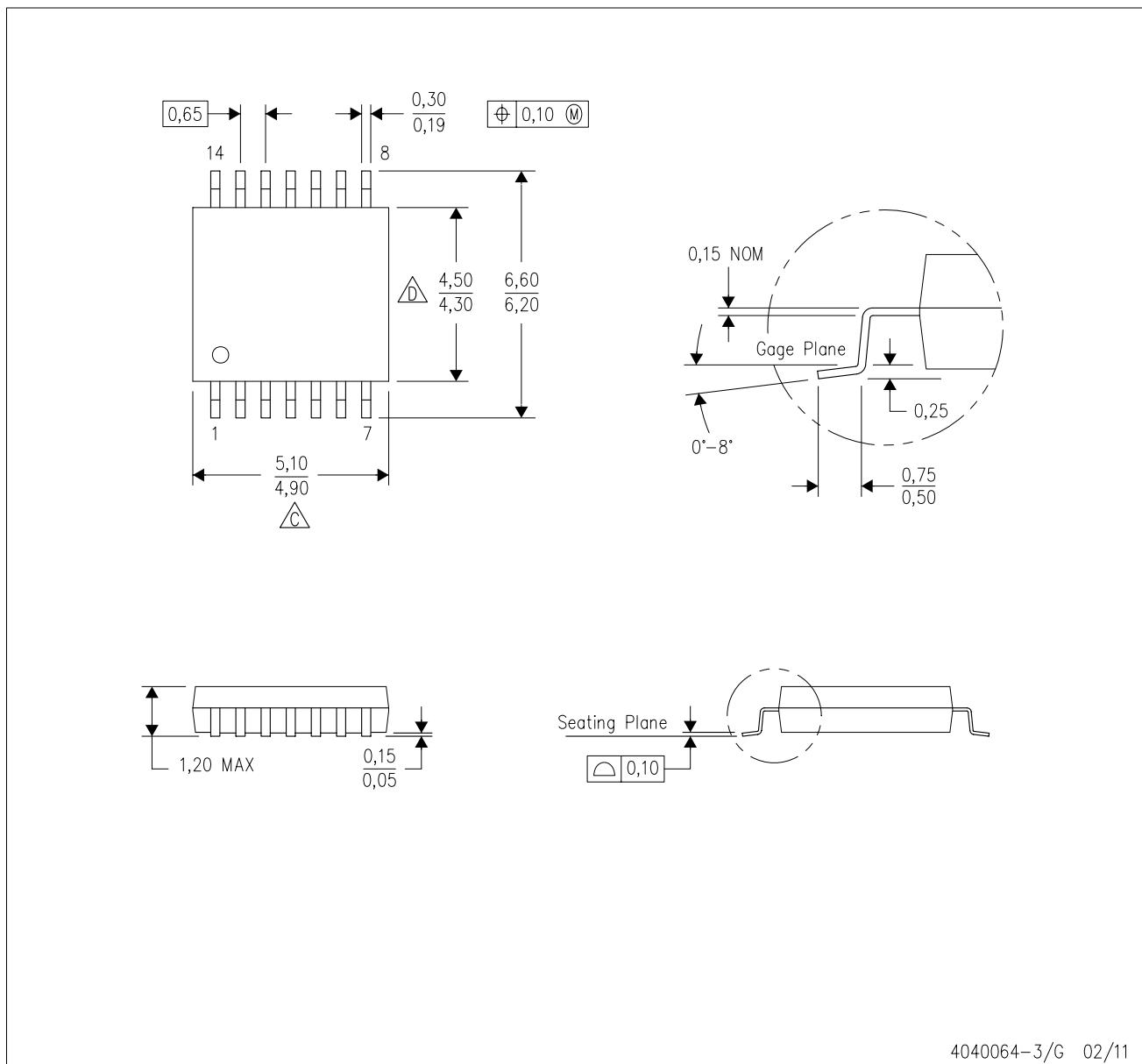
4211283-3/E 08/12

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Publication IPC-7351 is recommended for alternate designs.
- 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 other stencil recommendations.
- Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4040064-3/G 02/11

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.

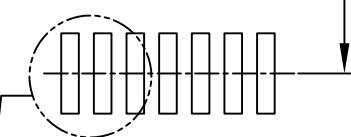
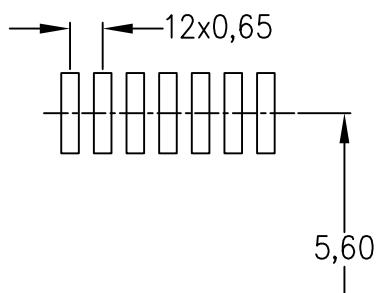
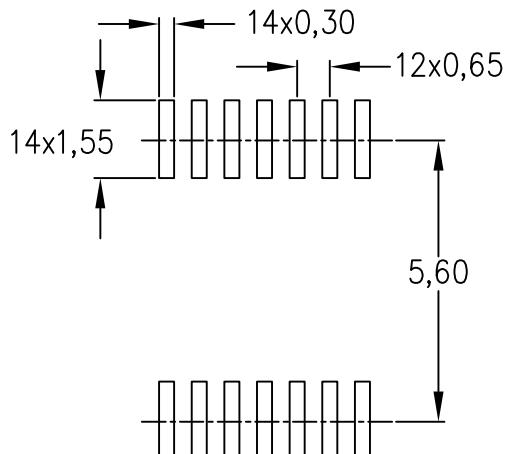
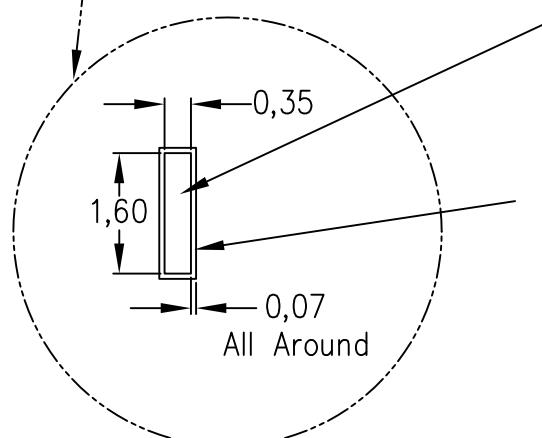
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

D. Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153

PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE

Example Board Layout
(Note C)Stencil Openings
(Note D)Example
Non Soldermask Defined PadExample
Pad Geometry
(See Note C)Example
Solder Mask Opening
(See Note E)

4211284-2/F 12/12

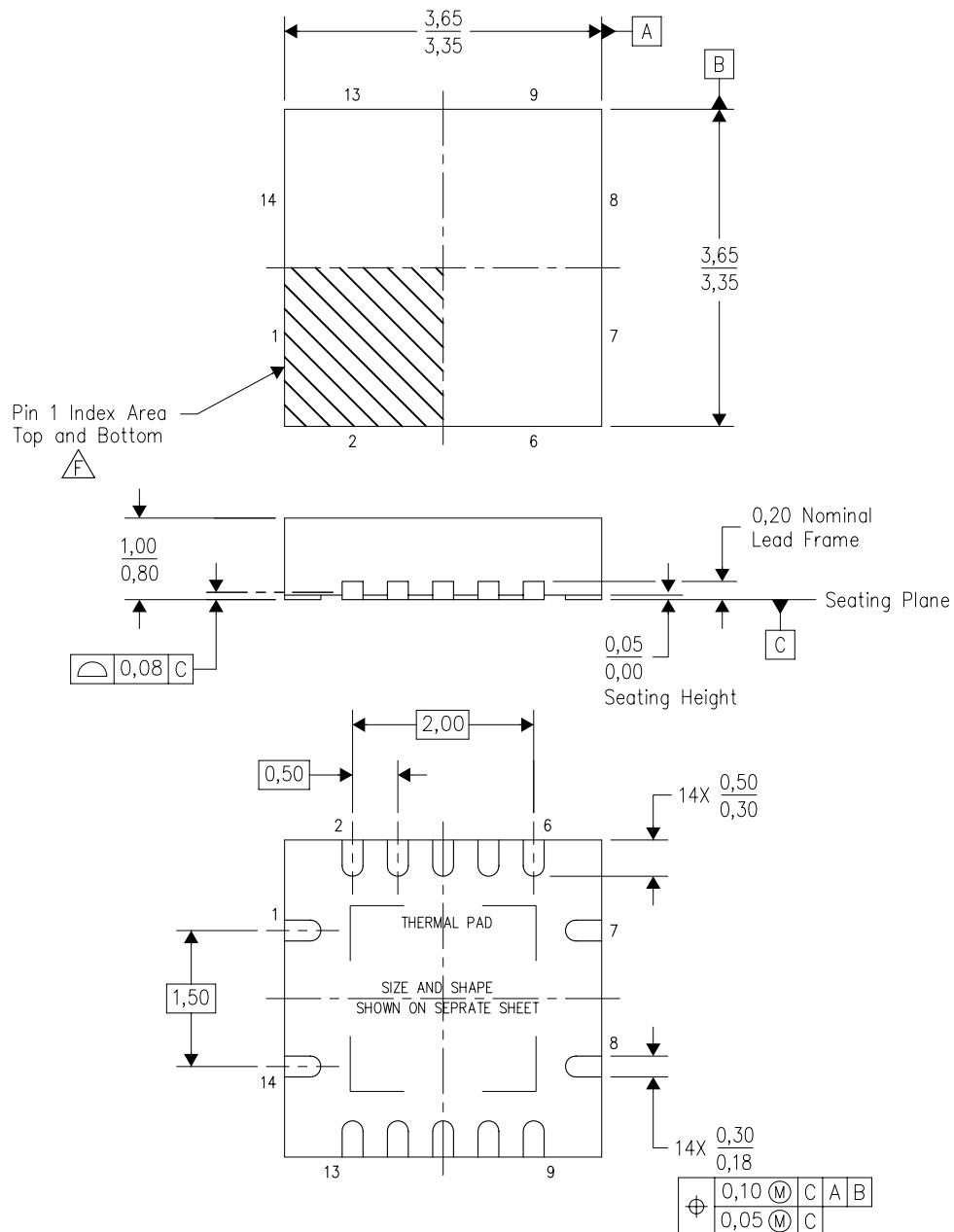
NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- 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 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

MECHANICAL DATA

RGY (S-PVQFN-N14)

PLASTIC QUAD FLATPACK NO-LEAD



Bottom View

4203539-2/l 06/2011

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. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
- F. 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.
- G. Package complies to JEDEC MO-241 variation BA.

THERMAL PAD MECHANICAL DATA

RGY (S-PVQFN-N14)

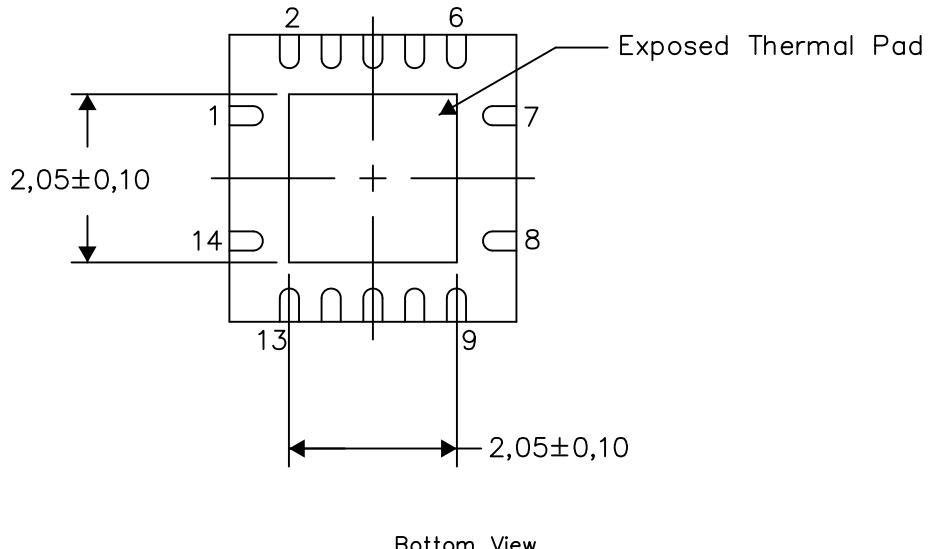
PLASTIC QUAD FLATPACK NO-LEAD

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.

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



Exposed Thermal Pad Dimensions

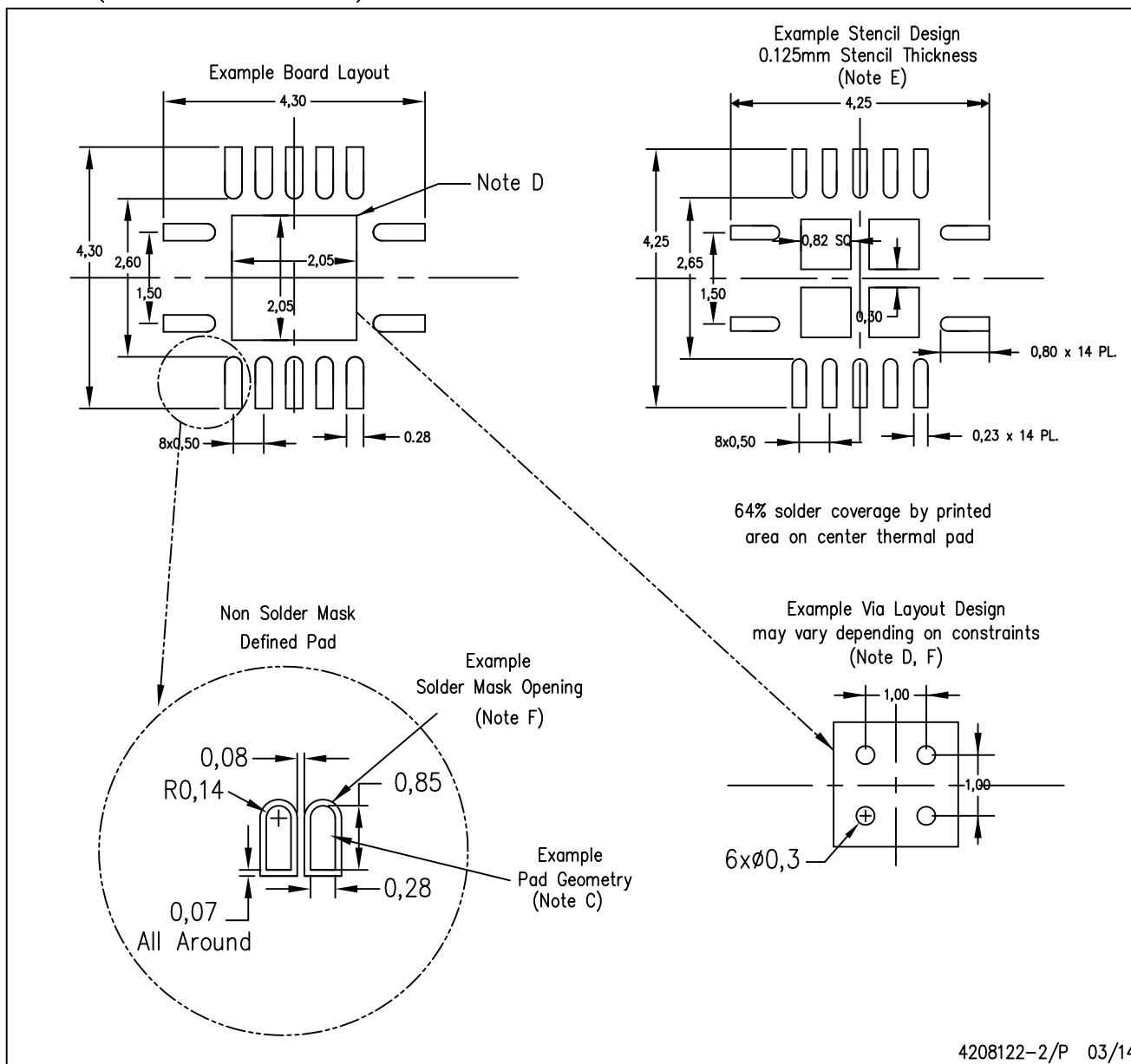
4206353-2/P 03/14

NOTE: All linear dimensions are in millimeters

LAND PATTERN DATA

RGY (S-PVQFN-N14)

PLASTIC QUAD FLATPACK NO-LEAD



4208122-2/P 03/14

NOTES:

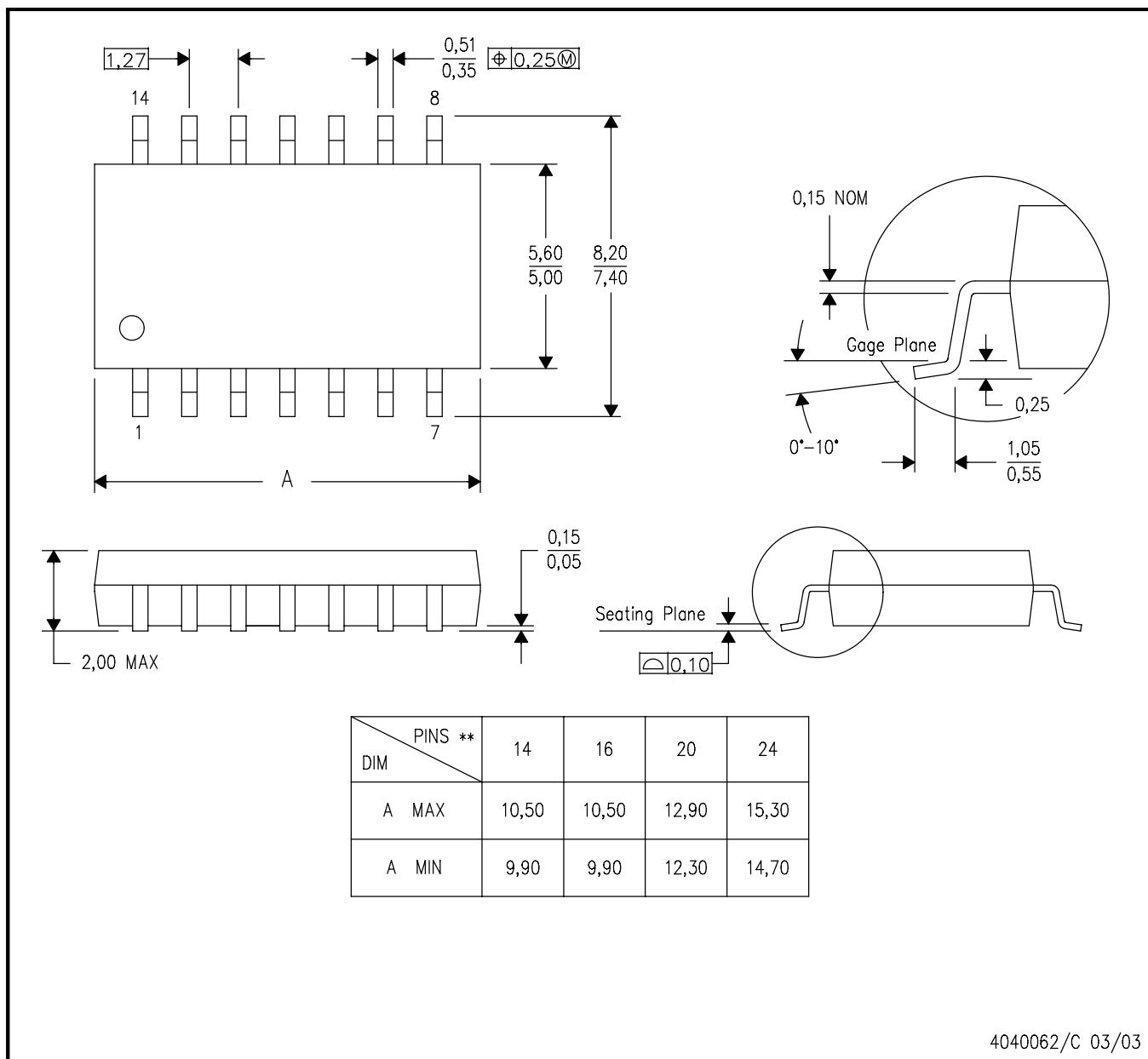
- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Publication IPC-7351 is recommended for alternate designs.
- This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack QFN/SON PCB Attachment, Texas 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>>.
- 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**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



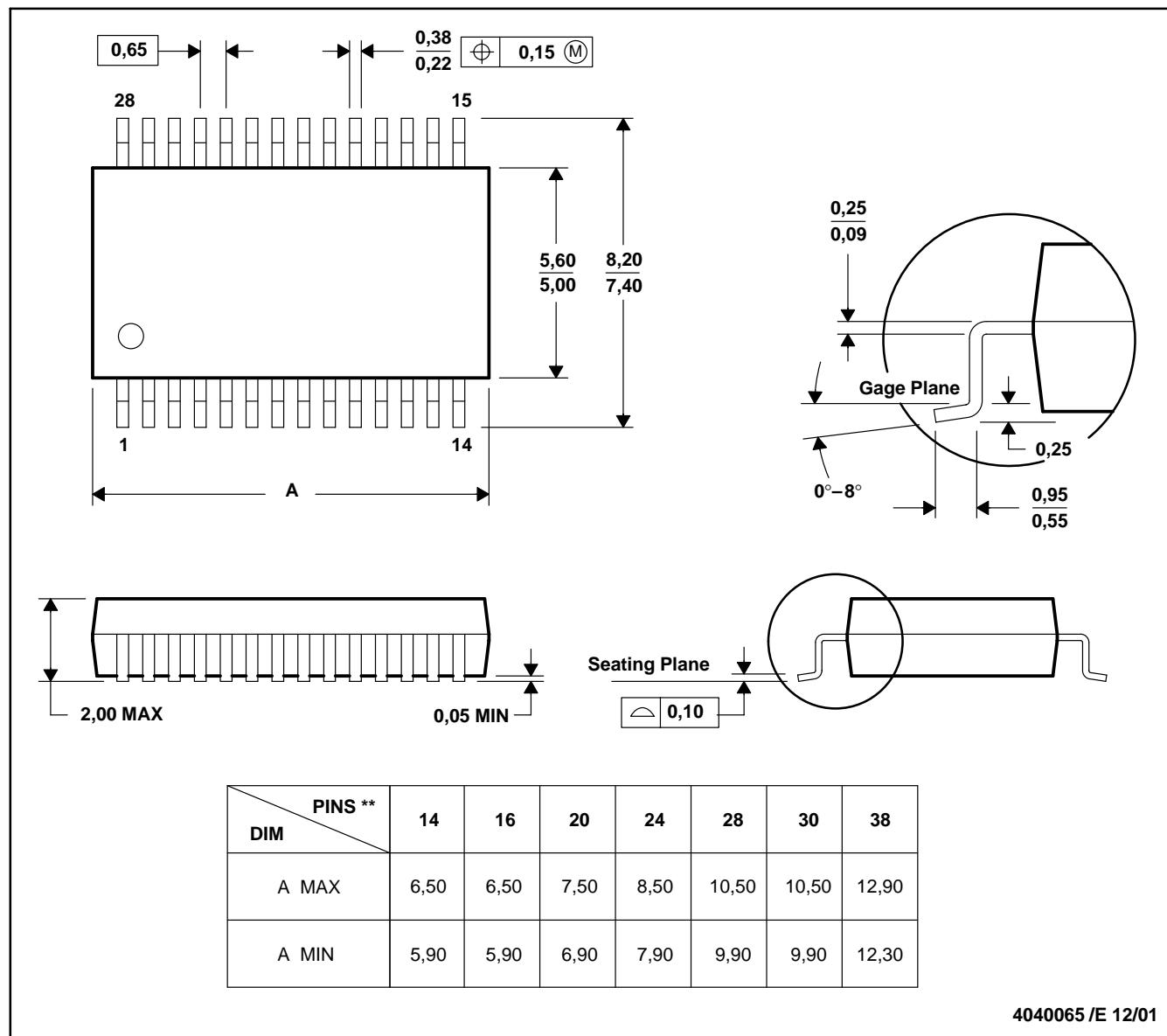
4040062/C 03/03

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

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

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TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

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