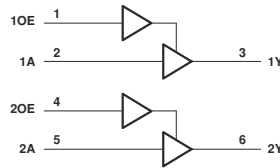


SN74LVC126A-Q1 Automotive Quadruple Bus Buffer Gate With 3-State Outputs

1 Features

- Qualified for automotive applications
- Operates from 1.65V to 3.6V
- Inputs accept voltages to 5.5V
- Max t_{pd} of 4.7ns at 3.3V
- Typical V_{OLP} (output ground bounce) $<0.8V$ at $V_{CC} = 3.3V$, $T_A = 25^\circ C$
- Typical V_{OHV} (output V_{OH} undershoot) $>2V$ at $V_{CC} = 3.3V$, $T_A = 25^\circ C$
- Latch-up performance exceeds 250mA per JESD 17
- ESD protection exceeds JESD 22



Logic Diagram (Positive Logic)

2 Description

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

| PART NUMBER | PACKAGE ⁽¹⁾ | PACKAGE SIZE ⁽²⁾ | BODY SIZE ⁽³⁾ |
|----------------|------------------------|-----------------------------|--------------------------|
| SN74LVC126A-Q1 | D (SOIC, 14) | 8.65mm × 6mm | 8.65mm × 3.9mm |
| | BQA (WQFN, 14) | 3mm × 2.5mm | 3mm × 2.5mm |
| | PW (TSSOP, 14) | 5mm × 6.4mm | 5mm × 4.4mm |

- (1) For more information, see [Section 10](#).
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.
- (3) The body size (length × width) is a nominal value and does not include pins.

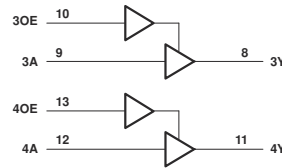
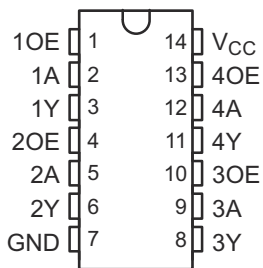


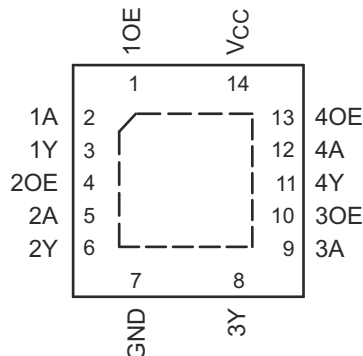
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3 Pin Configuration and Functions



**Figure 3-1. SN74LVC126A-Q1 D or PW Package;
14-Pin SOIC or TSSOP (Top View)**



**Figure 3-2. SN74LVC126A-Q1 BQA Package; 14-Pin
WQFN (Top View)**

Table 3-1. Pin Functions

| PIN | | I/O ⁽¹⁾ | DESCRIPTION |
|-------------|-----------------|--------------------|--|
| NO. | NAME | | |
| 1 | 1OE | I | Output enable 1 |
| 2 | 1A | I | Gate 1 input |
| 3 | 1Y | O | Gate 1 output |
| 4 | 2OE | I | Output enable 2 |
| 5 | 2A | I | Gate 2 input |
| 6 | 2Y | O | Gate 2 output |
| 7 | GND | — | Ground pin |
| 8 | 3Y | O | Gate 3 output |
| 9 | 3A | I | Gate 3 input |
| 10 | 3OE | I | Output enable 3 |
| 11 | 4Y | O | Gate 4 output |
| 12 | 4A | I | Gate 4 input |
| 13 | 4OE | I | Output Enable 4 |
| 14 | V _{CC} | — | Power pin |
| Thermal pad | | — | Connect the GND pin to the exposed thermal pad for correct operation. Connect the thermal pad to any internal PCB ground plane using multiple vias for good thermal performance. |

(1) I = input, O = output, P = power, FB = feedback, GND = ground, N/A = not applicable

4 Specifications

4.1 Absolute Maximum Ratings

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

| | | MIN | MAX | UNIT |
|-----------|--|-----------|----------------|------|
| V_{CC} | Supply voltage range | -0.5 | 6.5 | V |
| V_I | Input voltage range ⁽¹⁾ | -0.5 | 6.5 | V |
| V_O | Output voltage range ^{(1) (2)} | -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 |
| T_{stg} | Storage temperature range | -65 | 150 | °C |

(1) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(2) The value of V_{CC} is provided in the recommended operating conditions table.

4.2 ESD Ratings

| | | VALUE | UNIT |
|-------------|-------------------------|---|------------|
| $V_{(ESD)}$ | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾ | ±2000 V |

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process. This rating was tested on the D (SOIC) package.

4.3 Recommended Operating Conditions

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

| | | MIN | MAX | UNIT | |
|---------------------|------------------------------------|---|----------------------|------|----|
| V_{CC} | Supply voltage | Operating | 1.65 | 3.6 | V |
| | | Data retention only | 1.5 | | |
| V_{IH} | High-level input voltage | $V_{CC} = 1.65\text{ V to }1.95\text{ V}$ | $0.65 \times V_{CC}$ | | V |
| | | $V_{CC} = 2.3\text{ V to }2.7\text{ V}$ | 1.7 | | |
| | | $V_{CC} = 2.7\text{ V to }3.6\text{ V}$ | 2 | | |
| V_{IL} | Low-level input voltage | $V_{CC} = 1.65\text{ V to }1.95\text{ V}$ | $0.35 \times V_{CC}$ | | V |
| | | $V_{CC} = 2.3\text{ V to }2.7\text{ V}$ | | 0.7 | |
| | | $V_{CC} = 2.7\text{ V to }3.6\text{ V}$ | | 0.8 | |
| V_I | Input voltage | 0 | 5.5 | V | |
| V_O | Output voltage | 0 | V_{CC} | V | |
| I_{OH} | High-level output current | $V_{CC} = 1.65\text{ V}$ | | -4 | mA |
| | | $V_{CC} = 2.3\text{ V}$ | | -8 | |
| | | $V_{CC} = 2.7\text{ V}$ | | -12 | |
| | | $V_{CC} = 3\text{ V}$ | | -24 | |
| I_{OL} | Low-level output current | $V_{CC} = 1.65\text{ V}$ | | 4 | mA |
| | | $V_{CC} = 2.3\text{ V}$ | | 8 | |
| | | $V_{CC} = 2.7\text{ V}$ | | 12 | |
| | | $V_{CC} = 3\text{ V}$ | | 24 | |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | | 10 | ns/V | |
| T_A | Operating free-air temperature | -40 | 125 | °C | |

(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.

4.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | SN74LVC126A-Q1 | | | UNIT |
|---|----------------|----------|------------|------|
| | BQA (WQFN) | D (SOIC) | PW (TSSOP) | |
| | 14 PINS | 14 PINS | 14 PINS | |
| R _{θJA} Junction-to-ambient thermal resistance | 102.3 | 127.8 | 150.8 | °C/W |

(1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application report.

4.5 Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS | V _{CC} | MIN | TYP ⁽¹⁾ | MAX | UNIT |
|-------------------------|--|-----------------|-----------------------|--------------------|------|------|
| V _{OH} | I _{OH} = -100μA | 1.65V to 3.6V | V _{CC} - 0.2 | | | V |
| | I _{OH} = -4mA | 1.65V | 1.1 | | | |
| | I _{OH} = -8mA | 2.3V | 1.5 | | | |
| | I _{OH} = -12mA | 2.7V | 2.1 | | | |
| | | 3V | 2.35 | | | |
| I _{OH} = -24mA | 3V | 2.1 | | | | |
| V _{OL} | I _{OL} = 100μA | 1.65V to 3.6V | | | 0.2 | V |
| | I _{OL} = 4mA | 1.65V | | | 0.45 | |
| | I _{OL} = 8mA | 2.3V | | | 0.7 | |
| | I _{OL} = 12mA | 2.7V | | | 0.5 | |
| | I _{OL} = 24mA | 3V | | | 0.7 | |
| I _I | V _I = 5.5V or GND | 3.6V | | | ±10 | μA |
| I _{OZ} | V _O = V _{CC} or GND | 3.6V | | | ±10 | μA |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 3.6V | | | 20 | μA |
| ΔI _{CC} | One input at V _{CC} - 0.6 V, Other inputs at V _{CC} or GND | 2.7V to 3.6V | | | 500 | μA |
| C _i | V _I = V _{CC} or GND | 3.3V | | 4.5 | | pF |
| C _o | V _O = V _{CC} or GND | 3.3V | | 7 | | pF |

(1) All typical values are at V_{CC} = 3.3V, T_A = 25°C.

4.6 Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} = 2.7 V | | V _{CC} = 3.3 V ± 0.3 V | | UNIT |
|--------------------|--------------|-------------|-------------------------|-----|---------------------------------|-----|------|
| | | | MIN | MAX | MIN | MAX | |
| t _{pd} | A | Y | 1 | 6.2 | 1 | 5.7 | ns |
| t _{en} | OE | Y | 1 | 6.3 | 1 | 5.7 | ns |
| t _{dis} | OE | Y | 1 | 6.7 | 1 | 6 | ns |
| t _{sk(o)} | | | | | | 1 | ns |

4.7 Operating Characteristics

T_A = 25°C

| PARAMETER | TEST CONDITIONS | V _{CC} = 3.3 V | UNIT |
|--|------------------|-------------------------|------|
| | | TYP | |
| C _{pd} Power dissipation capacitance per gate | Outputs enabled | 22 | pF |
| | Outputs disabled | 4 | |

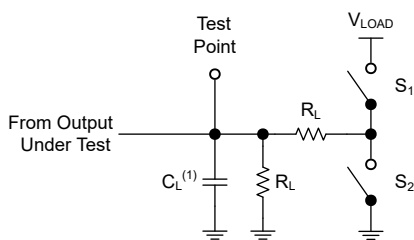
5 Parameter Measurement Information

Phase relationships between waveforms were chosen arbitrarily for the examples listed in the following table. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1MHz, Z_O = 50Ω, t_t ≤ 2.5ns.

The outputs are measured individually with one input transition per measurement.

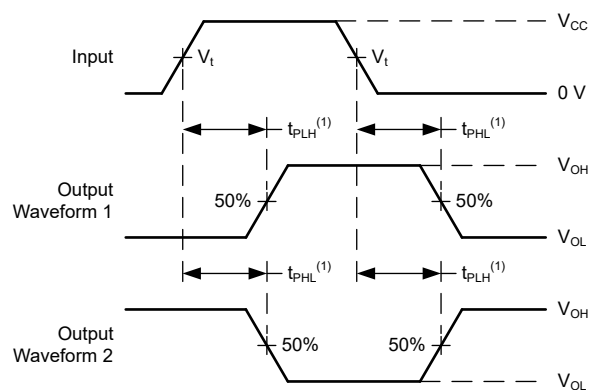
| TEST | S1 | S2 | R _L | C _L | ΔV | V _{LOAD} |
|-------------------------------------|--------|--------|----------------|----------------|------|-------------------|
| t _{PLH} , t _{PHL} | OPEN | OPEN | 500Ω | 50pF | — | — |
| t _{PLZ} , t _{PZL} | CLOSED | OPEN | 500Ω | 50pF | 0.3V | 2×V _{CC} |
| t _{PHZ} , t _{PZH} | OPEN | CLOSED | 500Ω | 50pF | 0.3V | — |

| V _{CC} | V _t | R _L | C _L | ΔV | V _{LOAD} |
|-----------------|--------------------|----------------|----------------|-------|-------------------|
| 1.8V ± 0.15V | V _{CC} /2 | 1kΩ | 30pF | 0.15V | 2×V _{CC} |
| 2.5V ± 0.2V | V _{CC} /2 | 500Ω | 30pF | 0.15V | 2×V _{CC} |
| 2.7V | 1.5V | 500Ω | 50pF | 0.3V | 6V |
| 3.3V ± 0.3V | 1.5V | 500Ω | 50pF | 0.3V | 6V |



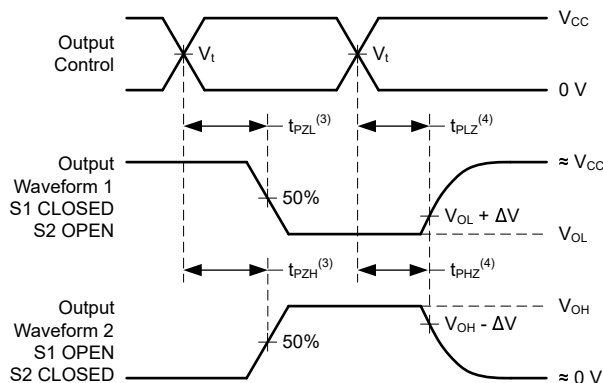
(1) C_L includes probe and test-fixture capacitance.

Figure 5-1. Load Circuit for 3-State Outputs



(1) The greater between t_{PLH} and t_{PHL} is the same as t_{pd}.

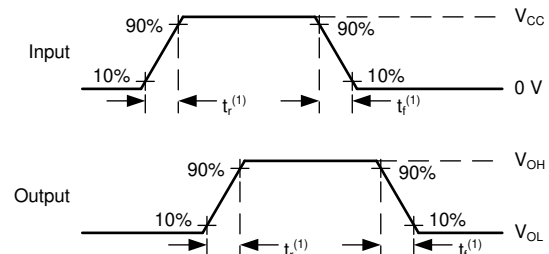
Figure 5-2. Voltage Waveforms Propagation Delays



(1) The greater between t_{PZL} and t_{PZH} is the same as t_{en}.

(2) The greater between t_{PLZ} and t_{PHZ} is the same as t_{dis}.

Figure 5-3. Voltage Waveforms Propagation Delays



(1) The greater between t_r and t_f is the same as t_t.

Figure 5-4. Voltage Waveforms, Input and Output Transition Times

6 Detailed Description

6.1 Overview

The SN74LVC126A features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (OE) input is low.

To ensure the high-impedance state during power up or power down, OE should be tied to GND through a pulldown resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

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

6.2 Functional Block Diagram

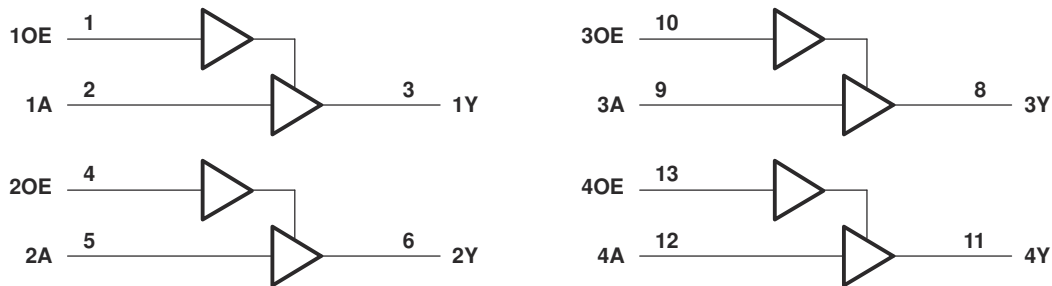


Figure 6-1. Logic Diagram (Positive Logic)

6.3 Device Functional Modes

Function Table
(Each Buffer)

| INPUTS | | OUTPUT |
|--------|---|--------|
| OE | A | Y |
| H | H | H |
| H | L | L |
| L | X | Z |

7 Application and Implementation

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.

7.1 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating in the [Recommended Operating Conditions](#).

Each V_{CC} pin must have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1 μF is recommended; if there are multiple V_{CC} pins, then 0.01 μF or 0.022 μF is recommended for each power pin. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. A 0.1 μF and a 1 μF are commonly used in parallel. The bypass capacitor must be installed as close to the power pin as possible for best results.

7.2 Layout

7.2.1 Layout Guidelines

When using multiple bit logic devices, inputs must never float.

In many cases, functions or parts of functions of digital logic devices are unused, for example, when only two inputs of a triple-input and gate are used, or only 3 of the 4 buffer gates are used. Such input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. [Layout Diagram](#) specifies the 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 must be applied to any particular unused input depends on the function of the device. Generally they are tied to GND or V_{CC} , whichever makes more sense or is more convenient. It is generally acceptable to float outputs, unless the part is a transceiver.

7.2.2 Layout Example

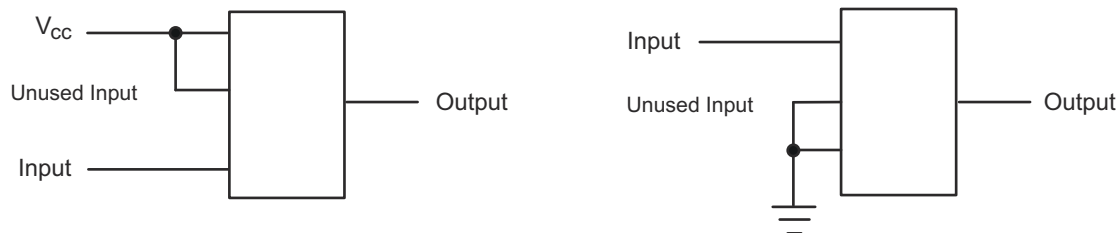


Figure 7-1. Layout Diagram

8 Device and Documentation Support

8.1 Documentation Support (Analog)

8.1.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 8-1. Related Links

| PARTS | PRODUCT FOLDER | SAMPLE & BUY | TECHNICAL DOCUMENTS | TOOLS & SOFTWARE | SUPPORT & COMMUNITY |
|----------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| SN74LVC126A-Q1 | Click here | Click here | Click here | Click here | Click here |

8.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](#). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.3 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

8.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision C (May 2024) to Revision D (October 2024) | Page |
|--|-------------|
| • Updated RθJA values: D = 86 to 127.8, all values in °C/W | 5 |

| Changes from Revision B (April 2008) to Revision C (May 2024) | Page |
|---|-------------|
| • Added BQA package to <i>Package Information</i> table, <i>Pin Configuration and Functions</i> section, and <i>Thermal Information</i> table..... | 1 |
| • Added <i>Package Information</i> table, <i>Pin Functions</i> table, <i>ESD Ratings</i> table, <i>Thermal Information</i> table, <i>Device Functional Modes</i> , Application and Implementation section, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section | 1 |
| • Deleted references to machine model throughout the data sheet..... | 1 |

-
- Updated R θ JA values: PW = 113 to 150.8, all values in °C/W5
-

10 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 part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|------------------------------------|---------------|----------------------|-----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| CLVC126AQPWRG4Q1 | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| CLVC126AQPWRG4Q1.A | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| CLVC126AQPWRG4Q1.B | Active | Production | TSSOP (PW) 14 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126APWRQ1 | Active | Production | TSSOP (PW) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126APWRQ1.A | Active | Production | TSSOP (PW) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AQDRG4Q1 | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AQDRG4Q1.B | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AQDRQ1 | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AQDRQ1.A | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AQDRQ1.B | Active | Production | SOIC (D) 14 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126AQ |
| SN74LVC126AWBQARQ1 | Active | Production | WQFN (BQA) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126Q |
| SN74LVC126AWBQARQ1.A | Active | Production | WQFN (BQA) 14 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | LC126Q |

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

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

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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

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

OTHER QUALIFIED VERSIONS OF SN74LVC126A-Q1 :

- Catalog : [SN74LVC126A](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

TAPE AND REEL INFORMATION

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 |
|--------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CLVC126AQPWRG4Q1 | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC126APWRQ1 | TSSOP | PW | 14 | 3000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74LVC126AWBQARQ1 | WQFN | BQA | 14 | 3000 | 180.0 | 12.4 | 2.8 | 3.3 | 1.1 | 4.0 | 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) |
|--------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CLVC126AQPWRG4Q1 | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74LVC126APWRQ1 | TSSOP | PW | 14 | 3000 | 353.0 | 353.0 | 32.0 |
| SN74LVC126AWBQARQ1 | WQFN | BQA | 14 | 3000 | 210.0 | 185.0 | 35.0 |



D0014A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
5. Reference JEDEC registration MS-012, variation AB.

EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

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

EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

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

GENERIC PACKAGE VIEW

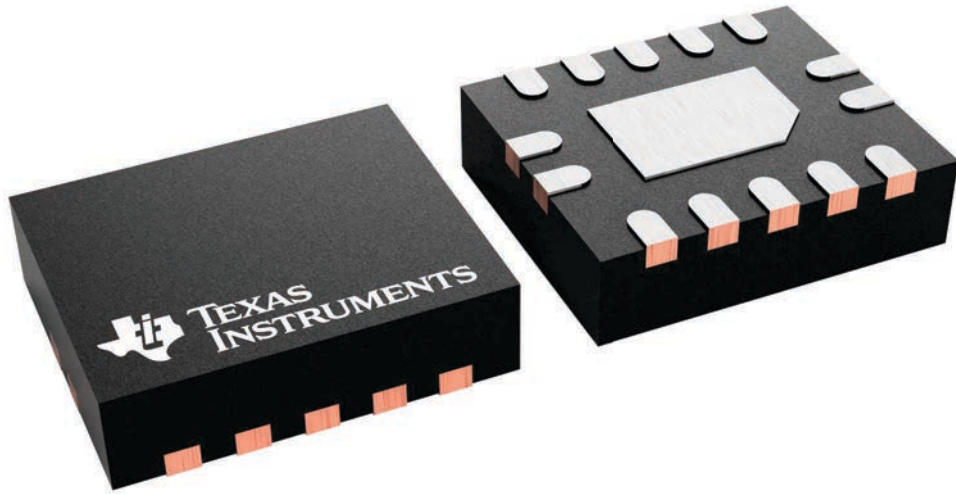
BQA 14

WQFN - 0.8 mm max height

2.5 x 3, 0.5 mm pitch

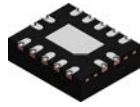
PLASTIC QUAD FLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4227145/A

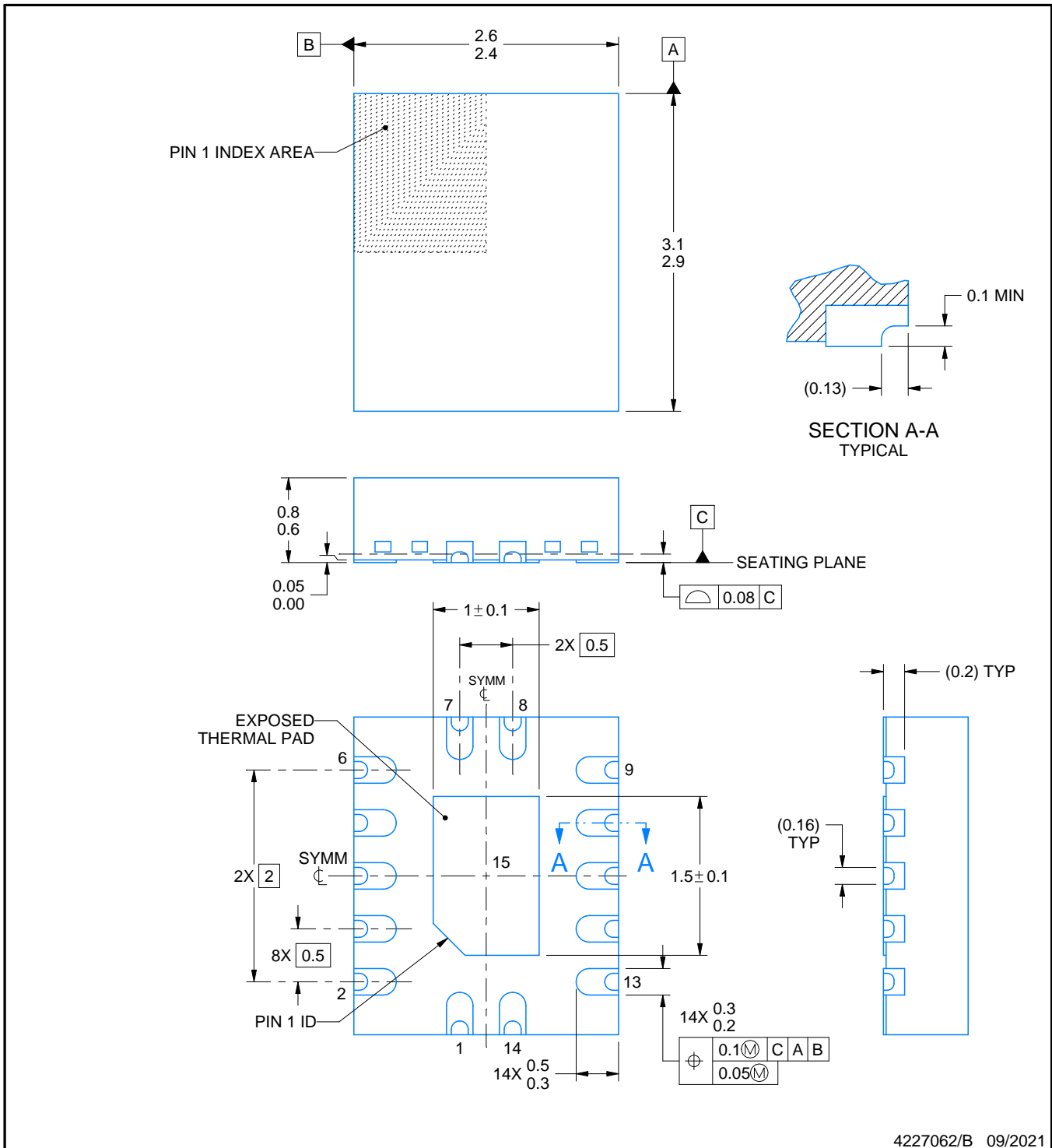
BQA0014B



PACKAGE OUTLINE

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



NOTES:

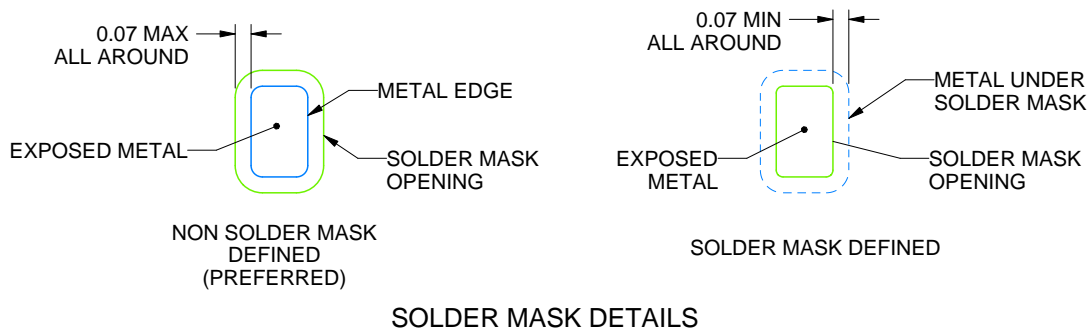
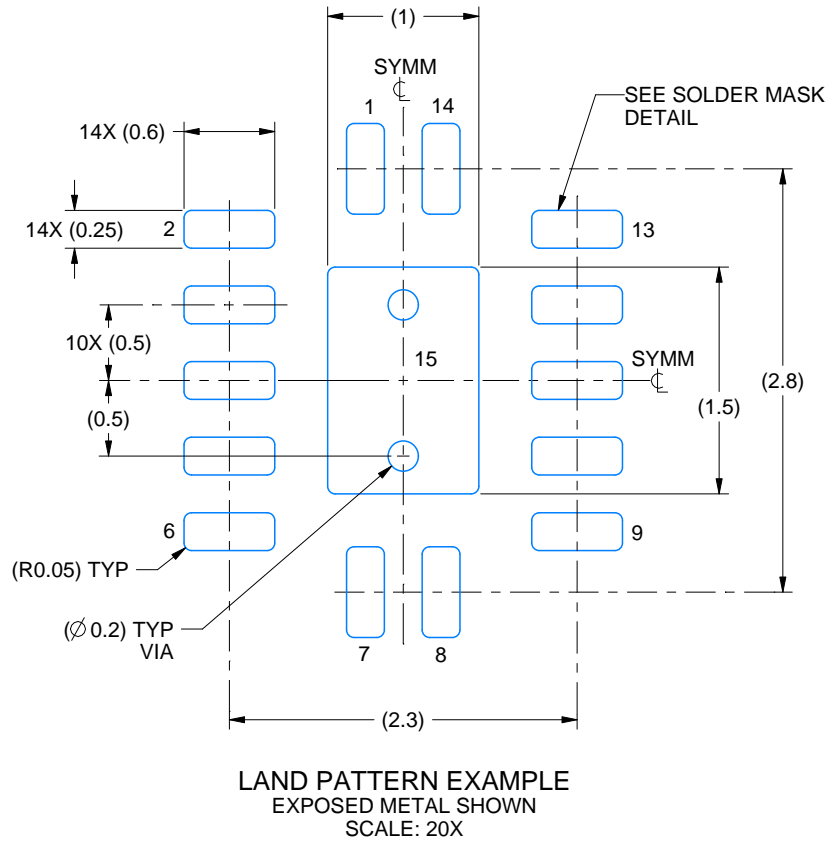
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

BQA0014B

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



4227062/B 09/2021

NOTES: (continued)

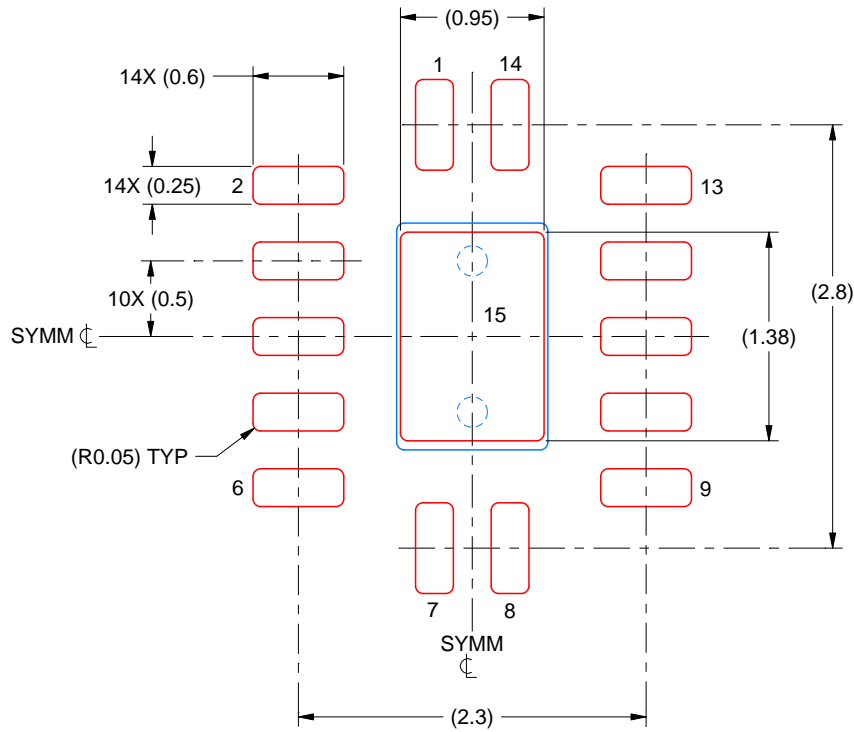
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

BQA0014B

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 20X

EXPOSED PAD 15
87% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

4227062/B 09/2021

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PW0014A



PACKAGE OUTLINE
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220202/B 12/2023

NOTES:

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

EXAMPLE BOARD LAYOUT

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220202/B 12/2023

NOTES: (continued)

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

EXAMPLE STENCIL DESIGN

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220202/B 12/2023

NOTES: (continued)

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

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