

# 74LVC2G126-Q100

Bus buffer/line driver; 3-state

Rev. 5 — 17 August 2023

Product data sheet

## 1. General description

The 74LVC2G126-Q100 is a dual buffer/line driver with 3-state outputs controlled by the output enable inputs (nOE). Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments.

Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times.

This device is fully specified for partial power down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- Wide supply voltage range from 1.65 V to 5.5 V
- Overvoltage tolerant inputs to 5.5 V
- High noise immunity
- ±24 mA output drive (V<sub>CC</sub> = 3.0 V)
- CMOS low power consumption
- I<sub>OFF</sub> circuitry provides partial Power-down mode operation
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Complies with JEDEC standard:
  - JESD8-7 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8-B/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V

## 3. Ordering information

Table 1. Ordering information

| Type number                       | Package           |        |   | Version                  |
|-----------------------------------|-------------------|--------|---|--------------------------|
|                                   | Temperature range | Name   | Description   |                          |
| <a href="#">74LVC2G126DP-Q100</a> | -40 °C to +125 °C | TSSOP8 | plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm | <a href="#">SOT505-2</a> |
| <a href="#">74LVC2G126DC-Q100</a> | -40 °C to +125 °C | VSSOP8 | plastic very thin shrink small outline package; 8 leads; body width 2.3 mm              | <a href="#">SOT765-1</a> |

## 4. Marking

Table 2. Marking codes

| Type number       | Marking code [1] |
|-------------------|------------------|
| 74LVC2G126DP-Q100 | V26              |
| 74LVC2G126DC-Q100 | V26              |

[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram

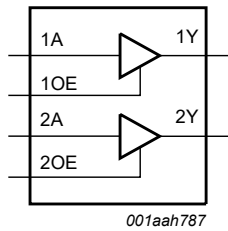


Fig. 1. Logic symbol

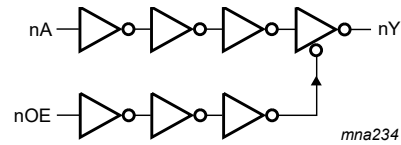
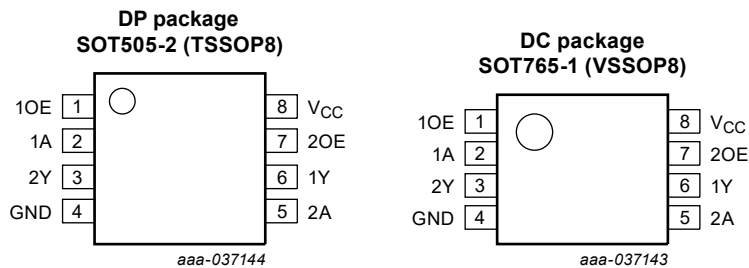


Fig. 2. Logic diagram (one gate)

## 6. Pinning information

### 6.1. Pinning



### 6.2. Pin description

Table 3. Pin description

| Symbol          | Pin  | Description                       |
|-----------------|------|-----------------------------------|
| 1OE, 2OE        | 1, 7 | output enable input (active HIGH) |
| 1A, 2A          | 2, 5 | data input                        |
| 1Y, 2Y          | 6, 3 | data output                       |
| GND             | 4    | ground (0 V)                      |
| V <sub>CC</sub> | 8    | supply voltage                    |

## 7. Functional description

**Table 4. Function table**

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

| Input |    | Output |
|-------|----|--------|
| nOE   | nA | nY     |
| H     | L  | L      |
| H     | H  | H      |
| L     | X  | Z      |

## 8. Limiting values

**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

| Symbol    | Parameter               | Conditions                      | Min      | Max            | Unit |
|-----------|-------------------------|---------------------------------|----------|----------------|------|
| $V_{CC}$  | supply voltage          |                                 | -0.5     | +6.5           | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                     | -50      | -              | mA   |
| $V_I$     | input voltage           |                                 | [1] -0.5 | +6.5           | V    |
| $I_{OK}$  | output clamping current | $V_O > V_{CC}$ or $V_O < 0$ V   | -        | ±50            | mA   |
| $V_O$     | output voltage          | Active mode                     | [1] -0.5 | $V_{CC} + 0.5$ | V    |
|           |                         | Power-down mode; $V_{CC} = 0$ V | [1] -0.5 | +6.5           | V    |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$         | -        | ±50            | mA   |
| $I_{CC}$  | supply current          |                                 | -        | +100           | mA   |
| $I_{GND}$ | ground current          |                                 | -100     | -              | mA   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to $+125$ °C | [2] -    | 250            | mW   |
| $T_{stg}$ | storage temperature     |                                 | -65      | +150           | °C   |

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SOT505-2 (TSSOP8) package:  $P_{tot}$  derates linearly with 4.6 mW/K above 96 °C.  
For SOT765-1 (VSSOP8) package:  $P_{tot}$  derates linearly with 4.9 mW/K above 99 °C.

## 9. Recommended operating conditions

**Table 6. Operating conditions**

| Symbol              | Parameter                           | Conditions                      | Min  | Max      | Unit |
|---------------------|-------------------------------------|---------------------------------|------|----------|------|
| $V_{CC}$            | supply voltage                      |                                 | 1.65 | 5.5      | V    |
| $V_I$               | input voltage                       |                                 | 0    | 5.5      | V    |
| $V_O$               | output voltage                      | Active mode                     | 0    | $V_{CC}$ | V    |
|                     |                                     | Power-down mode; $V_{CC} = 0$ V | 0    | 5.5      | V    |
| $T_{amb}$           | ambient temperature                 |                                 | -40  | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.65$ V to $2.7$ V    | -    | 20       | ns/V |
|                     |                                     | $V_{CC} = 2.7$ V to $5.5$ V     | -    | 10       | ns/V |

## 10. Static characteristics

**Table 7. Static characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

| Symbol           | Parameter                 | Conditions   | -40 °C to +85 °C      |         |                     | -40 °C to +125 °C     |                     | Unit |
|------------------|---------------------------|--|-----------------------|---------|---------------------|-----------------------|---------------------|------|
|                  |                           |  | Min                   | Typ [1] | Max                 | Min                   | Max                 |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> = 1.65 V to 1.95 V   | 0.65V <sub>CC</sub>   | -       | -                   | 0.65V <sub>CC</sub>   | -                   | V    |
|                  |                           | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.7                   | -       | -                   | 1.7                   | -                   | V    |
|                  |                           | V <sub>CC</sub> = 2.7 V to 3.6 V   | 2.0                   | -       | -                   | 2.0                   | -                   | V    |
|                  |                           | V <sub>CC</sub> = 4.5 V to 5.5 V   | 0.7V <sub>CC</sub>    | -       | -                   | 0.7V <sub>CC</sub>    | -                   | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 1.65 V to 1.95 V   | -                     | -       | 0.35V <sub>CC</sub> | -                     | 0.35V <sub>CC</sub> | V    |
|                  |                           | V <sub>CC</sub> = 2.3 V to 2.7 V   | -                     | -       | 0.7                 | -                     | 0.7                 | V    |
|                  |                           | V <sub>CC</sub> = 2.7 V to 3.6 V   | -                     | -       | 0.8                 | -                     | 0.8                 | V    |
|                  |                           | V <sub>CC</sub> = 4.5 V to 5.5 V   | -                     | -       | 0.3V <sub>CC</sub>  | -                     | 0.3V <sub>CC</sub>  | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |         |                     |                       |                     |      |
|                  |                           | I <sub>O</sub> = 100 μA; V <sub>CC</sub> = 1.65 V to 5.5 V   | -                     | -       | 0.1                 | -                     | 0.1                 | V    |
|                  |                           | I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V  | -                     | -       | 0.45                | -                     | 0.70                | V    |
|                  |                           | I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V   | -                     | -       | 0.3                 | -                     | 0.45                | V    |
|                  |                           | I <sub>O</sub> = 12 mA; V <sub>CC</sub> = 2.7 V  | -                     | -       | 0.4                 | -                     | 0.60                | V    |
|                  |                           | I <sub>O</sub> = 24 mA; V <sub>CC</sub> = 3.0 V  | -                     | -       | 0.55                | -                     | 0.80                | V    |
|                  |                           | I <sub>O</sub> = 32 mA; V <sub>CC</sub> = 4.5 V  | -                     | -       | 0.55                | -                     | 0.80                | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |         |                     |                       |                     |      |
|                  |                           | I <sub>O</sub> = -100 μA; V <sub>CC</sub> = 1.65 V to 5.5 V  | V <sub>CC</sub> - 0.1 | -       | -                   | V <sub>CC</sub> - 0.1 | -                   | V    |
|                  |                           | I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V   | 1.2                   | -       | -                   | 0.95                  | -                   | V    |
|                  |                           | I <sub>O</sub> = -8 mA; V <sub>CC</sub> = 2.3 V  | 1.9                   | -       | -                   | 1.7                   | -                   | V    |
|                  |                           | I <sub>O</sub> = -12 mA; V <sub>CC</sub> = 2.7 V   | 2.2                   | -       | -                   | 1.9                   | -                   | V    |
|                  |                           | I <sub>O</sub> = -24 mA; V <sub>CC</sub> = 3.0 V   | 2.3                   | -       | -                   | 2.0                   | -                   | V    |
|                  |                           | I <sub>O</sub> = -32 mA; V <sub>CC</sub> = 4.5 V   | 3.8                   | -       | -                   | 3.4                   | -                   | V    |
| I <sub>I</sub>   | input leakage current     | V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V  | -                     | ±0.1    | ±1                  | -                     | ±1                  | μA   |
| I <sub>OZ</sub>  | OFF-state output current  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 5.5 V or GND; V <sub>CC</sub> = 3.6 V | -                     | ±0.1    | ±2                  | -                     | ±2                  | μA   |
| I <sub>OFF</sub> | power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 5.5 V; V <sub>CC</sub> = 0 V  | -                     | ±0.1    | ±2                  | -                     | ±2                  | μA   |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 1.65 V to 5.5 V; I <sub>O</sub> = 0 A                       | -                     | 0.1     | 4                   | -                     | 4                   | μA   |
| ΔI <sub>CC</sub> | additional supply current | per pin; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 2.3 V to 5.5 V    | -                     | 5       | 500                 | -                     | 500                 | μA   |
| C <sub>I</sub>   | input capacitance         |  | -                     | 2       | -                   | -                     | -                   | pF   |

[1] Typical values are measured at V<sub>CC</sub> = 3.3 V and T<sub>amb</sub> = 25 °C.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 5.

| Symbol           | Parameter                     | Conditions  | -40 °C to +85 °C |         |      | -40 °C to +125 °C |      | Unit |
|------------------|-------------------------------|---|------------------|---------|------|-------------------|------|------|
|                  |                               |   | Min              | Typ [1] | Max  | Min               | Max  |      |
| t <sub>pd</sub>  | propagation delay             | nA to nY; see Fig. 3 [2]                                |                  |         |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                      | 1.0              | 3.9     | 9.8  | 1.0               | 12.3 | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                        | 0.5              | 2.6     | 4.9  | 0.5               | 6.3  | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                 | 1.0              | 2.8     | 4.7  | 1.0               | 5.9  | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                        | 0.5              | 2.4     | 4.3  | 0.5               | 5.4  | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                        | 0.5              | 1.9     | 3.2  | 0.5               | 4.0  | ns   |
| t <sub>en</sub>  | enable time                   | nOE to nY; see Fig. 4 [3]                               |                  |         |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                      | 1.0              | 4.1     | 10.0 | 1.0               | 12.5 | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                        | 1.0              | 2.6     | 5.0  | 1.0               | 6.3  | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                 | 1.0              | 2.8     | 4.7  | 1.0               | 5.9  | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                        | 1.0              | 2.4     | 4.1  | 1.0               | 5.1  | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                        | 0.5              | 1.8     | 3.1  | 0.5               | 3.9  | ns   |
| t <sub>dis</sub> | disable time                  | nOE to nY; see Fig. 4 [4]                               |                  |         |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                      | 1.0              | 3.3     | 12.6 | 1.0               | 15.4 | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                        | 0.5              | 1.9     | 5.7  | 0.5               | 7.5  | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                 | 1.5              | 3.0     | 4.8  | 1.5               | 6.2  | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                        | 1.0              | 2.5     | 4.4  | 1.0               | 5.7  | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                        | 0.5              | 1.8     | 3.3  | 0.5               | 4.4  | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | per buffer; V <sub>I</sub> = GND to V <sub>CC</sub> [5] |                  |         |      |                   |      |      |
|                  |                               | output enabled  | -                | 17      | -    | -                 | -    | pF   |
|                  |                               | output disabled   | -                | 5       | -    | -                 | -    | pF   |

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.8 V, 2.5 V, 2.7 V, 3.3 V and 5.0 V respectively.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.

[4] t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.

[5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

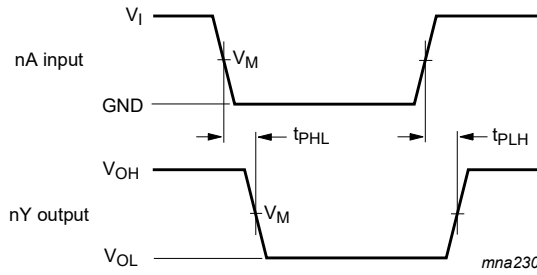
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of outputs.

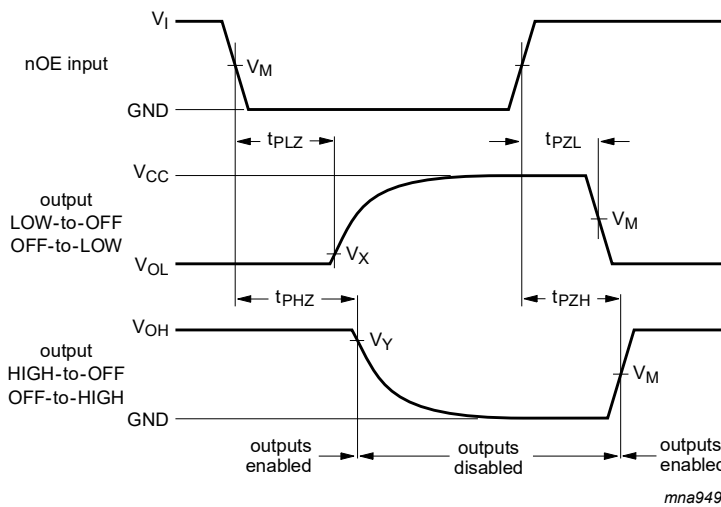
11.1. Waveforms and test circuit



Measurement points are given in Table 9.

Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

Fig. 3. The data input (nA) to output (nY) propagation delays



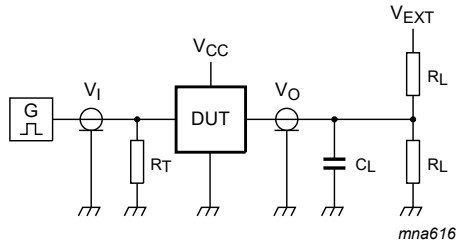
Measurement points are given in Table 9.

Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

Fig. 4. 3-state enable and disable times

Table 9. Measurement points

| Supply voltage   | Input               | Output              |                           |                           |
|------------------|---------------------|---------------------|---------------------------|---------------------------|
| $V_{CC}$         | $V_M$               | $V_M$               | $V_X$                     | $V_Y$                     |
| 1.65 V to 1.95 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 2.3 V to 2.7 V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 2.7 V            | 1.5 V               | 1.5 V               | $V_{OL} + 0.3 \text{ V}$  | $V_{OH} - 0.3 \text{ V}$  |
| 3.0 V to 3.6 V   | 1.5 V               | 1.5 V               | $V_{OL} + 0.3 \text{ V}$  | $V_{OH} - 0.3 \text{ V}$  |
| 4.5 V to 5.5 V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$  | $V_{OH} - 0.3 \text{ V}$  |



Test data is given in [Table 10](#).

Definitions for test circuit:

$R_L$  = Load resistance;

$C_L$  = Load capacitance including jig and probe capacitance;

$R_T$  = Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator;

$V_{EXT}$  = External voltage for measuring switching times.

**Fig. 5. Test circuit for measuring switching times**

**Table 10. Test data**

| Supply voltage   | Input    |               | Load  |              | $V_{EXT}$          |                    |                    |
|------------------|----------|---------------|-------|--------------|--------------------|--------------------|--------------------|
| $V_{CC}$         | $V_I$    | $t_r, t_f$    | $C_L$ | $R_L$        | $t_{PLH}, t_{PHL}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 1.65 V to 1.95 V | $V_{CC}$ | $\leq 2.0$ ns | 30 pF | 1 k $\Omega$ | open               | GND                | $2 \times V_{CC}$  |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2.0$ ns | 30 pF | 500 $\Omega$ | open               | GND                | $2 \times V_{CC}$  |
| 2.7 V            | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | 6 V                |
| 3.0 V to 3.6 V   | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | 6 V                |
| 4.5 V to 5.5 V   | $V_{CC}$ | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2 \times V_{CC}$  |

## 12. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2

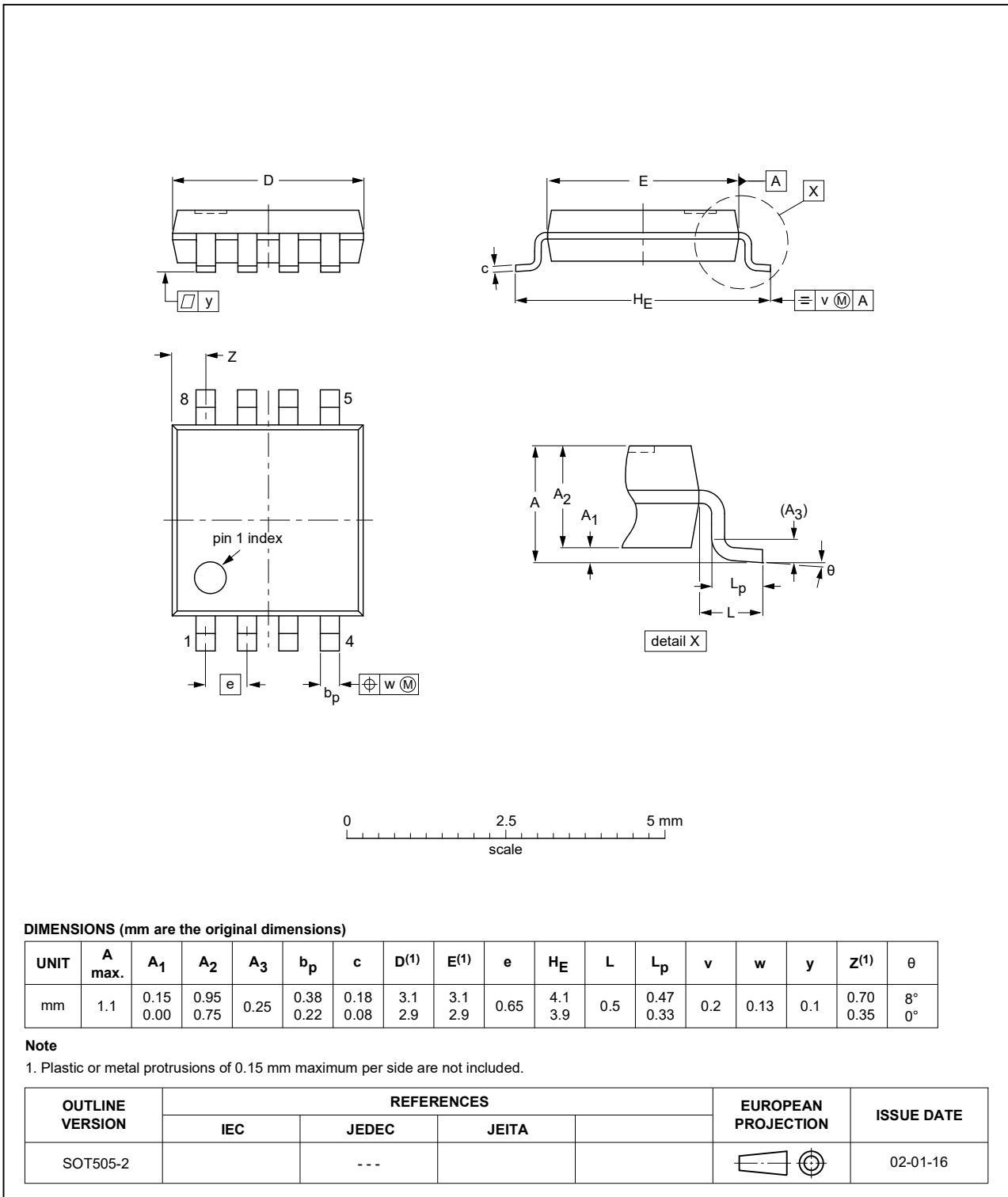


Fig. 6. Package outline SOT505-2 (TSSOP8)



VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1

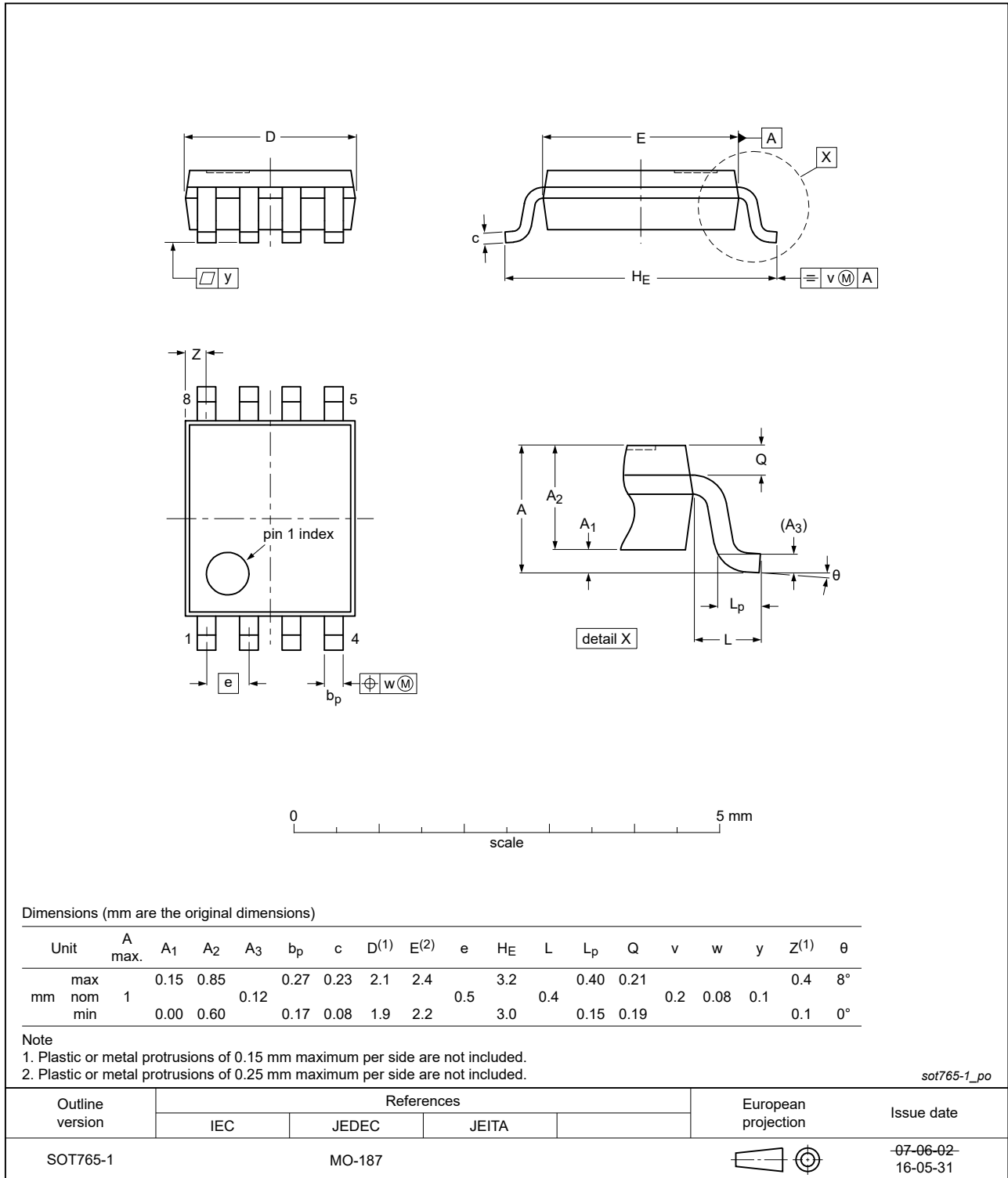


Fig. 7. Package outline SOT765-1 (VSSOP8)

## 13. Abbreviations

Table 11. Abbreviations

| Acronym | Description                             |
|---------|---|
| CDM     | Charged Device Model                    |
| CMOS    | Complementary Metal-Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| TTL     | Transistor-Transistor Logic             |

## 14. Revision history

Table 12. Revision history

| Document ID         | Release date  | Data sheet status  | Change notice | Supersedes          |
|---------------------|---|--------------------|---------------|---------------------|
| 74LVC2G126_Q100 v.5 | 20230817  | Product data sheet | -             | 74LVC2G126_Q100 v.4 |
| Modifications:      | <ul style="list-style-type: none"> <li><a href="#">Section 2</a>: ESD specification updated according to the latest JEDEC standard.</li> </ul>  |                    |               |                     |
| 74LVC2G126_Q100 v.4 | 20210428  | Product data sheet | -             | 74LVC2G126_Q100 v.3 |
| Modifications:      | <ul style="list-style-type: none"> <li><a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li><a href="#">Section 8</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>          |                    |               |                     |
| 74LVC2G126_Q100 v.3 | 20190110  | Product data sheet | -             | 74LVC2G126_Q100 v.2 |
| Modifications:      | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul> |                    |               |                     |
| 74LVC2G126_Q100 v.2 | 20161214  | Product data sheet | -             | 74LVC2G126_Q100 v.1 |
| Modifications:      | <ul style="list-style-type: none"> <li><a href="#">Table 7</a>: The maximum limits for leakage current and supply current have changed.</li> </ul>  |                    |               |                     |
| 74LVC2G126_Q100 v.1 | 20150512  | Product data sheet | -             | -                   |

## 15. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

### Definitions

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## Contents

|  |           |
|--|-----------|
| <b>1. General description</b> .....              | <b>1</b>  |
| <b>2. Features and benefits</b> .....            | <b>1</b>  |
| <b>3. Ordering information</b> .....             | <b>1</b>  |
| <b>4. Marking</b> .....                          | <b>2</b>  |
| <b>5. Functional diagram</b> .....               | <b>2</b>  |
| <b>6. Pinning information</b> .....              | <b>2</b>  |
| 6.1. Pinning.....                                | 2         |
| 6.2. Pin description.....                        | 2         |
| <b>7. Functional description</b> .....           | <b>3</b>  |
| <b>8. Limiting values</b> .....                  | <b>3</b>  |
| <b>9. Recommended operating conditions</b> ..... | <b>3</b>  |
| <b>10. Static characteristics</b> .....          | <b>4</b>  |
| <b>11. Dynamic characteristics</b> .....         | <b>5</b>  |
| 11.1. Waveforms and test circuit.....            | 6         |
| <b>12. Package outline</b> .....                 | <b>8</b>  |
| <b>13. Abbreviations</b> .....                   | <b>10</b> |
| <b>14. Revision history</b> .....                | <b>10</b> |
| <b>15. Legal information</b> .....               | <b>11</b> |

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