

# 74LVC1G125

Bus buffer/line driver; 3-state

Rev. 13 — 6 November 2017

Product data sheet

## 1 General description

The 74LVC1G125 provides one non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ( $\overline{OE}$ ). A HIGH-level at pin  $\overline{OE}$  causes the output to assume a high-impedance OFF-state.

The input can be driven from either 3.3 V or 5 V devices. This feature allows the use of this device in a mixed 3.3 V and 5 V environment.

This device is fully specified for partial power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

## 2 Features and benefits

- Wide supply voltage range from 1.65 V to 5.5 V
- High noise immunity
- 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)
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- ESD protection:
  - HBM JESD22-A114F exceeds 2 000 V
  - MM JESD22-A115-A exceeds 200 V
- CMOS low power consumption
- Inputs accept voltages up to 5 V
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Multiple package options
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C

3 Ordering information

Table 1. Ordering information

| Type number  | Package           |        |                                                                                                                        |          |
|--------------|-------------------|--------|------------------------------------------------------------------------------------------------------------------------|----------|
|              | Temperature range | Name   | Description                                                                                                            | Version  |
| 74LVC1G125GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm                                                 | SOT353-1 |
| 74LVC1G125GV | -40 °C to +125 °C | SC-74A | plastic surface-mounted package; 5 leads                                                                               | SOT753   |
| 74LVC1G125GM | -40 °C to +125 °C | XSON6  | plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm                            | SOT886   |
| 74LVC1G125GF | -40 °C to +125 °C | XSON6  | plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm                               | SOT891   |
| 74LVC1G125GN | -40 °C to +125 °C | XSON6  | extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm                                  | SOT1115  |
| 74LVC1G125GS | -40 °C to +125 °C | XSON6  | extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm                                  | SOT1202  |
| 74LVC1G125GX | -40 °C to +125 °C | X2SON5 | X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm | SOT1226  |

4 Marking

Table 2. Marking

| Type number  | Marking code <sup>[1]</sup> |
|--------------|-----------------------------|
| 74LVC1G125GW | VM                          |
| 74LVC1G125GV | V25                         |
| 74LVC1G125GM | VM                          |
| 74LVC1G125GF | VM                          |
| 74LVC1G125GN | VM                          |
| 74LVC1G125GS | VM                          |
| 74LVC1G125GX | VM                          |

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

5 Functional diagram

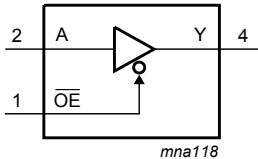


Figure 1. Logic symbol

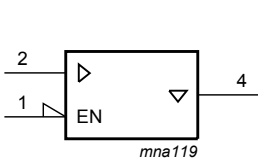


Figure 2. IEC logic symbol

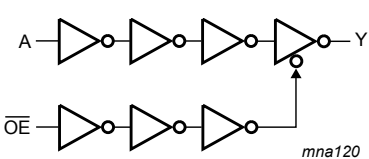


Figure 3. Logic diagram

6 Pinning information

6.1 Pinning

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001aaf198

Diagram showing pin configuration for SOT353-1 and SOT753 packages. The chip is a rectangular package with pins 1 through 5. Pin 1 is OE, pin 2 is A, pin 3 is GND, pin 4 is Y, and pin 5 is VCC.

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Transparent top view

Diagram showing pin configuration for SOT886 package. The chip is a rectangular package with pins 1 through 6. Pin 1 is OE, pin 2 is A, pin 3 is GND, pin 4 is Y, pin 5 is n.c., and pin 6 is VCC.

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Transparent top view

Diagram showing pin configuration for SOT891, SOT1115 and SOT1202 packages. The chip is a rectangular package with pins 1 through 6. Pin 1 is OE, pin 2 is A, pin 3 is GND, pin 4 is Y, pin 5 is n.c., and pin 6 is VCC.

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Transparent top view

Diagram showing pin configuration for SOT1226 (X2SON5) package. The chip is a rectangular package with pins 1 through 6. Pin 1 is OE, pin 2 is A, pin 3 is GND, pin 4 is Y, pin 5 is VCC, and pin 6 is n.c.

**Figure 4. Pin configuration SOT353-1 and SOT753**

**Figure 5. Pin configuration SOT886**

**Figure 6. Pin configuration SOT891, SOT1115 and SOT1202**

**Figure 7. Pin configuration SOT1226 (X2SON5)**

6.2 Pin description

Table 3. Pin description

| Symbol | Pin                       |       | Description         |
|--------|---------------------------|-------|---------------------|
|        | TSSOP5, SC-74A and X2SON5 | XSON6 |                     |
| OE     | 1                         | 1     | output enable input |
| A      | 2                         | 2     | data input          |
| GND    | 3                         | 3     | ground (0 V)        |
| Y      | 4                         | 4     | data output         |
| n.c.   | -                         | 5     | not connected       |
| VCC    | 5                         | 6     | 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 |
|-------|---|--------|
| OE    | A | Y      |
| L     | L | L      |
| L     | H | H      |
| H     | 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       | -    | $\pm 50$       | mA   |
| $V_O$     | output voltage          | Active mode [1] [2]                 | -0.5 | $V_{CC} + 0.5$ | V    |
|           |                         | Power-down mode [1] [2]             | -0.5 | +6.5           | V    |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$             | -    | $\pm 50$       | 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 [3] | -    | 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] When  $V_{CC} = 0$  V (Power-down mode), the output voltage can be 5.5 V in normal operation.

[3] For TSSOP5 and SC-74A packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.

For XSON6 and X2SON5 package: above 118 °C the value of  $P_{tot}$  derates linearly with 7.8 mW/K.

## 9 Recommended operating conditions

**Table 6. Recommended operating conditions**

| Symbol    | Parameter           | Conditions                      | Min  | Typ | 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    |
|           |                     | $V_{CC} = 0$ V; Power-down mode | 0    | -   | 5.5      | V    |
| $T_{amb}$ | ambient temperature |                                 | -40  | -   | +125     | °C   |

| Symbol              | Parameter                           | Conditions                                  | Min | Typ | Max | Unit |
|---------------------|-------------------------------------|---------------------------------------------|-----|-----|-----|------|
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.65 \text{ V to } 2.7 \text{ V}$ | -   | -   | 20  | ns/V |
|                     |                                     | $V_{CC} = 2.7 \text{ V to } 5.5 \text{ V}$  | -   | -   | 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                                                                                           | Min                  | Typ <sup>[1]</sup> | Max                  | Unit |
|-------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------|----------------------|--------------------|----------------------|------|
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b> |                           |                                                                                                      |                      |                    |                      |      |
| V <sub>IH</sub>                           | 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    |
|                                           |                           | $V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$                                                           | 2.0                  | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                                                           | $0.7 \times V_{CC}$  | -                  | -                    | V    |
| V <sub>IL</sub>                           | 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    |
|                                           |                           | $V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$                                                           | -                    | -                  | 0.8                  | V    |
|                                           |                           | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                                                           | -                    | -                  | $0.3 \times V_{CC}$  | V    |
| V <sub>OL</sub>                           | LOW-level output voltage  | $V_I = V_{IH} \text{ or } V_{IL}$                                                                    |                      |                    |                      |      |
|                                           |                           | $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}; I_O = 100 \mu\text{A}$                                   | -                    | -                  | 0.1                  | V    |
|                                           |                           | $V_{CC} = 1.65 \text{ V}; I_O = 4 \text{ mA}$                                                        | -                    | -                  | 0.45                 | V    |
|                                           |                           | $V_{CC} = 2.3 \text{ V}; I_O = 8 \text{ mA}$                                                         | -                    | -                  | 0.3                  | V    |
|                                           |                           | $V_{CC} = 2.7 \text{ V}; I_O = 12 \text{ mA}$                                                        | -                    | -                  | 0.4                  | V    |
|                                           |                           | $V_{CC} = 3.0 \text{ V}; I_O = 24 \text{ mA}$                                                        | -                    | -                  | 0.55                 | V    |
|                                           |                           | $V_{CC} = 4.5 \text{ V}; I_O = 32 \text{ mA}$                                                        | -                    | -                  | 0.55                 | V    |
| V <sub>OH</sub>                           | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$                                                                    |                      |                    |                      |      |
|                                           |                           | $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}; I_O = -100 \mu\text{A}$                                  | $V_{CC} - 0.1$       | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 1.65 \text{ V}; I_O = -4 \text{ mA}$                                                       | 1.2                  | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 2.3 \text{ V}; I_O = -8 \text{ mA}$                                                        | 1.9                  | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 2.7 \text{ V}; I_O = -12 \text{ mA}$                                                       | 2.2                  | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 3.0 \text{ V}; I_O = -24 \text{ mA}$                                                       | 2.3                  | -                  | -                    | V    |
|                                           |                           | $V_{CC} = 4.5 \text{ V}; I_O = -32 \text{ mA}$                                                       | 3.8                  | -                  | -                    | V    |
| I <sub>I</sub>                            | input leakage current     | $V_{CC} = 0 \text{ V to } 5.5 \text{ V}; V_I = 5.5 \text{ V or GND}$                                 | -                    | ±0.1               | ±1                   | μA   |
| I <sub>OZ</sub>                           | OFF-state output current  | $V_{CC} = 3.6 \text{ V}; V_I = V_{IH} \text{ or } V_{IL}; V_O = 5.5 \text{ V or GND}$                | -                    | ±0.1               | ±2                   | μA   |
| I <sub>OFF</sub>                          | power-off leakage current | $V_{CC} = 0 \text{ V}; V_I \text{ or } V_O = 5.5 \text{ V}$                                          | -                    | ±0.1               | ±2                   | μA   |
| I <sub>CC</sub>                           | supply current            | $V_I = 5.5 \text{ V or GND}; V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}; I_O = 0 \text{ A}$           | -                    | 0.1                | 4                    | μA   |
| ΔI <sub>CC</sub>                          | additional supply current | per pin; $V_{CC} = 2.3 \text{ V to } 5.5 \text{ V}; V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}$ | -                    | 5                  | 500                  | μA   |
| C <sub>I</sub>                            | input capacitance         |                                                                                                      | -                    | 5                  | -                    | pF   |

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

[1] All 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 [Figure 10](#).

| Symbol           | Parameter                     | Conditions                                                         | -40 °C to +85 °C |                    |     | -40 °C to +125 °C |      | Unit |
|------------------|-------------------------------|--------------------------------------------------------------------|------------------|--------------------|-----|-------------------|------|------|
|                  |                               |                                                                    | Min              | Typ <sup>[1]</sup> | Max | Min               | Max  |      |
| t <sub>pd</sub>  | propagation delay             | A to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>                |                  |                    |     |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                 | 1.0              | 3.3                | 8.0 | 1.0               | 10.5 | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                   | 0.5              | 2.2                | 5.5 | 0.5               | 7    | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                            | 0.5              | 2.5                | 5.5 | 0.5               | 7    | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                   | 0.5              | 2.1                | 4.5 | 0.5               | 6    | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                   | 0.5              | 1.7                | 4.0 | 0.5               | 5.5  | ns   |
| t <sub>en</sub>  | enable time                   | OE to Y; see <a href="#">Figure 9</a> <sup>[3]</sup>               |                  |                    |     |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                 | 1.0              | 4.1                | 9.4 | 1.0               | 12   | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                   | 0.5              | 2.8                | 6.6 | 0.5               | 8.5  | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                            | 0.5              | 3.3                | 6.6 | 0.5               | 8.5  | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                   | 0.5              | 2.4                | 5.3 | 0.5               | 7    | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                   | 0.5              | 2.1                | 5.0 | 0.5               | 6.5  | ns   |
| t <sub>dis</sub> | disable time                  | OE to Y; see <a href="#">Figure 9</a> <sup>[4]</sup>               |                  |                    |     |                   |      |      |
|                  |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                 | 1.0              | 4.3                | 9.2 | 1.0               | 12   | ns   |
|                  |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                   | 0.5              | 2.7                | 5.0 | 0.5               | 6.5  | ns   |
|                  |                               | V <sub>CC</sub> = 2.7 V                                            | 0.5              | 3.0                | 5.0 | 0.5               | 6.5  | ns   |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                   | 0.5              | 3.1                | 5.0 | 0.5               | 6.5  | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V                                   | 0.5              | 2.2                | 4.2 | 0.5               | 5.5  | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | per buffer; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[5]</sup> |                  |                    |     |                   |      |      |
|                  |                               | output enabled                                                     | -                | 25                 | -   | -                 | -    | pF   |
|                  |                               | output disabled                                                    | -                | 6                  | -   | -                 | -    | 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).

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

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

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

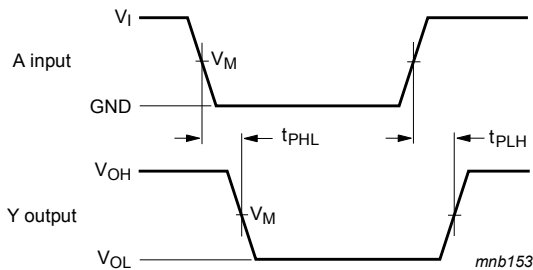
C<sub>L</sub> = output load capacitance in pF;

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

N = number of inputs switching;

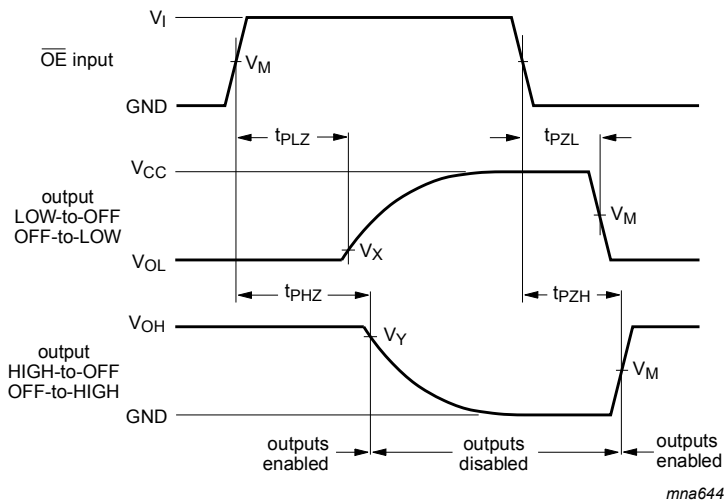
∑(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of outputs.

11.1 Waveforms and test circuit



Measurement points are given in [Table 9](#).  
 $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

Figure 8. Input A to output Y propagation delay times

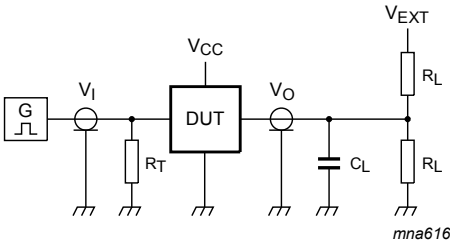


Measurement points are given in [Table 9](#).  
 $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

Figure 9. 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 | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.15\text{ V}$ | $V_{OH} - 0.15\text{ V}$ |
| 2.3 V to 2.7 V   | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.15\text{ V}$ | $V_{OH} - 0.15\text{ V}$ |
| 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   | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.3\text{ V}$  | $V_{OH} - 0.3\text{ V}$  |



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.

**Figure 10. 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                | $2V_{CC}$          |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2.0$ ns | 30 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |
| 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                | $2V_{CC}$          |

12 Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm SOT353-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c            | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | e <sub>1</sub> | H <sub>E</sub> | L     | L <sub>p</sub> | v   | w   | y   | Z <sup>(1)</sup> | θ        |
|------|-----------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|----------------|-------|----------------|-----|-----|-----|------------------|----------|
| mm   | 1.1       | 0.1<br>0       | 1.0<br>0.8     | 0.15           | 0.30<br>0.15   | 0.25<br>0.08 | 2.25<br>1.85     | 1.35<br>1.15     | 0.65 | 1.3            | 2.25<br>2.0    | 0.425 | 0.46<br>0.21   | 0.3 | 0.1 | 0.1 | 0.60<br>0.15     | 7°<br>0° |

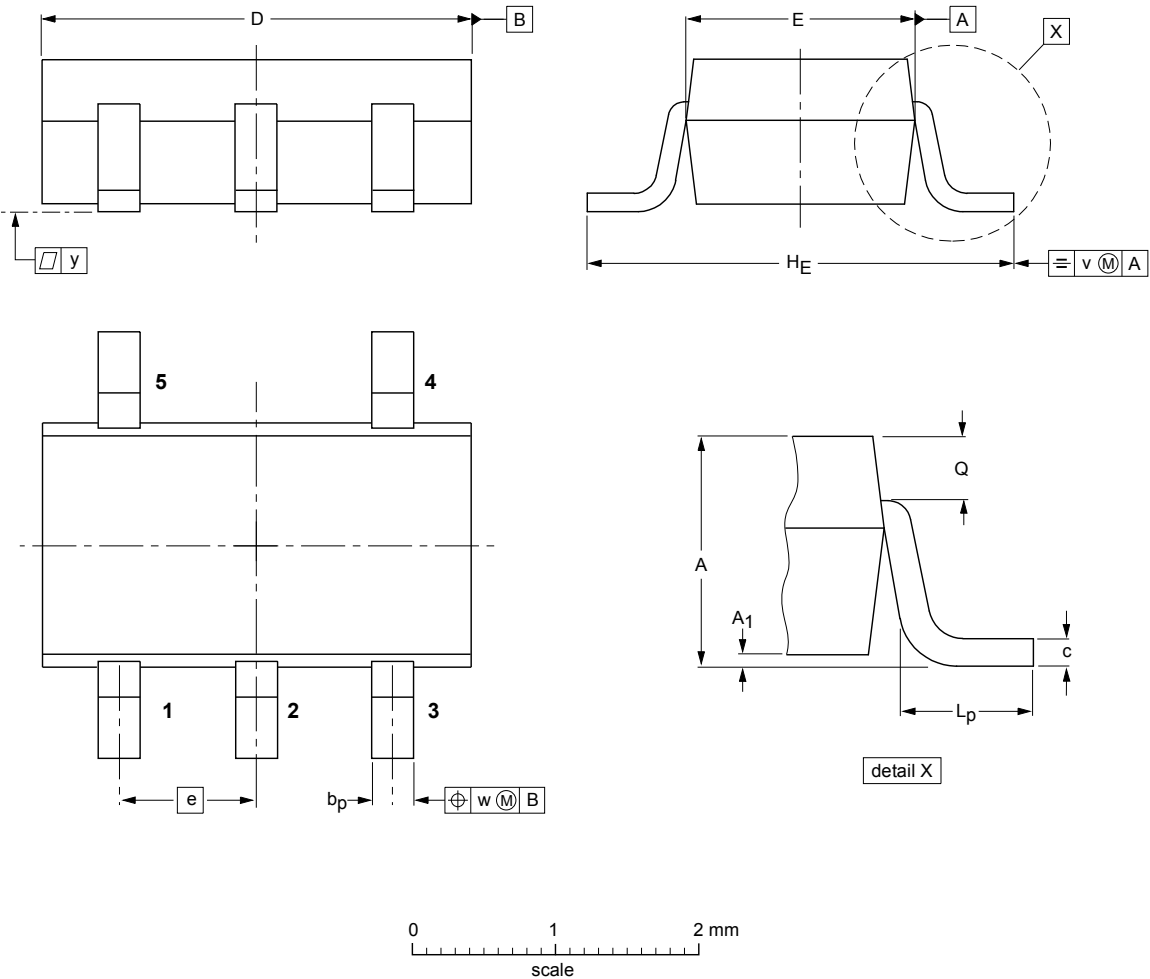
**Note**  
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |        |        |  | EUROPEAN<br>PROJECTION | ISSUE DATE                      |
|--------------------|------------|--------|--------|--|------------------------|---------------------------------|
|                    | IEC        | JEDEC  | JEITA  |  |                        |                                 |
| SOT353-1           |            | MO-203 | SC-88A |  |                        | <del>00-09-01</del><br>03-02-19 |

Figure 11. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753



DIMENSIONS (mm are the original dimensions)

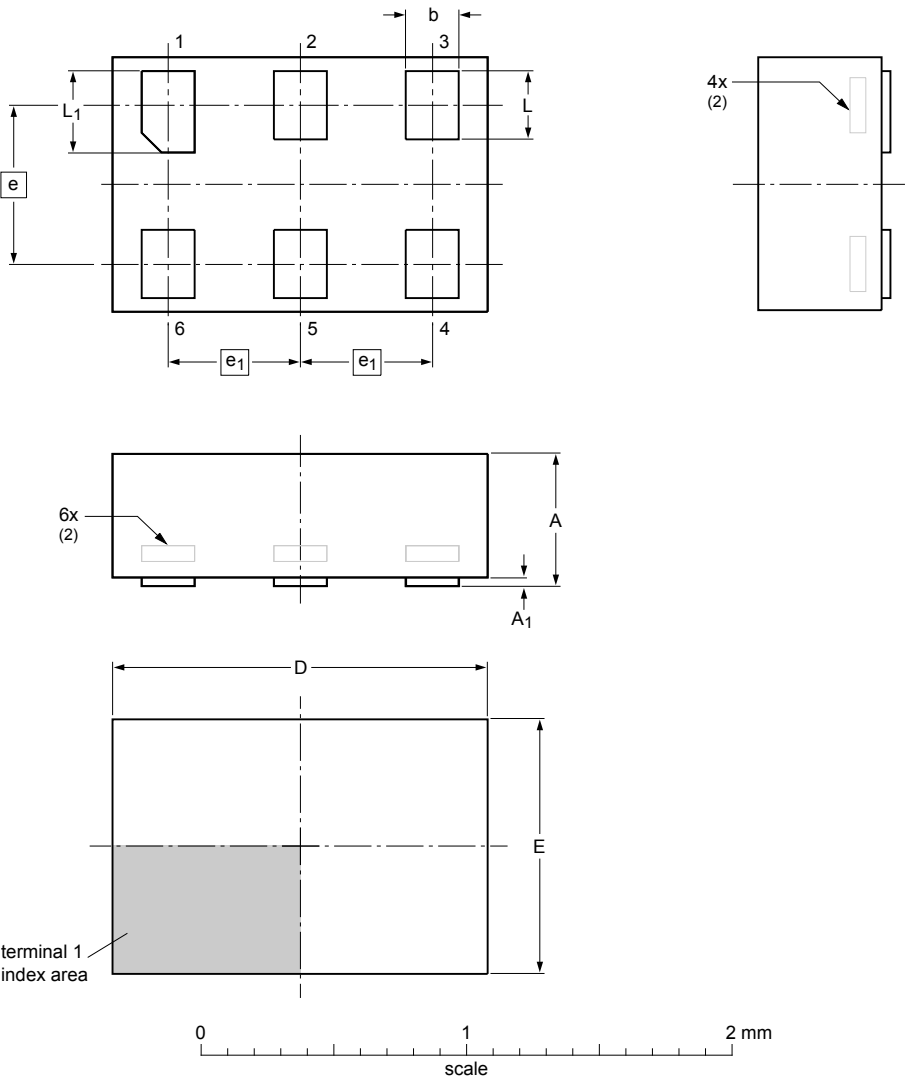
| UNIT | A          | A <sub>1</sub> | b <sub>p</sub> | c            | D          | E          | e    | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|----------------|----------------|--------------|------------|------------|------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.1<br>0.9 | 0.100<br>0.013 | 0.40<br>0.25   | 0.26<br>0.10 | 3.1<br>2.7 | 1.7<br>1.3 | 0.95 | 3.0<br>2.5     | 0.6<br>0.2     | 0.33<br>0.23 | 0.2 | 0.2 | 0.1 |

| OUTLINE<br>VERSION | REFERENCES |       |        |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE            |
|--------------------|------------|-------|--------|--|---------------------------------------------------------------------------------------|-----------------------|
|                    | IEC        | JEDEC | JEITA  |  |                                                                                       |                       |
| SOT753             |            |       | SC-74A |  |  | -02-04-16<br>06-03-16 |

Figure 12. Package outline SOT753

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm

SOT886



Dimensions (mm are the original dimensions)

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm   | max              | 0.5            | 0.04 | 0.25 | 1.50 | 1.05 |                | 0.35 | 0.40           |
|      | nom              |                |      | 0.20 | 1.45 | 1.00 | 0.6            | 0.30 | 0.35           |
|      | min              |                |      | 0.17 | 1.40 | 0.95 |                | 0.27 | 0.32           |

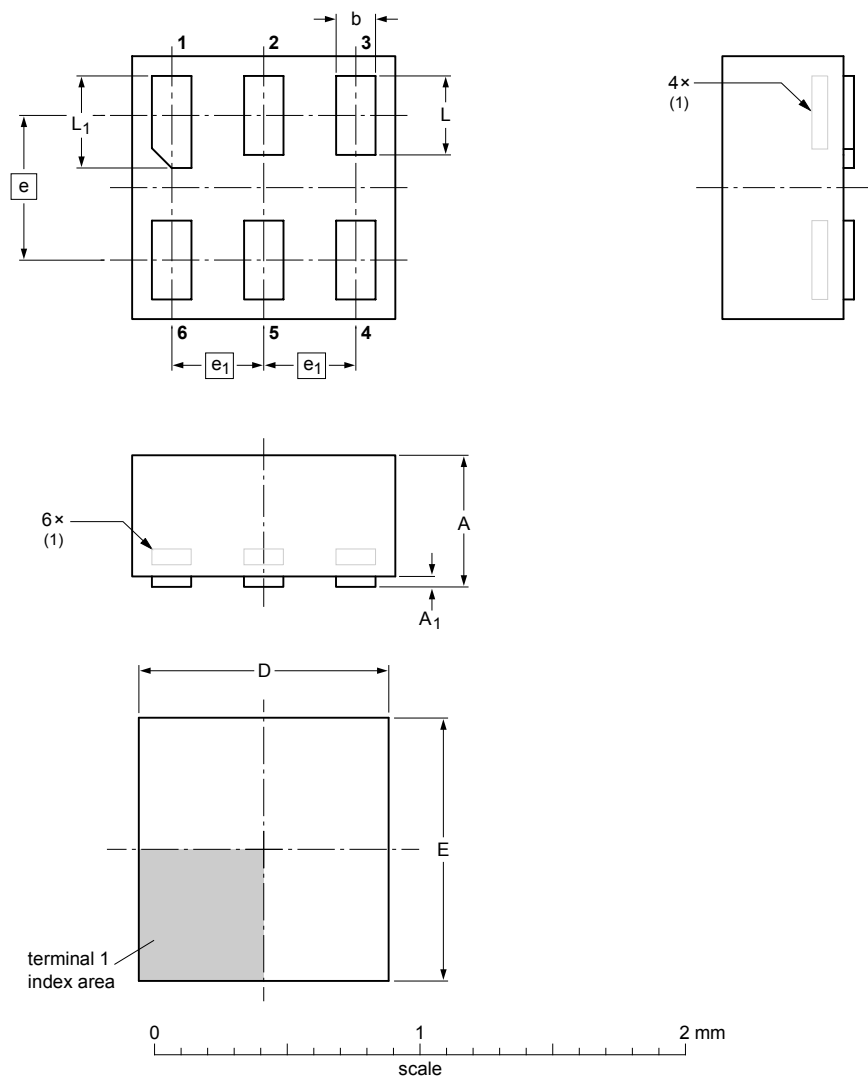
- Notes
- 1. Including plating thickness.
  - 2. Can be visible in some manufacturing processes.

|                 |            |       |       |  |                                                                                       |                      |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT886          | MO-252     |       |       |  |  | 04-07-22<br>12-01-05 |

Figure 13. Package outline SOT886 (XSON6)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm

SOT891



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max | A <sub>1</sub><br>max | b            | D            | E            | e    | e <sub>1</sub> | L            | L <sub>1</sub> |
|------|----------|-----------------------|--------------|--------------|--------------|------|----------------|--------------|----------------|
| mm   | 0.5      | 0.04                  | 0.20<br>0.12 | 1.05<br>0.95 | 1.05<br>0.95 | 0.55 | 0.35           | 0.35<br>0.27 | 0.40<br>0.32   |

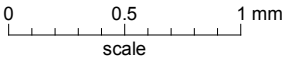
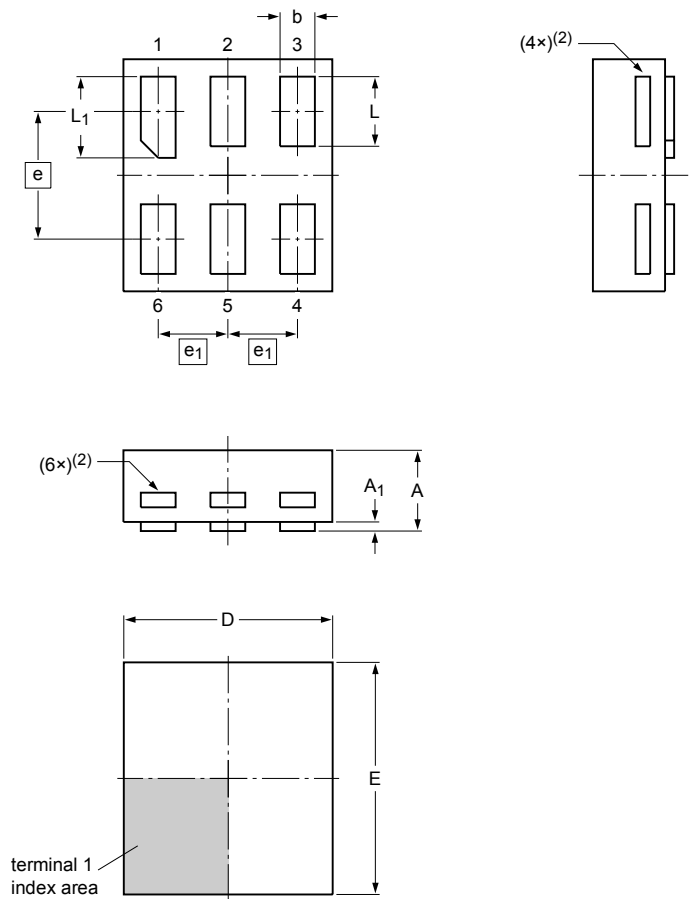
**Note**  
1. Can be visible in some manufacturing processes.

| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|-------|-------|--|------------------------|----------------------|
|                    | IEC        | JEDEC | JEITA |  |                        |                      |
| SOT891             |            |       |       |  |                        | 05-04-06<br>07-05-15 |

Figure 14. Package outline SOT891 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 0.9 x 1.0 x 0.35 mm

SOT1115



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm   | max              | 0.35           | 0.04 | 0.20 | 0.95 | 1.05 |                | 0.35 | 0.40           |
|      | nom              |                |      | 0.15 | 0.90 | 1.00 | 0.55           | 0.30 | 0.35           |
|      | min              |                |      | 0.12 | 0.85 | 0.95 |                | 0.27 | 0.32           |

Note

- 1. Including plating thickness.
- 2. Visible depending upon used manufacturing technology.

sot1115\_po

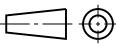
| Outline version | References |       |       |  | European projection                                                                   | Issue date            |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|-----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                       |
| SOT1115         |            |       |       |  |  | 10-04-02-<br>10-04-07 |

Figure 15. Package outline SOT1115 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 1.0 x 1.0 x 0.35 mm

SOT1202



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm   | max              | 0.35           | 0.04 | 0.20 | 1.05 | 1.05 |                | 0.35 | 0.40           |
|      | nom              |                |      | 0.15 | 1.00 | 1.00 | 0.55           | 0.30 | 0.35           |
|      | min              |                |      | 0.12 | 0.95 | 0.95 |                | 0.27 | 0.32           |

Note

1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1202\_po

| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT1202         |            |       |       |  |  | 10-04-02<br>10-04-06 |

Figure 16. Package outline SOT1202 (XSON6)

X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;  
5 terminals; body 0.8 x 0.8 x 0.35 mm

SOT1226

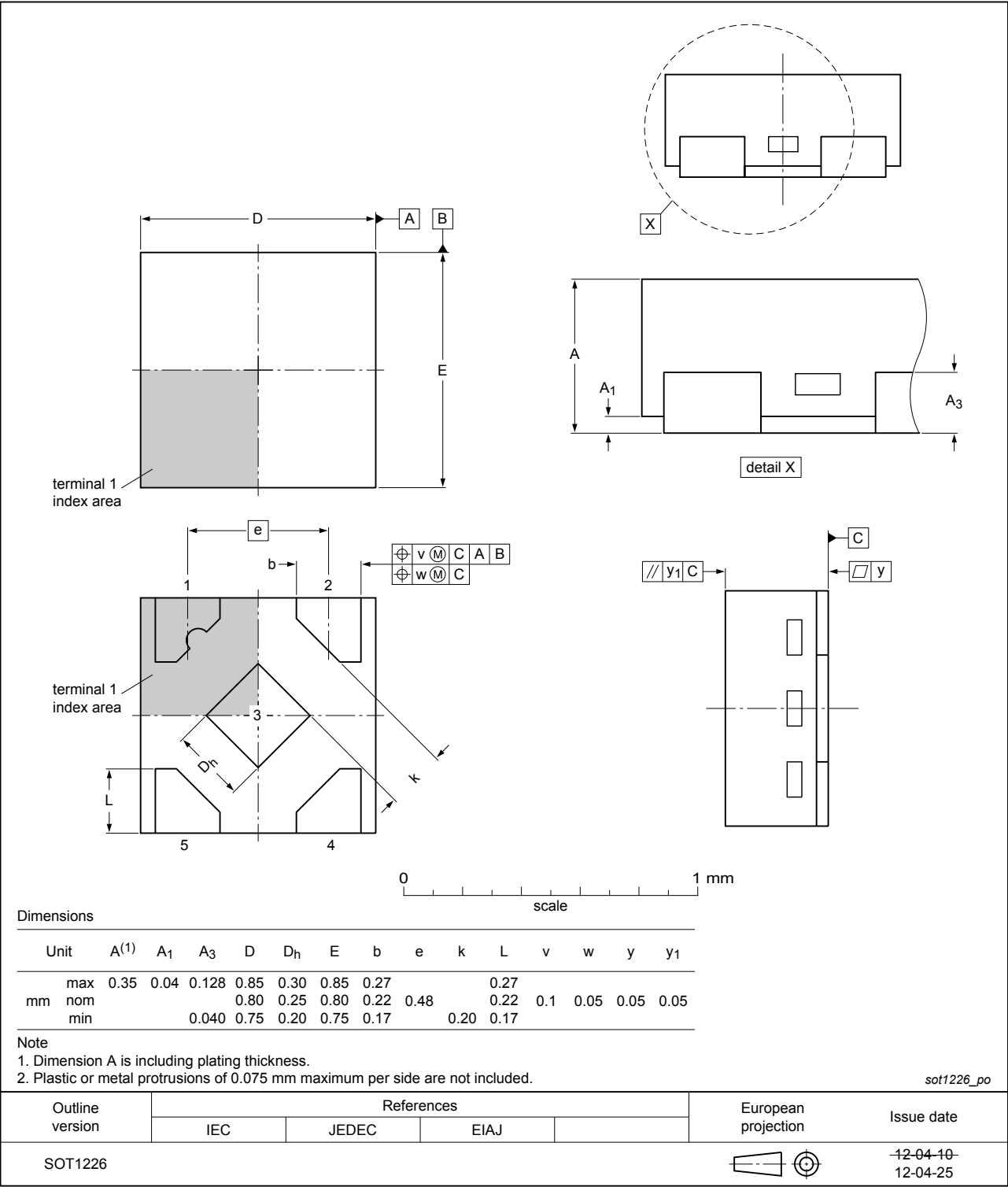


Figure 17. Package outline SOT1226 (X2SON5)

## 13 Abbreviations

Table 11. Abbreviations

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

## 14 Revision history

Table 12. Revision history

| Document ID     | Release date                                                                                                                                                                                                                              | Data sheet status     | Change notice | Supersedes      |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-----------------|
| 74LVC1G125 v.13 | 20171107                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.12 |
| 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> |                       |               |                 |
| 74LVC1G125 v.12 | 20161202                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.11 |
| 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>                                                                                        |                       |               |                 |
| 74LVC1G125 v.11 | 20120702                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.10 |
| Modifications:  | <ul style="list-style-type: none"> <li>Added type number 74LVC1G125GX (SOT1226)</li> <li>Package outline drawing of SOT886 (<a href="#">Figure 13</a>) modified.</li> </ul>                                                               |                       |               |                 |
| 74LVC1G125 v.10 | 20111207                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.9  |
| Modifications:  | <ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>                                                                                                                                                                    |                       |               |                 |
| 74LVC1G125 v.9  | 20101229                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.8  |
| 74LVC1G125 v.8  | 20100824                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.7  |
| 74LVC1G125 v.7  | 20070830                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.6  |
| 74LVC1G125 v.6  | 20060912                                                                                                                                                                                                                                  | Product data sheet    | -             | 74LVC1G125 v.5  |
| 74LVC1G125 v.5  | 20040915                                                                                                                                                                                                                                  | Product specification | -             | 74LVC1G125 v.4  |
| 74LVC1G125 v.4  | 20021118                                                                                                                                                                                                                                  | Product specification | -             | 74LVC1G125 v.3  |
| 74LVC1G125 v.3  | 20020528                                                                                                                                                                                                                                  | Product specification | -             | 74LVC1G125 v.2  |
| 74LVC1G125 v.2  | 20010406                                                                                                                                                                                                                                  | Product specification | -             | 74LVC1G125 v.1  |
| 74LVC1G125 v.1  | 20001222                                                                                                                                                                                                                                  | Product specification | -             | -               |

## 15 Legal information

### 15.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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".

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