

# DATA SHEET

## **74LVC1G125**

### **Bus buffer/line driver; 3-state**

Product specification  
Supersedes data of 2002 Nov 18

2004 Sep 15

**Bus buffer/line driver; 3-state****74LVC1G125****FEATURES**

- 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)
  - JESD8B/JESD36 (2.7 V to 3.6 V).
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5 V
- Multiple package options
- ESD protection:
  - HBM EIA/JESD22-A114-B exceeds 2000 V
  - MM EIA/JESD22-A115-A exceeds 200 V.
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C.

**DESCRIPTION**

The 74LVC1G125 is a high-performance, low-power, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families.

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.

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.

**QUICK REFERENCE DATA**

GND = 0 V;  $T_{amb} = 25$  °C;  $t_r = t_f \leq 2.5$  ns.

| SYMBOL            | PARAMETER                                | CONDITIONS                                            | TYPICAL | UNIT |
|-------------------|------------------------------------------|-------------------------------------------------------|---------|------|
| $t_{PHL}/t_{PLH}$ | propagation delay input A to output Y    | $V_{CC} = 1.8$ V; $C_L = 30$ pF; $R_L = 1$ k $\Omega$ | 3.3     | ns   |
|                   |                                          | $V_{CC} = 2.5$ V; $C_L = 30$ pF; $R_L = 500$ $\Omega$ | 2.2     | ns   |
|                   |                                          | $V_{CC} = 2.7$ V; $C_L = 50$ pF; $R_L = 500$ $\Omega$ | 2.5     | ns   |
|                   |                                          | $V_{CC} = 3.3$ V; $C_L = 50$ pF; $R_L = 500$ $\Omega$ | 2.1     | ns   |
|                   |                                          | $V_{CC} = 5.0$ V; $C_L = 50$ pF; $R_L = 500$ $\Omega$ | 1.7     | ns   |
| $C_I$             | input capacitance                        |                                                       | 5       | pF   |
| $C_{PD}$          | power dissipation capacitance per buffer | output enabled; notes 1 and 2                         | 25      | pF   |
|                   |                                          | output disabled; notes 1 and 2                        | 6       | pF   |

**Notes**

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu$ W).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in Volts;

$N$  = total switching outputs;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

2. The condition is  $V_i = \text{GND to } V_{CC}$ .

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## FUNCTION TABLE

See note 1.

| INPUT                  |   | OUTPUT |
|------------------------|---|--------|
| $\overline{\text{OE}}$ | A | Y      |
| L                      | L | L      |
| L                      | H | H      |
| H                      | X | Z      |

## Note

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

## ORDERING INFORMATION

| TYPE NUMBER  | PACKAGE           |      |         |          |        |         |
|--------------|-------------------|------|---------|----------|--------|---------|
|              | TEMPERATURE RANGE | PINS | PACKAGE | MATERIAL | CODE   | MARKING |
| 74LVC1G125GW | −40 °C to +125 °C | 5    | SC-88A  | plastic  | SOT353 | VM      |
| 74LVC1G125GV | −40 °C to +125 °C | 5    | SC-74A  | plastic  | SOT753 | V25     |
| 74LVC1G125GM | −40 °C to +125 °C | 6    | XSON6   | plastic  | SOT886 | VM      |

## PINNING

| PIN SC-88A; SC-74A | PIN XSON6 | SYMBOL                 | DESCRIPTION         |
|--------------------|-----------|------------------------|---------------------|
| 1                  | 1         | $\overline{\text{OE}}$ | output enable input |
| 2                  | 2         | A                      | data input A        |
| 3                  | 3         | GND                    | ground (0 V)        |
| 4                  | 4         | Y                      | data output Y       |
| -                  | 5         | n.c.                   | not connected       |
| 5                  | 6         | V <sub>CC</sub>        | supply voltage      |

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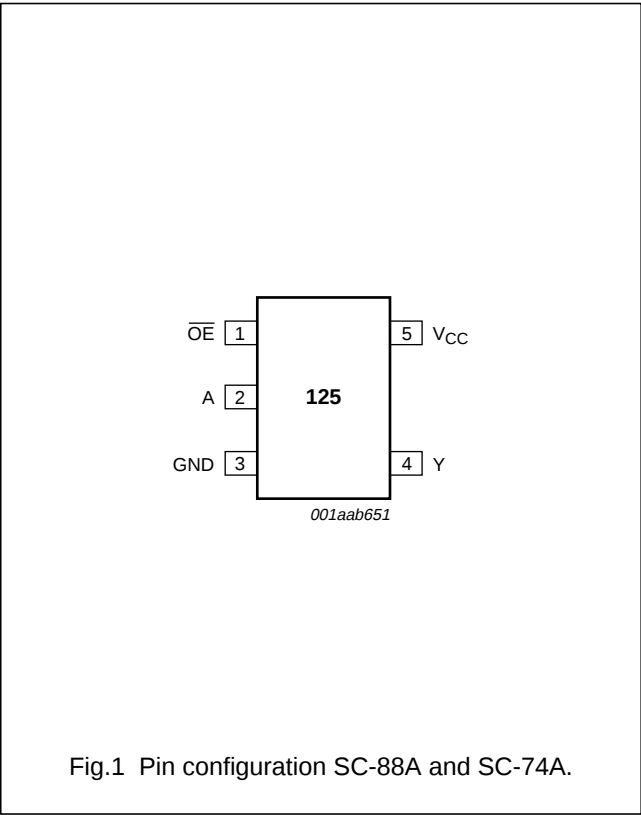


Fig.1 Pin configuration SC-88A and SC-74A.

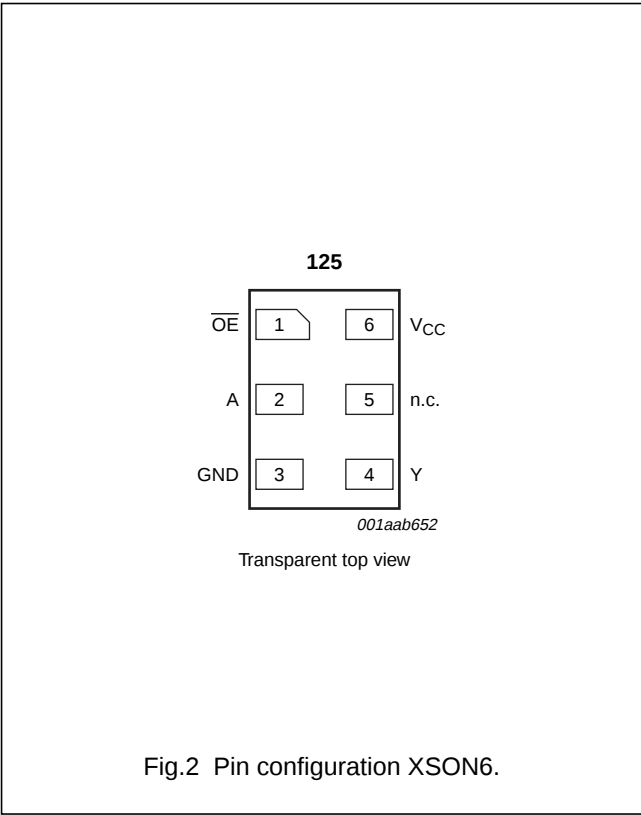


Fig.2 Pin configuration XSON6.

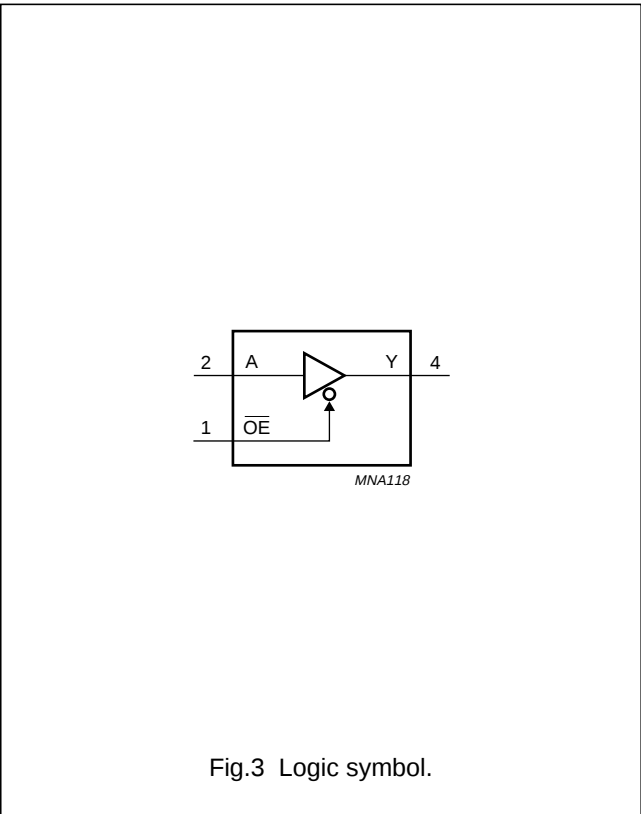


Fig.3 Logic symbol.

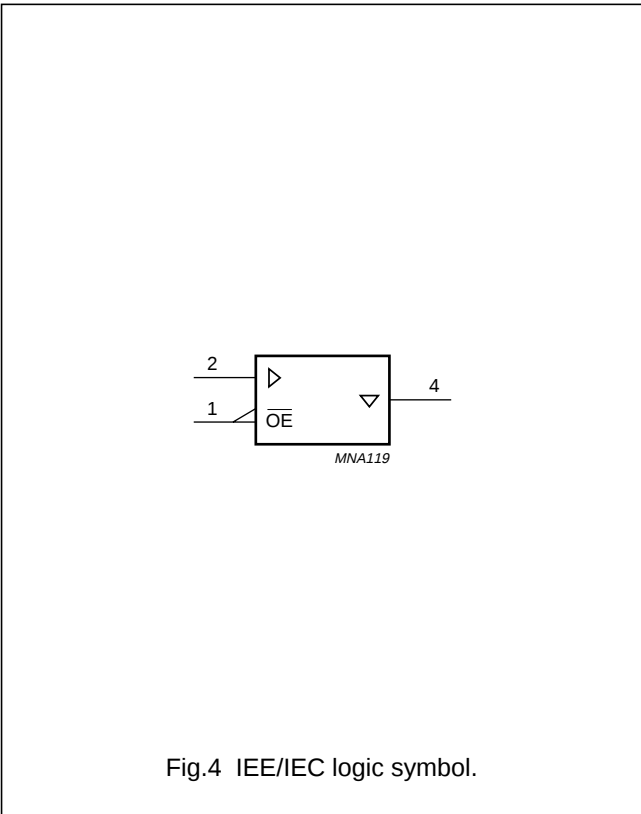


Fig.4 IEEE/IEC logic symbol.

## Bus buffer/line driver; 3-state

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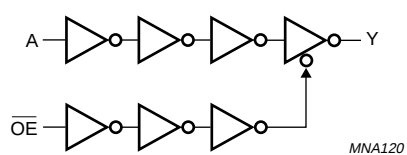


Fig.5 Logic diagram.

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## RECOMMENDED 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                | $V_{CC} = 1.65\text{ V to }5.5\text{ V}$ ; enable mode  | 0    | $V_{CC}$ | V    |
|            |                               | $V_{CC} = 1.65\text{ V to }5.5\text{ V}$ ; disable mode | 0    | 5.5      | V    |
|            |                               | $V_{CC} = 0\text{ V}$ ; Power-down mode                 | 0    | 5.5      | V    |
| $T_{amb}$  | operating ambient temperature |                                                         | -40  | +125     | °C   |
| $t_r, t_f$ | input rise and fall times     | $V_{CC} = 1.65\text{ V to }2.7\text{ V}$                | 0    | 20       | ns/V |
|            |                               | $V_{CC} = 2.7\text{ V to }5.5\text{ V}$                 | 0    | 10       | ns/V |

## 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 diode current           | $V_I < 0\text{ V}$                          | –    | -50            | mA   |
| $V_I$             | input voltage                 | note 1                                      | -0.5 | +6.5           | V    |
| $I_{OK}$          | output diode current          | $V_O > V_{CC}$ or $V_O < 0\text{ V}$        | –    | ±50            | mA   |
| $V_O$             | output voltage                | enable mode; notes 1 and 2                  | -0.5 | $V_{CC} + 0.5$ | V    |
|                   |                               | disable mode; notes 1 and 2                 | -0.5 | +6.5           | V    |
|                   |                               | Power-down mode; notes 1 and 2              | -0.5 | +6.5           | V    |
| $I_O$             | output source or sink current | $V_O = 0\text{ V to }V_{CC}$                | –    | ±50            | mA   |
| $I_{CC}, I_{GND}$ | $V_{CC}$ or GND current       |                                             | –    | ±100           | mA   |
| $T_{stg}$         | storage temperature           |                                             | -65  | +150           | °C   |
| $P_{tot}$         | power dissipation             | $T_{amb} = -40\text{ °C to }+125\text{ °C}$ | –    | 250            | mW   |

## Notes

1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. When  $V_{CC} = 0\text{ V}$  (Power-down mode), the output voltage can be 5.5 V in normal operation.

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## DC CHARACTERISTICS

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

| SYMBOL                              | PARAMETER                                   | TEST CONDITIONS                                                                                                                                                                                                      |                     | MIN.                   | TYP. <sup>(1)</sup> | MAX.                   | UNIT |
|-------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|---------------------|------------------------|------|
|                                     |                                             | OTHER                                                                                                                                                                                                                | V <sub>CC</sub> (V) |                        |                     |                        |      |
| T <sub>amb</sub> = −40 °C to +85 °C |                                             |                                                                                                                                                                                                                      |                     |                        |                     |                        |      |
| V <sub>IH</sub>                     | HIGH-level input voltage                    |                                                                                                                                                                                                                      | 1.65 to 1.95        | 0.65 × V <sub>CC</sub> | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.3 to 2.7          | 1.7                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.7 to 3.6          | 2.0                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 4.5 to 5.5          | 0.7 × V <sub>CC</sub>  | –                   | –                      | V    |
| V <sub>IL</sub>                     | LOW-level input voltage                     |                                                                                                                                                                                                                      | 1.65 to 1.95        | –                      | –                   | 0.35 × V <sub>CC</sub> | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.3 to 2.7          | –                      | –                   | 0.7                    | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.7 to 3.6          | –                      | –                   | 0.8                    | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 4.5 to 5.5          | –                      | –                   | 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><br>I <sub>O</sub> = 100 μA<br>I <sub>O</sub> = 4 mA<br>I <sub>O</sub> = 8 mA<br>I <sub>O</sub> = 12 mA<br>I <sub>O</sub> = 24 mA<br>I <sub>O</sub> = 32 mA       | 1.65 to 5.5         | –                      | –                   | 0.1                    | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 1.65                | –                      | –                   | 0.45                   | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.3                 | –                      | –                   | 0.3                    | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.7                 | –                      | –                   | 0.4                    | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 3.0                 | –                      | –                   | 0.55                   | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 4.5                 | –                      | –                   | 0.55                   | V    |
| V <sub>OH</sub>                     | HIGH-level output voltage                   | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub><br>I <sub>O</sub> = −100 μA<br>I <sub>O</sub> = −4 mA<br>I <sub>O</sub> = −8 mA<br>I <sub>O</sub> = −12 mA<br>I <sub>O</sub> = −24 mA<br>I <sub>O</sub> = −32 mA | 1.65 to 5.5         | V <sub>CC</sub> − 0.1  | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 1.65                | 1.2                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.3                 | 1.9                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 2.7                 | 2.2                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 3.0                 | 2.7                    | –                   | –                      | V    |
|                                     |                                             |                                                                                                                                                                                                                      | 4.5                 | 3.8                    | –                   | –                      | V    |
| I <sub>LI</sub>                     | input leakage current                       | V <sub>I</sub> = 5.5 V or GND                                                                                                                                                                                        | 5.5                 | –                      | ±0.1                | ±5                     | μA   |
| I <sub>OZ</sub>                     | 3-state output OFF-state current            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = 5.5 V or GND                                                                                                                               | 5.5                 | –                      | ±0.1                | ±10                    | μA   |
| I <sub>off</sub>                    | power OFF leakage current                   | V <sub>I</sub> or V <sub>O</sub> = 5.5 V                                                                                                                                                                             | 0                   | –                      | ±0.1                | ±10                    | μA   |
| I <sub>CC</sub>                     | quiescent supply current                    | V <sub>I</sub> = V <sub>CC</sub> or GND;<br>I <sub>O</sub> = 0 A                                                                                                                                                     | 5.5                 | –                      | 0.1                 | 10                     | μA   |
| ΔI <sub>CC</sub>                    | additional quiescent supply current per pin | V <sub>I</sub> = V <sub>CC</sub> − 0.6 V;<br>I <sub>O</sub> = 0 A                                                                                                                                                    | 2.3 to 5.5          | –                      | 5                   | 500                    | μA   |

## Bus buffer/line driver; 3-state

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| SYMBOL                               | PARAMETER                                   | TEST CONDITIONS                                                                                                                                                                                                |                     | MIN.                      | TYP. <sup>(1)</sup>                                                                                                                                                                                                  | MAX.                   | UNIT                  |
|--------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|
|                                      |                                             | OTHER                                                                                                                                                                                                          | V <sub>CC</sub> (V) |                           |                                                                                                                                                                                                                      |                        |                       |
| T <sub>amb</sub> = −40 °C to +125 °C |                                             |                                                                                                                                                                                                                |                     |                           |                                                                                                                                                                                                                      |                        |                       |
| V <sub>IH</sub>                      | HIGH-level input voltage                    |                                                                                                                                                                                                                | 1.65 to 1.95        | 0.65 × V <sub>CC</sub>    | —                                                                                                                                                                                                                    | —                      | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.3 to 2.7          | 1.7                       | —                                                                                                                                                                                                                    | —                      | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.7 to 3.6          | 2.0                       | —                                                                                                                                                                                                                    | —                      | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 4.5 to 5.5          | 0.7 × V <sub>CC</sub>     | —                                                                                                                                                                                                                    | —                      | V                     |
| V <sub>IL</sub>                      | LOW-level input voltage                     |                                                                                                                                                                                                                | 1.65 to 1.95        | —                         | —                                                                                                                                                                                                                    | 0.35 × V <sub>CC</sub> | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.3 to 2.7          | —                         | —                                                                                                                                                                                                                    | 0.7                    | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.7 to 3.6          | —                         | —                                                                                                                                                                                                                    | 0.8                    | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 4.5 to 5.5          | —                         | —                                                                                                                                                                                                                    | 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><br>I <sub>O</sub> = 100 μA<br>I <sub>O</sub> = 4 mA<br>I <sub>O</sub> = 8 mA<br>I <sub>O</sub> = 12 mA<br>I <sub>O</sub> = 24 mA<br>I <sub>O</sub> = 32 mA | 1.65 to 5.5         | —                         | —                                                                                                                                                                                                                    | 0.1                    | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 1.65                | —                         | —                                                                                                                                                                                                                    | 0.70                   | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.3                 | —                         | —                                                                                                                                                                                                                    | 0.45                   | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 2.7                 | —                         | —                                                                                                                                                                                                                    | 0.60                   | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 3.0                 | —                         | —                                                                                                                                                                                                                    | 0.80                   | V                     |
|                                      |                                             |                                                                                                                                                                                                                | 4.5                 | —                         | —                                                                                                                                                                                                                    | 0.80                   | V                     |
|                                      |                                             |                                                                                                                                                                                                                | V <sub>OH</sub>     | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub><br>I <sub>O</sub> = −100 μA<br>I <sub>O</sub> = −4 mA<br>I <sub>O</sub> = −8 mA<br>I <sub>O</sub> = −12 mA<br>I <sub>O</sub> = −24 mA<br>I <sub>O</sub> = −32 mA | 1.65 to 5.5            | V <sub>CC</sub> − 0.1 |
| 1.65                                 | 0.95                                        | —                                                                                                                                                                                                              |                     |                           |                                                                                                                                                                                                                      | —                      | V                     |
| 2.3                                  | 1.7                                         | —                                                                                                                                                                                                              |                     |                           |                                                                                                                                                                                                                      | —                      | V                     |
| 2.7                                  | 1.9                                         | —                                                                                                                                                                                                              |                     |                           |                                                                                                                                                                                                                      | —                      | V                     |
| 3.0                                  | 2.0                                         | —                                                                                                                                                                                                              |                     |                           |                                                                                                                                                                                                                      | —                      | V                     |
| 4.5                                  | 3.4                                         | —                                                                                                                                                                                                              |                     |                           |                                                                                                                                                                                                                      | —                      | V                     |
| I <sub>LI</sub>                      | input leakage current                       | V <sub>I</sub> = 5.5 V or GND                                                                                                                                                                                  |                     |                           |                                                                                                                                                                                                                      | 5.5                    | —                     |
| I <sub>OZ</sub>                      | 3-state output OFF-state current            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>O</sub> = 5.5 V or GND                                                                                                                         | 5.5                 | —                         | —                                                                                                                                                                                                                    | ±200                   | μA                    |
| I <sub>off</sub>                     | power OFF leakage current                   | V <sub>I</sub> or V <sub>O</sub> = 5.5 V                                                                                                                                                                       | 0                   | —                         | —                                                                                                                                                                                                                    | ±200                   | μA                    |
| I <sub>CC</sub>                      | quiescent supply current                    | V <sub>I</sub> = V <sub>CC</sub> or GND;<br>I <sub>O</sub> = 0 A                                                                                                                                               | 5.5                 | —                         | —                                                                                                                                                                                                                    | 200                    | μA                    |
| ΔI <sub>CC</sub>                     | additional quiescent supply current per pin | V <sub>I</sub> = V <sub>CC</sub> − 0.6 V;<br>I <sub>O</sub> = 0 A                                                                                                                                              | 2.3 to 5.5          | —                         | —                                                                                                                                                                                                                    | 5000                   | μA                    |

**Note**

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

## Bus buffer/line driver; 3-state

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## AC CHARACTERISTICS

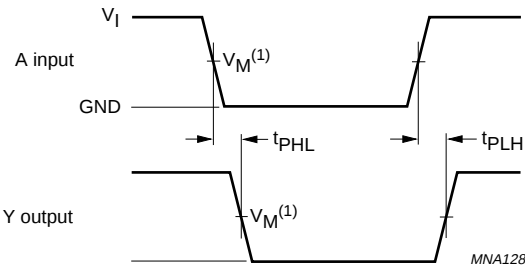
GND = 0 V;  $t_r = t_f \leq 2.0$  ns.

| SYMBOL                               | PARAMETER                                                        | TEST CONDITIONS  |                     | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|------------------------------------------------------------------|------------------|---------------------|------|------|------|------|
|                                      |                                                                  | WAVEFORMS        | V <sub>CC</sub> (V) |      |      |      |      |
| T <sub>amb</sub> = −40 °C to +85 °C  |                                                                  |                  |                     |      |      |      |      |
| t <sub>PHL</sub> /t <sub>PLH</sub>   | propagation delay<br>A, B to Y                                   | see Figs 6 and 8 | 1.65 to 1.95        | 1.0  | 3.3  | 8.0  | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | 2.2  | 5.5  | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | 2.5  | 5.5  | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | 2.1  | 4.5  | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | 1.7  | 4.0  | ns   |
| t <sub>PZH</sub> /t <sub>PZL</sub>   | 3-state output enable<br>time input $\overline{\text{OE}}$ to Y  | see Figs 7 and 8 | 1.65 to 1.95        | 1.0  | 4.1  | 9.4  | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | 2.8  | 6.6  | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | 3.3  | 6.6  | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | 2.4  | 5.3  | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | 2.1  | 5.0  | ns   |
| t <sub>PHZ</sub> /t <sub>PLZ</sub>   | 3-state output disable<br>time input $\overline{\text{OE}}$ to Y | see Figs 7 and 8 | 1.65 to 1.95        | 1.0  | 4.3  | 9.2  | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | 2.7  | 5.0  | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | 3.0  | 5.0  | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | 3.1  | 5.0  | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | 2.2  | 4.2  | ns   |
| T <sub>amb</sub> = −40 °C to +125 °C |                                                                  |                  |                     |      |      |      |      |
| t <sub>PHL</sub> /t <sub>PLH</sub>   | propagation delay<br>A, B to Y                                   | see Figs 6 and 8 | 1.65 to 1.95        | 1.0  | —    | 10.5 | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | —    | 7    | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | —    | 7    | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | —    | 6    | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | —    | 5.5  | ns   |
| t <sub>PZH</sub> /t <sub>PZL</sub>   | 3-state output enable<br>time input $\overline{\text{OE}}$ to Y  | see Figs 7 and 8 | 1.65 to 1.95        | 1.0  | —    | 12   | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | —    | 8.5  | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | —    | 8.5  | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | —    | 7    | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | —    | 6.5  | ns   |
| t <sub>PHZ</sub> /t <sub>PLZ</sub>   | 3-state output disable<br>time input $\overline{\text{OE}}$ to Y | see Figs 7 and 8 | 1.65 to 1.95        | 1.0  | —    | 12   | ns   |
|                                      |                                                                  |                  | 2.3 to 2.7          | 0.5  | —    | 6.5  | ns   |
|                                      |                                                                  |                  | 2.7                 | 0.5  | —    | 6.5  | ns   |
|                                      |                                                                  |                  | 3.0 to 3.6          | 0.5  | —    | 6.5  | ns   |
|                                      |                                                                  |                  | 4.5 to 5.5          | 0.5  | —    | 5.5  | ns   |

Bus buffer/line driver; 3-state

74LVC1G125

AC WAVEFORMS



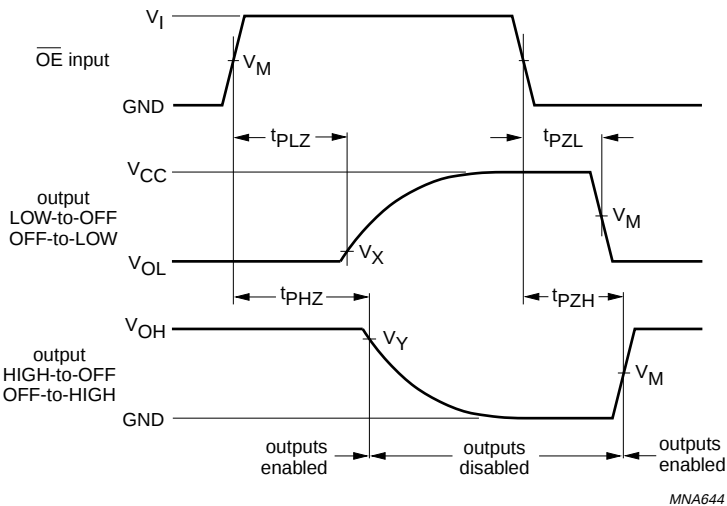
| $V_{CC}$         | $V_M$               | INPUT    |               |
|------------------|---------------------|----------|---------------|
|                  |                     | $V_I$    | $t_r = t_f$   |
| 1.65 V to 1.95 V | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 2.0$ ns |
| 2.3 V to 2.7 V   | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 2.0$ ns |
| 2.7 V            | 1.5 V               | 2.7 V    | $\leq 2.5$ ns |
| 3.0 V to 3.6 V   | 1.5 V               | 2.7 V    | $\leq 2.5$ ns |
| 4.5 V to 5.5 V   | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 2.5$ ns |

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

Fig.6 Input A to output Y propagation delay times.

Bus buffer/line driver; 3-state

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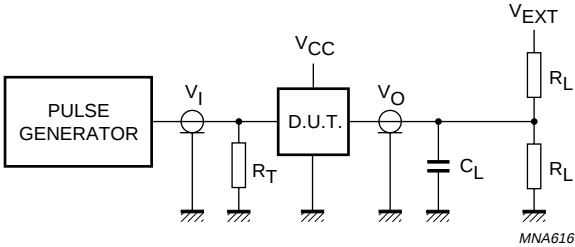
| V <sub>CC</sub>  | V <sub>M</sub>        | INPUT           |                                 |
|------------------|-----------------------|-----------------|---------------------------------|
|                  |                       | V <sub>I</sub>  | t <sub>r</sub> = t <sub>f</sub> |
| 1.65 V to 1.95 V | 0.5 × V <sub>CC</sub> | V <sub>CC</sub> | ≤ 2.0 ns                        |
| 2.3 V to 2.7 V   | 0.5 × V <sub>CC</sub> | V <sub>CC</sub> | ≤ 2.0 ns                        |
| 2.7 V            | 1.5 V                 | 2.7 V           | ≤ 2.5 ns                        |
| 3.0 V to 3.6 V   | 1.5 V                 | 2.7 V           | ≤ 2.5 ns                        |
| 4.5 V to 5.5 V   | 0.5 × V <sub>CC</sub> | V <sub>CC</sub> | ≤ 2.5 ns                        |

V<sub>X</sub> = V<sub>OL</sub> + 0.3 V at V<sub>CC</sub> ≥ 2.7 V;  
V<sub>X</sub> = V<sub>OL</sub> + 0.15 V at V<sub>CC</sub> < 2.7 V;  
V<sub>Y</sub> = V<sub>OH</sub> - 0.3 V at V<sub>CC</sub> ≥ 2.7 V;  
V<sub>Y</sub> = V<sub>OH</sub> - 0.15 V at V<sub>CC</sub> < 2.7 V.  
V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage drop that occur with the output load.

Fig.7 3-state enable and disable times.

Bus buffer/line driver; 3-state

74LVC1G125



| $V_{CC}$         | $V_I$    | $C_L$ | $R_L$        | $V_{EXT}$         |                   |                   |
|------------------|----------|-------|--------------|-------------------|-------------------|-------------------|
|                  |          |       |              | $t_{PLH}/t_{PHL}$ | $t_{PZH}/t_{PHZ}$ | $t_{PZL}/t_{PLZ}$ |
| 1.65 V to 1.95 V | $V_{CC}$ | 30 pF | 1 k $\Omega$ | open              | GND               | $2 \times V_{CC}$ |
| 2.3 V to 2.7 V   | $V_{CC}$ | 30 pF | 500 $\Omega$ | open              | GND               | $2 \times V_{CC}$ |
| 2.7 V            | 2.7 V    | 50 pF | 500 $\Omega$ | open              | GND               | 6 V               |
| 3.0 V to 3.6 V   | 2.7 V    | 50 pF | 500 $\Omega$ | open              | GND               | 6 V               |
| 4.5 V to 5.5 V   | $V_{CC}$ | 50 pF | 500 $\Omega$ | open              | GND               | $2 \times V_{CC}$ |

Definitions for test circuits:  
 $R_L$  = Load resistor.  
 $C_L$  = Load capacitance including jig and probe capacitance.  
 $R_T$  = Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator.

Fig.8 Load circuitry for switching times.

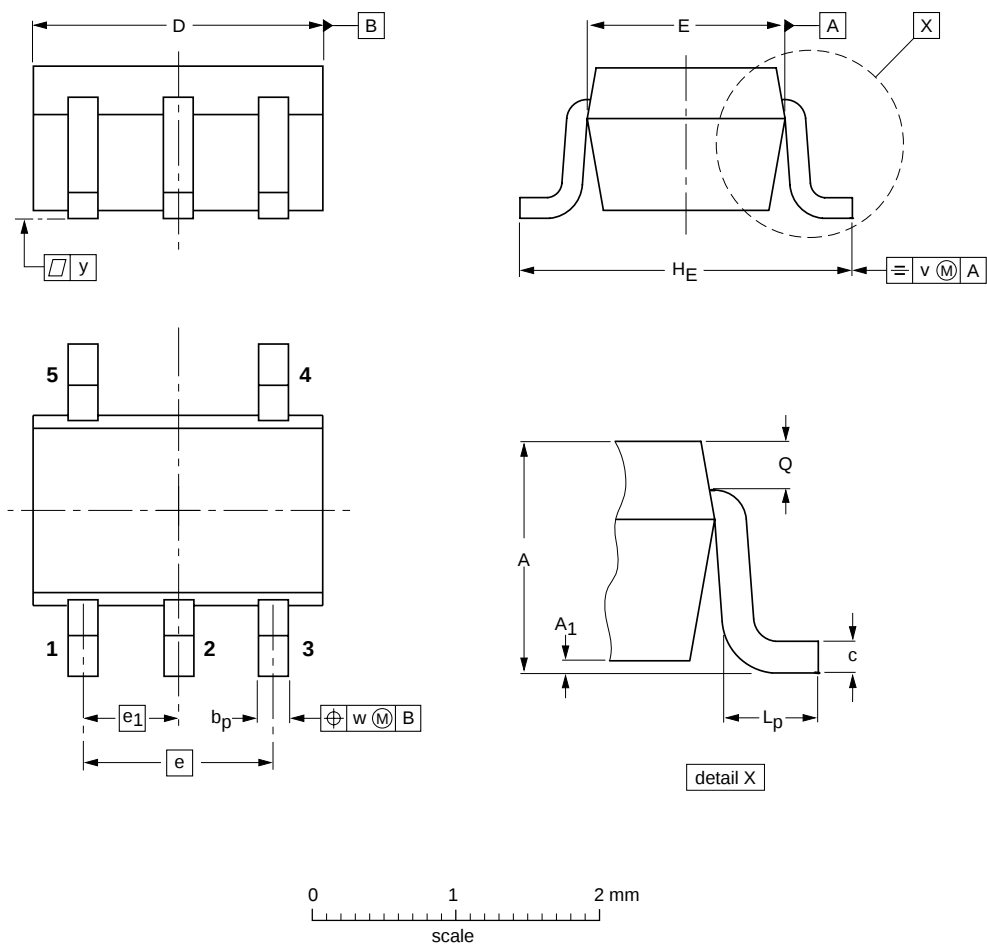
Bus buffer/line driver; 3-state

74LVC1G125

PACKAGE OUTLINES

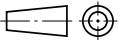
Plastic surface mounted package; 5 leads

SOT353



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max | b <sub>p</sub> | c            | D          | E <sup>(2)</sup> | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|-----------------------|----------------|--------------|------------|------------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.1<br>0.8 | 0.1                   | 0.30<br>0.20   | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15     | 1.3 | 0.65           | 2.2<br>2.0     | 0.45<br>0.15   | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

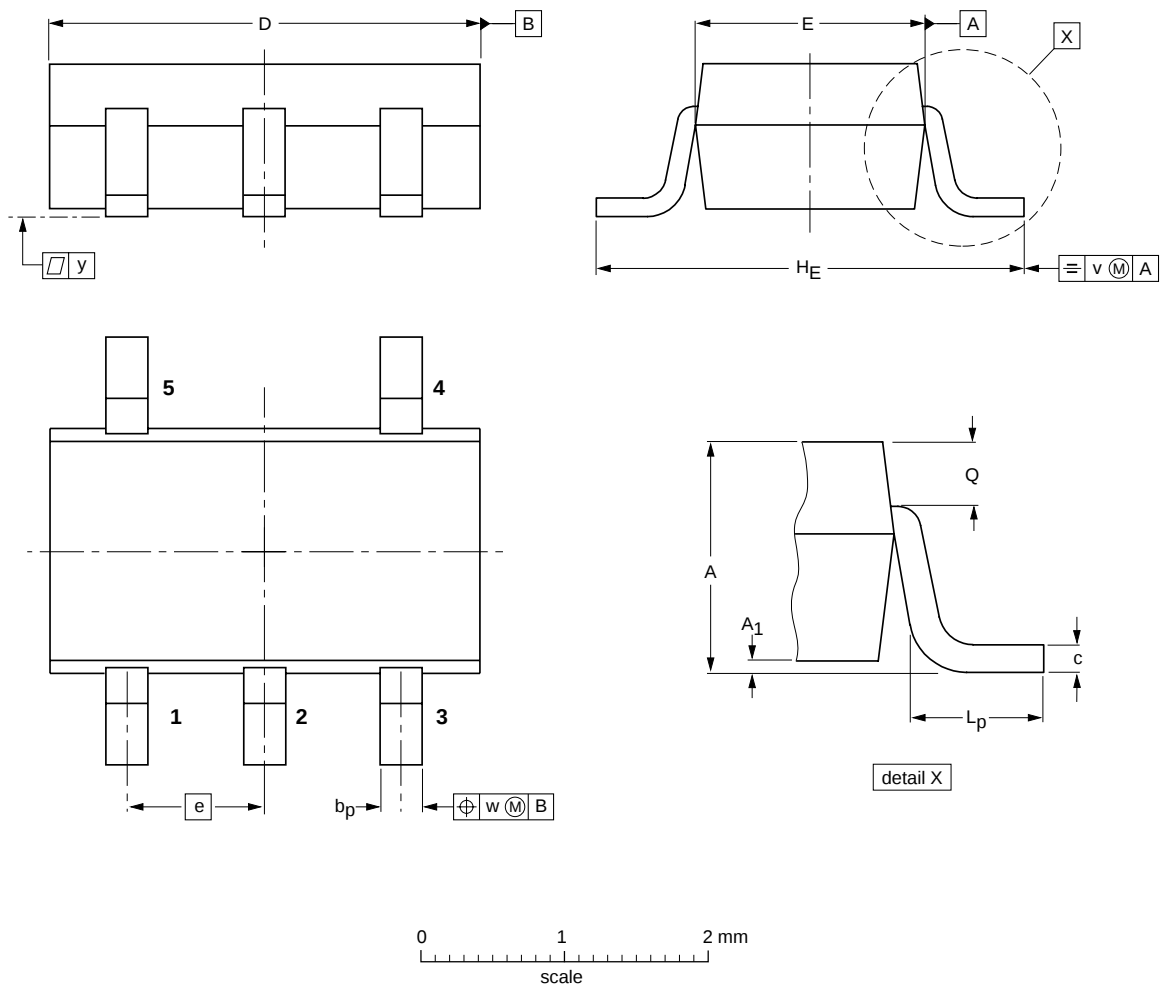
| OUTLINE<br>VERSION | REFERENCES |       |        |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE |
|--------------------|------------|-------|--------|--|---------------------------------------------------------------------------------------|------------|
|                    | IEC        | JEDEC | EIAJ   |  |                                                                                       |            |
| SOT353             |            |       | SC-88A |  |  | 97-02-28   |

Bus buffer/line driver; 3-state

74LVC1G125

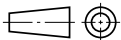
Plastic surface mounted package; 5 leads

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 |

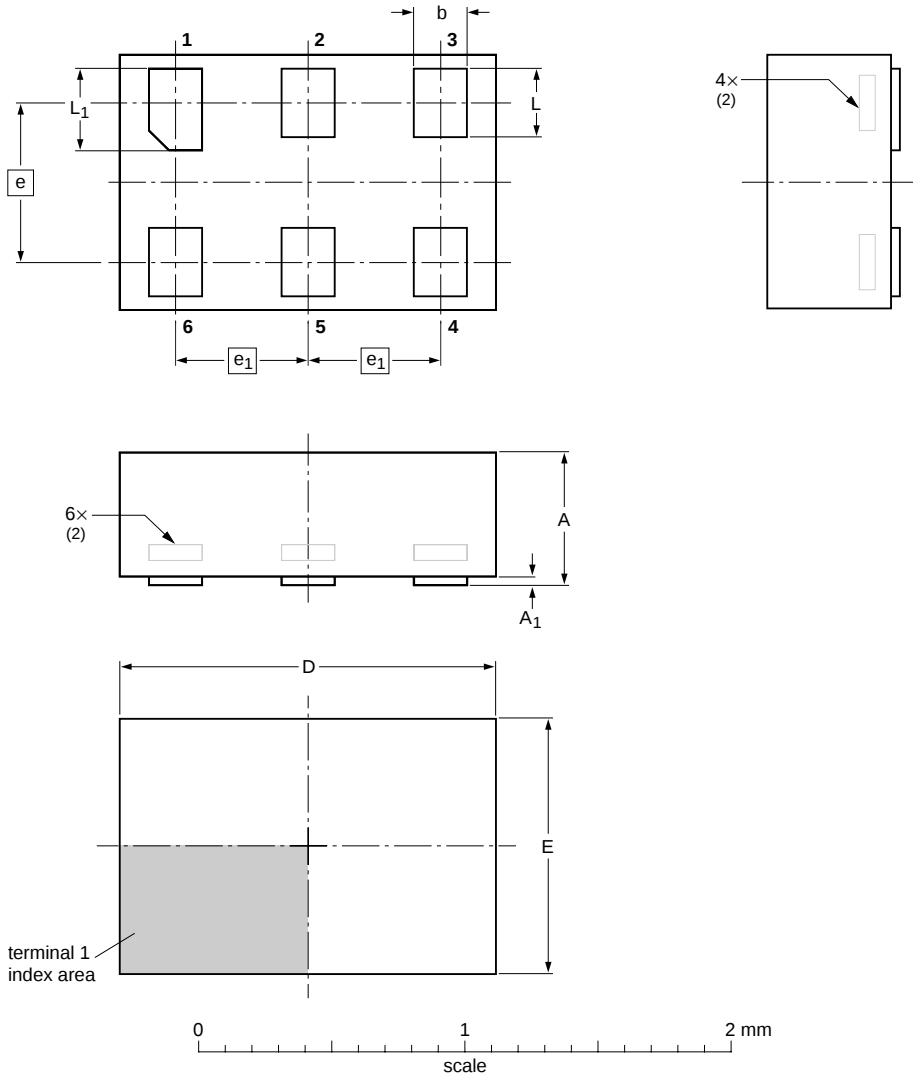
| OUTLINE<br>VERSION | REFERENCES |       |        |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE |
|--------------------|------------|-------|--------|--|---------------------------------------------------------------------------------------|------------|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

Bus buffer/line driver; 3-state

74LVC1G125

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><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                  | 0.25<br>0.17 | 1.5<br>1.4 | 1.05<br>0.95 | 0.6 | 0.5            | 0.35<br>0.27 | 0.40<br>0.32   |

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

| OUTLINE<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|--------|-------|--|------------------------|----------------------|
|                    | IEC        | JEDEC  | JEITA |  |                        |                      |
| SOT886             |            | MO-252 |       |  |                        | 04-07-15<br>04-07-22 |

## Bus buffer/line driver; 3-state

74LVC1G125

## DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)(3)</sup> | DEFINITION                                                                                                                                                                                                                                                                                     |
|-------|----------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I     | Objective data                   | Development                      | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.                                                                                                    |
| II    | Preliminary data                 | Qualification                    | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.             |
| III   | Product data                     | Production                       | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). |

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