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74ALVT16240

16-bit inverting buffer/driver; 3-state

Rev. 03 — 4 July 2005

Product data sheet

1. General description

The 74ALVT16240 is a high-performance BiCMOS device designed for V_{CC} operation at 2.5 V or 3.3 V with I/O compatibility up to 5 V.

The 74ALVT16240 is an inverting 16-bit buffer that is ideal for driving bus lines. The device features four output enable inputs ($\overline{1OE}$, $\overline{2OE}$, $\overline{3OE}$, $\overline{4OE}$), each controlling four of the 3-state outputs.

2. Features

- 5 V I/O compatible
- Live insertion and extraction permitted
- 3-state buffers
- Power-up 3-state
- Output capability: +64 mA and –32 mA
- Latch-up protection:
 - ◆ JESD 78 exceeds 500 mA
- Electrostatic discharge protection:
 - ◆ MIL STD 883 method 3015: exceeds 2000 V
 - ◆ Machine model: exceeds 200 V
- Bus hold data inputs eliminate need for external pull-up resistors to hold unused inputs
- 16-bit bus interface
- TTL input and output switching levels
- Input and output interface capability to systems at 5 V supply
- No bus current loading when output is tied to 5 V bus

3. Quick reference data

Table 1: Quick reference data

$T_{amb} = 25^{\circ}C$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---------------------------------------|--|-----|-----|-----|------|
| t_{PLH} | propagation delay nAx to nYx | $C_L = 50 \text{ pF}$; $V_{CC} = 2.5 \text{ V}$ | 1.0 | 2.5 | 3.7 | ns |
| | | $C_L = 50 \text{ pF}$; $V_{CC} = 3.3 \text{ V}$ | 0.5 | 1.7 | 3.0 | ns |
| t_{PHL} | propagation delay nAx to nYx | $C_L = 50 \text{ pF}$; $V_{CC} = 2.5 \text{ V}$ | 1.0 | 1.9 | 2.9 | ns |
| | | $C_L = 50 \text{ pF}$; $V_{CC} = 3.3 \text{ V}$ | 0.5 | 1.7 | 2.6 | ns |
| C_i | input capacitance on \overline{nOE} | $V_I = 0 \text{ V}$ or V_{CC} | - | 3 | - | pF |

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Table 1: Quick reference data ...continued
 $T_{amb} = 25^{\circ}\text{C}$.

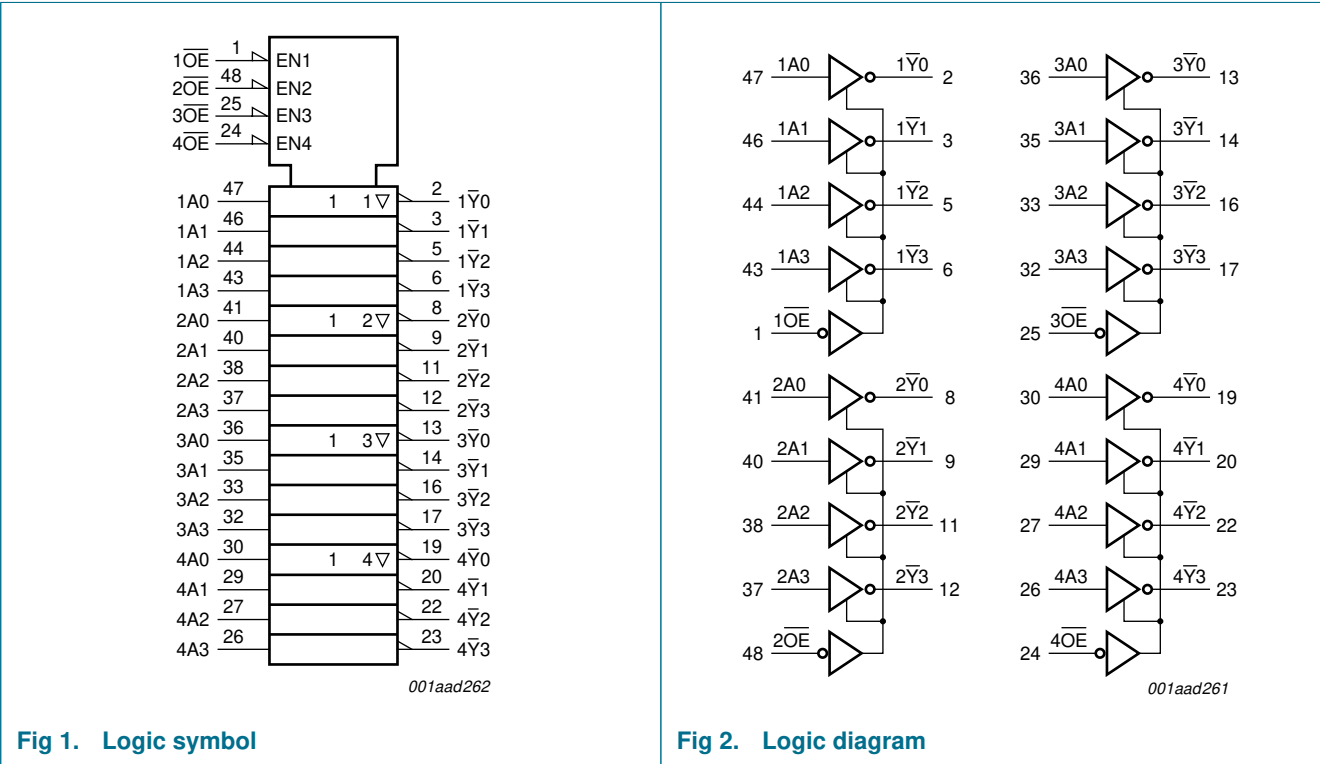
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------|--------------------|--|-----|-----|-----|---------------|
| C_o | output capacitance | $V_{IO} = 0\text{ V or }V_{CC}$ | - | 9 | - | pF |
| I_{CC} | supply current | outputs disabled; $V_{CC} = 2.5\text{ V}$ | - | 40 | 100 | μA |
| | | outputs disabled; $V_{CC} = 3.3\text{ V}$ | - | 60 | 100 | μA |

4. Ordering information

Table 2: Ordering information

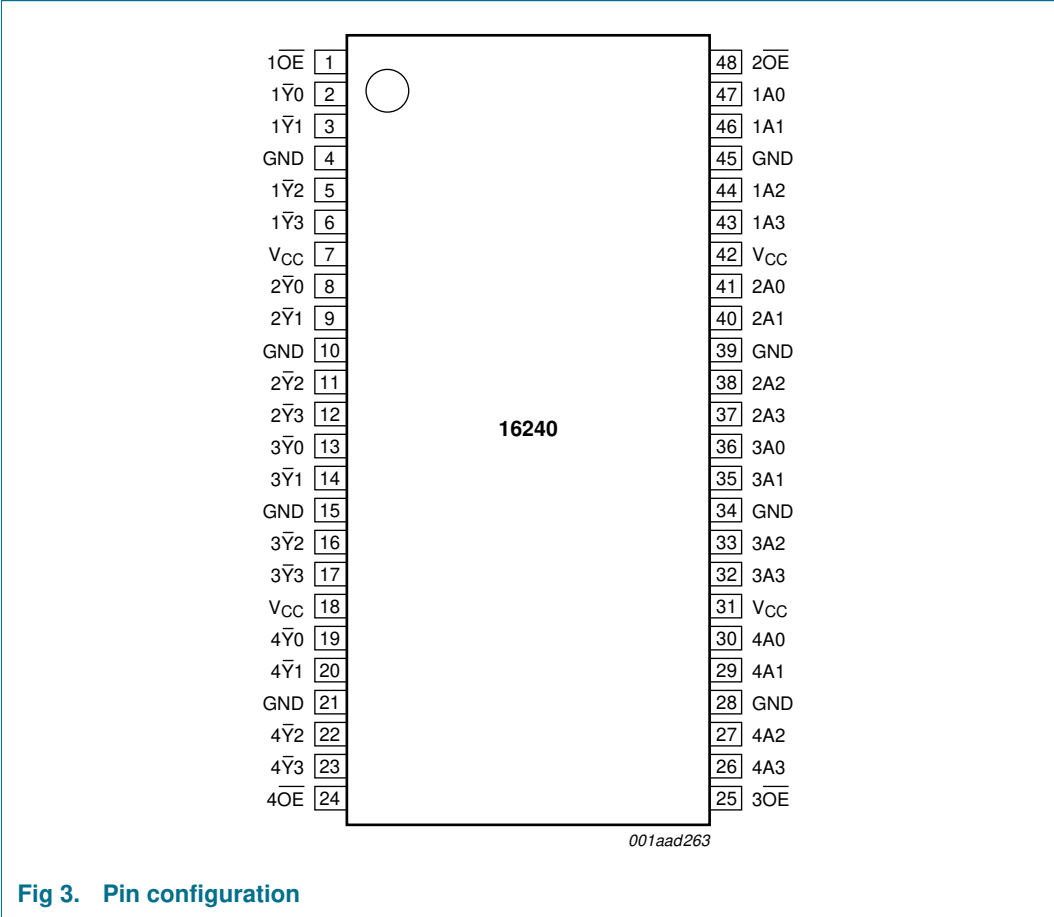
| Type number | Package | | | |
|----------------|-------------------|---------|--|----------|
| | Temperature range | Name | Description | Version |
| 74ALVT16240DL | -40 °C to +85 °C | SSOP48 | plastic shrink small outline package; 48 leads; body width 7.5 mm | SOT370-1 |
| 74ALVT16240DGG | -40 °C to +85 °C | TSSOP48 | plastic thin shrink small outline package; 48 leads; body width 6.1 mm | SOT362-1 |

5. Functional diagram



6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3: Pin description

| Symbol | Pin | Description |
|--------|-----|----------------------------------|
| 1OE | 1 | output enable input (active LOW) |
| 1Y0 | 2 | data output |
| 1Y1 | 3 | data output |
| GND | 4 | ground (0 V) |
| 1Y2 | 5 | data output |
| 1Y3 | 6 | data output |
| VCC | 7 | supply voltage |
| 2Y0 | 8 | data output |
| 2Y1 | 9 | data output |
| GND | 10 | ground (0 V) |
| 2Y2 | 11 | data output |

Table 3: Pin description ...continued

| Symbol | Pin | Description |
|-----------------|-----|----------------------------------|
| 2Y3 | 12 | data output |
| 3Y0 | 13 | data output |
| 3Y1 | 14 | data output |
| GND | 15 | ground (0 V) |
| 3Y2 | 16 | data output |
| 3Y4 | 17 | data output |
| V _{CC} | 18 | supply voltage |
| 4Y0 | 19 | data output |
| 4Y1 | 20 | data output |
| GND | 21 | ground (0 V) |
| 4Y2 | 22 | data output |
| 4Y3 | 23 | data output |
| 4OE | 24 | output enable input (active LOW) |
| 3OE | 25 | output enable input (active LOW) |
| 4A3 | 26 | data input |
| 4A2 | 27 | data input |
| GND | 28 | ground (0 V) |
| 4A1 | 29 | data input |
| 4A0 | 30 | data input |
| V _{CC} | 31 | supply voltage |
| 3A3 | 32 | data input |
| 3A2 | 33 | data input |
| GND | 34 | ground (0 V) |
| 3A1 | 35 | data input |
| 3A0 | 36 | data input |
| 2A3 | 37 | data input |
| 2A2 | 38 | data input |
| GND | 39 | ground (0 V) |
| 2A1 | 40 | data input |
| 2A0 | 41 | data input |
| V _{CC} | 42 | supply voltage |
| 1A3 | 43 | data input |
| 1A2 | 44 | data input |
| GND | 45 | ground (0 V) |
| 1A1 | 46 | data input |
| 1A0 | 47 | data input |
| 2OE | 48 | output enable input (active LOW) |

7. Functional description

7.1 Function table

Table 4: Function table [1]

| Input | | Output |
|-------|-----|--------|
| nOE | nAx | nYx |
| L | L | H |
| L | H | L |
| H | X | Z |

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

8. Limiting values

Table 5: Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|----------------------|-----------------------------------|----------|------|------|
| V_{CC} | supply voltage | | -0.5 | +4.6 | V |
| I_{IK} | input diode current | $V_I < 0$ V | - | -50 | mA |
| V_I | input voltage | | [1] -0.5 | +7.0 | V |
| I_{OK} | output diode current | $V_O < 0$ V | - | -50 | mA |
| V_O | output voltage | output in OFF-state or HIGH-state | [1] -0.5 | +7.0 | V |
| I_O | output current | output in LOW-state | - | 128 | mA |
| | | output in HIGH-state | - | -64 | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| T_j | junction temperature | | [2] - | +150 | °C |

- [1] The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.
- [2] The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

9. Recommended operating conditions

Table 6: Recommended operating conditions

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|------------------------------------|---|-----|-----|-----|------|
| $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ | | | | | | |
| V_{CC} | supply voltage | | 2.3 | - | 2.7 | V |
| V_I | input voltage | | 0 | - | 5.5 | V |
| V_{IH} | HIGH-level input voltage | | 1.7 | - | - | V |
| V_{IL} | LOW-level input voltage | | - | - | 0.7 | V |
| I_{OH} | HIGH-level output current | | - | - | -8 | mA |
| I_{OL} | LOW-level output current | none | - | - | 8 | mA |
| | | current duty cycle $\leq 50\%$; $f \geq 1\text{ kHz}$ | - | - | 24 | mA |
| $\Delta t/\Delta V$ | input transition rise or fall rate | outputs enabled | - | - | 10 | ns/V |
| T_{amb} | ambient temperature | in free air | -40 | - | +85 | °C |
| $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | | | | | |
| V_{CC} | supply voltage | | 3.0 | - | 3.6 | V |
| V_I | input voltage | | 0 | - | 5.5 | V |
| V_{IH} | HIGH-level input voltage | | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | | - | - | 0.8 | V |
| I_{OH} | HIGH-level output current | | - | - | -32 | mA |
| I_{OL} | LOW-level output current | none | - | - | 32 | mA |
| | | current duty cycle $\leq 50\%$; $f \geq 1\text{ kHz}$ | - | - | 64 | mA |
| $\Delta t/\Delta V$ | input transition rise or fall rate | outputs enabled | - | - | 10 | ns/V |
| T_{amb} | ambient temperature | in free air | -40 | - | +85 | °C |

10. Static characteristics

Table 7: Static characteristics

At recommended operating conditions; voltages are referred to GND (ground = 0 V); $T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|---|--|----------------|----------|-----------|---------------|
| $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ [1] | | | | | | |
| V_{IK} | input diode voltage | $V_{CC} = 2.3\text{ V}$; $I_{IK} = -18\text{ mA}$ | - | -0.85 | -1.2 | V |
| V_{OH} | HIGH-level output voltage | $V_{CC} = 2.3\text{ V}$ to 3.6 V ; $I_{OH} = -100\text{ }\mu\text{A}$ | $V_{CC} - 0.2$ | V_{CC} | - | V |
| | | $V_{CC} = 2.3\text{ V}$; $I_{OH} = -8\text{ mA}$ | 1.8 | 2.5 | - | V |
| V_{OL} | LOW-level output voltage | $V_{CC} = 2.3\text{ V}$ | | | | |
| | | $I_{OL} = 100\text{ }\mu\text{A}$ | - | 0.07 | 0.2 | V |
| | | $I_{OL} = 24\text{ mA}$ | - | 0.3 | 0.5 | V |
| | | $I_{OL} = 8\text{ mA}$ | - | - | 0.4 | V |
| I_{LI} | input leakage current | control pins | | | | |
| | | $V_{CC} = 2.7\text{ V}$; $V_I = V_{CC}$ or GND | - | 0.1 | ± 1 | μA |
| | | $V_{CC} = 0\text{ V}$ or 2.7 V ; $V_I = 5.5\text{ V}$ | - | 0.1 | 10 | μA |
| | data pins | $V_{CC} = 2.7\text{ V}$; $V_I = V_{CC}$ | [2] - | 0.1 | 1 | μA |
| | | $V_{CC} = 2.7\text{ V}$; $V_I = 0\text{ V}$ | [2] - | +0.1 | -5 | μA |
| I_{OFF} | power-down output current | $V_{CC} = 0\text{ V}$; V_I or $V_O = 0\text{ V}$ to 4.5 V | - | 0.1 | ± 100 | μA |
| I_{HOLD} | bus hold current on data inputs | $V_{CC} = 2.3\text{ V}$; $V_I = 0.7\text{ V}$ | [3] - | 90 | - | μA |
| | | $V_{CC} = 2.3\text{ V}$; $V_I = 1.7\text{ V}$ | [3] - | -10 | - | μA |
| I_{EX} | external current into output | output HIGH-state; $V_O = 5.5\text{ V}$; $V_{CC} = 2.3\text{ V}$ | - | 10 | 125 | μA |
| I_{PU} | power-up 3-state output current | $V_{CC} \leq 1.2\text{ V}$; $V_O = 0.5\text{ V}$ to V_{CC} ; $V_I = \text{GND}$ or V_{CC} | [4] - | 1 | ± 100 | μA |
| I_{PD} | power-down 3-state output current | $V_{CC} \leq 1.2\text{ V}$; $V_O = 0.5\text{ V}$ to V_{CC} ; $V_I = \text{GND}$ or V_{CC} | [4] - | 1 | ± 100 | μA |
| I_{OZ} | 3-state output current | $V_{CC} = 2.7\text{ V}$; $V_I = V_{IL}$ or V_{IH} | | | | |
| | | output HIGH-state; $V_O = 2.3\text{ V}$ | - | 0.5 | 5 | μA |
| | | output LOW-state; $V_O = 0.5\text{ V}$ | - | +0.5 | -5 | μA |
| I_{CC} | supply current | $V_{CC} = 2.7\text{ V}$; $V_I = \text{GND}$ or V_{CC} ; $I_O = 0\text{ A}$ | | | | |
| | | outputs HIGH-state | - | 0.04 | 0.1 | mA |
| | | outputs LOW-state | - | 2.7 | 4.5 | mA |
| | | outputs disabled | [5] - | 0.04 | 0.1 | mA |
| ΔI_{CC} | additional supply current per input pin | $V_{CC} = 2.3\text{ V}$ to 2.7 V ; one input at $V_{CC} - 0.6\text{ V}$; other inputs at V_{CC} or GND | [6] - | 0.04 | 0.4 | mA |
| C_i | input capacitance on \overline{nOE} | $V_I = 0\text{ V}$ or V_{CC} | - | 3 | - | pF |
| C_o | output capacitance | $V_{IO} = 0\text{ V}$ or V_{CC} | - | 9 | - | pF |
| $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ [7] | | | | | | |
| V_{IK} | input diode voltage | $V_{CC} = 3.0\text{ V}$; $I_{IK} = -18\text{ mA}$ | - | -0.85 | -1.2 | V |
| V_{OH} | HIGH-level output voltage | $V_{CC} = 3.0\text{ V}$ to 3.6 V ; $I_{OH} = -100\text{ }\mu\text{A}$ | $V_{CC} - 0.2$ | V_{CC} | - | V |
| | | $V_{CC} = 3.0\text{ V}$; $I_{OH} = -32\text{ mA}$ | 2.0 | 2.3 | - | V |

Table 7: Static characteristics ...continuedAt recommended operating conditions; voltages are referred to GND (ground = 0 V); $T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------|---|--|---------------|------|-----------|---------------|
| V_{OL} | LOW-level output voltage | $V_{CC} = 3.0\text{ V}$ | | | | |
| | | $I_{OL} = 100\text{ }\mu\text{A}$ | - | 0.07 | 0.2 | V |
| | | $I_{OL} = 16\text{ mA}$ | - | 0.25 | 0.4 | V |
| | | $I_{OL} = 32\text{ mA}$ | - | 0.3 | 0.5 | V |
| | | $I_{OL} = 64\text{ mA}$ | - | 0.4 | 0.55 | V |
| I_{LI} | input leakage current | | | | | |
| | | control pins | | | | |
| | | $V_{CC} = 3.6\text{ V}; V_I = V_{CC}$ or GND | - | 0.1 | ± 1 | μA |
| | | $V_{CC} = 0\text{ V}$ or $3.6\text{ V}; V_I = 5.5\text{ V}$ | - | 0.1 | 10 | μA |
| | data pins | $V_{CC} = 3.6\text{ V}; V_I = V_{CC}$ | [2] - | 0.5 | 1 | μA |
| | | $V_{CC} = 3.6\text{ V}; V_I = 0\text{ V}$ | [2] - | +0.1 | -5 | μA |
| I_{OFF} | power-down output current | $V_{CC} = 0\text{ V}; V_I$ or $V_O = 0\text{ V}$ to 4.5 V | - | 0.1 | ± 100 | μA |
| I_{HOLD} | bus hold current on data inputs | $V_{CC} = 3\text{ V}; V_I = 0.8\text{ V}$ | [3] 75 | 130 | - | μA |
| | | $V_{CC} = 3\text{ V}; V_I = 2.0\text{ V}$ | [3] -75 | -140 | - | μA |
| | | $V_{CC} = 0\text{ V}$ to $3.6\text{ V}; V_I = 3.6\text{ V}$ | [3] ± 500 | - | - | μA |
| I_{PU} | power-up 3-state output current | $V_{CC} \leq 1.2\text{ V}; V_O = 0.5\text{ V}$ to $V_{CC}; V_I = \text{GND}$ or V_{CC} | [8] - | 1 | ± 100 | μA |
| I_{PD} | power-down 3-state output current | $V_{CC} \leq 1.2\text{ V}; V_O = 0.5\text{ V}$ to $V_{CC}; V_I = \text{GND}$ or V_{CC} | [8] - | 1 | ± 100 | μA |
| I_{OZ} | 3-state output current | $V_{CC} = 3.6\text{ V}; V_I = V_{IL}$ or V_{IH} | | | | |
| | | output HIGH-state; $V_O = 3.0\text{ V}$ | - | 0.5 | 5 | μA |
| | | output LOW-state; $V_O = 0.5\text{ V}$ | - | +0.5 | -5 | μA |
| I_{CC} | supply current | $V_{CC} = 3.6\text{ V}; V_I = \text{GND}$ or $V_{CC}; I_O = 0\text{ A}$ | | | | |
| | | outputs HIGH-state | - | 0.05 | 0.1 | mA |
| | | outputs LOW-state | - | 3.9 | 5.5 | mA |
| | | outputs disabled | [5] - | 0.06 | 0.1 | mA |
| ΔI_{CC} | additional supply current per input pin | $V_{CC} = 3\text{ V}$ to 3.6 V ; one input at $V_{CC} - 0.6\text{ V}$; other inputs at V_{CC} or GND | [6] - | 0.04 | 0.4 | mA |

[1] All typical values are at $V_{CC} = 2.5\text{ V}$ and $T_{amb} = 25^{\circ}\text{C}$.[2] Unused pins at V_{CC} or GND.

[3] This is the bus hold overdrive current required to force the input to the opposite logic state.

[4] This parameter is valid for any V_{CC} between 0 V and 1.2 V with a transition time of up to 10 ms. From $V_{CC} = 1.2\text{ V}$ to $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ a transition time of 100 μs is permitted. This parameter is valid for $T_{amb} = 25^{\circ}\text{C}$ only.[5] I_{CC} is measured with outputs pulled up to V_{CC} or pulled down to ground.[6] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.[7] All typical values are at $V_{CC} = 3.3\text{ V}$ and $T_{amb} = 25^{\circ}\text{C}$.[8] This parameter is valid for any V_{CC} between 0 V and 1.2 V with a transition time of up to 10 ms. From $V_{CC} = 1.2\text{ V}$ to $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ a transition time of 100 μs is permitted. This parameter is valid for $T_{amb} = 25^{\circ}\text{C}$ only.

11. Dynamic characteristics

Table 8: Dynamic characteristics

$GND = 0\text{ V}$; $T_{amb} = -40\text{ °C}$ to $+85\text{ °C}$; for test circuit see [Figure 6](#).

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--|------------------------------|-----|-----|-----|------|
| $V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$ [1] | | | | | | |
| t_{PLH} | propagation delay nA_x to $n\bar{Y}_x$ | see Figure 4 | 1.0 | 2.5 | 3.7 | ns |
| t_{PHL} | propagation delay nA_x to $n\bar{Y}_x$ | see Figure 4 | 1.0 | 1.9 | 2.9 | ns |
| t_{PZH} | output enable time to HIGH-level | see Figure 5 | 1.0 | 3.3 | 5.3 | ns |
| t_{PZL} | output enable time to LOW-level | see Figure 5 | 1.0 | 2.6 | 4.2 | ns |
| t_{PHZ} | output disable time from HIGH-level | see Figure 5 | 1.0 | 2.5 | 4.0 | ns |
| t_{PLZ} | output disable time from LOW-level | see Figure 5 | 1.0 | 1.8 | 3.0 | ns |
| $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ [2] | | | | | | |
| t_{PLH} | propagation delay nA_x to $n\bar{Y}_x$ | see Figure 4 | 0.5 | 1.7 | 3.0 | ns |
| t_{PHL} | propagation delay nA_x to $n\bar{Y}_x$ | see Figure 4 | 0.5 | 1.7 | 2.6 | ns |
| t_{PZH} | output enable time to HIGH-level | see Figure 5 | 1.0 | 2.5 | 3.2 | ns |
| t_{PZL} | output enable time to LOW-level | see Figure 5 | 1.0 | 1.9 | 3.1 | ns |
| t_{PHZ} | output disable time from HIGH-level | see Figure 5 | 1.5 | 2.8 | 4.1 | ns |
| t_{PLZ} | output disable time from LOW-level | see Figure 5 | 1.5 | 2.3 | 3.4 | ns |

[1] All typical values are at $V_{CC} = 2.5\text{ V}$ and $T_{amb} = 25\text{ °C}$.

[2] All typical values are at $V_{CC} = 3.3\text{ V}$ and $T_{amb} = 25\text{ °C}$.

12. Waveforms

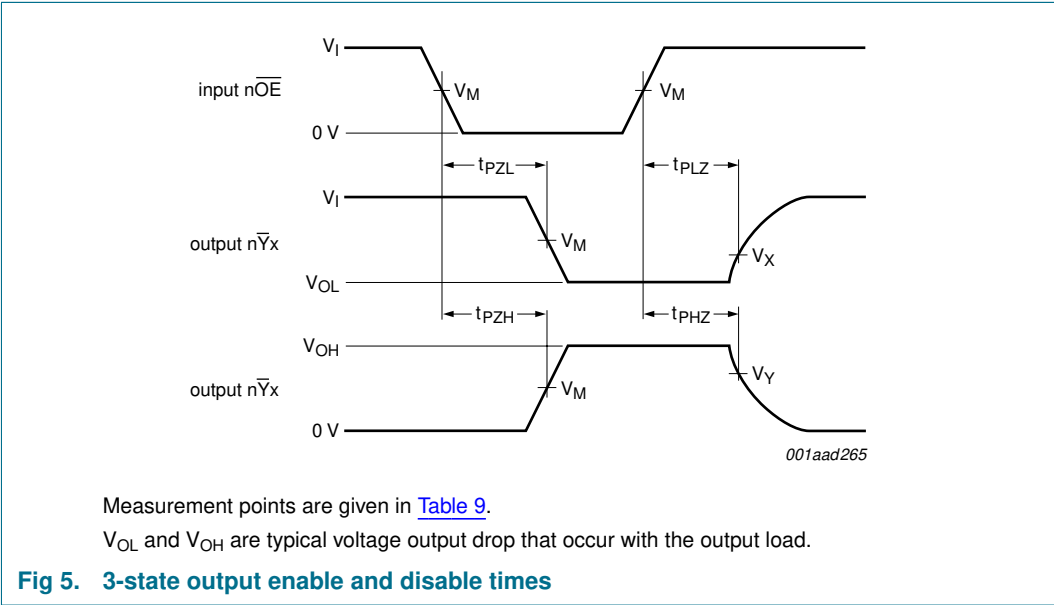
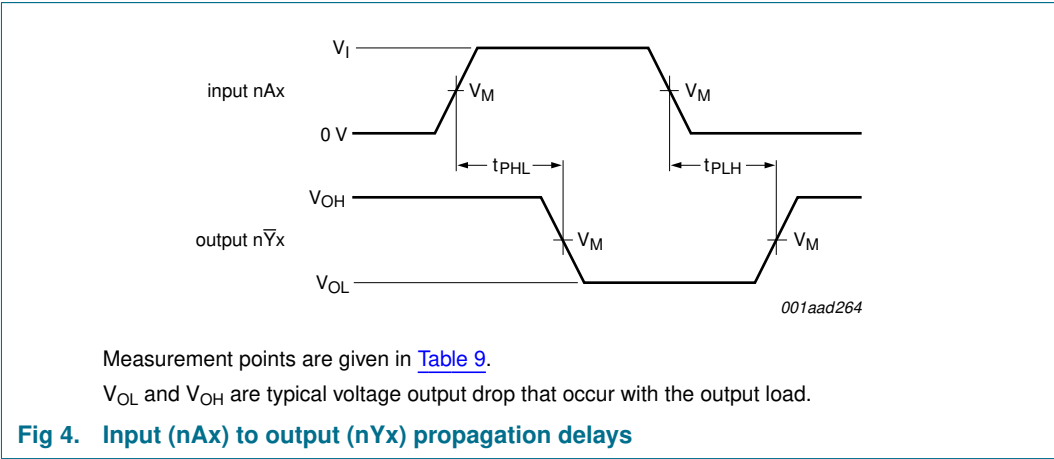


Table 9: Measurement points

| Supply voltage | Input | Output | | |
|---------------------|---------------------|---------------------|--------------------------|--------------------------|
| V_{CC} | V_M | V_M | V_X | V_Y |
| $\geq 3\text{ V}$ | 1.5 V | 1.5 V | $V_{OL} + 0.3\text{ V}$ | $V_{OH} - 0.3\text{ V}$ |
| $\leq 2.7\text{ V}$ | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15\text{ V}$ | $V_{OH} - 0.15\text{ V}$ |

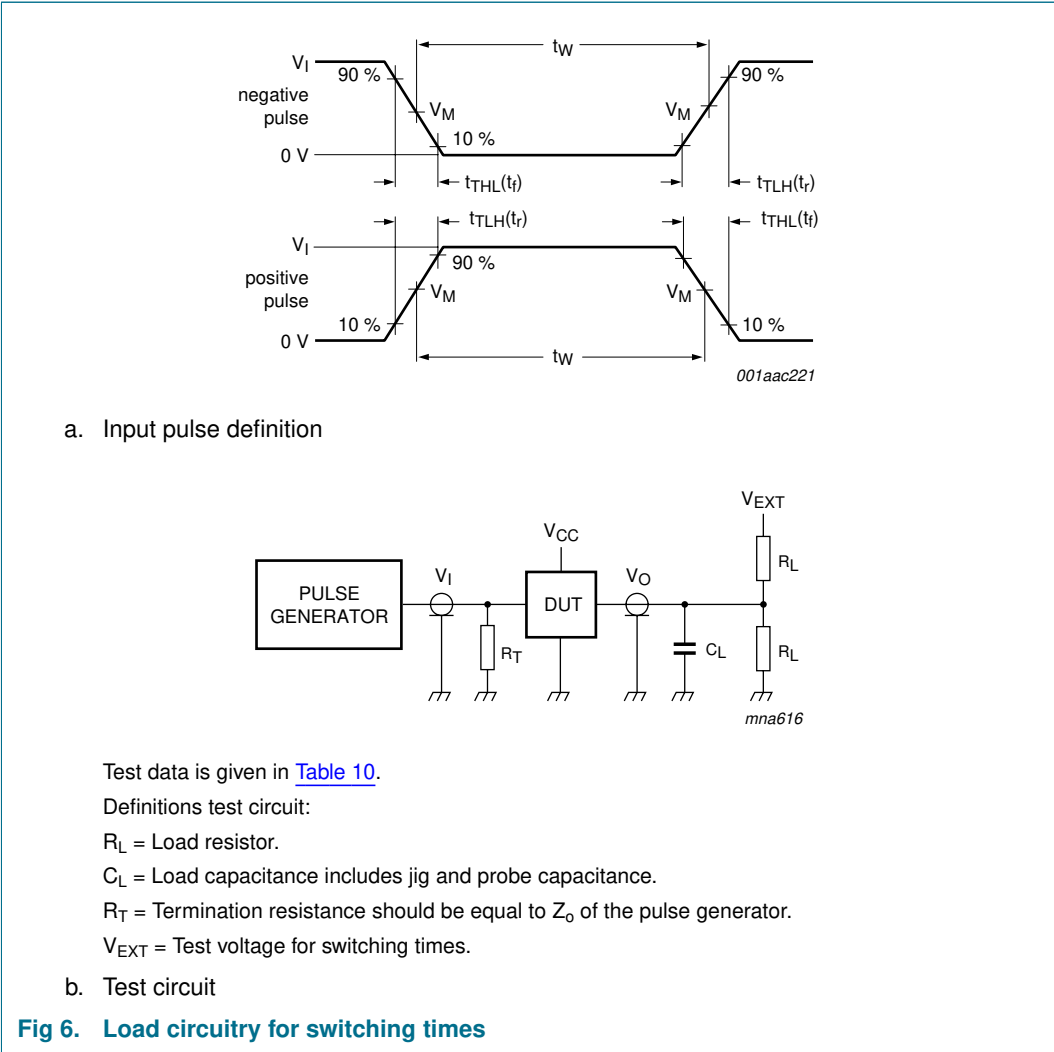


Table 10: Test data

| Input | | | | Load | | V_{EXT} | | |
|-------------------------------------|---------------|--------|---------------|-------|--------------|--------------------|--------------------------|--------------------|
| V_I | f_i | t_W | t_r, t_f | C_L | R_L | t_{PHZ}, t_{PZH} | t_{PLZ}, t_{PZL} | t_{PLH}, t_{PHL} |
| 3.0 V or V_{CC} whichever is less | ≤ 10 MHz | 500 ns | ≤ 2.5 ns | 50 pF | 500 Ω | GND | 6 V or $2 \times V_{CC}$ | open |

13. Package outline

SSOP48: plastic shrink small outline package; 48 leads; body width 7.5 mm SOT370-1

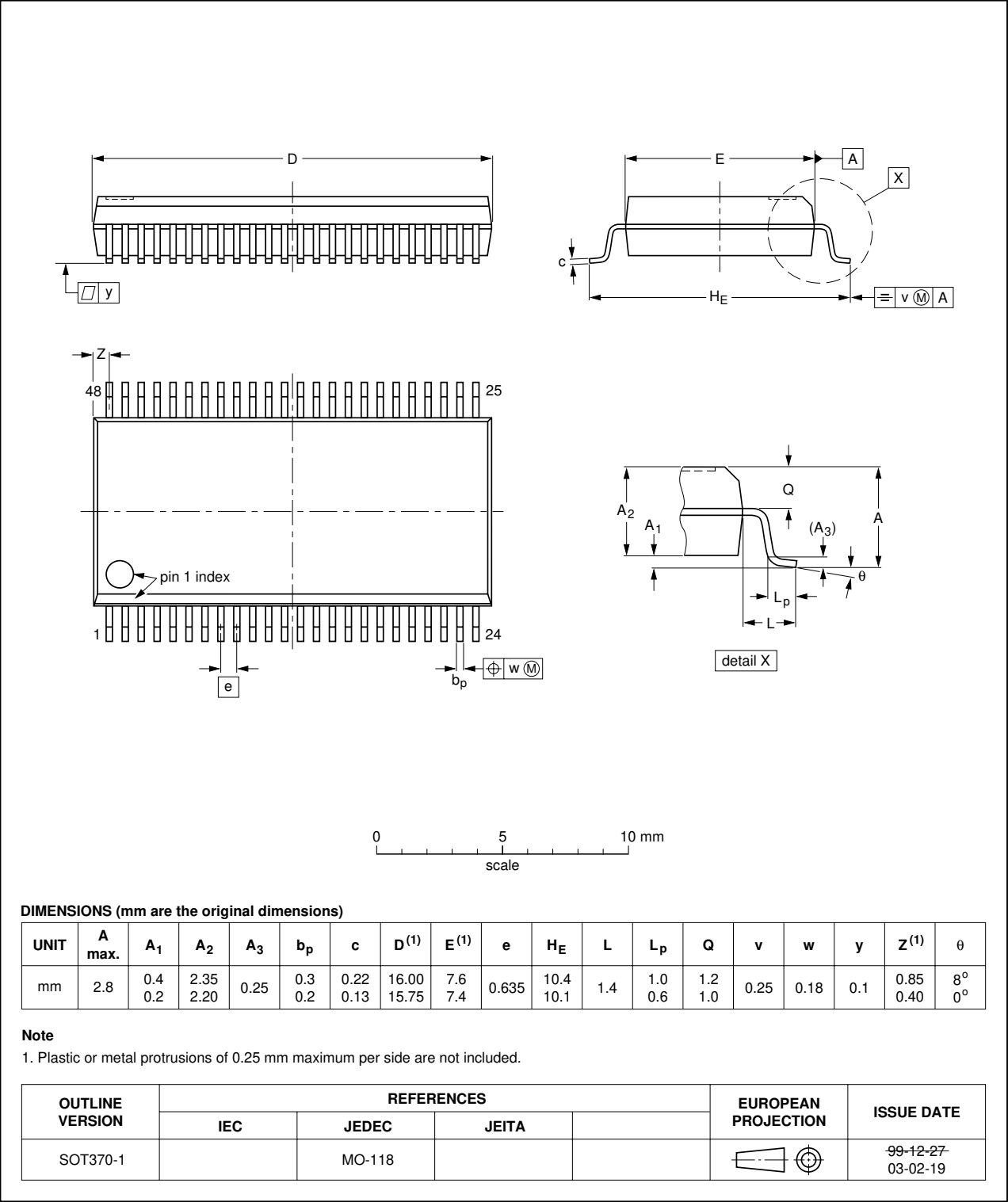


Fig 7. Package outline SOT370-1 (SSOP48)



TSSOP48: plastic thin shrink small outline package; 48 leads; body width 6.1 mm

SOT362-1

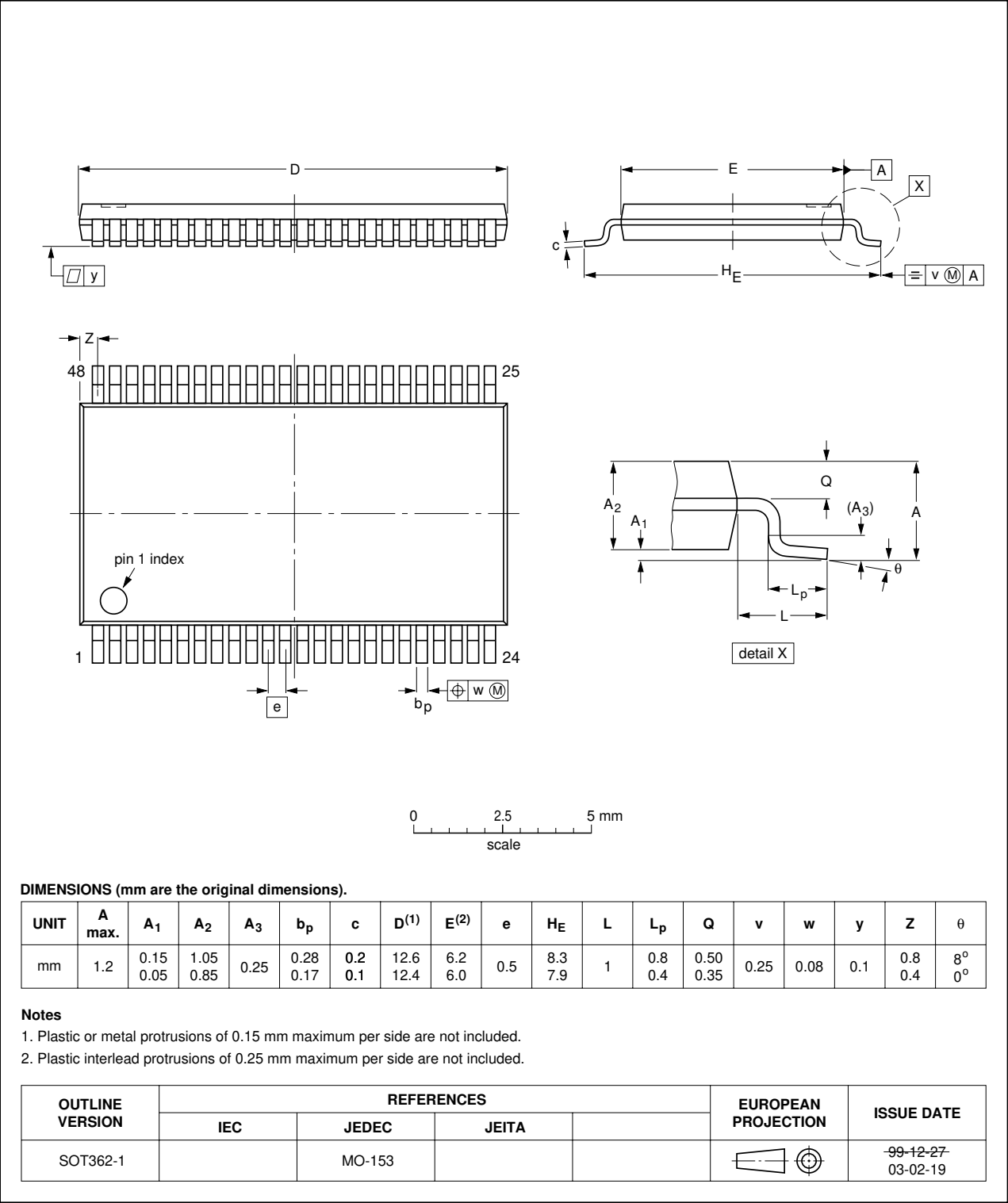


Fig 8. Package outline SOT362-1 (TSSOP48)

14. Revision history

Table 11: Revision history

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|--|--------------|-----------------------|---------------|----------------|---------------|
| 74ALVT16240_3 | 20050704 | Product data sheet | - | 9397 750 15192 | 74ALVT16240_2 |
| Modifications: | | | | | |
| <ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.In Table 8; update of the typical and maximum value of t_{PZH} at $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ | | | | | |
| 74ALVT16240_2 | 19980213 | Product specification | - | 9397 750 03615 | 74ALVT16240_1 |
| 74ALVT16240_1 | 19970502 | - | - | - | - |

15. Data sheet status

| Level | Data sheet status ^[1] | Product status ^{[2] [3]} | 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). |

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

16. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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19. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com



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