

74AXP1T32

Dual supply 2-input OR gate

Rev. 1 — 7 November 2016

Product data sheet

1. General description

The 74AXP1T32 is a dual supply 2-input OR gate. It features two inputs (A, B), an output (Y) and dual supply pins (V_{CCI} and V_{CCO}). The inputs are referenced to V_{CCI} and the output is referenced to V_{CCO} . All inputs can be connected directly to V_{CCI} or GND. V_{CCI} can be supplied at any voltage between 0.7 V and 2.75 V. V_{CCO} can be supplied at any voltage between 1.2 V and 5.5 V. This feature allows voltage level translation.

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

This device ensures very low static and dynamic power consumption across the entire supply range and is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2. Features and benefits

- Wide supply voltage range:
 - ◆ V_{CCI} : 0.7 V to 2.75 V
 - ◆ V_{CCO} : 1.2 V to 5.5 V
- Low input capacitance; $C_I = 0.6$ pF (typical)
- Low output capacitance; $C_O = 1.8$ pF (typical)
- Low dynamic power consumption; $C_{PD} = 0.5$ pF at $V_{CCI} = 1.2$ V (typical)
- Low dynamic power consumption; $C_{PD} = 7.1$ pF at $V_{CCO} = 3.3$ V (typical)
- Low static power consumption; $I_{CCI} = 0.5$ μ A (85 °C maximum)
- Low static power consumption; $I_{CCO} = 1.8$ μ A (85 °C maximum)
- High noise immunity
- Complies with JEDEC standard:
 - ◆ JESD8-12A.01 (1.1 V to 1.3 V; A, B input)
 - ◆ JESD8-11A.01 (1.4 V to 1.6 V)
 - ◆ JESD8-7A (1.65 V to 1.95 V)
 - ◆ JESD8-5A.01 (2.3 V to 2.7 V)
 - ◆ JESD8-C (2.7 V to 3.6 V; Y output)
 - ◆ JESD12-6 (4.5 V to 5.5 V; Y output)
- ESD protection:
 - ◆ HBM ANSI/ESDA/JEDEC JS-001 Class 2 exceeds 2 kV
 - ◆ CDM JESD22-C101E exceeds 1000 V
- Latch-up performance exceeds 100 mA per JESD78D Class II
- Inputs accept voltages up to 2.75 V

- Low noise overshoot and undershoot < 10 % of V_{CC0}
- I_{OFF} circuitry provides partial power-down mode operation
- Specified from -40 °C to $+85\text{ °C}$

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|-------------|------------------------------------|--------|--|---------|
| | Temperature range | Name | Description | |
| 74AXP1T32GW | -40 °C to $+85\text{ °C}$ | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74AXP1T32GX | -40 °C to $+85\text{ °C}$ | X2SON6 | plastic thermal extremely thin small outline package; no leads; 6 terminals; body $1 \times 0.8 \times 0.35\text{ mm}$ | SOT1255 |

4. Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| 74AXP1T32GW | rT |
| 74AXP1T32GX | rT |

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

5. Functional diagram

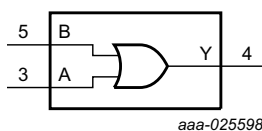


Fig 1. Logic symbol

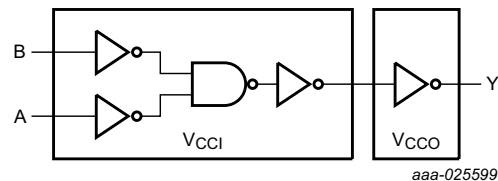


Fig 2. Logic diagram

6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|------------------|-----|-----------------------|
| V _{CCI} | 1 | input supply voltage |
| GND | 2 | ground (0 V) |
| A | 3 | data input A |
| Y | 4 | data output Y |
| B | 5 | data input B |
| V _{CCO} | 6 | output supply voltage |

7. Functional description

Table 4. Function table^[1]

| Supply voltage | | Input | | Output |
|------------------|------------------|-------|---|--------|
| V _{CCI} | V _{CCO} | A | B | Y |
| 0.7 V to 2.75 V | 1.2 V to 5.5 V | L | L | L |
| 0.7 V to 2.75 V | 1.2 V to 5.5 V | L | H | H |
| 0.7 V to 2.75 V | 1.2 V to 5.5 V | H | L | H |
| 0.7 V to 2.75 V | 1.2 V to 5.5 V | H | H | H |
| GND | 1.2 V to 5.5 V | X | X | Z |
| 0.7 V to 2.75 V | GND | X | X | Z |
| GND | GND | X | X | Z |

[1] H = HIGH voltage level; L = LOW voltage level.

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_{CCI} | input supply voltage | | -0.5 | 3.3 | V |
| V_{CCO} | output supply voltage | | -0.5 | 6.0 | V |
| I_{IK} | input clamping current | $V_I < 0$ V | -50 | - | mA |
| V_I | input voltage | | -0.5 | 3.3 | V |
| I_{OK} | output clamping current | $V_O < 0$ V | -50 | - | mA |
| V_O | output voltage | Active mode | -0.5 | $V_{CCO} + 0.5$ | V |
| | | Power-down or 3-state mode | -0.5 | 6.0 | V |
| I_O | output current | $V_O = 0$ V to V_{CCO} | - | ± 25 | mA |
| I_{CCI} | input supply current | | - | 50 | mA |
| I_{CCO} | output supply current | | - | 50 | mA |
| I_{GND} | ground current | | -50 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | $T_{amb} = -40$ °C to +85 °C | - | 250 | mW |

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

[2] $V_{CCO} + 0.5$ V should not exceed 6.0 V.

[3] For SOT363 package: above 82.5 °C, the value of P_{tot} derates linearly with 3.7 mW/K.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---------------------|-------------------------------------|-----------------------------|-----|-----------|------|
| V_{CCI} | input supply voltage | | 0.7 | 2.75 | V |
| V_{CCO} | output supply voltage | | 1.2 | 5.5 | V |
| V_I | input voltage | | 0 | 2.75 | V |
| V_O | output voltage | Active mode | 0 | V_{CCO} | V |
| | | Power-down or 3-state mode | 0 | 5.5 | V |
| T_{amb} | ambient temperature | | -40 | +85 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CCI} = 0.7$ V to 2.75 V | 0 | 200 | ns/V |

10. Static characteristics

Table 7. Static characteristics

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

| Symbol | Parameter | Conditions | $T_{amb} = -40\text{ °C to }+85\text{ °C}$ | | | | Unit |
|------------------|--------------------------------------|---|--|-------------|---------------|---------------|---------------|
| | | | Min | Typ 25 °C | Max 25 °C | Max 85 °C | |
| V_{IH} | HIGH-level input voltage | $V_{CCI} = 0.75\text{ V to }0.85\text{ V}$ | $0.75V_{CCI}$ | - | - | - | V |
| | | $V_{CCI} = 1.1\text{ V to }1.95\text{ V}$ | $0.65V_{CCI}$ | - | - | - | V |
| | | $V_{CCI} = 2.3\text{ V to }2.7\text{ V}$ | 1.6 | - | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CCI} = 0.75\text{ V to }0.85\text{ V}$ | - | - | $0.25V_{CCI}$ | $0.25V_{CCI}$ | V |
| | | $V_{CCI} = 1.1\text{ V to }1.95\text{ V}$ | - | - | $0.35V_{CCI}$ | $0.35V_{CCI}$ | V |
| | | $V_{CCI} = 2.3\text{ V to }2.7\text{ V}$ | - | - | 0.7 | 0.7 | V |
| V_{OH} | HIGH-level output voltage | $I_O = -2\text{ mA}; V_{CCO} = 1.2\text{ V}$ [1] | - | 1.05 | - | - | V |
| | | $I_O = -3\text{ mA}; V_{CCO} = 1.4\text{ V}$ | 1.05 | - | - | - | V |
| | | $I_O = -4.5\text{ mA}; V_{CCO} = 1.65\text{ V}$ | 1.2 | - | - | - | V |
| | | $I_O = -8\text{ mA}; V_{CCO} = 2.3\text{ V}$ | 1.7 | - | - | - | V |
| | | $I_O = -10\text{ mA}; V_{CCO} = 3.0\text{ V}$ | 2.2 | - | - | - | V |
| | | $I_O = -12\text{ mA}; V_{CCO} = 4.5\text{ V}$ | 3.7 | - | - | - | V |
| V_{OL} | LOW-level output voltage | $I_O = 2\text{ mA}; V_{CCO} = 1.2\text{ V}$ [1] | - | 0.18 | - | - | V |
| | | $I_O = 3\text{ mA}; V_{CCO} = 1.4\text{ V}$ | - | - | 0.35 | 0.35 | V |
| | | $I_O = 4.5\text{ mA}; V_{CCO} = 1.65\text{ V}$ | - | - | 0.45 | 0.45 | V |
| | | $I_O = 8\text{ mA}; V_{CCO} = 2.3\text{ V}$ | - | - | 0.7 | 0.7 | V |
| | | $I_O = 10\text{ mA}; V_{CCO} = 3.0\text{ V}$ | - | - | 0.8 | 0.8 | V |
| | | $I_O = 12\text{ mA}; V_{CCO} = 4.5\text{ V}$ | - | - | 0.8 | 0.8 | V |
| I_I | input leakage current | $V_I = 0\text{ V to }2.75\text{ V};$ $V_{CCI} = 0\text{ V to }2.75\text{ V}$ [1] | - | ± 0.001 | ± 0.1 | ± 0.5 | μA |
| I_{OZ} | OFF-state output current | $V_O = 0\text{ V to }5.5\text{ V};$ $V_{CCO} = 1.2\text{ V to }5.5\text{ V}$ | - | ± 0.001 | ± 0.1 | ± 0.5 | μA |
| I_{OFF} | power-off leakage current | inputs; $V_I = 0\text{ V to }2.75\text{ V};$ $V_{CCI} = 0\text{ V}; V_{CCO} = 0\text{ V to }5.5\text{ V}$ [1] | - | ± 0.01 | ± 0.1 | ± 0.5 | μA |
| | | output; $V_O = 0\text{ V to }5.5\text{ V};$ $V_{CCO} = 0\text{ V}; V_{CCI} = 0\text{ V to }2.75\text{ V};$ $V_I = 0\text{ V to }2.75\text{ V}$ [1] | - | ± 0.01 | ± 0.1 | ± 0.5 | μA |
| ΔI_{OFF} | additional power-off leakage current | inputs; $V_I = 0\text{ V or }2.75\text{ V};$ $V_{CCI} = 0\text{ V to }0.1\text{ V};$ $V_{CCO} = 0\text{ V to }5.5\text{ V}$ [1] | - | ± 0.02 | ± 0.1 | ± 0.5 | μA |
| | | output; $V_O = 0\text{ V or }5.5\text{ V};$ $V_{CCO} = 0\text{ V to }0.1\text{ V};$ $V_{CCI} = 0\text{ V to }2.75\text{ V};$ $V_I = 0\text{ V or }2.75\text{ V}$ [1] | - | ± 0.02 | ± 0.1 | ± 0.5 | μA |

[1] Typical values are measured at $V_{CCI} = V_{CCO} = 1.2\text{ V}$ unless otherwise specified.

Table 8. Static characteristics supply current

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

| Symbol | Parameter | Conditions | $T_{amb} = -40\text{ °C to }+85\text{ °C}$ | | | | Unit |
|------------------|--|---|--|-----------|-----------|---------------|---------------|
| | | | Typ 25 °C | Max 25 °C | Typ 85 °C | Max 85 °C | |
| I_{CCI} | input supply current | $V_I = 0\text{ V or }V_{CCI}$; | | | | | |
| | | $V_{CCI} = 0.7\text{ V to }1.3\text{ V}$ [1] | 1 | 100 | 10 | 300 | nA |
| | | $V_{CCI} = 1.3\text{ V to }2.75\text{ V}$ [2] | 1 | 100 | 20 | 500 | nA |
| | | $V_{CCI} = 2.75\text{ V}; V_{CCO} = 0\text{ V}$ | 1 | 100 | 20 | 500 | nA |
| | | $V_{CCI} = 0\text{ V}; V_{CCO} = 5.5\text{ V}$ | 1 | 100 | 1 | 100 | nA |
| I_{CCO} | output supply current | $V_I = 0\text{ V or }V_{CCI}$; $I_O = 0\text{ A}$; see Table 9 | | | | | |
| | | $V_{CCO} = 1.2\text{ V to }3.6\text{ V}$ [1] | 0.001 | 1.0 | 0.01 | 1.2 | μA |
| | | $V_{CCO} = 3.6\text{ V to }5.5\text{ V}$ [3] | 0.8 | 1.5 | 1.0 | 1.8 | μA |
| | | $V_{CCI} = 2.75\text{ V}; V_{CCO} = 0\text{ V}$ | 0.001 | 0.1 | 0.003 | 0.2 | μA |
| | | $V_{CCI} = 0\text{ V}; V_{CCO} = 3.6\text{ V}$ | 0.2 | 0.6 | 0.3 | 0.8 | μA |
| | $V_{CCI} = 0\text{ V}; V_{CCO} = 5.5\text{ V}$ | 0.4 | 0.8 | 0.5 | 1.0 | μA | |
| ΔI_{CCI} | additional input supply current | $V_I = V_{CCI} - 0.5\text{ V}; V_{CCI} = 2.5\text{ V}$ | 2 | 100 | 14 | 150 | μA |

[1] Typical values are measured at $V_{CCI} = V_{CCO} = 1.2\text{ V}$.[2] Typical values are measured at $V_{CCI} = V_{CCO} = 2.5\text{ V}$.[3] Typical values are measured at $V_{CCI} = 1.2\text{ V}$ and $V_{CCO} = 5.0\text{ V}$.**Table 9. Typical output supply current (I_{CCO})**

| V_{CCI} | V_{CCO} | | | | | | | Unit |
|-----------|-----------|-------|-------|-------|-------|-------|-------|------|
| | 0 V | 1.2 V | 1.5 V | 1.8 V | 2.5 V | 3.3 V | 5.0 V | |
| 0 V | 0 | 1 | 5 | 20 | 100 | 200 | 400 | nA |
| 0.8 V | 1 | 10 | 150 | 200 | 300 | 500 | 800 | nA |
| 1.2 V | 1 | 1 | 5 | 200 | 300 | 500 | 800 | nA |
| 1.5 V | 1 | 1 | 5 | 100 | 300 | 500 | 800 | nA |
| 1.8 V | 1 | 1 | 5 | 100 | 300 | 500 | 800 | nA |
| 2.5 V | 1 | 1 | 5 | 100 | 100 | 500 | 800 | nA |

11. Dynamic characteristics

Table 10. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit, see [Figure 12](#); for waveform, see [Figure 5](#).

| Symbol | Parameter | Conditions | V _{CC0} | | | | | | | Unit | |
|---|-------------------|---|--------------------|---------------|--------------------|------|----------------|--------------------|------|------|--|
| | | | 1.2 V | 1.5 V ± 0.1 V | | | 1.8 V ± 0.15 V | | | | |
| | | | Typ ^[1] | Min | Typ ^[1] | Max | Min | Typ ^[1] | Max | | |
| T_{amb} = 25 °C | | | | | | | | | | | |
| t _{pd} | propagation delay | A, B to Y ^[2] | | | | | | | | | |
| | | V _{CCI} = 0.75 V to 0.85 V | 23 | 3 | 18 | 73 | 3 | 16 | 69 | ns | |
| | | V _{CCI} = 1.1 V to 1.3 V | 16.9 | 3.1 | 10.8 | 19.9 | 2.8 | 8.7 | 15.9 | ns | |
| | | V _{CCI} = 1.4 V to 1.6 V | 16.0 | 2.8 | 9.9 | 18.2 | 2.5 | 7.8 | 13.2 | ns | |
| | | V _{CCI} = 1.65 V to 1.95 V | 15.6 | 2.7 | 9.5 | 17.3 | 2.4 | 7.3 | 11.8 | ns | |
| | | V _{CCI} = 2.3 V to 2.7 V | 15.2 | 2.5 | 9.0 | 16.8 | 2.2 | 6.9 | 11.0 | ns | |
| T_{amb} = -40 °C to +85 °C | | | | | | | | | | | |
| t _{pd} | propagation delay | A, B to Y ^[2] | | | | | | | | | |
| | | V _{CCI} = 0.75 V to 0.85 V | 23 | 3 | 18 | 148 | 3 | 16 | 145 | ns | |
| | | V _{CCI} = 1.1 V to 1.3 V | 16.9 | 3.1 | 10.8 | 19.9 | 2.8 | 8.7 | 15.9 | ns | |
| | | V _{CCI} = 1.4 V to 1.6 V | 16.0 | 2.8 | 9.9 | 18.2 | 2.5 | 7.8 | 13.2 | ns | |
| | | V _{CCI} = 1.65 V to 1.95 V | 15.6 | 2.7 | 9.5 | 17.3 | 2.4 | 7.3 | 11.8 | ns | |
| | | V _{CCI} = 2.3 V to 2.7 V | 15.2 | 2.5 | 9.0 | 16.8 | 2.2 | 6.9 | 11.0 | ns | |
| t _t | transition time | V _{CCI} = 0.75 V to 2.7 V ^[3] | - | 1.0 | - | - | 1.0 | - | - | ns | |

[1] Typical values are measured at nominal supply voltages and T_{amb} = +25 °C.

[2] t_{pd} is the same as t_{PLH} and t_{PHL}.

[3] t_t is the same as t_{THL} and t_{TLH}.

Table 11. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit, see [Figure 12](#); for waveform, see [Figure 5](#).

| Symbol | Parameter | Conditions | V _{CC0} | | | | | | | | | Unit |
|---|-------------------|--|------------------|--------------------|------|---------------|--------------------|-----|---------------|--------------------|-----|------|
| | | | 2.5 V ± 0.2 V | | | 3.3 V ± 0.3 V | | | 5.0 V ± 0.5 V | | | |
| | | | Min | Typ ^[1] | Max | Min | Typ ^[1] | Max | Min | Typ ^[1] | Max | |
| T_{amb} = 25 °C | | | | | | | | | | | | |
| t _{pd} | propagation delay | A, B to Y [2] | | | | | | | | | | |
| | | V _{CCI} = 0.75 V to 0.85 V | 2 | 14 | 69 | 2 | 14 | 77 | 2 | 15 | 89 | ns |
| | | V _{CCI} = 1.1 V to 1.3 V | 2.4 | 6.9 | 10.9 | 2.2 | 6.3 | 9.6 | 2.1 | 6.0 | 9.1 | ns |
| | | V _{CCI} = 1.4 V to 1.6 V | 2.1 | 6.0 | 9.1 | 2.0 | 5.4 | 8.2 | 1.9 | 5.0 | 7.7 | ns |
| | | V _{CCI} = 1.65 V to 1.95 V | 2.0 | 5.6 | 8.6 | 1.8 | 4.9 | 7.6 | 1.8 | 4.6 | 7.2 | ns |
| | | V _{CCI} = 2.3 V to 2.7 V | 1.9 | 5.1 | 8.0 | 1.7 | 4.5 | 7.0 | 1.6 | 4.1 | 6.5 | ns |
| T_{amb} = -40 °C to +85 °C | | | | | | | | | | | | |
| t _{pd} | propagation delay | A, B to Y [2] | | | | | | | | | | |
| | | V _{CCI} = 0.75 V to 0.85 V | 2 | 14 | 164 | 2 | 14 | 191 | 2 | 15 | 222 | ns |
| | | V _{CCI} = 1.1 V to 1.3 V | 2.4 | 6.9 | 10.9 | 2.2 | 6.3 | 9.6 | 2.1 | 6.0 | 9.1 | ns |
| | | V _{CCI} = 1.4 V to 1.6 V | 2.1 | 6.0 | 9.1 | 2.0 | 5.4 | 8.2 | 1.9 | 5.0 | 7.7 | ns |
| | | V _{CCI} = 1.65 V to 1.95 V | 2.0 | 5.6 | 8.6 | 1.8 | 4.9 | 7.6 | 1.8 | 4.6 | 7.2 | ns |
| | | V _{CCI} = 2.3 V to 2.7 V | 1.9 | 5.1 | 8.0 | 1.7 | 4.5 | 7.0 | 1.6 | 4.1 | 6.5 | ns |
| t _t | transition time | V _{CCI} = 0.75 V to 2.7 V [3] | 1.0 | - | - | 1.0 | - | - | 1.0 | - | - | ns |

[1] Typical values are measured at nominal supply voltages and t_{amb} = +25 °C.

[2] t_{pd} is the same as t_{PLH} and t_{PHL}.

[3] t_t is the same as t_{THL} and t_{TLH}.

Table 12. Typical dynamic characteristics at $T_{amb} = 25\text{ °C}$

Voltages are referenced to GND (ground = 0 V); for test circuit, see [Figure 12](#); for waveform, see [Figure 5](#).

| Symbol | Parameter | Conditions | V_{CCO} | | | | | | Unit | |
|--------------------------|-------------------------------|---|-----------|-------|-------|-------|-------|-------|------|--|
| | | | 1.2 V | 1.5 V | 1.8 V | 2.5 V | 3.3 V | 5.0 V | | |
| C_{PD} | power dissipation capacitance | $f_i = 1\text{ MHz}$; $R_L = \infty\ \Omega$; $V_I = 0\text{ V}$ to V_{CCI} [1] | | | | | | | | |
| | | input supply [2] | | | | | | | | |
| | | $V_{CCI} = 0.8\text{ V}$ | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | pF | |
| | | $V_{CCI} = 1.2\text{ V}$ | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | pF | |
| | | $V_{CCI} = 1.5\text{ V}$ | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | pF | |
| | | $V_{CCI} = 1.8\text{ V}$ | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | pF | |
| | | $V_{CCI} = 2.5\text{ V}$ | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | pF | |
| | | output supply [3] | | | | | | | | |
| | | $V_{CCI} = 0.8\text{ V}$ | 6.7 | 6.8 | 6.8 | 6.9 | 7.5 | 9.5 | pF | |
| | | $V_{CCI} = 1.2\text{ V}$ | 6.8 | 6.9 | 7.0 | 7.0 | 7.1 | 7.6 | pF | |
| | | $V_{CCI} = 1.5\text{ V}$ | 6.9 | 6.9 | 6.9 | 7.0 | 7.1 | 7.6 | pF | |
| | | $V_{CCI} = 1.8\text{ V}$ | 6.9 | 6.9 | 6.9 | 7.0 | 7.2 | 7.6 | pF | |
| $V_{CCI} = 2.5\text{ V}$ | 6.9 | 7.0 | 7.0 | 7.0 | 7.2 | 7.6 | pF | | | |
| C_I | input capacitance | $V_I = 0\text{ V}$ or V_{CCI} ; $V_{CCI} = 0\text{ V}$ to 2.7 V | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | pF | |
| C_O | output capacitance | $V_O = 0\text{ V}$; $V_{CCO} = 0\text{ V}$ | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | pF | |

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

[2] Power dissipated from input supply (V_{CCI})

$$P_D = C_{PD} \times V_{CCI}^2 \times f_i \times N \text{ where:}$$

C_{PD} = power dissipation capacitance of the input supply.

V_{CCI} = input supply voltage in V;

f_i = input frequency in MHz;

N = number of inputs switching;

[3] Power dissipated from output supply (V_{CCO})

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

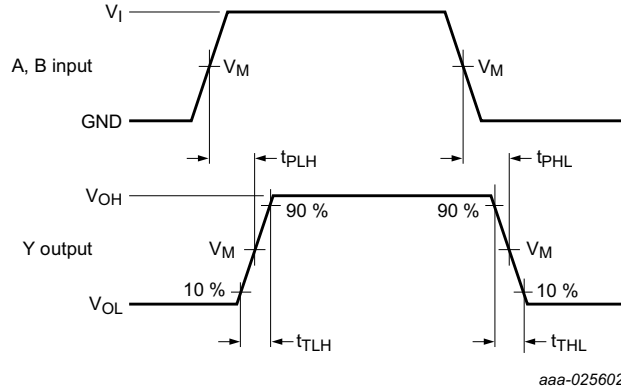
C_L = load capacitance in pF;

C_{PD} = power dissipation capacitance of the output supply.

V_{CCO} = output supply voltage in V;

f_o = output frequency in MHz;

11.1 Waveforms and graphs



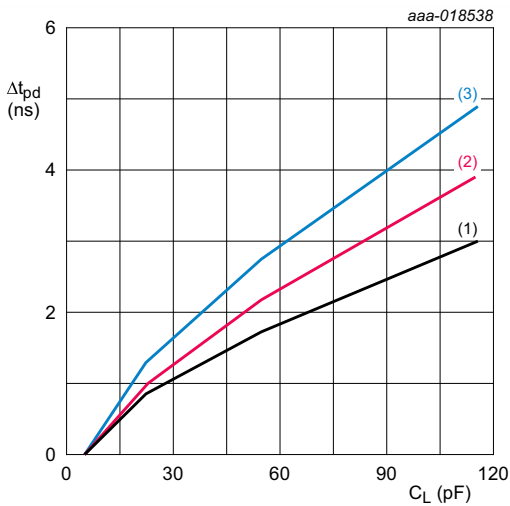
Measurement points are given in [Table 13](#).

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

Fig 5. Input A, B to output Y propagation delay times and output transition times

Table 13. Measurement points

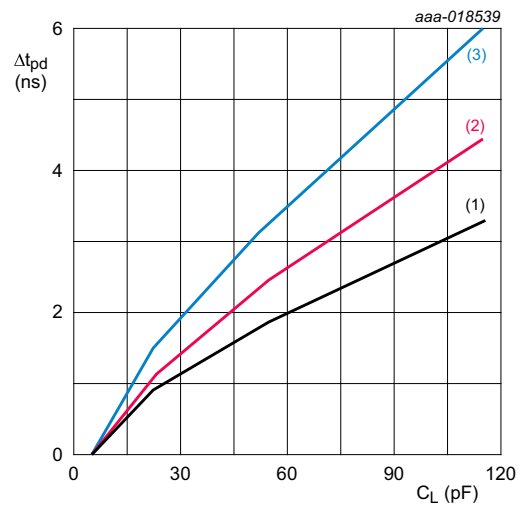
| Supply voltage | | Output | Input | |
|-----------------|----------------|--------------|--------------|-----------|
| V_{CCI} | V_{CCO} | V_M | V_M | V_I |
| 0.75 V to 2.7 V | 1.2 V to 5.5 V | $0.5V_{CCO}$ | $0.5V_{CCI}$ | V_{CCI} |



$T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ unless otherwise specified.

- (1) Minimum: $V_{CCO} = 5.5\text{ V}$
- (2) Typical: $T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 5\text{ V}$
- (3) Maximum: $V_{CCO} = 4.5\text{ V}$

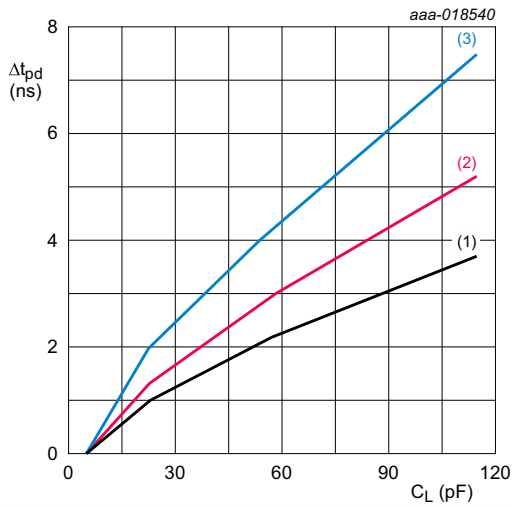
Fig 6. Additional propagation delay versus load capacitance



$T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ unless otherwise specified.

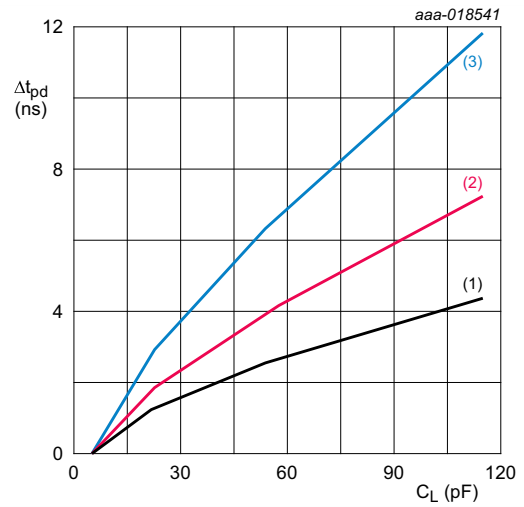
- (1) Minimum: $V_{CCO} = 3.6\text{ V}$
- (2) Typical: $T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 3.3\text{ V}$
- (3) Maximum: $V_{CCO} = 3\text{ V}$

Fig 7. Additional propagation delay versus load capacitance



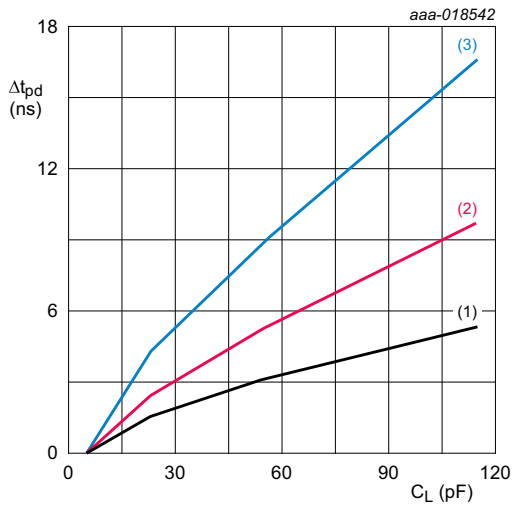
$T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ unless otherwise specified.
 (1) Minimum: $V_{CCO} = 2.7\text{ V}$
 (2) Typical: $T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 2.5\text{ V}$
 (3) Maximum: $V_{CCO} = 2.3\text{ V}$

Fig 8. Additional propagation delay versus load capacitance



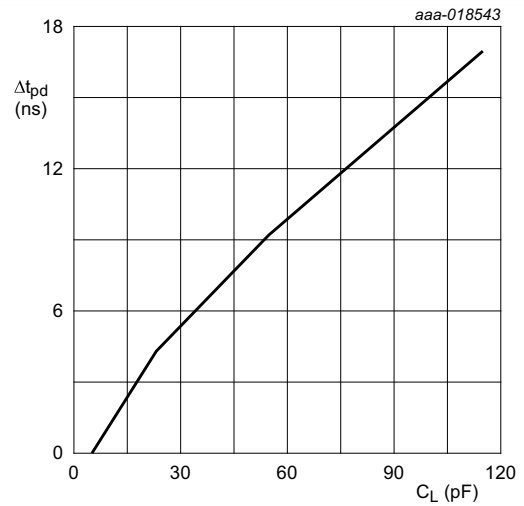
$T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ unless otherwise specified.
 (1) Minimum: $V_{CCO} = 1.95\text{ V}$
 (2) Typical: $T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 1.8\text{ V}$
 (3) Maximum: $V_{CCO} = 1.65\text{ V}$

Fig 9. Additional propagation delay versus load capacitance



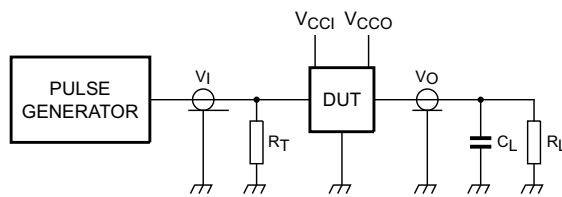
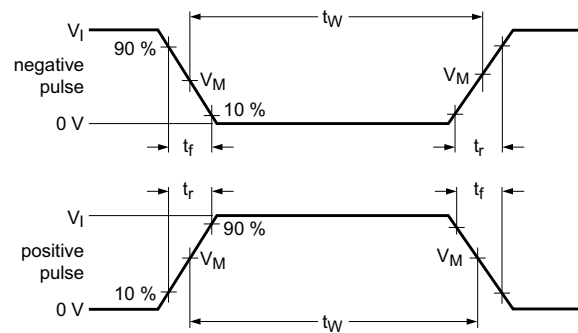
$T_{amb} = -40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ unless otherwise specified.
 (1) Minimum: $V_{CCO} = 1.6\text{ V}$
 (2) Typical: $T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 1.5\text{ V}$
 (3) Maximum: $V_{CCO} = 1.4\text{ V}$

Fig 10. Additional propagation delay versus load capacitance



$T_{amb} = 25\text{ }^{\circ}\text{C}$; $V_{CCO} = 1.2\text{ V}$.

Fig 11. Additional propagation delay versus load capacitance



aaa-018544

Test data is given in [Table 14](#).

Definitions test circuit:

R_T = termination resistance should be equal to output impedance Z_o of the pulse generator.

C_L = load capacitance including jig and probe capacitance.

R_L = Load resistance.

Fig 12. Test circuit for measuring switching times

Table 14. Test data

| Supply voltage | | Load | | Input | |
|-----------------|----------------|-------|-------|------------|-----------|
| V_{CCI} | V_{CCO} | C_L | R_L | t_r, t_f | V_I |
| 0.75 V to 2.7 V | 1.2 V to 5.5 V | 5 pF | 5 kΩ | ≤3.0 ns | V_{CCI} |

12. Package outline

Plastic surface-mounted package; 6 leads

SOT363

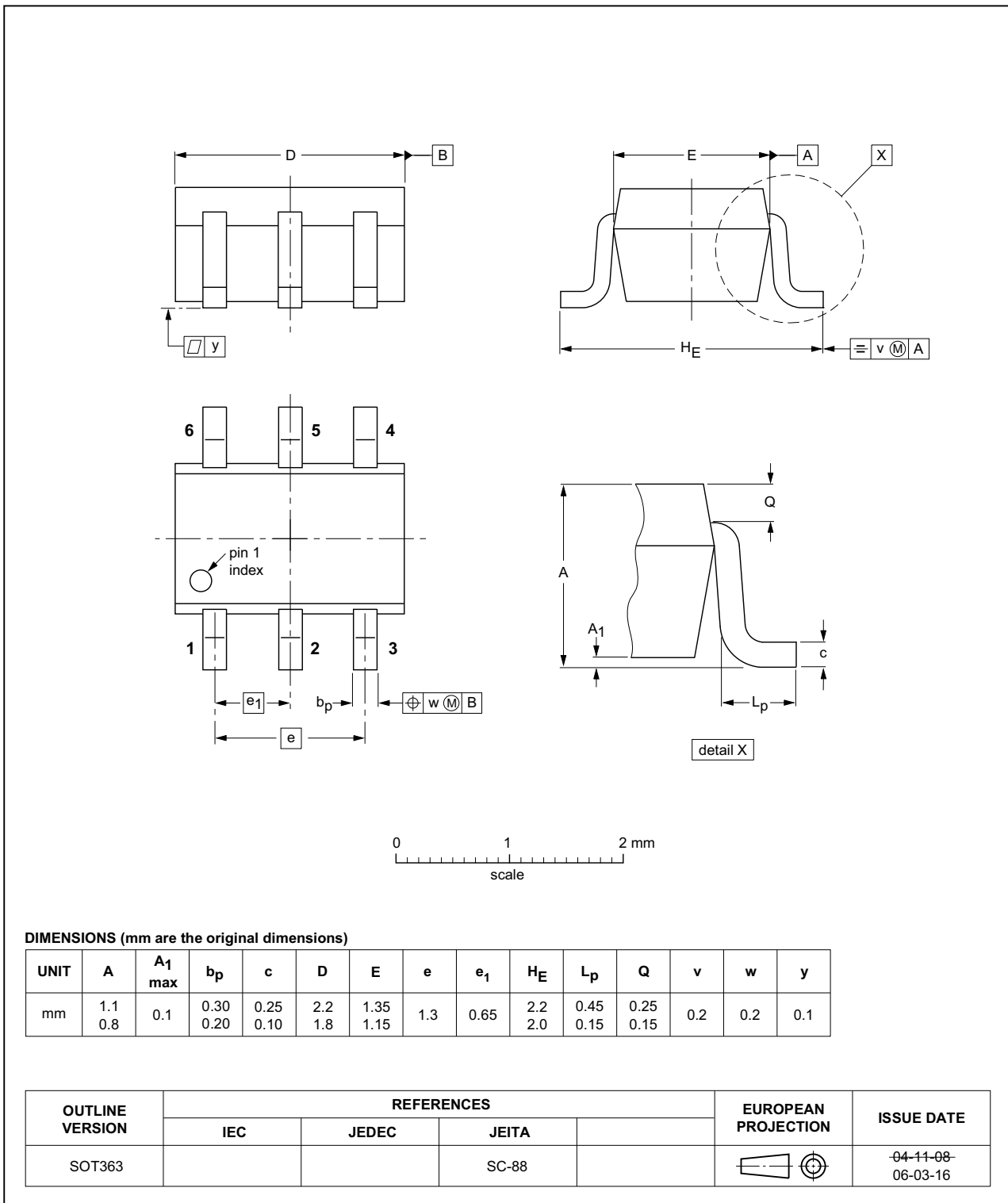


Fig 13. Package outline SOT363 (SC-88)

**X2SON6: plastic thermal enhanced extremely thin small outline package; no leads;
6 terminals; body 1.0 x 0.8 x 0.35 mm**

SOT1255

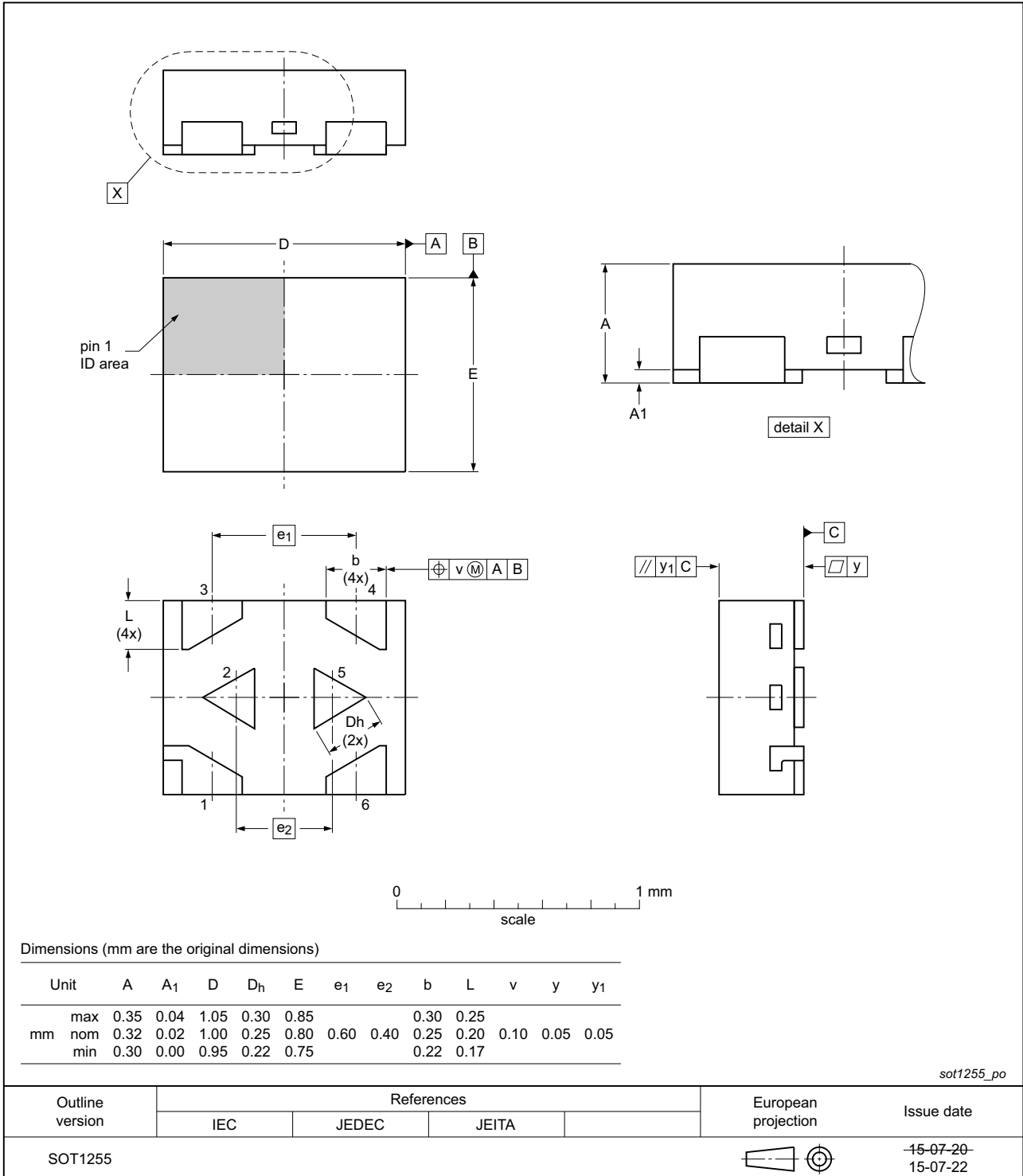


Fig 14. Package outline SOT1255 (X2SON6)

13. Abbreviations

Table 15. Abbreviations

| Acronym | Description |
|---------|-------------------------|
| CDM | Charged Device Model |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |

14. Revision history

Table 16. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| 74AXP1T32 v.1 | 20161107 | Product data sheet | - | - |

15. Legal information

15.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
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| 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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