

74AUP1T97-Q100

Low-power configurable gate with voltage-level translator

Rev. 3 — 27 January 2022

Product data sheet

1. General description

The 74AUP1T97-Q100 is a configurable multiple function gate with level translating, Schmitt-trigger inputs. The device can be configured as any of the following logic functions MUX, AND, OR, NAND, NOR, inverter and buffer; using the 3-bit input. All inputs can be connected directly to V_{CC} or GND. Low threshold Schmitt trigger inputs allow these devices to be driven by 1.8 V logic levels in 3.3 V applications. This device ensures very low static and dynamic power consumption across the entire V_{CC} range from 2.3 V to 3.6 V. This device 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.

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

2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
 - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- Wide supply voltage range from 2.3 V to 3.6 V
- CMOS low power dissipation
- High noise immunity
- Overvoltage tolerant inputs to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial power-down mode operation
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Low static power consumption; $I_{CC} = 1.5 \mu\text{A}$ (maximum)
- Complies with JEDEC standards:
 - JESD8-12 (0.8 V to 1.3 V)
 - JESD8-11 (0.9 V to 1.65 V)
 - JESD8-7 (1.65 V to 1.95 V)
 - JESD8-5 (2.3 V to 2.7 V)
 - JESD8C (2.7 V to 3.6 V)
- ESD protection:
 - HBM JESD22-A114F Class 3A exceeds 5000 V
 - MM JESD22-A115-A exceeds 200 V
 - CDM JESD22-C101E exceeds 1000 V

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|------------------|-------------------|--------|---|----------|
| | Temperature range | Name | Description | Version |
| 74AUP1T97GW-Q100 | -40 °C to +125 °C | TSSOP6 | plastic thin shrink small outline package; 6 leads; body width 1.25 mm | SOT363-2 |

4. Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|------------------|-----------------------------|
| 74AUP1T97GW-Q100 | 59 |

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

5. Functional diagram

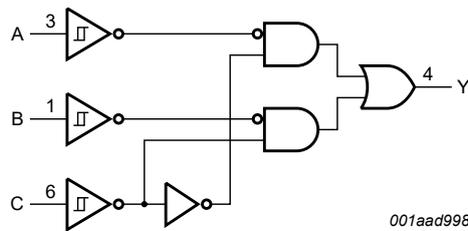


Fig. 1. Logic symbol

6. Pinning information

6.1. Pinning

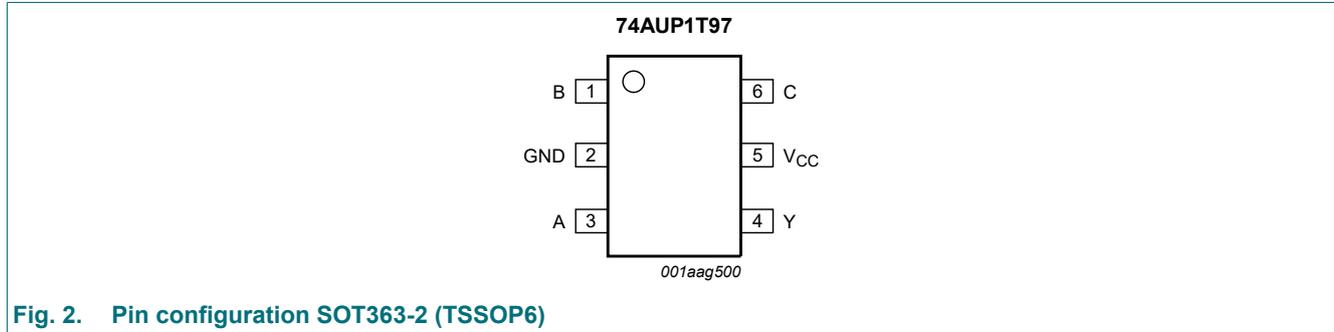


Fig. 2. Pin configuration SOT363-2 (TSSOP6)

6.2. Pin description

Table 3. Pin description

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

7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level.

| Input | | | Output |
|-------|---|---|--------|
| C | B | A | Y |
| L | L | L | L |
| L | L | H | L |
| L | H | L | H |
| L | H | H | H |
| H | L | L | L |
| H | L | H | H |
| H | H | L | L |
| H | H | H | H |

7.1. Logic configurations

Table 5. Function selection table

| Logic function | Figure |
|--------------------------------------|------------|
| 2-input MUX | see Fig. 3 |
| 2-input AND | see Fig. 4 |
| 2-input OR with one input inverted | see Fig. 5 |
| 2-input NAND with one input inverted | see Fig. 5 |
| 2-input AND with one input inverted | see Fig. 6 |
| 2-input NOR with one input inverted | see Fig. 6 |
| 2-input OR | see Fig. 7 |
| Inverter | see Fig. 8 |
| Buffer | see Fig. 9 |

Fig. 3. 2-input MUX

Fig. 4. 2-input AND gate

Fig. 5. 2-input NAND gate with input A inverted or 2-input OR gate with input C inverted

Fig. 6. 2-input NOR gate with input B inverted or 2-input AND gate with input C inverted

Fig. 7. 2-input OR gate

Fig. 8. Inverter

Fig. 9. Buffer

8. Limiting values

Table 6. 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 | +4.6 | V |
| I_{IK} | input clamping current | $V_I < 0$ V | -50 | - | mA |
| V_I | input voltage | | [1] -0.5 | +4.6 | V |
| I_{OK} | output clamping current | $V_O < 0$ V | -50 | - | mA |
| V_O | output voltage | Active mode and Power-down mode | [1] -0.5 | +4.6 | V |
| I_O | output current | $V_O = 0$ V to V_{CC} | - | ±20 | mA |
| I_{CC} | 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 +125 °C | [2] - | 250 | mW |

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

[2] For SOT363-2 (TSSOP6) package: P_{tot} derates linearly with 3.7 mW/K above 83 °C.

9. Recommended operating conditions

Table 7. Recommended operating conditions

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------|---------------------------------|-----|----------|------|
| V_{CC} | supply voltage | | 2.3 | 3.6 | V |
| V_I | input voltage | | 0 | 3.6 | V |
| V_O | output voltage | Active mode | 0 | V_{CC} | V |
| | | Power-down mode; $V_{CC} = 0$ V | 0 | 3.6 | V |
| T_{amb} | ambient temperature | | -40 | +125 | °C |

10. Static characteristics

Table 8. Static characteristics

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|--------------------------------------|--|-----------------------|-----|------|------|
| T_{amb} = 25 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.60 | - | 1.10 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.75 | - | 1.16 | V |
| V _{T-} | negative-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.35 | - | 0.60 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.50 | - | 0.85 | V |
| V _H | hysteresis voltage | (V _H = V _{T+} - V _{T-}) | | | | |
| | | V _{CC} = 2.3 V to 2.7 V | 0.23 | - | 0.60 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.25 | - | 0.56 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = -20 μA; V _{CC} = 2.3 V to 3.6 V | V _{CC} - 0.1 | - | - | V |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 2.05 | - | - | V |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.9 | - | - | V |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.72 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.6 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.3 V to 3.6 V | - | - | 0.10 | V |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.31 | V |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.44 | V |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.31 | V |
| | | I _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.44 | V |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.1 | μA |
| I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.1 | μA |
| ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.2 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 2.3 V to 3.6 V | - | - | 1.2 | μA |
| C _I | input capacitance | V _{CC} = 0 V to 3.6 V; V _I = GND or V _{CC} | - | 0.8 | - | pF |
| C _O | output capacitance | V _O = GND; V _{CC} = 0 V | - | 1.7 | - | pF |

Low-power configurable gate with voltage-level translator

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------------|--|-----------------------|-----|------|------|
| T_{amb} = -40 °C to +85 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.60 | - | 1.10 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.75 | - | 1.19 | V |
| V _{T-} | negative-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.35 | - | 0.60 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.50 | - | 0.85 | V |
| V _H | hysteresis voltage | (V _H = V _{T+} - V _{T-}) | | | | |
| | | V _{CC} = 2.3 V to 2.7 V | 0.10 | - | 0.60 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.15 | - | 0.56 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = -20 μA; V _{CC} = 2.3 V to 3.6 V | V _{CC} - 0.1 | - | - | V |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 1.97 | - | - | V |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.85 | - | - | V |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.67 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.55 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.3 V to 3.6 V | - | - | 0.1 | V |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.33 | V |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.45 | V |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.33 | V |
| | | I _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.45 | V |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.5 | μA |
| I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.5 | μA |
| ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.5 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 2.3 V to 3.6 V | - | - | 1.5 | μA |
| ΔI _{CC} | additional supply current | V _{CC} = 2.3 V to 2.7 V; I _O = 0 A [1] | - | - | 4 | μA |
| | | V _{CC} = 3.0 V to 3.6 V; I _O = 0 A [2] | - | - | 12 | μA |

Low-power configurable gate with voltage-level translator

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|--------------------------------------|--|------------------------|-----|-------|------|
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{T+} | positive-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.60 | - | 1.10 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.75 | - | 1.19 | V |
| V _{T-} | negative-going threshold voltage | V _{CC} = 2.3 V to 2.7 V | 0.33 | - | 0.64 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.46 | - | 0.85 | V |
| V _H | hysteresis voltage | (V _H = V _{T+} - V _{T-}) | | | | |
| | | V _{CC} = 2.3 V to 2.7 V | 0.10 | - | 0.60 | V |
| | | V _{CC} = 3.0 V to 3.6 V | 0.15 | - | 0.56 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = -20 μA; V _{CC} = 2.3 V to 3.6 V | V _{CC} - 0.11 | - | - | V |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 1.77 | - | - | V |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.67 | - | - | V |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.40 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.30 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.3 V to 3.6 V | - | - | 0.11 | V |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.36 | V |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.50 | V |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.36 | V |
| | | I _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.50 | V |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.75 | μA |
| I _{OFF} | power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V | - | - | ±0.75 | μA |
| ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.75 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 2.3 V to 3.6 V | - | - | 3.5 | μA |
| ΔI _{CC} | additional supply current | V _{CC} = 2.3 V to 2.7 V; I _O = 0 A [1] | - | - | 7 | μA |
| | | V _{CC} = 3.0 V to 3.6 V; I _O = 0 A [2] | - | - | 22 | μA |

[1] One input at 0.3 V or 1.1 V, other input at V_{CC} or GND.

[2] One input at 0.45 V or 1.2 V, other input at V_{CC} or GND.

11. Dynamic characteristics

Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 11.

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|--|-------------------|-------------------------------|-------|---------|-----|------------------|------|-------------------|------|------|
| | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| V_{CC} = 2.3 V to 2.7 V; V_I = 1.65 V to 1.95 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 2.2 | 3.5 | 5.5 | 0.5 | 6.8 | 0.5 | 7.5 | ns |
| | | C _L = 10 pF | 2.6 | 4.1 | 6.3 | 1.0 | 7.9 | 1.0 | 8.7 | ns |
| | | C _L = 30 pF | 3.7 | 5.8 | 8.4 | 1.5 | 10.8 | 1.5 | 11.9 | ns |
| V_{CC} = 2.3 V to 2.7 V; V_I = 2.3 V to 2.7 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 1.8 | 3.4 | 5.5 | 0.5 | 6.0 | 0.5 | 6.6 | ns |
| | | C _L = 10 pF | 2.2 | 4.0 | 6.2 | 1.0 | 7.1 | 1.0 | 7.9 | ns |
| | | C _L = 30 pF | 3.2 | 5.6 | 8.3 | 1.5 | 10.0 | 1.5 | 11.0 | ns |
| V_{CC} = 2.3 V to 2.7 V; V_I = 3.0 V to 3.6 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 1.4 | 3.1 | 5.0 | 0.5 | 5.5 | 0.5 | 6.1 | ns |
| | | C _L = 10 pF | 1.8 | 3.7 | 5.7 | 1.0 | 6.5 | 1.0 | 7.2 | ns |
| | | C _L = 30 pF | 2.9 | 5.3 | 7.9 | 1.5 | 9.5 | 1.5 | 10.5 | ns |
| V_{CC} = 3.0 V to 3.6 V; V_I = 1.65 V to 1.95 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 2.1 | 2.9 | 3.9 | 0.5 | 8.0 | 0.5 | 8.8 | ns |
| | | C _L = 10 pF | 2.5 | 3.4 | 4.6 | 1.0 | 8.5 | 1.0 | 9.4 | ns |
| | | C _L = 30 pF | 3.6 | 5.0 | 6.7 | 1.5 | 9.8 | 1.5 | 10.8 | ns |
| V_{CC} = 3.0 V to 3.6 V; V_I = 2.3 V to 2.7 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 1.7 | 2.8 | 4.2 | 0.5 | 5.3 | 0.5 | 5.9 | ns |
| | | C _L = 10 pF | 2.1 | 3.4 | 5.0 | 1.0 | 6.1 | 1.0 | 6.8 | ns |
| | | C _L = 30 pF | 3.2 | 5.0 | 7.1 | 1.5 | 8.5 | 1.5 | 9.4 | ns |
| V_{CC} = 3.0 V to 3.6 V; V_I = 3.0 V to 3.6 V | | | | | | | | | | |
| t _{pd} | propagation delay | A, B, C to Y; see Fig. 10 [2] | | | | | | | | |
| | | C _L = 5 pF | 1.4 | 2.7 | 4.2 | 0.5 | 4.7 | 0.5 | 5.2 | ns |
| | | C _L = 10 pF | 1.8 | 3.3 | 5.0 | 1.0 | 5.7 | 1.0 | 6.3 | ns |
| | | C _L = 30 pF | 2.9 | 4.9 | 7.1 | 1.5 | 7.8 | 1.5 | 8.6 | ns |

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|--------------------------------|-------------------------------|---|-------|---------|-----|------------------|-----|-------------------|-----|------|
| | | | Min | Typ [1] | Max | Min | Max | Min | Max | |
| T_{amb} = 25 °C | | | | | | | | | | |
| C _{PD} | power dissipation capacitance | f _i = 1 MHz; V _I = GND to V _{CC} [3] | | | | | | | | |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.6 | - | - | - | - | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | 4.3 | - | - | - | - | - | pF |

- [1] All typical values are measured at nominal V_{CC}.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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 V;
 N = number of inputs switching;
 Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

11.1. Waveform and test circuit

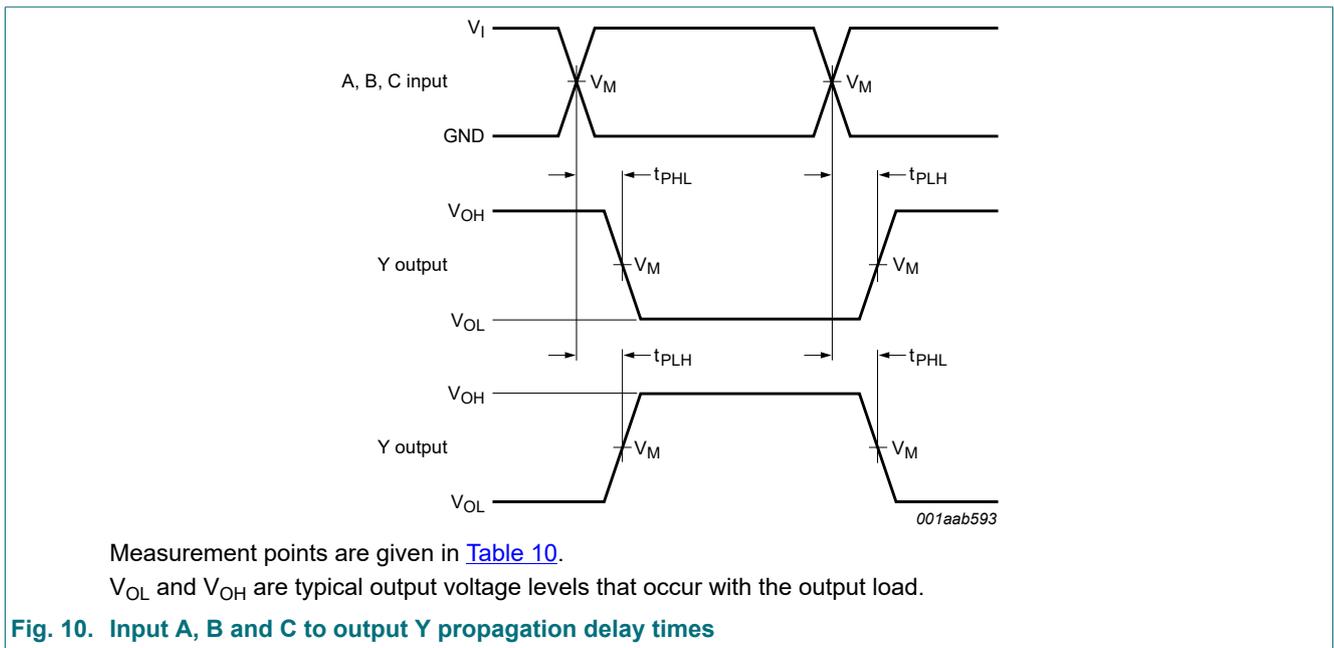
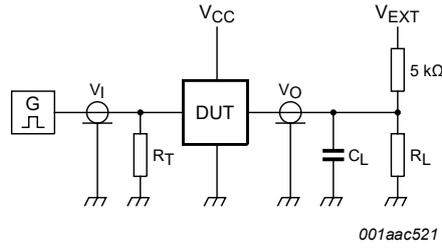


Table 10. Measurement points

| Supply voltage | Input | | | Output |
|-----------------|----------------------|-----------------|---------------------------------|-----------------------|
| V _{CC} | V _M | V _I | t _r = t _f | V _M |
| 2.3 V to 3.6 V | 0.5 × V _I | 1.65 V to 3.6 V | ≤ 3.0 ns | 0.5 × V _{CC} |



001aac521

Test data is given in [Table 11](#).

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. 11. Test circuit for measuring switching times

Table 11. Test data

| Supply voltage | Load | | V_{EXT} | | |
|----------------|------------------------------|--------------|-----------------------|-----------------------|-----------------------|
| V_{CC} | C_L | R_L [1] | t_{PLH} , t_{PHL} | t_{PZH} , t_{PHZ} | t_{PZL} , t_{PLZ} |
| 2.3 V to 3.6 V | 5 pF, 10 pF, 15 pF and 30 pF | 5 kΩ or 1 MΩ | open | GND | $2 \times V_{CC}$ |

[1] For measuring enable and disable times $R_L = 5 \text{ k}\Omega$.

For measuring propagation delays, setup and hold times and pulse width $R_L = 1 \text{ M}\Omega$.

12. Package outline

TSSOP6: plastic thin shrink small outline package; 6 leads; body width 1.25 mm

SOT363-2

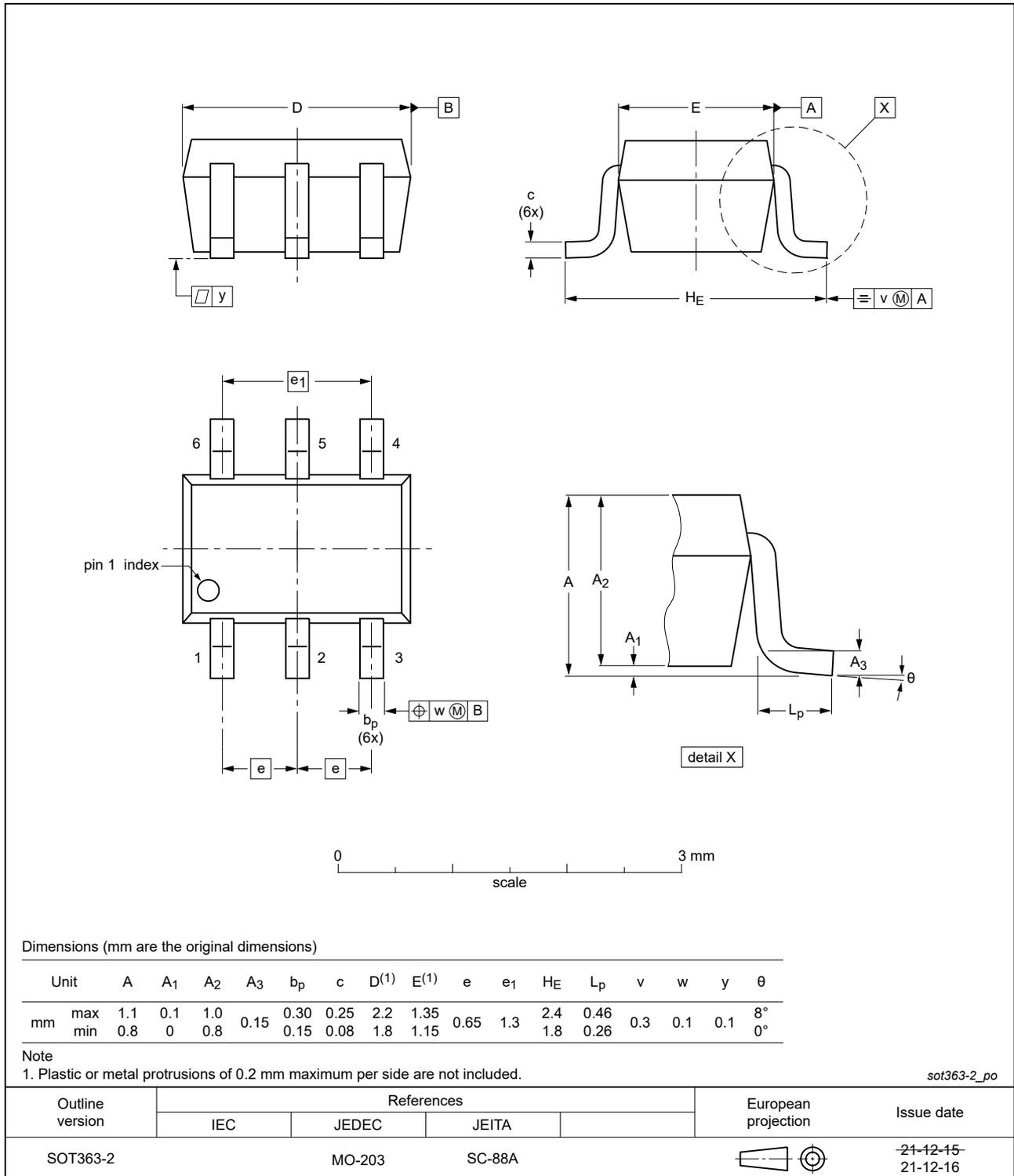


Fig. 12. Package outline SOT363-2 (TSSOP6)

13. Abbreviations

Table 12. Abbreviations

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

14. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------|--|--------------------|---------------|--------------------|
| 74AUP1T97_Q100 v.3 | 20220127 | Product data sheet | - | 74AUP1T97_Q100 v.2 |
| Modifications: | <ul style="list-style-type: none"> Package SOT363 (SC-88) changed to SOT363-2 (TSSOP6). | | | |
| 74AUP1T97_Q100 v.2 | 20211104 | Product data sheet | - | 74AUP1T97_Q100 v.1 |
| Modifications: | <ul style="list-style-type: none"> Section 1 and Section 2 updated. | | | |
| 74AUP1T97_Q100 v.1 | 20210715 | Product data sheet | - | - |

15. Legal information

Data sheet status

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

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