

# 74AUP1G04-Q100

Low-power inverter

Rev. 3 — 13 January 2022

Product data sheet

## 1. General description

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The 74AUP1G04-Q100 is a single inverter.

Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times across the entire V<sub>CC</sub> range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire V<sub>CC</sub> range from 0.8 V to 3.6 V.

This device is fully specified for partial Power-down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output, preventing the 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

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- 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 0.8 V to 3.6 V
- CMOS low power dissipation
- High noise immunity
- 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:
  - MIL-STD-883, method 3015 Class 3A. Exceeds 5000 V
  - HBM JESD22-A114F Class 3A. Exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V (C = 200 pF, R = 0 Ω)
- Low static power consumption; I<sub>CC</sub> = 0.9 μA (maximum)
- Latch-up performance exceeds 100 mA per JESD 78B Class II
- Overvoltage tolerant inputs to 3.6 V
- Low noise overshoot and undershoot < 10 % of V<sub>CC</sub>
- I<sub>OFF</sub> circuitry provides partial Power-down mode operation

### 3. Ordering information

Table 1. Ordering information

| Type number      | Package           |        |  | Version  |
|------------------|-------------------|--------|--|----------|
|                  | Temperature range | Name   | Description  |          |
| 74AUP1G04GV-Q100 | -40 °C to +125 °C | SC-74A | plastic surface-mounted package; 5 leads                               | SOT753   |
| 74AUP1G04GW-Q100 | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |

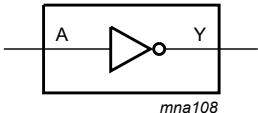
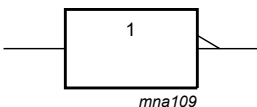
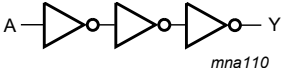
### 4. Marking

Table 2. Marking

| Type number      | Marking code <sup>[1]</sup> |
|------------------|-----------------------------|
| 74AUP1G04GV-Q100 | p04                         |
| 74AUP1G04GW-Q100 | pC                          |

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

### 5. Functional diagram

|   |   |  |
|---|---|--|
|  <p>Fig. 1. Logic symbol</p> |  <p>Fig. 2. IEC logic symbol</p> |  <p>Fig. 3. Logic diagram</p> |
|---|---|--|

### 6. Pinning information

#### 6.1. Pinning

**74AUP1G04-Q100**

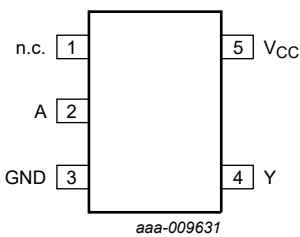


Fig. 4. Pin configuration SOT353-1 (TSSOP5) and SOT753 (SC-74A)

#### 6.2. Pin description

Table 3. Pin description

| Symbol | Pin | Description   |
|--------|-----|---------------|
| n.c.   | 1   | not connected |
| A      | 2   | data input    |

| Symbol          | Pin | Description    |
|-----------------|-----|----------------|
| GND             | 3   | ground (0 V)   |
| Y               | 4   | data output    |
| V <sub>CC</sub> | 5   | supply voltage |

## 7. Functional description

**Table 4. Function table**

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

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

## 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 <sub>CC</sub>  | supply voltage          |   | -0.5 | +4.6                  | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < 0 V                    | -50  | -                     | mA   |
| V <sub>I</sub>   | input voltage           | [1]                                     | -0.5 | +4.6                  | V    |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < 0 V                    | -50  | -                     | mA   |
| V <sub>O</sub>   | output voltage          | active mode                             | [1]  | V <sub>CC</sub> + 0.5 | V    |
|                  |                         | power-down mode; V <sub>CC</sub> = 0 V  | [1]  | +4.6                  | V    |
| I <sub>O</sub>   | output current          | V <sub>O</sub> = 0 V to V <sub>CC</sub> | -    | ± 20                  | mA   |
| I <sub>CC</sub>  | supply current          |   | -    | +50                   | mA   |
| I <sub>GND</sub> | ground current          |   | -50  | -                     | mA   |
| T <sub>stg</sub> | storage temperature     |   | -65  | +150                  | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -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 SOT753 (SC-74A) package: P<sub>tot</sub> derates linearly with 3.8 mW/K above 85 °C.  
For SOT353-1 (TSSOP5) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

| Symbol           | Parameter                           | Conditions                             | Min | Max             | Unit |
|------------------|-------------------------------------|--|-----|-----------------|------|
| V <sub>CC</sub>  | supply voltage                      |  | 0.8 | 3.6             | V    |
| V <sub>I</sub>   | input voltage                       |  | 0   | 3.6             | V    |
| V <sub>O</sub>   | output voltage                      | active mode                            | 0   | V <sub>CC</sub> | V    |
|                  |                                     | power-down mode; V <sub>CC</sub> = 0 V | 0   | 3.6             | V    |
| T <sub>amb</sub> | ambient temperature                 |  | -40 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 0.8 V to 3.6 V       | 0   | 200             | ns/V |

## 10. Static characteristics

**Table 7. Static characteristics**

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

| Symbol   | Parameter                            | Conditions   | Min                   | Typ | Max                  | Unit |
|--|--------------------------------------|--|-----------------------|-----|----------------------|------|
| <b>T<sub>amb</sub> = 25 °C</b>                   |                                      |  |                       |     |                      |      |
| V <sub>IH</sub>                                  | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V  | 0.70×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | 0.65×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.6                   | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.0                   | -   | -                    | V    |
| V <sub>IL</sub>                                  | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V  | -                     | -   | 0.30×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | -                     | -   | 0.35×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | -                     | -   | 0.7                  | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                     | -   | 0.9                  | V    |
| V <sub>OH</sub>                                  | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |     |                      |      |
|  |                                      | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V  | V <sub>CC</sub> - 0.1 | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V  | 0.75×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V  | 1.11                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V   | 1.32                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V  | 2.05                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V  | 1.9                   | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V  | 2.72                  | -   | -                    | V    |
| V <sub>OL</sub>                                  | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |     |                      |      |
|  |                                      | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V   | -                     | -   | 0.1                  | V    |
|  |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V   | -                     | -   | 0.3×V <sub>CC</sub>  | V    |
|  |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V   | -                     | -   | 0.31                 | V    |
|  |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V  | -                     | -   | 0.31                 | V    |
|  |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V   | -                     | -   | 0.31                 | V    |
|  |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V   | -                     | -   | 0.44                 | V    |
|  |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V   | -                     | -   | 0.31                 | V    |
| I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V | -                                    | -  | 0.44                  | V   |                      |      |
| I <sub>I</sub>                                   | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                    | -                     | -   | ± 0.1                | μA   |
| I <sub>OFF</sub>                                 | power-off leakage current            | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                           | -                     | -   | ± 0.2                | μA   |
| ΔI <sub>OFF</sub>                                | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V                  | -                     | -   | ± 0.2                | μA   |
| I <sub>CC</sub>                                  | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V | -                     | -   | 0.5                  | μA   |
| ΔI <sub>CC</sub>                                 | additional supply current            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V          | -                     | -   | 40                   | μA   |
| C <sub>I</sub>                                   | input capacitance                    | V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub>                          | -                     | 0.8 | -                    | pF   |
| C <sub>O</sub>                                   | output capacitance                   | V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V  | -                     | 1.7 | -                    | pF   |

| Symbol                                     | Parameter                            | Conditions   | Min                   | Typ | Max                  | Unit |
|--|--------------------------------------|--|-----------------------|-----|----------------------|------|
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b>  |                                      |  |                       |     |                      |      |
| V <sub>IH</sub>                            | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V  | 0.70×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | 0.65×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.6                   | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.0                   | -   | -                    | V    |
| V <sub>IL</sub>                            | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V  | -                     | -   | 0.30×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | -                     | -   | 0.35×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | -                     | -   | 0.7                  | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                     | -   | 0.9                  | V    |
| V <sub>OH</sub>                            | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |     |                      |      |
|  |                                      | I <sub>O</sub> = -20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V  | V <sub>CC</sub> - 0.1 | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V  | 0.7×V <sub>CC</sub>   | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V  | 1.03                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V   | 1.30                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V  | 1.97                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V  | 1.85                  | -   | -                    | V    |
|  |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V  | 2.67                  | -   | -                    | V    |
| V <sub>OL</sub>                            | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                       |     |                      |      |
|  |                                      | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 0.8 V to 3.6 V   | -                     | -   | 0.1                  | V    |
|  |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V   | -                     | -   | 0.3×V <sub>CC</sub>  | V    |
|  |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V   | -                     | -   | 0.37                 | V    |
|  |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V  | -                     | -   | 0.35                 | V    |
|  |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V   | -                     | -   | 0.33                 | V    |
|  |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V   | -                     | -   | 0.45                 | V    |
|  |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V   | -                     | -   | 0.33                 | V    |
| I <sub>I</sub>                             | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                    | -                     | -   | ± 0.5                | µA   |
|  |                                      | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                           | -                     | -   | ± 0.5                | µA   |
| ΔI <sub>OFF</sub>                          | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V                  | -                     | -   | ± 0.6                | µA   |
| I <sub>CC</sub>                            | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V | -                     | -   | 0.9                  | µA   |
| ΔI <sub>CC</sub>                           | additional supply current            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V          | -                     | -   | 50                   | µA   |
| <b>T<sub>amb</sub> = -40 °C to +125 °C</b> |                                      |  |                       |     |                      |      |
| V <sub>IH</sub>                            | HIGH-level input voltage             | V <sub>CC</sub> = 0.8 V  | 0.75×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | 0.70×V <sub>CC</sub>  | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.6                   | -   | -                    | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.0                   | -   | -                    | V    |
| V <sub>IL</sub>                            | LOW-level input voltage              | V <sub>CC</sub> = 0.8 V  | -                     | -   | 0.25×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 0.9 V to 1.95 V  | -                     | -   | 0.30×V <sub>CC</sub> | V    |
|  |                                      | V <sub>CC</sub> = 2.3 V to 2.7 V   | -                     | -   | 0.7                  | V    |
|  |                                      | V <sub>CC</sub> = 3.0 V to 3.6 V   | -                     | -   | 0.9                  | V    |

| Symbol            | Parameter                            | Conditions   | Min                    | Typ | Max                  | Unit |
|-------------------|--------------------------------------|--|------------------------|-----|----------------------|------|
| V <sub>OH</sub>   | HIGH-level output voltage            | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                        |     |                      |      |
|                   |                                      | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V  | V <sub>CC</sub> - 0.11 | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V  | 0.6×V <sub>CC</sub>    | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V  | 0.93                   | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V   | 1.17                   | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V  | 1.77                   | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V  | 1.67                   | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V  | 2.40                   | -   | -                    | V    |
|                   |                                      | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V  | 2.30                   | -   | -                    | V    |
| V <sub>OL</sub>   | LOW-level output voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>  |                        |     |                      |      |
|                   |                                      | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V   | -                      | -   | 0.11                 | V    |
|                   |                                      | I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V   | -                      | -   | 0.33×V <sub>CC</sub> | V    |
|                   |                                      | I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V   | -                      | -   | 0.41                 | V    |
|                   |                                      | I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V  | -                      | -   | 0.39                 | V    |
|                   |                                      | I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V   | -                      | -   | 0.36                 | V    |
|                   |                                      | I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V   | -                      | -   | 0.50                 | V    |
|                   |                                      | I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V   | -                      | -   | 0.36                 | V    |
|                   |                                      | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V   | -                      | -   | 0.50                 | V    |
| I <sub>I</sub>    | input leakage current                | V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V                                    | -                      | -   | ± 0.75               | μA   |
| I <sub>OFF</sub>  | power-off leakage current            | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V                           | -                      | -   | ± 0.75               | μA   |
| ΔI <sub>OFF</sub> | additional power-off leakage current | V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V                  | -                      | -   | ± 0.75               | μA   |
| I <sub>CC</sub>   | supply current                       | V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V | -                      | -   | 1.4                  | μA   |
| ΔI <sub>CC</sub>  | additional supply current            | V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V          | -                      | -   | 75                   | μA   |

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Fig. 6](#)

| Symbol   | Parameter         | Conditions                             | Min | Typ[1] | Max  | Unit |
|--|-------------------|--|-----|--------|------|------|
| <b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 5 pF</b> |                   |  |     |        |      |      |
| t <sub>pd</sub>                                      | propagation delay | A to Y; see <a href="#">Fig. 5</a> [2] |     |        |      |      |
|  |                   | V <sub>CC</sub> = 0.8 V                | -   | 16.0   | -    | ns   |
|  |                   | V <sub>CC</sub> = 1.1 V to 1.3 V       | 2.4 | 5.0    | 10.3 | ns   |
|  |                   | V <sub>CC</sub> = 1.4 V to 1.6 V       | 1.8 | 3.6    | 6.4  | ns   |
|  |                   | V <sub>CC</sub> = 1.65 V to 1.95 V     | 1.5 | 2.9    | 5.0  | ns   |
|  |                   | V <sub>CC</sub> = 2.3 V to 2.7 V       | 1.2 | 2.4    | 3.9  | ns   |
|  |                   | V <sub>CC</sub> = 3.0 V to 3.6 V       | 1.1 | 2.1    | 3.2  | ns   |

| Symbol  | Parameter                     | Conditions   | Min | Typ[1] | Max  | Unit |
|---|-------------------------------|--|-----|--------|------|------|
| <b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 10 pF</b> |                               |  |     |        |      |      |
| t <sub>pd</sub>                                       | propagation delay             | A to Y; see Fig. 5 [2]                                 |     |        |      |      |
|   |                               | V <sub>CC</sub> = 0.8 V                                | -   | 19.8   | -    | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                       | 2.8 | 5.9    | 12.2 | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                       | 2.3 | 4.2    | 7.5  | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                     | 2.0 | 3.5    | 5.9  | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                       | 1.7 | 2.9    | 4.6  | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                      | 1.6                           | 2.7  | 3.8 | ns     |      |      |
| <b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 15 pF</b> |                               |  |     |        |      |      |
| t <sub>pd</sub>                                       | propagation delay             | A to Y; see Fig. 5 [2]                                 |     |        |      |      |
|   |                               | V <sub>CC</sub> = 0.8 V                                | -   | 23.3   | -    | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                       | 3.2 | 6.7    | 13.0 | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                       | 2.6 | 4.7    | 8.6  | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                     | 2.3 | 4.0    | 6.7  | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                       | 2.1 | 3.3    | 5.1  | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                      | 2.0                           | 3.1  | 4.2 | ns     |      |      |
| <b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 30 pF</b> |                               |  |     |        |      |      |
| t <sub>pd</sub>                                       | propagation delay             | A to Y; see Fig. 5 [2]                                 |     |        |      |      |
|   |                               | V <sub>CC</sub> = 0.8 V                                | -   | 33.6   | -    | ns   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                       | 4.4 | 8.9    | 16.0 | ns   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                       | 3.6 | 6.3    | 10.8 | ns   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                     | 3.2 | 5.3    | 9.0  | ns   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                       | 2.9 | 4.5    | 6.5  | ns   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                      | 2.9                           | 4.2  | 5.4 | ns     |      |      |
| <b>T<sub>amb</sub> = 25 °C</b>                        |                               |  |     |        |      |      |
| C <sub>PD</sub>                                       | power dissipation capacitance | f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3] |     |        |      |      |
|   |                               | V <sub>CC</sub> = 0.8 V                                | -   | 2.5    | -    | pF   |
|   |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                       | -   | 2.7    | -    | pF   |
|   |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                       | -   | 2.8    | -    | pF   |
|   |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                     | -   | 3.0    | -    | pF   |
|   |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                       | -   | 3.5    | -    | pF   |
| V <sub>CC</sub> = 3.0 V to 3.6 V                      | -                             | 4.0  | -   | pF     |      |      |

[1] All typical values are measured at nominal V<sub>CC</sub>.

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[3] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

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

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

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

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

N = number of inputs switching;

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

Table 9. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 6

| Symbol                       | Parameter         | Conditions                         | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------------------|-------------------|------------------------------------|------------------|------|-------------------|------|------|
|                              |                   |                                    | Min              | Max  | Min               | Max  |      |
| <b>C<sub>L</sub> = 5 pF</b>  |                   |                                    |                  |      |                   |      |      |
| t <sub>pd</sub>              | propagation delay | A to Y; see Fig. 5 [1]             |                  |      |                   |      |      |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 2.1              | 11.4 | 2.1               | 12.6 | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 1.6              | 7.4  | 1.6               | 8.2  | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.4              | 5.9  | 1.4               | 6.5  | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.1              | 4.5  | 1.1               | 5.0  | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.0              | 3.9  | 1.0               | 4.3  | ns   |
| <b>C<sub>L</sub> = 10 pF</b> |                   |                                    |                  |      |                   |      |      |
| t <sub>pd</sub>              | propagation delay | A to Y; see Fig. 5 [1]             |                  |      |                   |      |      |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 2.6              | 13.7 | 2.6               | 15.1 | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.1              | 8.7  | 2.1               | 9.6  | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 1.8              | 7.0  | 1.8               | 7.7  | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.5              | 5.4  | 1.5               | 6.0  | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.4              | 4.5  | 1.4               | 5.0  | ns   |
| <b>C<sub>L</sub> = 15 pF</b> |                   |                                    |                  |      |                   |      |      |
| t <sub>pd</sub>              | propagation delay | A to Y; see Fig. 5 [1]             |                  |      |                   |      |      |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 3.0              | 15.8 | 3.0               | 17.4 | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 2.4              | 10.0 | 2.4               | 11.0 | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.1              | 8.0  | 2.1               | 8.8  | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 1.8              | 6.1  | 1.8               | 6.8  | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.8              | 5.0  | 1.8               | 5.5  | ns   |
| <b>C<sub>L</sub> = 30 pF</b> |                   |                                    |                  |      |                   |      |      |
| t <sub>pd</sub>              | propagation delay | A to Y; see Fig. 5 [1]             |                  |      |                   |      |      |
|                              |                   | V <sub>CC</sub> = 1.1 V to 1.3 V   | 4.0              | 19.0 | 4.0               | 20.9 | ns   |
|                              |                   | V <sub>CC</sub> = 1.4 V to 1.6 V   | 3.2              | 12.9 | 3.2               | 14.2 | ns   |
|                              |                   | V <sub>CC</sub> = 1.65 V to 1.95 V | 2.9              | 10.5 | 2.9               | 11.6 | ns   |
|                              |                   | V <sub>CC</sub> = 2.3 V to 2.7 V   | 2.6              | 7.6  | 2.6               | 8.4  | ns   |
|                              |                   | V <sub>CC</sub> = 3.0 V to 3.6 V   | 2.6              | 6.2  | 2.6               | 6.9  | ns   |

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.



11.1. Waveform and test circuit

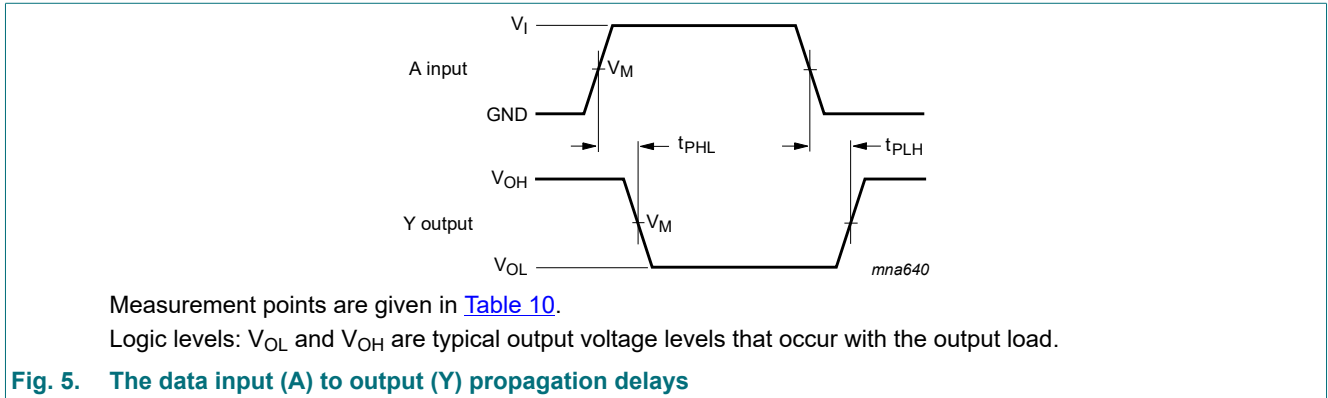


Table 10. Measurement points

| Supply voltage | Output              | Input               |          |               |
|----------------|---------------------|---------------------|----------|---------------|
| $V_{CC}$       | $V_M$               | $V_M$               | $V_I$    | $t_r = t_f$   |
| 0.8 V to 3.6 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{CC}$ | $\leq 3.0$ ns |

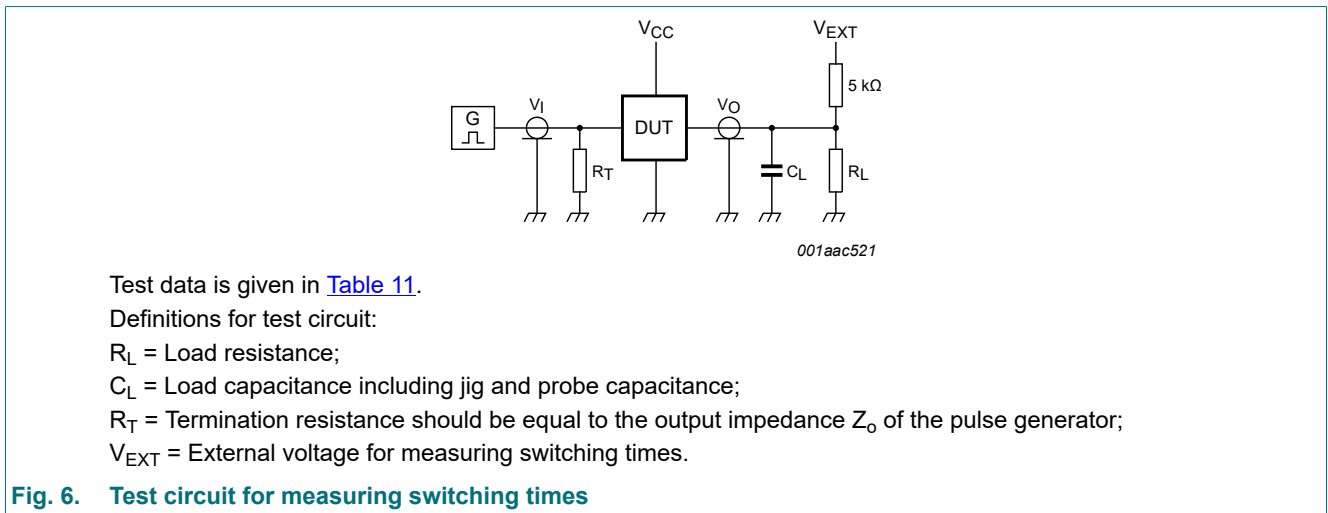


Table 11. Test data

| Supply voltage | Load                         |              | $V_{EXT}$             |                       |                       |
|----------------|------------------------------|--------------|-----------------------|-----------------------|-----------------------|
| $V_{CC}$       | $C_L$                        | $R_L$ [1]    | $t_{PLH}$ , $t_{PHL}$ | $t_{PZH}$ , $t_{PHZ}$ | $t_{PZL}$ , $t_{PLZ}$ |
| 0.8 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  $R_L = 5$  kΩ.  
 For measuring propagation delays, setup and hold times and pulse width  $R_L = 1$  MΩ.

## 12. Package outline

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

SOT353-1



Fig. 7. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

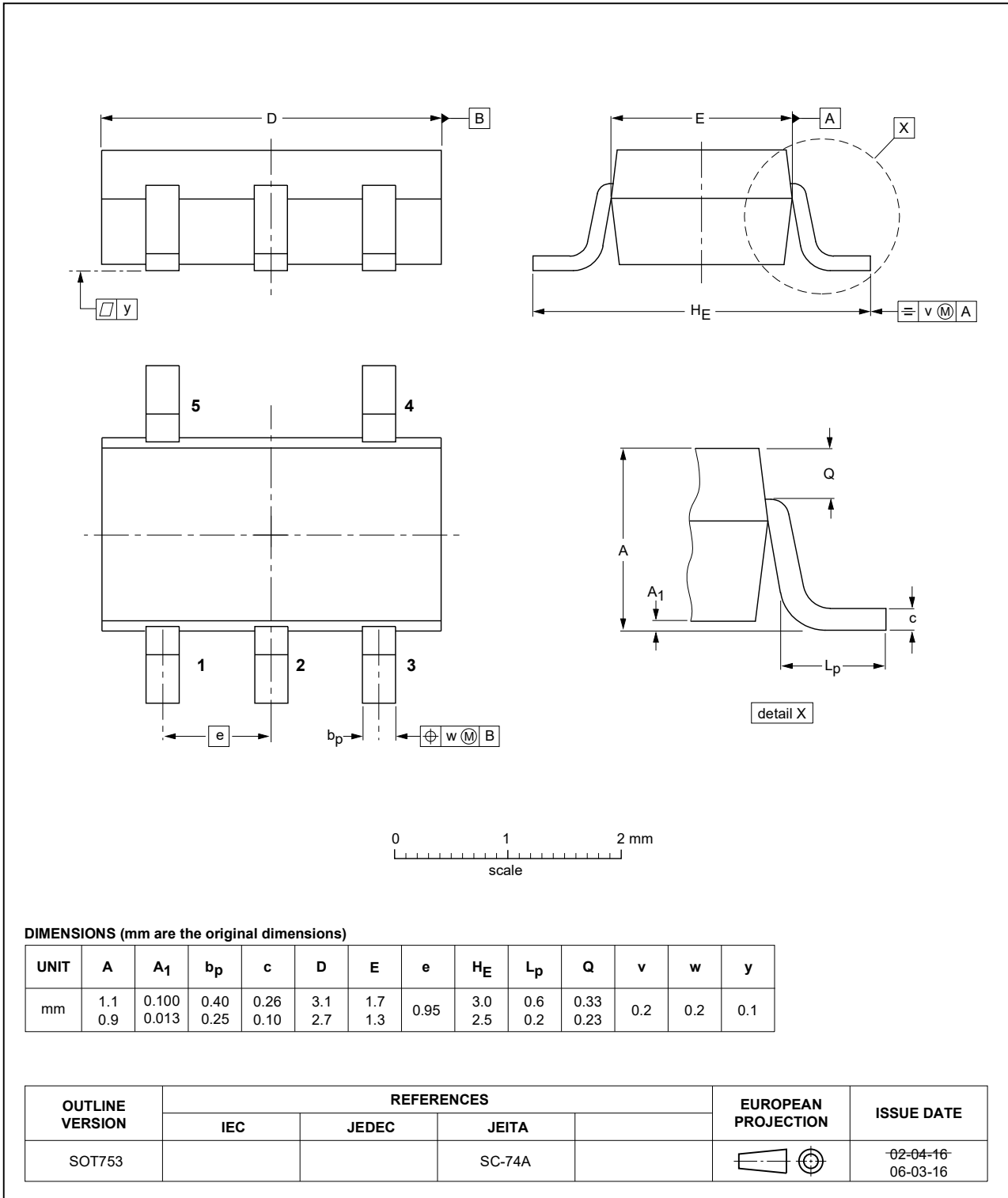


Fig. 8. Package outline SOT753 (SC-74A)

## 13. Abbreviations

Table 12. Abbreviations

| Acronym | Description             |
|---------|-------------------------|
| DUT     | Device Under Test       |
| ESD     | ElectroStatic Discharge |
| HBM     | Human Body Model        |
| MIL     | Military                |
| MM      | Machine Model           |

## 14. Revision history

Table 13. Revision history

| Document ID        | Release date  | Data sheet status  | Change notice | Supersedes         |
|--------------------|---|--------------------|---------------|--------------------|
| 74AUP1G04_Q100 v.3 | 20220113  | Product data sheet | -             | 74AUP1G04_Q100 v.2 |
| Modifications:     | <ul style="list-style-type: none"> <li>• <a href="#">Section 1</a> and <a href="#">Section 2</a> updated.</li> <li>• <a href="#">Fig. 7</a>: Package outline drawing for SOT353-1(TSSOP5) has changed.</li> </ul>   |                    |               |                    |
| 74AUP1G04_Q100 v.2 | 20210430  | Product data sheet | -             | 74AUP1G04_Q100 v.1 |
| Modifications:     | <ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• <a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation have been updated.</li> </ul> |                    |               |                    |
| 74AUP1G04_Q100 v.1 | 20131118  | 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.                                     |

- [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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