

# 74AUP2G97

## Low-power dual PCB configurable multiple function gate

Rev. 3 — 22 July 2019

Product data sheet

### 1. General description

The 74AUP2G97 is a dual configurable multiple function gate with Schmitt-trigger inputs. Each gate within 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.

This device ensures very low static and dynamic power consumption across the entire  $V_{CC}$  range from 0.8 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.

### 2. Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- ESD protection:
  - HBM JESD22-A114F exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Low static power consumption;  $I_{CC} = 0.9 \mu A$  (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of  $V_{CC}$
- $I_{OFF}$  circuitry provides partial power-down mode operation
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

### 3. Ordering information

Table 1. Ordering information

| Type number | Package           |         |                                                                                               |           |
|-------------|-------------------|---------|-----------------------------------------------------------------------------------------------|-----------|
|             | Temperature range | Name    | Description                                                                                   | Version   |
| 74AUP2G97DP | -40 °C to +125 °C | TSSOP10 | plastic thin shrink small outline package; 10 leads; body width 3 mm                          | SOT552-1  |
| 74AUP2G97GU | -40 °C to +125 °C | XQFN10  | plastic, extremely thin quad flat package; no leads; 10 terminals; body 1.40 × 1.80 × 0.50 mm | SOT1160-1 |

4. Marking

Table 2. Marking

| Type number | Marking code [1] |
|-------------|------------------|
| 74AUP2G97DP | aV               |
| 74AUP2G97GU | aV               |

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

5. Functional diagram

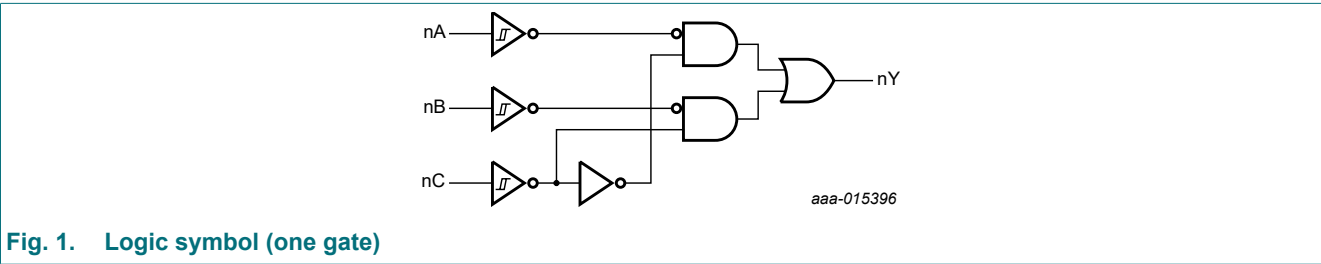


Fig. 1. Logic symbol (one gate)

6. Pinning information

6.1. Pinning

74AUP2G97

1A 1 10 VCC  
1B 2 9 1Y  
1C 3 8 2C  
2Y 4 7 2B  
GND 5 6 2A

aaa-015397

74AUP2G97

terminal 1 index area

1A 10 9 VCC 8 1Y  
1B 1 7 2C  
1C 2 6 2B  
2Y 3 4 5 2A  
GND

Transparent top view

aaa-015399

Fig. 2. Pin configuration SOT552-1 (TSSOP10)

Fig. 3. Pin configuration SOT1160-1 (XQFN10)

## 6.2. Pin description

Table 3. Pin description

| Symbol          | Pin      |           | Description    |
|-----------------|----------|-----------|----------------|
|                 | SOT552-1 | SOT1160-1 |                |
| 1A, 2A          | 1, 6     | 10, 5     | data input     |
| 1B, 2B          | 2, 7     | 1, 6      | data input     |
| 1C, 2C          | 3, 8     | 2, 7      | data input     |
| 1Y, 2Y          | 9, 4     | 8, 3      | data output    |
| GND             | 5        | 4         | ground (0 V)   |
| V <sub>CC</sub> | 10       | 9         | supply voltage |

## 7. Functional description

Table 4. Function table

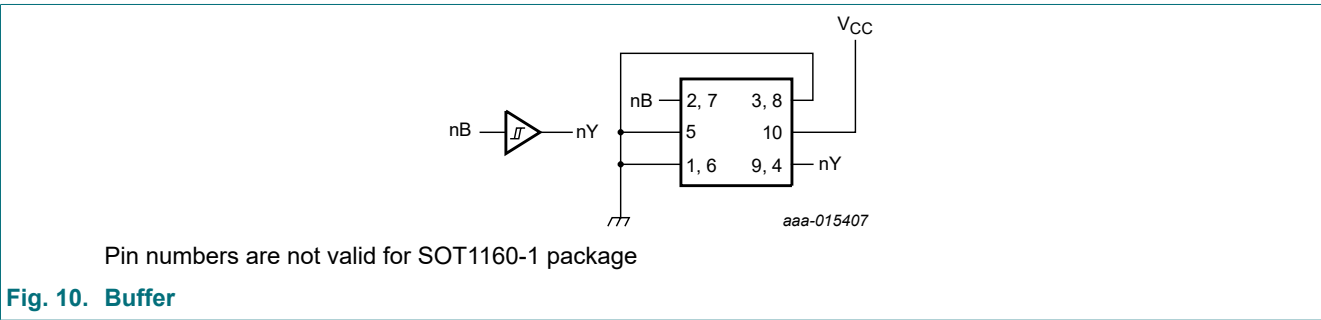
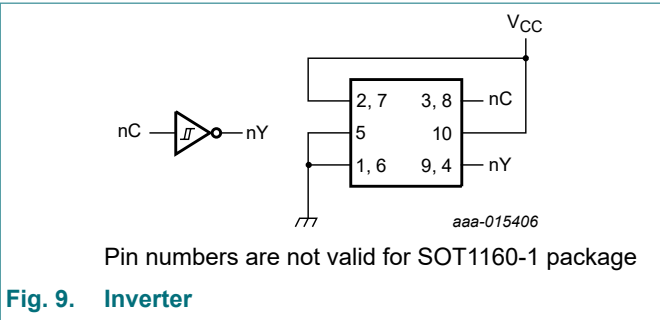
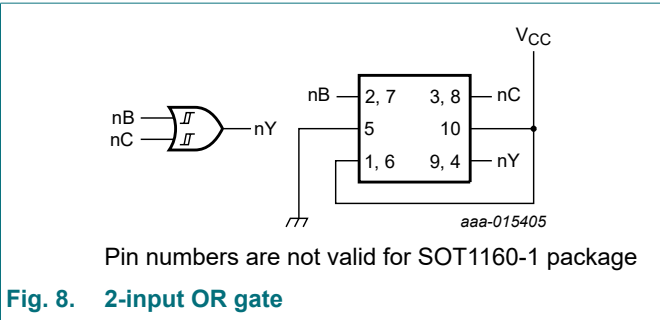
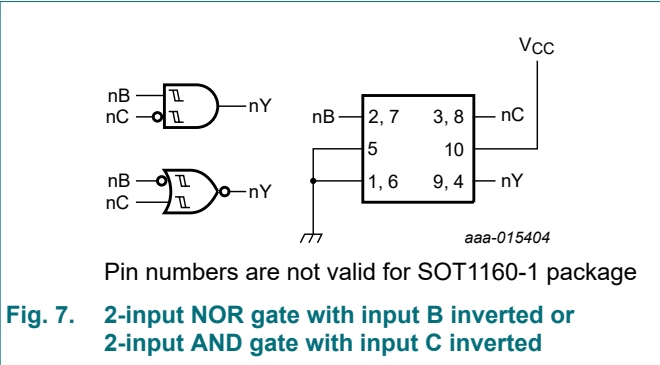
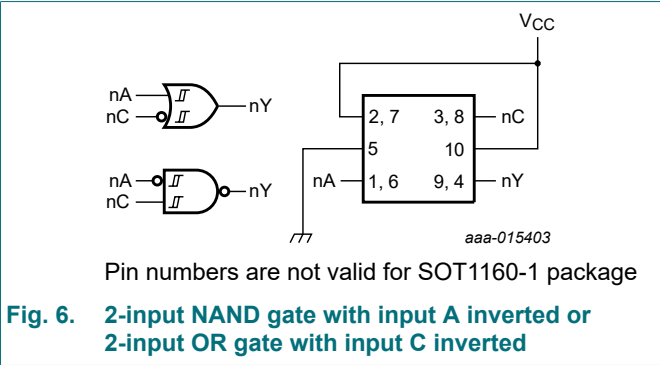
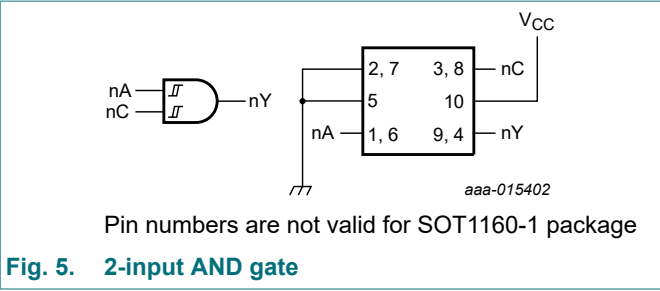
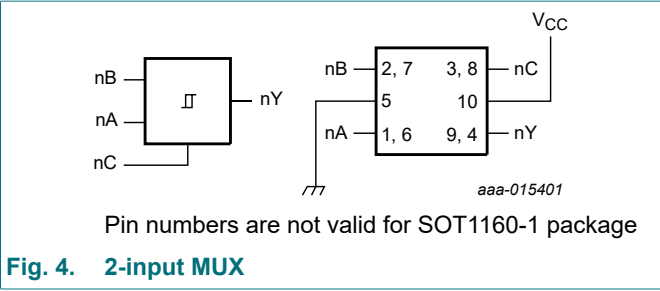
*H = HIGH voltage level; L = LOW voltage level.*

| Input |    |    | Output |
|-------|----|----|--------|
| nC    | nB | nA | nY     |
| 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 <a href="#">Fig. 4</a>  |
| 2-input AND                          | see <a href="#">Fig. 5</a>  |
| 2-input OR with one input inverted   | see <a href="#">Fig. 6</a>  |
| 2-input NAND with one input inverted | see <a href="#">Fig. 6</a>  |
| 2-input AND with one input inverted  | see <a href="#">Fig. 7</a>  |
| 2-input NOR with one input inverted  | see <a href="#">Fig. 7</a>  |
| 2-input OR                           | see <a href="#">Fig. 8</a>  |
| Inverter                             | see <a href="#">Fig. 9</a>  |
| Buffer                               | see <a href="#">Fig. 10</a> |



## 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 SOT552-1 (TSSOP10) packages:  $P_{tot}$  derates linearly with 8.3 mW/K above 120 °C.  
For SOT1160-1 (XQFN10) packages:  $P_{tot}$  derates linearly with 7.1 mW/K above 115 °C.

## 9. Recommended operating conditions

**Table 7. Recommended operating conditions**

| Symbol    | Parameter           | Conditions                      | Min | Max      | Unit |
|-----------|---------------------|---------------------------------|-----|----------|------|
| $V_{CC}$  | supply voltage      |                                 | 0.8 | 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 |                           |                                           |                      |     |     |      |
| $V_{OH}$          | HIGH-level output voltage | $V_I = V_{T+}$ or $V_{T-}$                |                      |     |     |      |
|                   |                           | $I_O = -20$ µA; $V_{CC} = 0.8$ V to 3.6 V | $V_{CC} - 0.1$       | -   | -   | V    |
|                   |                           | $I_O = -1.1$ mA; $V_{CC} = 1.1$ V         | $0.75 \times V_{CC}$ | -   | -   | V    |
|                   |                           | $I_O = -1.7$ mA; $V_{CC} = 1.4$ V         | 1.11                 | -   | -   | V    |
|                   |                           | $I_O = -1.9$ mA; $V_{CC} = 1.65$ V        | 1.32                 | -   | -   | 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    |

| Symbol                                    | Parameter                            | Conditions                                                                                          | Min                   | Typ | Max                   | Unit |
|-------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|------|
| V <sub>OL</sub>                           | LOW-level output voltage             | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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;<br>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 [1]         | -                     | -   | 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>                             | -                     | 1.1 | -                     | pF   |
| C <sub>O</sub>                            | output capacitance                   | V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V                                                         | -                     | 1.7 | -                     | pF   |
| <b>T<sub>amb</sub> = -40 °C to +85 °C</b> |                                      |                                                                                                     |                       |     |                       |      |
| V <sub>OH</sub>                           | HIGH-level output voltage            | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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    |
|                                           |                                      | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V                                                   | 2.55                  | -   | -                     | V    |
| V <sub>OL</sub>                           | LOW-level output voltage             | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V                                                    | -                     | -   | 0.45                  | 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   |
| 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                              | -                     | -   | ±0.5                  | 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;<br>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 [1]         | -                     | -   | 50                    | µA   |

| Symbol                                     | Parameter                            | Conditions                                                                                          | Min                    | Typ | Max                    | Unit |
|--------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| <b>T<sub>amb</sub> = -40 °C to +125 °C</b> |                                      |                                                                                                     |                        |     |                        |      |
| V <sub>OH</sub>                            | HIGH-level output voltage            | V <sub>I</sub> = V <sub>T+</sub> or V <sub>T-</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>T+</sub> or V <sub>T-</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;<br>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 [1]         | -                      | -   | 75                     | µA   |

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.

## 10.1. Transfer characteristics

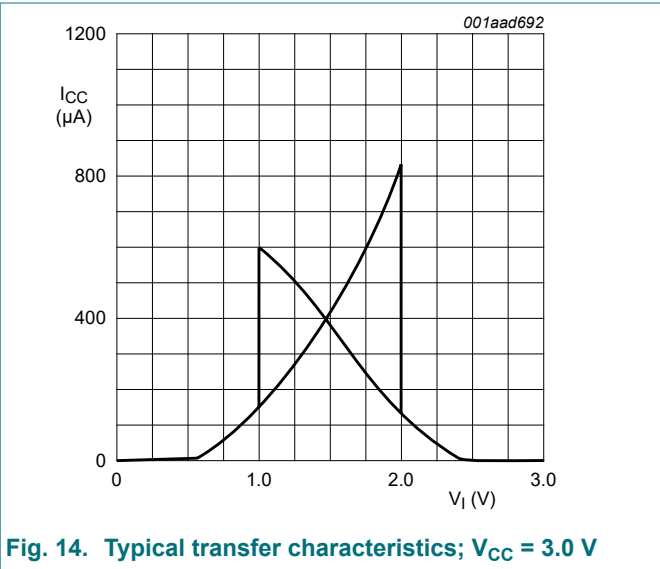
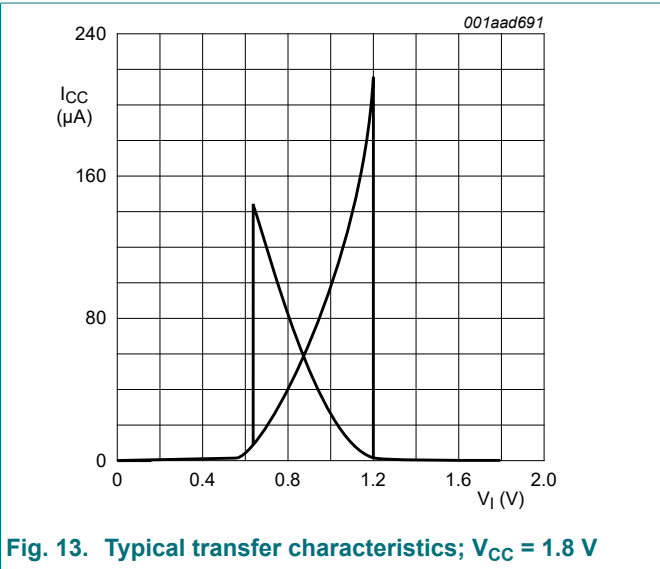
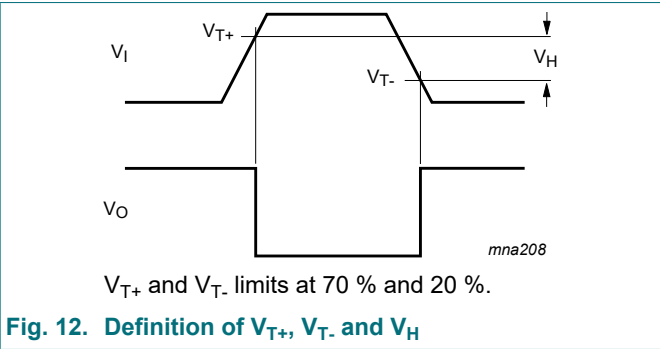
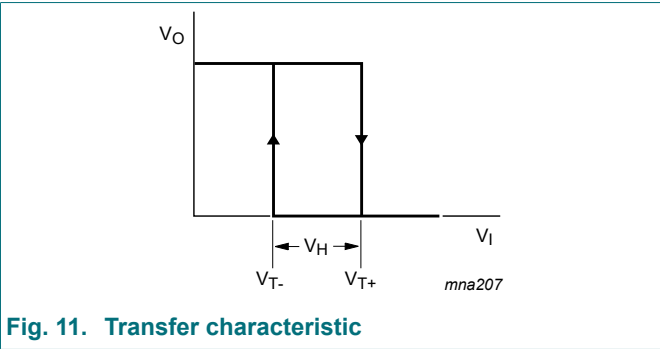
**Table 9. Transfer characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit, see Fig. 16.

| Symbol          | Parameter                        | Conditions               | 25 °C |     |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|-----------------|----------------------------------|--------------------------|-------|-----|------|------------------|------|-------------------|------|------|
|                 |                                  |                          | Min   | Typ | Max  | Min              | Max  | Min               | Max  |      |
| V <sub>T+</sub> | positive-going threshold voltage | see Fig. 11 and Fig. 12  |       |     |      |                  |      |                   |      |      |
|                 |                                  | V <sub>CC</sub> = 0.8 V  | 0.30  | -   | 0.60 | 0.30             | 0.60 | 0.30              | 0.62 | V    |
|                 |                                  | V <sub>CC</sub> = 1.1 V  | 0.53  | -   | 0.90 | 0.53             | 0.90 | 0.53              | 0.92 | V    |
|                 |                                  | V <sub>CC</sub> = 1.4 V  | 0.74  | -   | 1.11 | 0.74             | 1.11 | 0.74              | 1.13 | V    |
|                 |                                  | V <sub>CC</sub> = 1.65 V | 0.91  | -   | 1.29 | 0.91             | 1.29 | 0.91              | 1.31 | V    |
|                 |                                  | V <sub>CC</sub> = 2.3 V  | 1.37  | -   | 1.77 | 1.37             | 1.77 | 1.37              | 1.80 | V    |
|                 |                                  | V <sub>CC</sub> = 3.0 V  | 1.88  | -   | 2.29 | 1.88             | 2.29 | 1.88              | 2.32 | V    |

| Symbol          | Parameter                        | Conditions                                                                                                                                        | 25 °C |     |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|-----------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|------|------------------|------|-------------------|------|------|
|                 |                                  |                                                                                                                                                   | Min   | Typ | Max  | Min              | Max  | Min               | Max  |      |
| V <sub>T-</sub> | negative-going threshold voltage | see <a href="#">Fig. 11</a> and <a href="#">Fig. 12</a>                                                                                           |       |     |      |                  |      |                   |      |      |
|                 |                                  | V <sub>CC</sub> = 0.8 V                                                                                                                           | 0.10  | -   | 0.60 | 0.10             | 0.60 | 0.10              | 0.60 | V    |
|                 |                                  | V <sub>CC</sub> = 1.1 V                                                                                                                           | 0.26  | -   | 0.65 | 0.26             | 0.65 | 0.26              | 0.65 | V    |
|                 |                                  | V <sub>CC</sub> = 1.4 V                                                                                                                           | 0.39  | -   | 0.75 | 0.39             | 0.75 | 0.39              | 0.75 | V    |
|                 |                                  | V <sub>CC</sub> = 1.65 V                                                                                                                          | 0.47  | -   | 0.84 | 0.47             | 0.84 | 0.47              | 0.84 | V    |
|                 |                                  | V <sub>CC</sub> = 2.3 V                                                                                                                           | 0.69  | -   | 1.04 | 0.69             | 1.04 | 0.69              | 1.04 | V    |
|                 |                                  | V <sub>CC</sub> = 3.0 V                                                                                                                           | 0.88  | -   | 1.24 | 0.88             | 1.24 | 0.88              | 1.24 | V    |
| V <sub>H</sub>  | hysteresis voltage               | (V <sub>T+</sub> - V <sub>T-</sub> ); see <a href="#">Fig. 11</a> , <a href="#">Fig. 12</a> , <a href="#">Fig. 13</a> and <a href="#">Fig. 14</a> |       |     |      |                  |      |                   |      |      |
|                 |                                  | V <sub>CC</sub> = 0.8 V                                                                                                                           | 0.07  | -   | 0.50 | 0.07             | 0.50 | 0.07              | 0.50 | V    |
|                 |                                  | V <sub>CC</sub> = 1.1 V                                                                                                                           | 0.08  | -   | 0.46 | 0.08             | 0.46 | 0.08              | 0.46 | V    |
|                 |                                  | V <sub>CC</sub> = 1.4 V                                                                                                                           | 0.18  | -   | 0.56 | 0.18             | 0.56 | 0.18              | 0.56 | V    |
|                 |                                  | V <sub>CC</sub> = 1.65 V                                                                                                                          | 0.27  | -   | 0.66 | 0.27             | 0.66 | 0.27              | 0.66 | V    |
|                 |                                  | V <sub>CC</sub> = 2.3 V                                                                                                                           | 0.53  | -   | 0.92 | 0.53             | 0.92 | 0.53              | 0.92 | V    |
|                 |                                  | V <sub>CC</sub> = 3.0 V                                                                                                                           | 0.79  | -   | 1.31 | 0.79             | 1.31 | 0.79              | 1.31 | V    |

10.2. Waveforms transfer characteristics



## 11. Dynamic characteristics

**Table 10. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit, see Fig. 16.

| Symbol                 | Parameter         | Conditions                                        | 25 °C |         |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------------|-------------------|---------------------------------------------------|-------|---------|------|------------------|------|-------------------|------|------|
|                        |                   |                                                   | Min   | Typ [1] | Max  | Min              | Max  | Min               | Max  |      |
| C <sub>L</sub> = 5 pF  |                   |                                                   |       |         |      |                  |      |                   |      |      |
| t <sub>pd</sub>        | propagation delay | nA, nB, nC to nY; see <a href="#">Fig. 15</a> [2] |       |         |      |                  |      |                   |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                           | -     | 23.0    | -    | -                | -    | -                 | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                  | 2.8   | 6.6     | 12.6 | 2.5              | 13.0 | 2.5               | 13.2 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                  | 2.3   | 4.7     | 7.6  | 2.5              | 8.2  | 2.5               | 8.6  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                | 2.2   | 3.9     | 6.2  | 2.0              | 6.8  | 2.0               | 7.2  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                  | 2.0   | 3.2     | 4.5  | 1.7              | 5.1  | 1.7               | 5.3  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                  | 1.9   | 2.8     | 3.9  | 1.5              | 4.1  | 1.5               | 4.3  | ns   |
| C <sub>L</sub> = 10 pF |                   |                                                   |       |         |      |                  |      |                   |      |      |
| t <sub>pd</sub>        | propagation delay | nA, nB, nC to nY; see <a href="#">Fig. 15</a> [2] |       |         |      |                  |      |                   |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                           | -     | 26.6    | -    | -                | -    | -                 | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                  | 3.2   | 7.4     | 14.3 | 2.9              | 14.9 | 2.9               | 15.2 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                  | 2.6   | 5.3     | 8.7  | 2.8              | 9.4  | 2.8               | 9.8  | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                | 2.5   | 4.5     | 7.0  | 2.3              | 7.8  | 2.3               | 8.2  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                  | 2.4   | 3.7     | 5.2  | 2.1              | 5.9  | 2.1               | 6.1  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                  | 2.3   | 3.4     | 4.6  | 1.9              | 4.9  | 1.9               | 5.1  | ns   |
| C <sub>L</sub> = 15 pF |                   |                                                   |       |         |      |                  |      |                   |      |      |
| t <sub>pd</sub>        | propagation delay | nA, nB, nC to nY; see <a href="#">Fig. 15</a> [2] |       |         |      |                  |      |                   |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                           | -     | 30.1    | -    | -                | -    | -                 | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                  | 3.6   | 8.2     | 16.0 | 3.2              | 16.7 | 3.2               | 17.0 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                  | 2.9   | 5.9     | 9.6  | 3.1              | 10.4 | 3.1               | 10.9 | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                | 2.8   | 5.0     | 7.8  | 2.5              | 8.7  | 2.5               | 9.1  | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                  | 2.7   | 4.2     | 5.8  | 2.4              | 6.5  | 2.4               | 6.9  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                  | 2.5   | 3.8     | 5.1  | 2.2              | 5.5  | 2.2               | 5.7  | ns   |
| C <sub>L</sub> = 30 pF |                   |                                                   |       |         |      |                  |      |                   |      |      |
| t <sub>pd</sub>        | propagation delay | nA, nB, nC to nY; see <a href="#">Fig. 15</a> [2] |       |         |      |                  |      |                   |      |      |
|                        |                   | V <sub>CC</sub> = 0.8 V                           | -     | 38.3    | -    | -                | -    | -                 | -    | ns   |
|                        |                   | V <sub>CC</sub> = 1.1 V to 1.3 V                  | 4.6   | 10.5    | 20.9 | 4.0              | 21.8 | 4.0               | 22.2 | ns   |
|                        |                   | V <sub>CC</sub> = 1.4 V to 1.6 V                  | 3.7   | 7.4     | 12.2 | 3.8              | 13.3 | 3.8               | 14.0 | ns   |
|                        |                   | V <sub>CC</sub> = 1.65 V to 1.95 V                | 3.5   | 6.3     | 9.9  | 3.2              | 11.1 | 3.2               | 11.8 | ns   |
|                        |                   | V <sub>CC</sub> = 2.3 V to 2.7 V                  | 3.4   | 5.3     | 7.4  | 3.1              | 8.3  | 3.1               | 8.8  | ns   |
|                        |                   | V <sub>CC</sub> = 3.0 V to 3.6 V                  | 3.2   | 4.9     | 6.6  | 2.8              | 7.0  | 2.8               | 7.4  | ns   |

## Low-power dual PCB configurable multiple function gate

| Symbol                                        | Parameter                     | Conditions                                                          | 25 °C |         |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|-----------------------------------------------|-------------------------------|---------------------------------------------------------------------|-------|---------|-----|------------------|-----|-------------------|-----|------|
|                                               |                               |                                                                     | Min   | Typ [1] | Max | Min              | Max | Min               | Max |      |
| C <sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF |                               |                                                                     |       |         |     |                  |     |                   |     |      |
| C <sub>PD</sub>                               | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> [3] |       |         |     |                  |     |                   |     |      |
|                                               |                               | V <sub>CC</sub> = 0.8 V                                             | -     | 2.6     | -   | -                | -   | -                 | -   | pF   |
|                                               |                               | V <sub>CC</sub> = 1.1 V to 1.3 V                                    | -     | 2.8     | -   | -                | -   | -                 | -   | pF   |
|                                               |                               | V <sub>CC</sub> = 1.4 V to 1.6 V                                    | -     | 2.9     | -   | -                | -   | -                 | -   | pF   |
|                                               |                               | V <sub>CC</sub> = 1.65 V to 1.95 V                                  | -     | 3.1     | -   | -                | -   | -                 | -   | pF   |
|                                               |                               | V <sub>CC</sub> = 2.3 V to 2.7 V                                    | -     | 3.7     | -   | -                | -   | -                 | -   | pF   |
|                                               |                               | V <sub>CC</sub> = 3.0 V to 3.6 V                                    | -     | 4.3     | -   | -                | -   | -                 | -   | 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).

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

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

11.1. Waveforms and test circuit

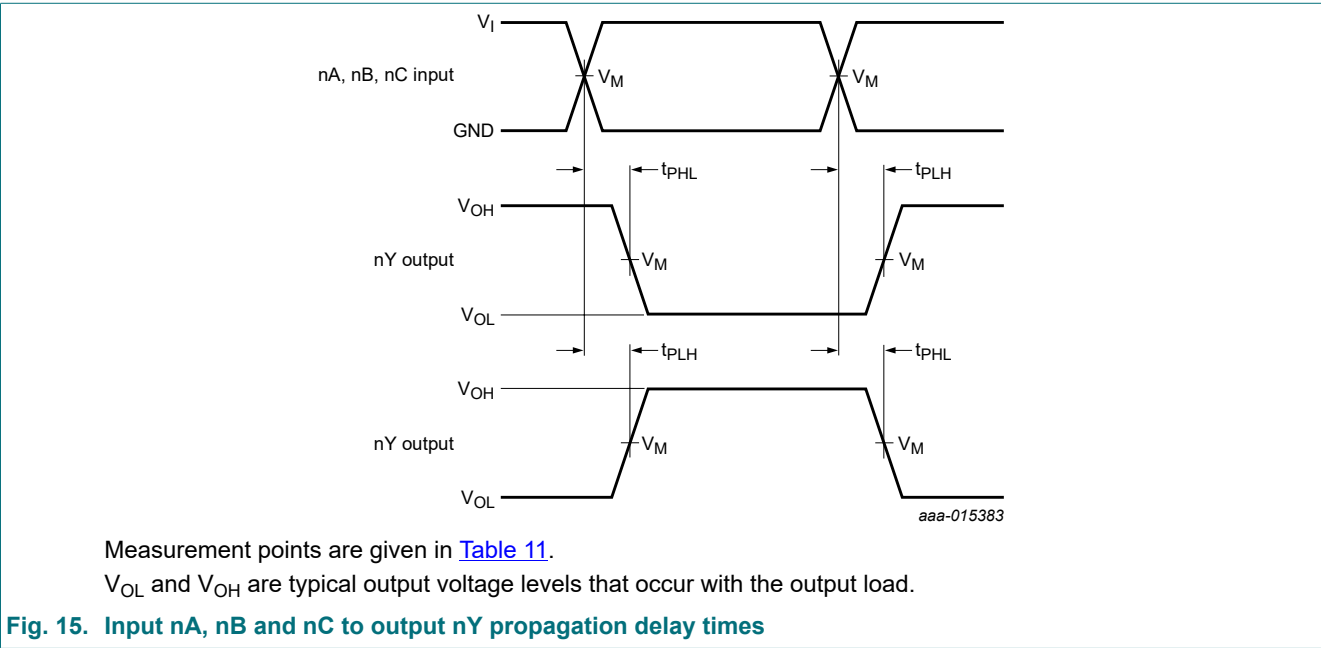


Table 11. Measurement points

| 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 |

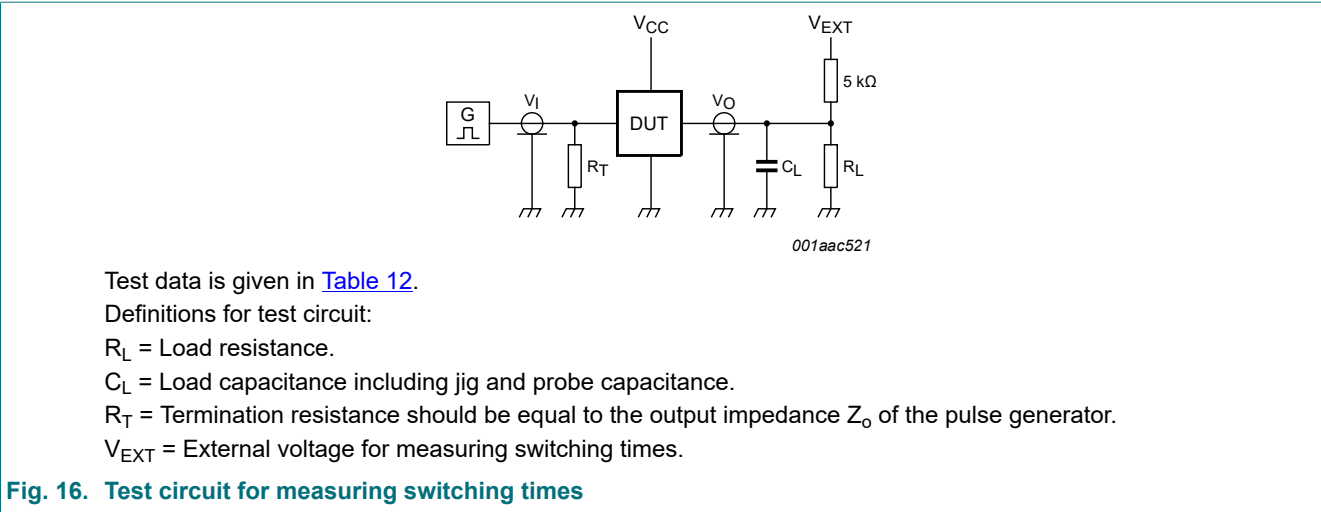


Table 12. Test data

| 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                   | $2V_{CC}$             |

[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

TSSOP10: plastic thin shrink small outline package; 10 leads; body width 3 mm

SOT552-1

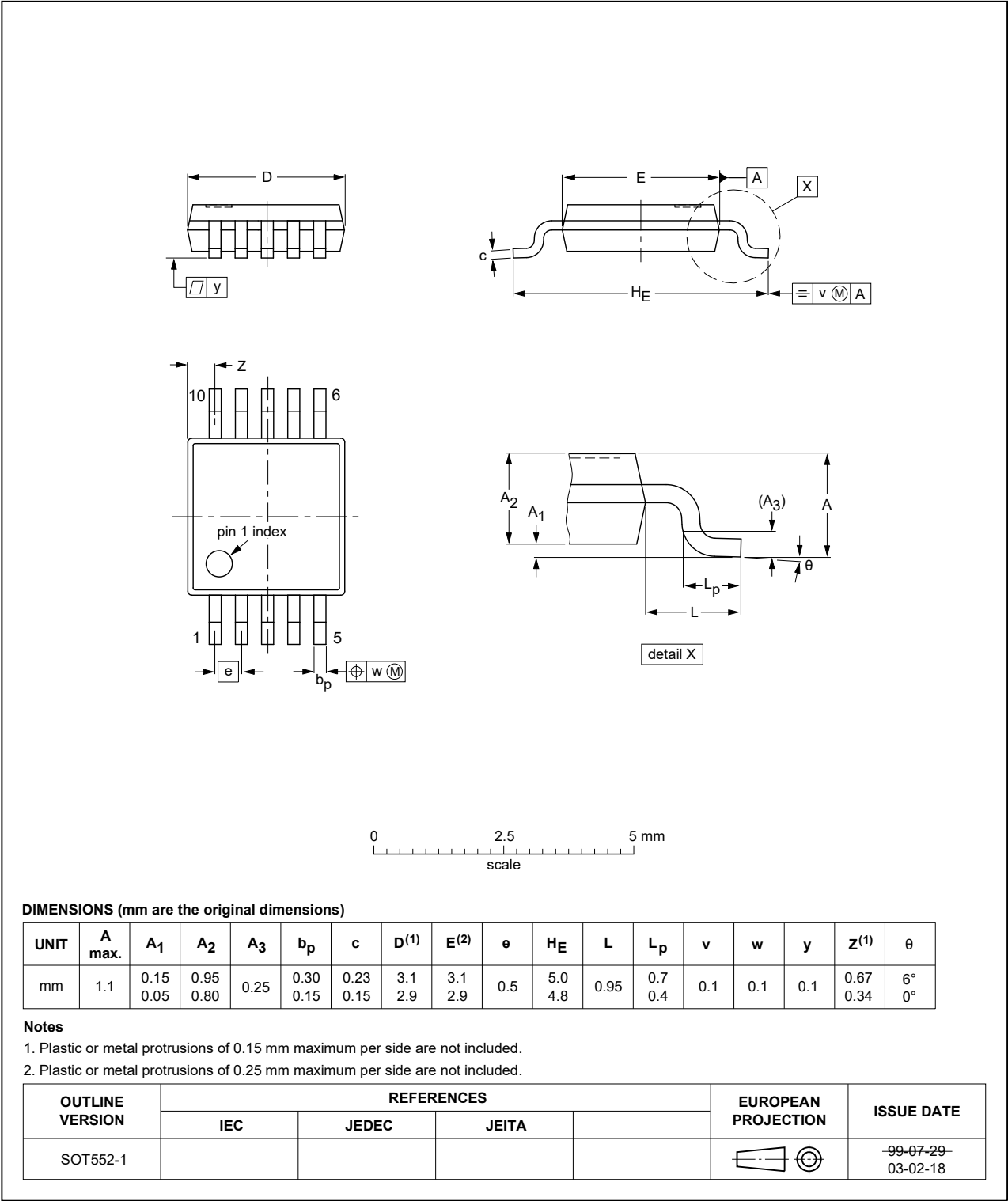


Fig. 17. Package outline SOT552-1 (TSSOP10)

XQFN10: plastic, extremely thin quad flat package; no leads;  
10 terminals; body 1.40 x 1.80 x 0.50 mm

SOT1160-1

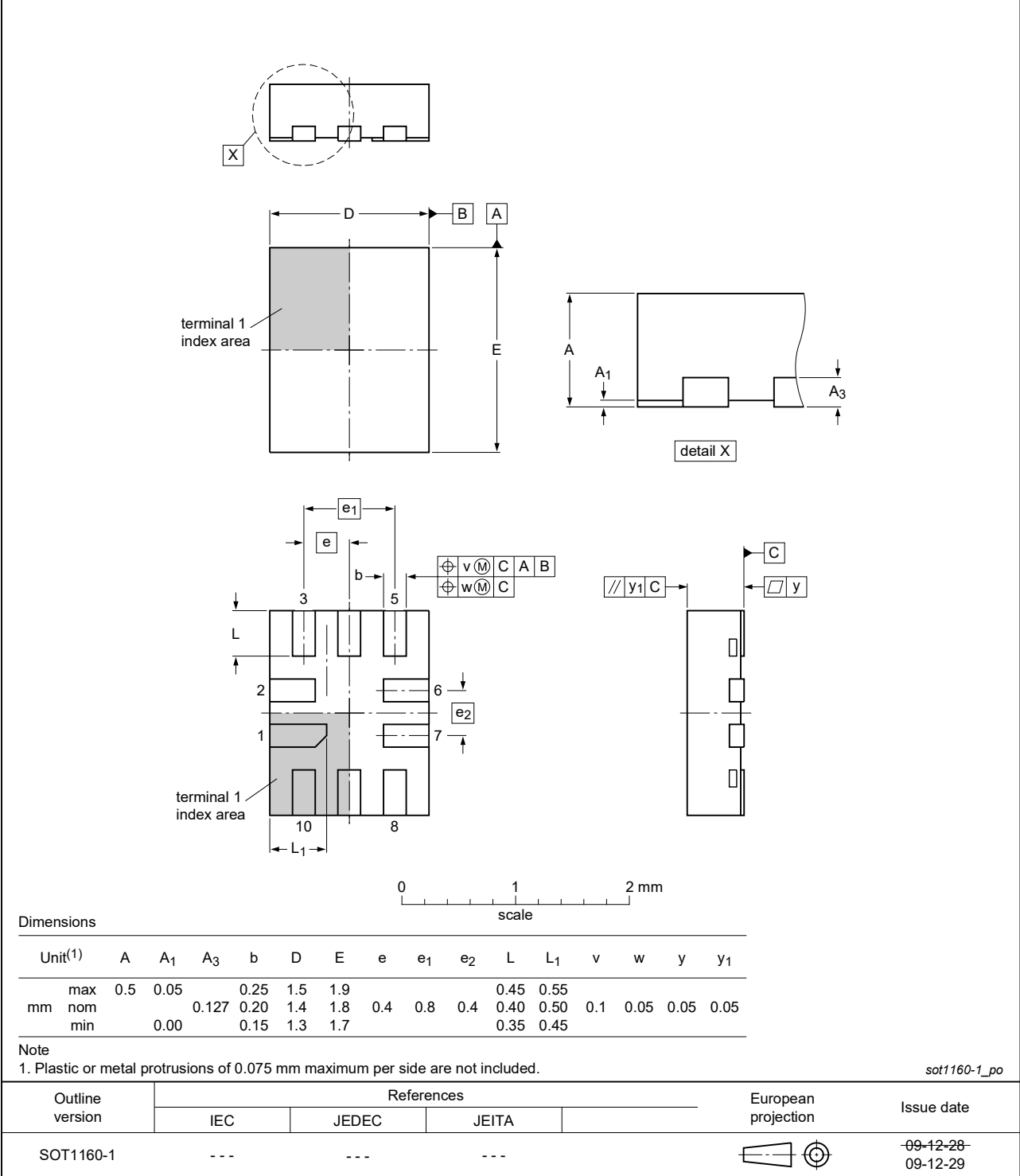


Fig. 18. Package outline SOT1160-1 (XQFN10)

## 13. Abbreviations

Table 13. Abbreviations

| Acronym | Description             |
|---------|-------------------------|
| CDM     | Charged Device Model    |
| DUT     | Device Under Test       |
| ESD     | ElectroStatic Discharge |
| HBM     | Human Body Model        |
| MM      | Machine Model           |
| PCB     | Printed-Circuit Board   |

## 14. Revision history

Table 14. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                | Data sheet status  | Change notice | Supersedes    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|---------------|
| 74AUP2G97 v.3  | 20190722                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G97 v.2 |
| 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>Type number 74AUP2G97GF (SOT1081-2) removed.</li></ul> |                    |               |               |
| 74AUP2G97 v.2  | 20151202                                                                                                                                                                                                                                                                                    | Product data sheet | -             | 74AUP2G97 v.1 |
| Modifications: | <ul style="list-style-type: none"><li>Maximum value temperature range TSSOP10 (74AUP2G97DP) changed from 85 °C to 125 °C.</li><li>Removed 74AUP2G97GM (SOT1049-3).</li></ul>                                                                                                                |                    |               |               |
| 74AUP2G97 v.1  | 20141104                                                                                                                                                                                                                                                                                    | 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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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