

74AUP1G14-Q100

Low-power Schmitt trigger inverter

Rev. 3.1 — 12 July 2023

Product data sheet

1. General description

The 74AUP1G14-Q100 is a single inverter with Schmitt-trigger input. 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.

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 0.8 V to 3.6 V
- CMOS low power dissipation
- High noise immunity
- Overvoltage tolerant inputs to 3.6 V
- Low static power consumption; $I_{CC} = 0.9 \mu\text{A}$ (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation
- 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: ANSI/ESDA/JEDEC JS-001 class 3A exceeds 5000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V

3. Applications

- Wave and pulse shaper
- Astable multivibrator
- Monostable multivibrator

4. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|-----------------------------------|-------------------|--------|--|---------------------------|
| | Temperature range | Name | Description | |
| 74AUP1G14GX4-Q100 | -40 °C to +125 °C | X2SON4 | plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 × 0.6 × 0.32 mm | SOT1269-2 |

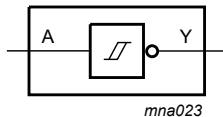
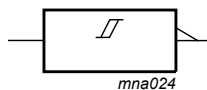
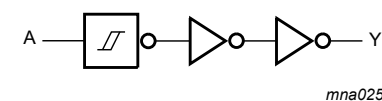
5. Marking

Table 2. Marking

| Type number | Marking code[1] |
|-------------------|-----------------|
| 74AUP1G14GX4-Q100 | pF |

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

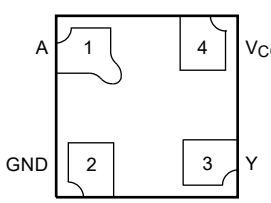
6. Functional diagram

| | | |
|---|---|---|
|  <p><i>mna023</i></p> |  <p><i>mna024</i></p> |  <p><i>mna025</i></p> |
| Fig. 1. Logic symbol | Fig. 2. IEC logic symbol | Fig. 3. Logic diagram |

7. Pinning information

7.1. Pinning

GX4 package
SOT1269-2 (X2SON4)



aaa-035754

Transparent top view

7.2. Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|--------|-----|--------------|
| A | 1 | data input |
| GND | 2 | ground (0 V) |

| Symbol | Pin | Description |
|-----------------|-----|----------------|
| Y | 3 | data output |
| V _{CC} | 4 | supply voltage |

8. Functional description

Table 4. Function table

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

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

9. 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 _{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 | | | |
| | | X2SON4 package | [2] - | 150 | mW |

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

[2] For SOT1269-2 (X2SON4) package: P_{tot} derates linearly with 1.7 mW/K above 57 °C.

10. Recommended operating conditions

Table 6. 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 |

11. 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 |
|---|---|--|------------------------|------|-----------------------|------|
| 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 × 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 | |
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V | - | - | 0.1 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.3 × V _{CC} | V |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.31 | V |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.31 | 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 | - | - | ±0.2 | 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} = 0.8 V to 3.6 V | - | - | 0.5 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | - | - | 40 | μA |
| C _I | input capacitance | V _I = GND or V _{CC} ; V _{CC} = 0 V to 3.6 V | - | 1.1 | - | pF |
| C _O | output capacitance | V _O = GND; V _{CC} = 0 V | - | 1.7 | - | pF |
| T_{amb} = -40 °C to +85 °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 | 0.7 × V _{CC} | - | - | V |
| | | I _O = -1.7 mA; V _{CC} = 1.4 V | 1.03 | - | - | V |
| | | I _O = -1.9 mA; V _{CC} = 1.65 V | 1.30 | - | - | 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 | |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------------|--|------------------------|-----|------------------------|------|
| V _{OL} | LOW-level output voltage | V _I = V _{T+} or V _{T-} | | | | |
| | | I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V | - | - | 0.1 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.3 × V _{CC} | V |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.37 | V |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.35 | 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 | - | - | ±0.6 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V | - | - | 0.9 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | - | - | 50 | μA |
| T_{amb} = -40 °C to +125 °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} - 0.11 | - | - | V |
| | | I _O = -1.1 mA; V _{CC} = 1.1 V | 0.6 × V _{CC} | - | - | V |
| | | I _O = -1.7 mA; V _{CC} = 1.4 V | 0.93 | - | - | V |
| | | I _O = -1.9 mA; V _{CC} = 1.65 V | 1.17 | - | - | 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} = 0.8 V to 3.6 V | - | - | 0.11 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.33 × V _{CC} | V |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.41 | V |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.39 | 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} = 0.8 V to 3.6 V | - | - | 1.4 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | - | - | 75 | μA |

12. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 5.

| 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_L = 5 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 4 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 19.9 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.7 | 5.9 | 11.0 | 2.4 | 11.1 | 2.4 | 11.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.6 | 4.3 | 6.6 | 2.4 | 7.1 | 2.4 | 7.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.1 | 3.7 | 5.4 | 2.0 | 6.0 | 2.0 | 6.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.0 | 3.0 | 4.1 | 1.7 | 4.5 | 1.7 | 4.7 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.9 | 2.8 | 3.6 | 1.5 | 3.9 | 1.5 | 4.0 | ns |
| C_L = 10 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 4 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 23.4 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.9 | 6.8 | 12.7 | 2.8 | 12.8 | 2.8 | 12.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.8 | 5.0 | 7.7 | 2.6 | 8.2 | 2.6 | 8.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.7 | 4.2 | 6.2 | 2.5 | 6.7 | 2.5 | 7.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 3.6 | 4.8 | 2.1 | 5.2 | 2.1 | 5.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.1 | 3.3 | 4.3 | 2.0 | 4.5 | 2.0 | 4.7 | ns |
| C_L = 15 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 4 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 26.9 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 7.6 | 14.3 | 3.0 | 14.5 | 3.0 | 14.7 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.3 | 5.5 | 8.6 | 2.9 | 9.4 | 2.9 | 9.8 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.8 | 4.7 | 7.0 | 2.8 | 7.7 | 2.8 | 8.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.7 | 4.0 | 5.5 | 2.4 | 5.9 | 2.4 | 6.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.6 | 3.8 | 4.8 | 2.2 | 5.2 | 2.2 | 5.4 | ns |
| C_L = 30 pF | | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Fig. 4 [2] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 37.3 | - | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.0 | 9.8 | 18.7 | 3.9 | 19.6 | 3.9 | 20.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.7 | 7.1 | 11.2 | 3.8 | 12.3 | 3.8 | 12.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.6 | 6.0 | 9.1 | 3.6 | 10.0 | 3.6 | 10.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 3.5 | 5.2 | 6.9 | 3.2 | 7.5 | 3.2 | 7.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 3.3 | 4.8 | 6.1 | 3.1 | 7.1 | 3.1 | 7.4 | 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 | |
| C_L = 5 pF, 10 pF, 15 pF and 30 pF | | | | | | | | | | |
| C _{PD} | power dissipation capacitance | f _i = 1 MHz; V _I = GND to V _{CC} [3] | | | | | | | | |
| | | V _{CC} = 0.8 V | - | 2.6 | - | - | - | - | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.7 | - | - | - | - | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 2.9 | - | - | - | - | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 3.1 | - | - | - | - | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.7 | - | - | - | - | - | 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.

12.1. Waveform and test circuit

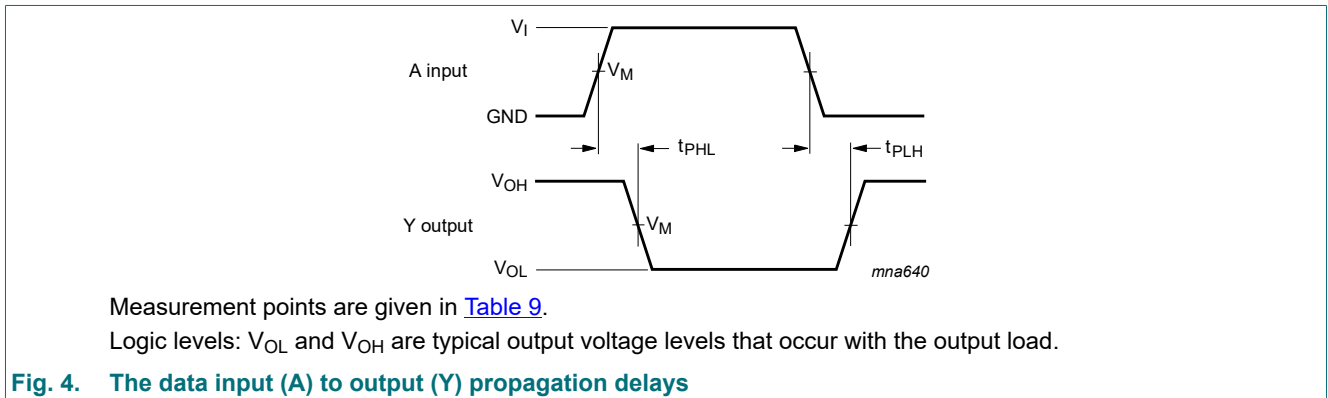
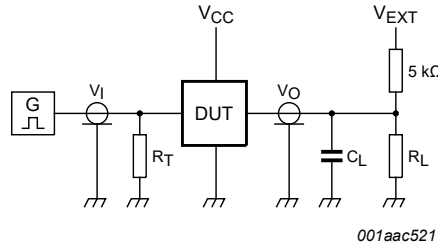


Table 9. Measurement points

| 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 × V _{CC} | 0.5 × V _{CC} | V _{CC} | ≤ 3.0 ns |



Test data is given in [Table 10](#).

Definitions for test circuit:

R_L = Load resistance;

C_L = Load capacitance including jig and probe capacitance;

R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator;

V_{EXT} = External voltage for measuring switching times.

Fig. 5. Test circuit for measuring switching times

Table 10. 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 $R_L = 5 \text{ k}\Omega$.

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

12.2. Transfer characteristics

Table 11. Transfer characteristics

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

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|----------|----------------------------------|---|-------|------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| V_{T+} | positive-going threshold voltage | see Fig. 6 and Fig. 7 | | | | | | | | |
| | | $V_{CC} = 0.8 \text{ V}$ | 0.30 | - | 0.60 | 0.30 | 0.60 | 0.30 | 0.62 | V |
| | | $V_{CC} = 1.1 \text{ V}$ | 0.53 | - | 0.90 | 0.53 | 0.90 | 0.53 | 0.92 | V |
| | | $V_{CC} = 1.4 \text{ V}$ | 0.74 | - | 1.11 | 0.74 | 1.11 | 0.74 | 1.13 | V |
| | | $V_{CC} = 1.65 \text{ V}$ | 0.91 | - | 1.29 | 0.91 | 1.29 | 0.91 | 1.31 | V |
| | | $V_{CC} = 2.3 \text{ V}$ | 1.37 | - | 1.77 | 1.37 | 1.77 | 1.37 | 1.80 | V |
| V_{T-} | negative-going threshold voltage | see Fig. 6 and Fig. 7 | | | | | | | | |
| | | $V_{CC} = 0.8 \text{ V}$ | 0.10 | - | 0.60 | 0.10 | 0.60 | 0.10 | 0.60 | V |
| | | $V_{CC} = 1.1 \text{ V}$ | 0.26 | - | 0.65 | 0.26 | 0.65 | 0.26 | 0.65 | V |
| | | $V_{CC} = 1.4 \text{ V}$ | 0.39 | - | 0.75 | 0.39 | 0.75 | 0.39 | 0.75 | V |
| | | $V_{CC} = 1.65 \text{ V}$ | 0.47 | - | 0.84 | 0.47 | 0.84 | 0.47 | 0.84 | V |
| | | $V_{CC} = 2.3 \text{ V}$ | 0.69 | - | 1.04 | 0.69 | 1.04 | 0.69 | 1.04 | V |
| | $V_{CC} = 3.0 \text{ V}$ | 0.88 | - | 1.24 | 0.88 | 1.24 | 0.88 | 1.24 | 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 _H | hysteresis voltage | see Fig. 6, Fig. 7, Fig. 8 and Fig. 9 | | | | | | | | |
| | | V _{CC} = 0.8 V | 0.07 | - | 0.50 | 0.07 | 0.50 | 0.07 | 0.50 | V |
| | | V _{CC} = 1.1 V | 0.08 | - | 0.46 | 0.08 | 0.46 | 0.08 | 0.46 | V |
| | | V _{CC} = 1.4 V | 0.18 | - | 0.56 | 0.18 | 0.56 | 0.18 | 0.56 | V |
| | | V _{CC} = 1.65 V | 0.27 | - | 0.66 | 0.27 | 0.66 | 0.27 | 0.66 | V |
| | | V _{CC} = 2.3 V | 0.53 | - | 0.92 | 0.53 | 0.92 | 0.53 | 0.92 | V |
| | | V _{CC} = 3.0 V | 0.79 | - | 1.31 | 0.79 | 1.31 | 0.79 | 1.31 | V |

12.3. Waveforms transfer characteristics

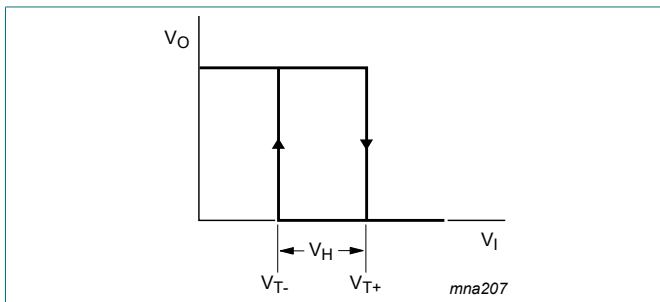


Fig. 6. Transfer characteristic

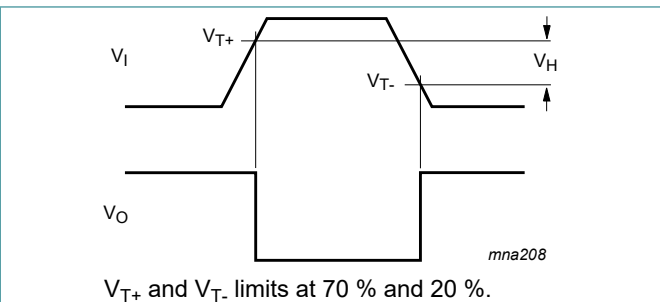


Fig. 7. Definition of V_{T+}, V_{T-} and V_H

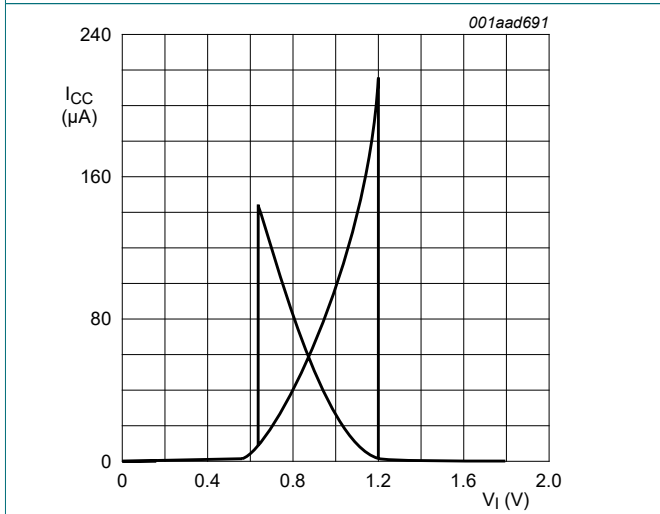


Fig. 8. Typical transfer characteristics; V_{CC} = 1.8 V

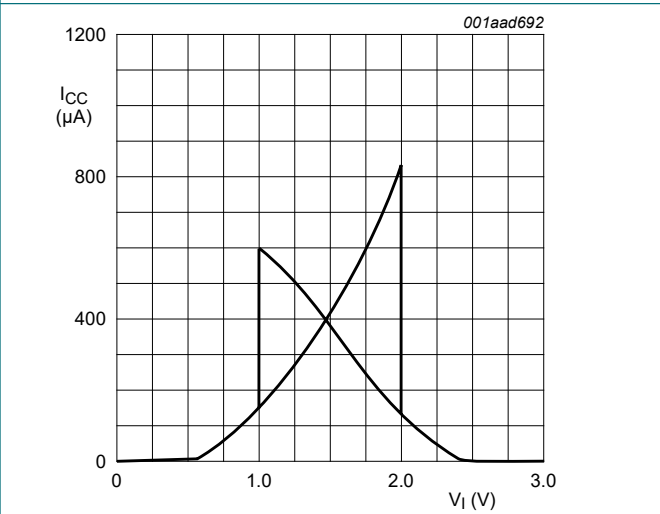


Fig. 9. Typical transfer characteristics; V_{CC} = 3.0 V

13. Application information

The slow input rise and fall times cause additional power dissipation, this can be calculated using the following formula:

$$P_{ad} = f_i \times (t_r \times I_{CC(AV)} + t_f \times I_{CC(AV)}) \times V_{CC} \text{ where:}$$

- P_{ad} = additional power dissipation (μW);
- f_i = input frequency (MHz);
- t_r = input rise time (ns); 10 % to 90 %;
- t_f = input fall time (ns); 90 % to 10 %;
- $I_{CC(AV)}$ = average additional supply current (μA).

Average I_{CC} differs with positive or negative input transitions, as shown in Fig. 10.

An example of a relaxation circuit using the 74AUP1G14 is shown in Fig. 11.

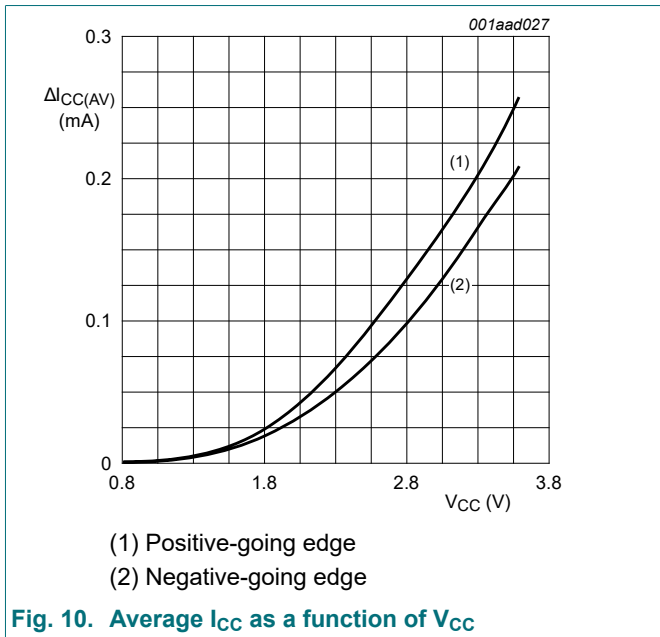


Fig. 10. Average I_{CC} as a function of V_{CC}

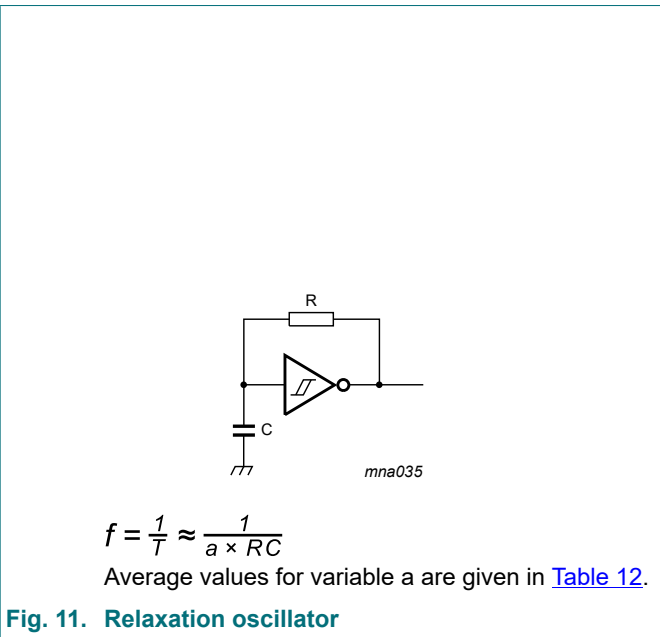


Fig. 11. Relaxation oscillator

Table 12. Variable values

| Supply voltage | Variable a |
|----------------|------------|
| 1.1 V | 1.28 |
| 1.5 V | 1.22 |
| 1.8 V | 1.24 |
| 2.8 V | 1.34 |
| 3.3 V | 1.45 |

14. Package outline

X2SON4: plastic thermal enhanced extremely thin small outline package; no leads; 4 terminals; body 0.6 x 0.6 x 0.32 mm

SOT1269-2

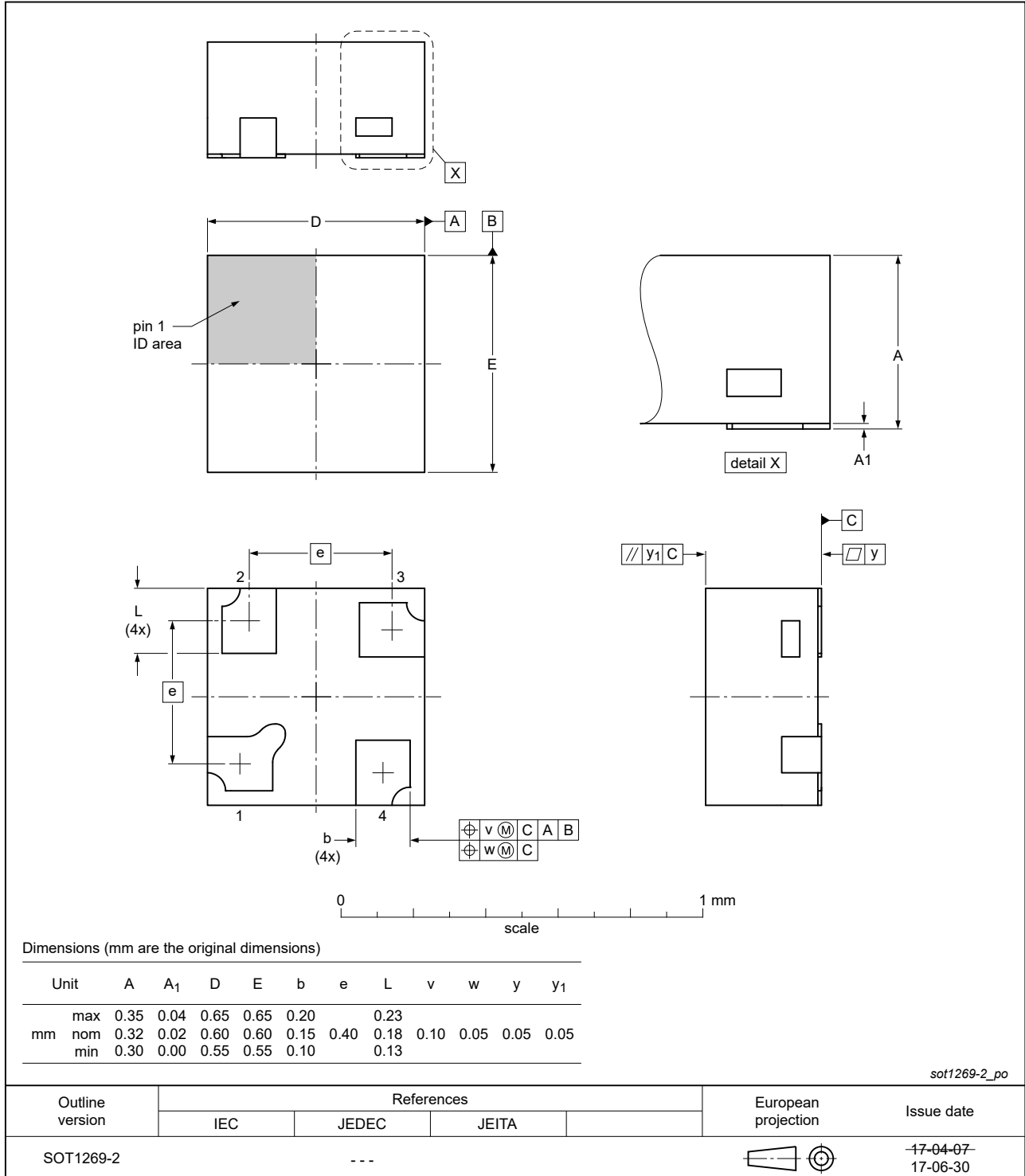


Fig. 12. Package outline SOT1269-2 (X2SON4)

15. Abbreviations

Table 13. Abbreviations

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

16. Revision history

Table 14. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------------|---|--------------------|---------------|--------------------|
| 74AUP1G14_Q100 v.3.1 | 20230712 | Product data sheet | - | 74AUP1G14_Q100 v.2 |
| Modifications: | • Section 2 : ESD specification updated according to the latest JEDEC standard. | | | |
| 74AUP1G14_Q100 v.2 | 20210713 | Product data sheet | - | 74AUP1G14_Q100 v.1 |
| Modifications: | • Section 1 and Section 2 updated. | | | |
| 74AUP1G14_Q100 v.1 | 20210127 | Product data sheet | - | - |

17. 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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