

74AUP1G32-Q100

Low-power 2-input OR-gate

Rev. 2 — 4 July 2013

Product data sheet

1. General description

The 74AUP1G32-Q100 provides the single 2-input OR function.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8 V to 3.6 V.

This device ensures a 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 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 $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ and from $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$
- Wide supply voltage range from 0.8 V to 3.6 V
- 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 (1.2 V to 1.95 V)
 - ◆ JESD8-5 (1.8 V to 2.7 V)
 - ◆ JESD8-B (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 ($C = 200\text{ pF}$, $R = 0\text{ }\Omega$)
- Low static power consumption; $I_{CC} = 0.9\text{ }\mu\text{A}$ (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



3. Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|------------------|-------------------|--------|------------------------------------------------------------------------|----------|
| | Temperature range | Name | Description | |
| 74AUP1G32GW-Q100 | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |

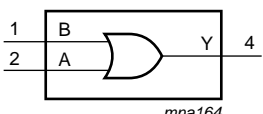
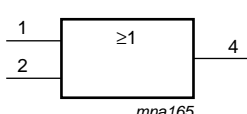
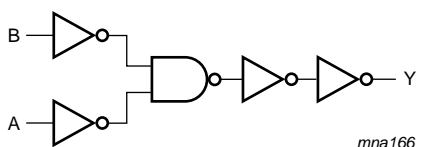
4. Marking

Table 2. Marking

| Type number | Marking code ^[1] |
|------------------|-----------------------------|
| 74AUP1G32GW-Q100 | pG |

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

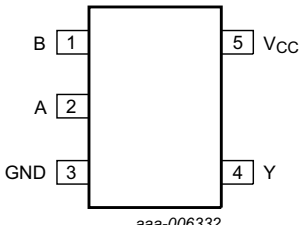
5. Functional diagram

| | | |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  <p><i>mna164</i></p> |  <p><i>mna165</i></p> |  <p><i>mna166</i></p> |
| Fig 1. Logic symbol | Fig 2. IEC logic symbol | Fig 3. Logic diagram |

6. Pinning information

6.1 Pinning

74AUP1G32-Q100



aaa-006332

Fig 4. Pin configuration SOT353-1

6.2 Pin description

Table 3. Pin description

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

7. Functional description

Table 4. Function table^[1]

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

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

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|------------------|-------------------------|-----------------------------------------|---------------------|------|------|
| V _{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 input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For TSSOP5 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

9. 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 |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 0.8$ 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 |
|-------------------------------------|---------------------------|------------------------------------------------|----------------------|-----|----------------------|------|
| $T_{amb} = 25$ °C | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8$ V | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | $0.65 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | 1.6 | - | - | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8$ V | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | - | - | $0.35 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3$ V to 2.7 V | - | - | 0.7 | V |
| | | $V_{CC} = 3.0$ V to 3.6 V | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20$ μ A; $V_{CC} = 0.8$ 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 |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20$ μ A; $V_{CC} = 0.8$ V to 3.6 V | - | - | 0.1 | V |
| | | $I_O = 1.1$ mA; $V_{CC} = 1.1$ V | - | - | $0.3 \times V_{CC}$ | 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 |

Table 7. Static characteristics ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------|-----|-----|-----------|---------------|
| I_I | input leakage current | $V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$ | - | - | ± 0.1 | μA |
| I_{OFF} | power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$ | - | - | ± 0.2 | μA |
| ΔI_{OFF} | additional power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$ | - | - | ± 0.2 | μA |
| I_{CC} | supply current | $V_I = \text{GND or } V_{CC}; I_O = 0 \text{ A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 0.5 | μA |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ | [1] | - | 40 | μA |
| C_I | input capacitance | $V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_I = \text{GND or } V_{CC}$ | - | 0.8 | - | pF |
| C_O | output capacitance | $V_O = \text{GND}; V_{CC} = 0 \text{ V}$ | - | 1.7 | - | pF |

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

| | | | | | | |
|-------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------|----------------------|---|----------------------|---------------|
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8 \text{ V}$ | $0.70 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$ | $0.65 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | 1.6 | - | - | V |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | $V_{CC} = 0.8 \text{ V}$ | - | - | $0.30 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$ | - | - | $0.35 \times V_{CC}$ | V |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | - | - | 0.7 | V |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | - | - | 0.9 | V |
| V_{OH} | HIGH-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$ | | | | |
| | | $I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | $V_{CC} - 0.1$ | - | - | V |
| | | $I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$ | $0.7 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$ | 1.03 | - | - | V |
| | | $I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$ | 1.30 | - | - | V |
| | | $I_O = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$ | 1.97 | - | - | V |
| | | $I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$ | 1.85 | - | - | V |
| | | $I_O = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$ | 2.67 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH} \text{ or } V_{IL}$ | | | | |
| | | $I_O = 20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$ | - | - | $0.3 \times V_{CC}$ | V |
| | | $I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$ | - | - | 0.37 | V |
| | | $I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$ | - | - | 0.35 | V |
| | | $I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$ | - | - | 0.33 | V |
| | | $I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$ | - | - | 0.45 | V |
| | | $I_O = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$ | - | - | 0.33 | V |
| | | $I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$ | - | - | 0.45 | V |
| I_I | input leakage current | $V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$ | - | - | ± 0.5 | μA |
| I_{OFF} | power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$ | - | - | ± 0.5 | μA |
| ΔI_{OFF} | additional power-off leakage current | $V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$ | - | - | ± 0.6 | μA |

Table 7. Static characteristics ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------|-----|------------------------|------|
| 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 | [1] | - | 50 | μA |
| T_{amb} = -40 °C to +125 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 0.8 V | 0.75 × V _{CC} | - | - | V |
| | | V _{CC} = 0.9 V to 1.95 V | 0.70 × V _{CC} | - | - | V |
| | | V _{CC} = 2.3 V to 2.7 V | 1.6 | - | - | V |
| | | V _{CC} = 3.0 V to 3.6 V | 2.0 | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 0.8 V | - | - | 0.25 × V _{CC} | V |
| | | V _{CC} = 0.9 V to 1.95 V | - | - | 0.30 × V _{CC} | V |
| | | V _{CC} = 2.3 V to 2.7 V | - | - | 0.7 | V |
| | | V _{CC} = 3.0 V to 3.6 V | - | - | 0.9 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | 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 _{IH} or V _{IL} | | | | |
| | | 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 | [1] | - | 75 | μA |

[1] One input at V_{CC} - 0.6 V, other input at V_{CC} or GND.

11. Dynamic characteristics

Table 8. Dynamic characteristics

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

| Symbol | Parameter | Conditions | Min | Typ ^[1] | Max | Unit |
|-------------------------------------------------------|-------------------|-----------------------------------------|-----|--------------------|------|------|
| T_{amb} = 25 °C; C_L = 5 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 | | | | |
| | | V _{CC} = 0.8 V | - | 16.8 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.4 | 5.1 | 10.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.6 | 3.6 | 6.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.4 | 3.0 | 5.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.1 | 2.4 | 3.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.0 | 2.1 | 3.5 | ns |
| T_{amb} = 25 °C; C_L = 10 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 | | | | |
| | | V _{CC} = 0.8 V | - | 20.3 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.3 | 5.9 | 12.7 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.9 | 4.2 | 7.7 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.7 | 3.5 | 6.0 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 2.9 | 4.6 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 2.7 | 4.3 | ns |
| T_{amb} = 25 °C; C_L = 15 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 | | | | |
| | | V _{CC} = 0.8 V | - | 23.8 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.3 | 6.7 | 14.3 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.3 | 4.8 | 8.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 4.0 | 6.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 3.3 | 5.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.5 | 3.1 | 4.9 | ns |
| T_{amb} = 25 °C; C_L = 30 pF | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 | | | | |
| | | V _{CC} = 0.8 V | - | 34.1 | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.5 | 9.0 | 19.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.4 | 6.3 | 11.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 5.3 | 8.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.3 | 4.4 | 7.0 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.2 | 4.2 | 6.4 | ns |

Table 8. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#)

| Symbol | Parameter | Conditions | Min | Typ [1] | Max | Unit |
|--------------------------------|-------------------------------|--------------------------------------------------------|-----|---------|-----|------|
| T_{amb} = 25 °C | | | | | | |
| C _{PD} | power dissipation capacitance | f = 1 MHz; V _I = GND to V _{CC} [3] | | | | |
| | | V _{CC} = 0.8 V | - | 2.5 | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.6 | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 2.8 | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 2.9 | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.4 | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | 3.9 | - | 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;
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

Table 9. Dynamic characteristics
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#)

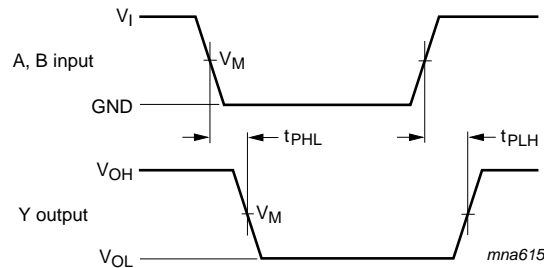
| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------------------|-------------------|---------------------------------------------|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| C_L = 5 pF | | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.1 | 11.9 | 2.1 | 13.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.4 | 7.5 | 1.4 | 8.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.2 | 6.0 | 1.2 | 6.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.0 | 4.6 | 1.0 | 5.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 0.9 | 4.1 | 0.9 | 4.6 | ns |
| C_L = 10 pF | | | | | | | |
| t _{pd} | propagation delay | A, B to Y; see Figure 5 [1] | | | | | |
| | | V _{CC} = 1.1 V to 1.3 V | 2.1 | 13.8 | 2.1 | 15.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.7 | 8.7 | 1.7 | 9.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.5 | 6.9 | 1.5 | 7.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.3 | 5.5 | 1.3 | 6.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.2 | 5.0 | 1.2 | 5.5 | ns |

Table 9. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 6](#)

| Symbol | Parameter | Conditions | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------------------------------|-------------------|------------------------------------------------------------------------------|------------------|------|-------------------|------|------|
| | | | Min | Max | Min | Max | |
| $C_L = 15 \text{ pF}$ | | | | | | | |
| t_{pd} | propagation delay | A, B to Y; see Figure 5 [1] | | | | | |
| | | $V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$ | 3.0 | 15.6 | 3.0 | 17.2 | ns |
| | | $V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$ | 2.0 | 9.8 | 2.0 | 10.8 | ns |
| | | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$ | 1.8 | 7.9 | 1.8 | 8.7 | ns |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | 1.6 | 6.3 | 1.6 | 6.9 | ns |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | 1.5 | 5.8 | 1.5 | 6.4 | ns |
| $C_L = 30 \text{ pF}$ | | | | | | | |
| t_{pd} | propagation delay | A, B to Y; see Figure 5 [1] | | | | | |
| | | $V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$ | 4.0 | 21.5 | 4.0 | 23.7 | ns |
| | | $V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$ | 2.9 | 13.3 | 2.9 | 14.7 | ns |
| | | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$ | 2.4 | 10.7 | 2.4 | 11.8 | ns |
| | | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$ | 2.2 | 8.4 | 2.2 | 9.3 | ns |
| | | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ | 2.1 | 7.7 | 2.1 | 8.5 | ns |

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

12. Waveforms

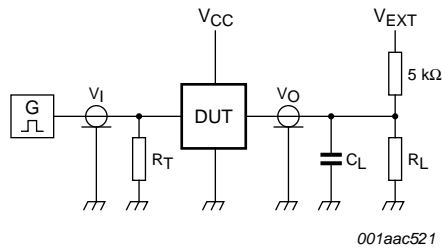


Measurement points are given in [Table 10](#).
 Logic levels: V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig 5. The data input (A or B) to output (Y) propagation delays

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} | $\leq 3.0 \text{ ns}$ |



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

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 6. Test circuit for measuring switching times

Table 11. Test data

| Supply voltage | Load | | V_{EXT} | | |
|----------------|------------------------------|--------------|--------------------|--------------------|--------------------|
| V_{CC} | C_L | R_L [1] | t_{PLH}, t_{PHL} | t_{PZH}, t_{PHZ} | t_{PZL}, t_{PLZ} |
| 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 $R_L = 1\text{ M}\Omega$.

13. Package outline

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

SOT353-1

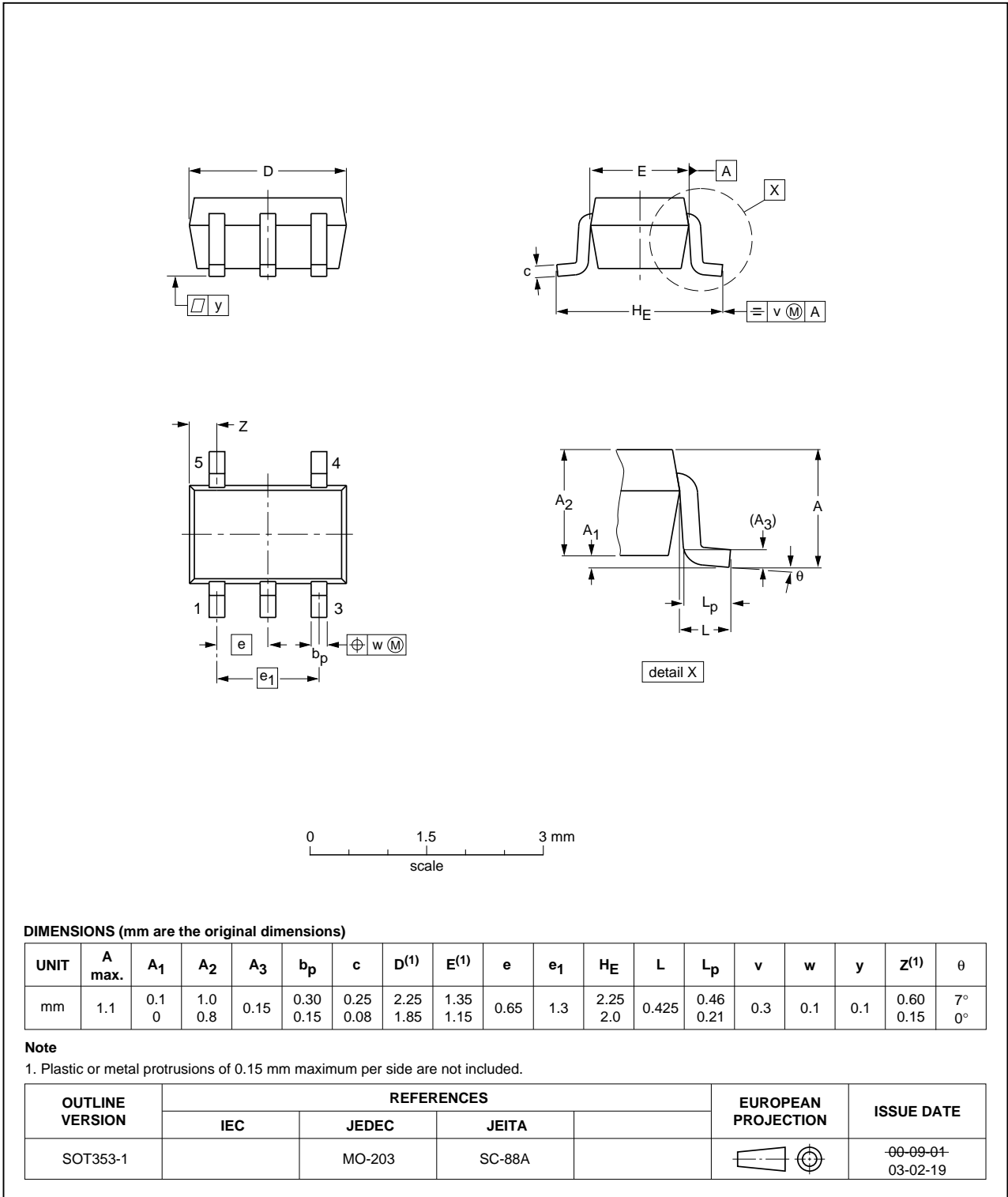


Fig 7. Package outline SOT353-1 (TSSOP5)

14. Abbreviations

Table 12. Abbreviations

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

15. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------|------------------------------------------------------|--------------------|---------------|--------------------|
| 74AUP1G32_Q100 v.2 | 20130704 | Product data sheet | - | 74AUP1G32_Q100 v.1 |
| Modifications: | • Typical values C_I and C_O corrected (errata). | | | |
| 74AUP1G32_Q100 v.1 | 20130320 | Product data sheet | - | - |

16. Legal information

16.1 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. |
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| Product [short] data sheet | Production | This document contains the product specification. |

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[2] The term 'short data sheet' is explained in section "Definitions".

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