

74AUP2G00

Low-power dual 2-input NAND gate

Rev. 10 — 3 July 2017

Product data sheet

1 General description

The 74AUP2G00 provides dual 2-input NAND 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 a 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
- 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:
 - HBM JESD22-A114F Class 3A exceeds 5 000 V
 - MM JESD22-A115-A exceeds 200 V
 - CDM JESD22-C101E exceeds 1 000 V
- Low static power consumption; $I_{CC} = 0.9 \mu\text{A}$ (maximum)
- Latch-up performance exceeds 100 mA per JESD78 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
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

3 Ordering information

Table 1. Ordering information

| Type number | Package | | | Version |
|-------------|-------------------|--------|---|----------|
| | Temperature range | Name | Description | |
| 74AUP2G00DC | -40 °C to +125 °C | VSSOP8 | plastic very thin shrink small outline package; 8 leads; body width 2.3 mm | SOT765-1 |
| 74AUP2G00GT | -40 °C to +125 °C | XSON8 | plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm | SOT833-1 |
| 74AUP2G00GF | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1 x 0.5 mm | SOT1089 |
| 74AUP2G00GM | -40 °C to +125 °C | XQFN8 | plastic, extremely thin quad flat package; no leads; 8 terminals; body 1.6 x 1.6 x 0.5 mm | SOT902-2 |
| 74AUP2G00GN | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.2 x 1.0 x 0.35 mm | SOT1116 |
| 74AUP2G00GS | -40 °C to +125 °C | XSON8 | extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1.0 x 0.35 mm | SOT1203 |
| 74AUP2G00GX | -40 °C to +125 °C | X2SON8 | plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; body 1.35 x 0.8 x 0.35 mm | SOT1233 |

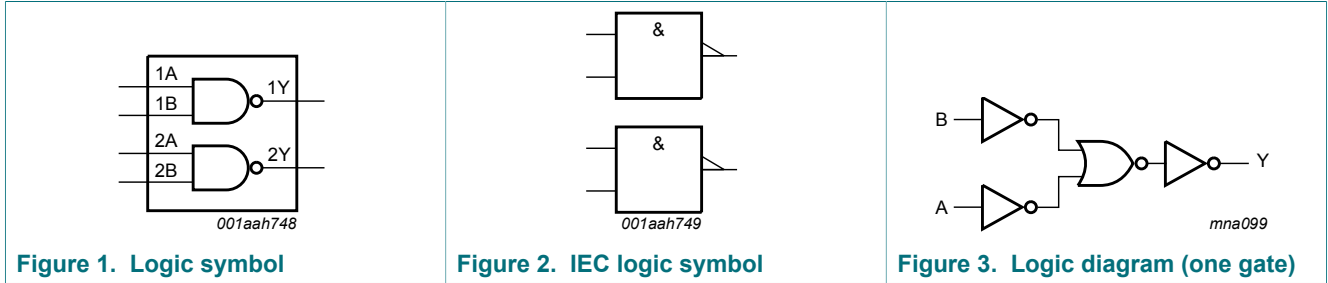
4 Marking

Table 2. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| 74AUP2G00DC | p00 |
| 74AUP2G00GT | p00 |
| 74AUP2G00GF | pA |
| 74AUP2G00GM | p00 |
| 74AUP2G00GN | pA |
| 74AUP2G00GS | pA |
| 74AUP2G00GX | pA |

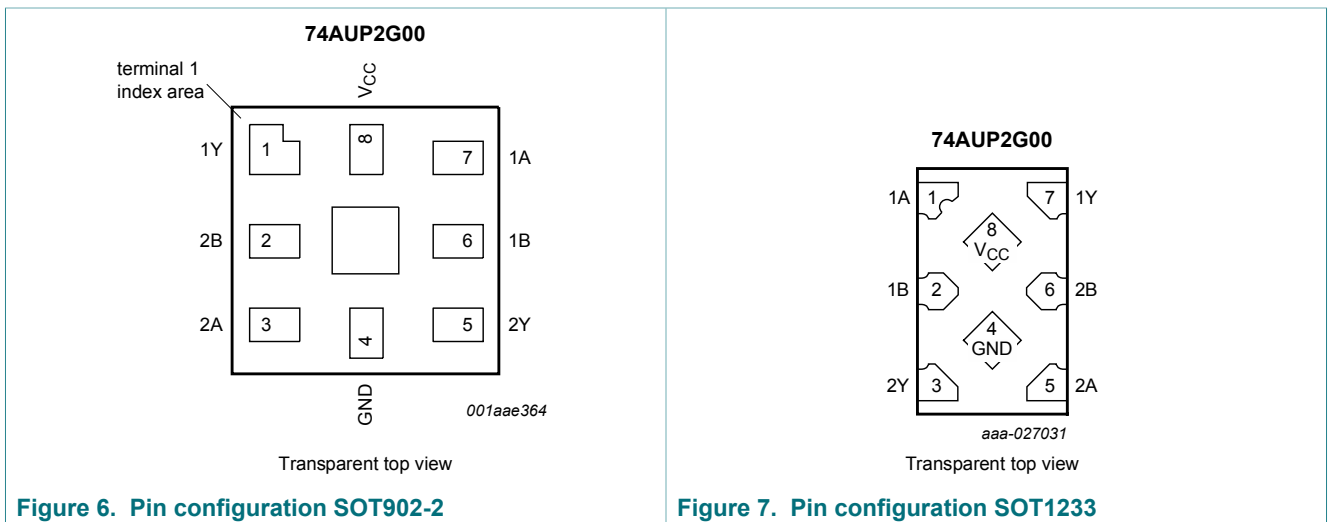
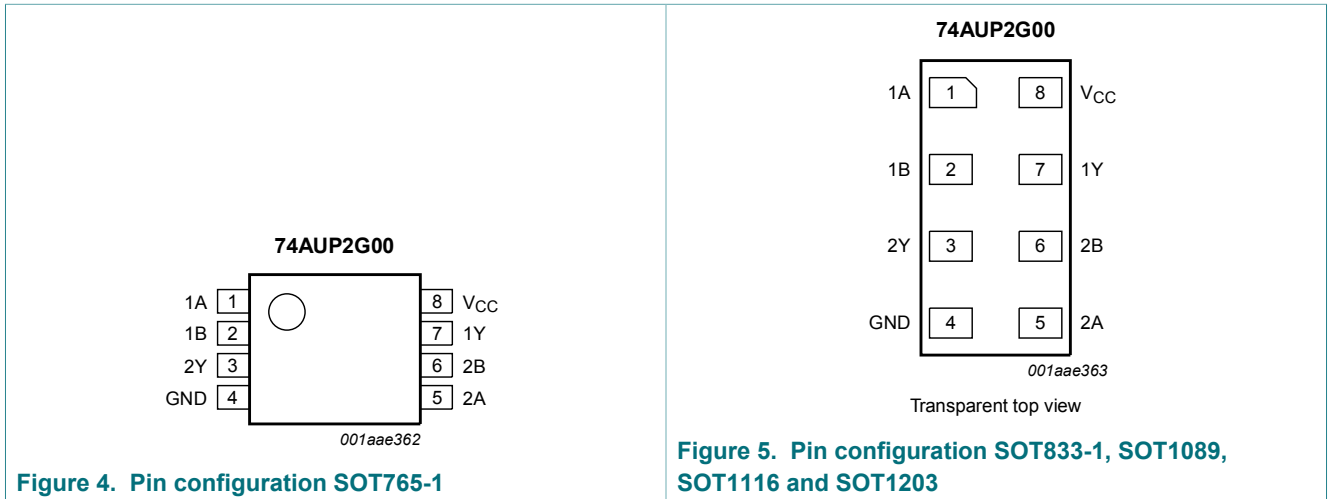
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5 Functional diagram



6 Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description

| Symbol | Pin | | Description |
|-----------------|---|----------|----------------|
| | SOT765-1, SOT833-1, SOT1089, SOT1116, SOT1203 and SOT1233 | SOT902-2 | |
| 1A, 2A | 1, 5 | 7, 3 | data input |
| 1B, 2B | 2, 6 | 6, 2 | data input |
| GND | 4 | 4 | ground (0 V) |
| 1Y, 2Y | 7, 3 | 1, 5 | data output |
| V _{CC} | 8 | 8 | supply voltage |

7 Functional description

Table 4. Function table ^[1]

| Input | | Output |
|-------|----|--------|
| nA | nB | nY |
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

[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 |
| V_I | input voltage | [1] | -0.5 | +4.6 | V |
| V_O | output voltage | Active mode and Power-down mode [1] | -0.5 | +4.6 | V |
| I_{IK} | input clamping current | $V_I < 0$ V | -50 | - | mA |
| I_{OK} | output clamping current | $V_O < 0$ V | -50 | - | mA |
| 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 VSSOP8 packages: above 110 °C the value of P_{tot} derates linearly with 8.0 mW/K.

For XSON8 and XQFN8 packages: above 118 °C the value of P_{tot} derates linearly with 7.8 mW/K.

For X2SON8 package: above 118 °C the value of P_{tot} derates linearly with 7.7 mW/K.

9 Recommended operating conditions

Table 6. 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 | - | 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 |
|--|--------------------------------------|--|----------------------|-----|----------------------|---------------|
| $T_{amb} = 25\text{ }^{\circ}\text{C}$ | | | | | | |
| 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 | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | $V_{CC} - 0.1$ | - | - | V |
| | | $I_O = -1.1\text{ mA}; V_{CC} = 1.1\text{ V}$ | $0.75 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7\text{ mA}; V_{CC} = 1.4\text{ V}$ | 1.11 | - | - | V |
| | | $I_O = -1.9\text{ mA}; V_{CC} = 1.65\text{ V}$ | 1.32 | - | - | V |
| | | $I_O = -2.3\text{ mA}; V_{CC} = 2.3\text{ V}$ | 2.05 | - | - | V |
| | | $I_O = -3.1\text{ mA}; V_{CC} = 2.3\text{ V}$ | 1.9 | - | - | V |
| | | $I_O = -2.7\text{ mA}; V_{CC} = 3.0\text{ V}$ | 2.72 | - | - | V |
| | | $I_O = -4.0\text{ mA}; V_{CC} = 3.0\text{ V}$ | 2.6 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}$ or V_{IL} | | | | |
| | | $I_O = 20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | - | - | 0.1 | V |
| | | $I_O = 1.1\text{ mA}; V_{CC} = 1.1\text{ V}$ | - | - | $0.3 \times V_{CC}$ | V |
| | | $I_O = 1.7\text{ mA}; V_{CC} = 1.4\text{ V}$ | - | - | 0.31 | V |
| | | $I_O = 1.9\text{ mA}; V_{CC} = 1.65\text{ V}$ | - | - | 0.31 | V |
| | | $I_O = 2.3\text{ mA}; V_{CC} = 2.3\text{ V}$ | - | - | 0.31 | V |
| | | $I_O = 3.1\text{ mA}; V_{CC} = 2.3\text{ V}$ | - | - | 0.44 | V |
| | | $I_O = 2.7\text{ mA}; V_{CC} = 3.0\text{ V}$ | - | - | 0.31 | V |
| $I_O = 4.0\text{ mA}; V_{CC} = 3.0\text{ V}$ | - | - | 0.44 | V | | |
| I_I | input leakage current | $V_I = \text{GND to }3.6\text{ V}; V_{CC} = 0\text{ V to }3.6\text{ V}$ | - | - | ± 0.1 | μA |
| I_{OFF} | power-off leakage current | V_I 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 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 | $V_I = V_{CC} - 0.6\text{ V}; I_O = 0\text{ A}; V_{CC} = 3.3\text{ V}; \text{ per pin}$ ^[1] | - | - | 40 | μA |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|--|----------------------|------|----------------------|---------------|
| 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 | $V_I = V_{IH}\text{ or }V_{IL}$ | | | | |
| | | $I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | $V_{CC} - 0.1$ | - | - | 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 | $V_I = V_{IH}\text{ or }V_{IL}$ | | | | |
| | | $I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | - | - | 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 |
| I_{CC} | supply current | $V_I = \text{GND or }V_{CC}$; $I_O = 0\text{ A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | - | - | 0.9 | μA |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6\text{ V}$; $I_O = 0\text{ A}$; $V_{CC} = 3.3\text{ V}$; per pin | - | - | 50 | μA |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|--------------------------------------|--|----------------------|-----|----------------------|---------------|
| $T_{amb} = -40\text{ }^{\circ}\text{C to }+125\text{ }^{\circ}\text{C}$ | | | | | | |
| V_{IH} | HIGH-level input voltage | $V_{CC} = 0.8\text{ V}$ | $0.75 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9\text{ V to }1.95\text{ V}$ | $0.70 \times V_{CC}$ | - | - | 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 | $V_{CC} = 0.8\text{ V}$ | - | - | $0.25 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9\text{ V to }1.95\text{ V}$ | - | - | $0.30 \times V_{CC}$ | 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 | $V_I = V_{IH}\text{ or }V_{IL}$ | | | | |
| | | $I_O = -20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | $V_{CC} - 0.11$ | - | - | V |
| | | $I_O = -1.1\text{ mA}; V_{CC} = 1.1\text{ V}$ | $0.6 \times V_{CC}$ | - | - | V |
| | | $I_O = -1.7\text{ mA}; V_{CC} = 1.4\text{ V}$ | 0.93 | - | - | V |
| | | $I_O = -1.9\text{ mA}; V_{CC} = 1.65\text{ V}$ | 1.17 | - | - | V |
| | | $I_O = -2.3\text{ mA}; V_{CC} = 2.3\text{ V}$ | 1.77 | - | - | V |
| | | $I_O = -3.1\text{ mA}; V_{CC} = 2.3\text{ V}$ | 1.67 | - | - | V |
| | | $I_O = -2.7\text{ mA}; V_{CC} = 3.0\text{ V}$ | 2.40 | - | - | V |
| V_{OL} | LOW-level output voltage | $V_I = V_{IH}\text{ or }V_{IL}$ | | | | |
| | | $I_O = 20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | - | - | 0.11 | V |
| | | $I_O = 1.1\text{ mA}; V_{CC} = 1.1\text{ V}$ | - | - | $0.33 \times V_{CC}$ | V |
| | | $I_O = 1.7\text{ mA}; V_{CC} = 1.4\text{ V}$ | - | - | 0.41 | V |
| | | $I_O = 1.9\text{ mA}; V_{CC} = 1.65\text{ V}$ | - | - | 0.39 | V |
| | | $I_O = 2.3\text{ mA}; V_{CC} = 2.3\text{ V}$ | - | - | 0.36 | V |
| | | $I_O = 3.1\text{ mA}; V_{CC} = 2.3\text{ V}$ | - | - | 0.50 | V |
| | | $I_O = 2.7\text{ mA}; V_{CC} = 3.0\text{ V}$ | - | - | 0.36 | V |
| I_I | input leakage current | $V_I = \text{GND to }3.6\text{ V}; V_{CC} = 0\text{ V to }3.6\text{ V}$ | - | - | ± 0.75 | μA |
| | | $V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}; V_{CC} = 0\text{ V}$ | - | - | ± 0.75 | μA |
| ΔI_{OFF} | additional power-off leakage current | $V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}; V_{CC} = 0\text{ V to }0.2\text{ V}$ | - | - | ± 0.75 | μA |
| I_{CC} | supply current | $V_I = \text{GND or }V_{CC}; I_O = 0\text{ A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$ | - | - | 1.4 | μA |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 0.6\text{ V}; I_O = 0\text{ A}; V_{CC} = 3.3\text{ V}; \text{ per pin}$ ^[1] | - | - | 75 | μA |

[1] One input at $V_{CC} - 0.6\text{ V}$, 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 9](#).

| Symbol | Parameter | Conditions | T _{amb} = 25 °C | | | T _{amb} = -40 °C to +125 °C | | | Unit |
|------------------------|-------------------|---|--------------------------|--------------------|------|--------------------------------------|-------------|--------------|------|
| | | | Min | Typ ^[1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| C _L = 5 pF | | | | | | | | | |
| t _{pd} | propagation delay | nA, nB to nY; see Figure 8 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 17.5 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.5 | 5.3 | 11.0 | 2.1 | 12.2 | 13.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.0 | 3.8 | 6.8 | 1.8 | 7.8 | 8.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.6 | 3.1 | 5.3 | 1.4 | 6.2 | 6.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.3 | 2.5 | 4.0 | 1.1 | 4.7 | 5.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.0 | 2.2 | 3.6 | 1.0 | 4.2 | 4.7 | ns |
| C _L = 10 pF | | | | | | | | | |
| t _{pd} | propagation delay | nA, nB to nY; see Figure 8 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 21.0 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.4 | 6.1 | 13.0 | 2.2 | 14.4 | 15.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.4 | 4.4 | 7.9 | 2.2 | 9.2 | 10.2 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 3.7 | 6.2 | 1.9 | 7.3 | 8.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.4 | 3.0 | 4.7 | 1.3 | 5.6 | 6.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 2.8 | 4.3 | 1.2 | 4.9 | 5.4 | ns |
| C _L = 15 pF | | | | | | | | | |
| t _{pd} | propagation delay | nA, nB to nY; see Figure 8 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 24.5 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.4 | 6.9 | 14.8 | 3.1 | 16.5 | 18.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.8 | 5.0 | 8.9 | 2.5 | 10.5 | 11.6 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 4.1 | 7.0 | 2.0 | 8.3 | 9.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.7 | 3.5 | 5.3 | 1.5 | 6.4 | 7.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.6 | 3.2 | 4.9 | 1.4 | 5.7 | 6.3 | ns |
| C _L = 30 pF | | | | | | | | | |
| t _{pd} | propagation delay | nA, nB to nY; see Figure 8 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 34.8 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.6 | 9.2 | 20.1 | 4.1 | 22.6 | 24.9 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 6.5 | 11.8 | 2.9 | 14.0 | 15.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.6 | 5.4 | 9.3 | 2.3 | 11.1 | 12.3 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.4 | 4.6 | 7.1 | 2.1 | 8.5 | 9.4 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.3 | 4.3 | 6.5 | 2.1 | 7.6 | 8.4 | ns |

| Symbol | Parameter | Conditions | T _{amb} = 25 °C | | | T _{amb} = -40 °C to +125 °C | | | Unit |
|---|-------------------------------|--|--------------------------|--------------------|-----|--------------------------------------|-------------|--------------|------|
| | | | Min | Typ ^[1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| 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 | - | 2.8 | - | - | - | - | pF |
| | | V _{CC} = 1.1 V to 1.3 V | - | 2.9 | - | - | - | - | pF |
| | | V _{CC} = 1.4 V to 1.6 V | - | 3.0 | - | - | - | - | pF |
| | | V _{CC} = 1.65 V to 1.95 V | - | 3.0 | - | - | - | - | 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).
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ 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 outputs.

11.1 Waveforms and test circuit

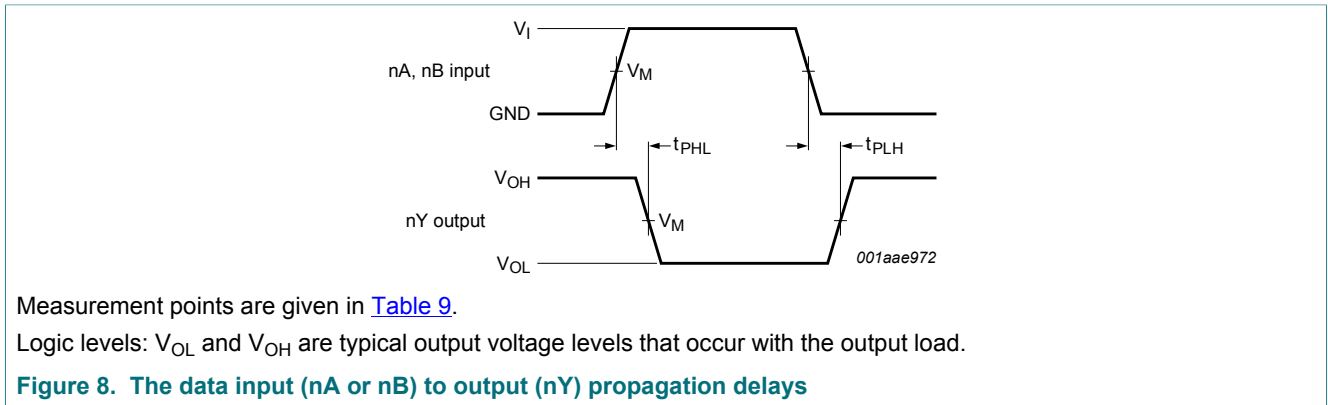
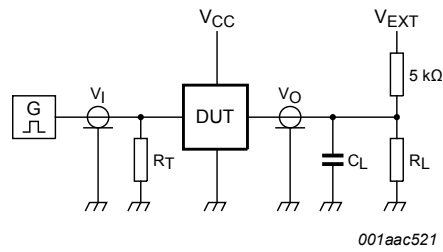


Table 9. Measurement points

| 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.

Figure 9. 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 Package outline

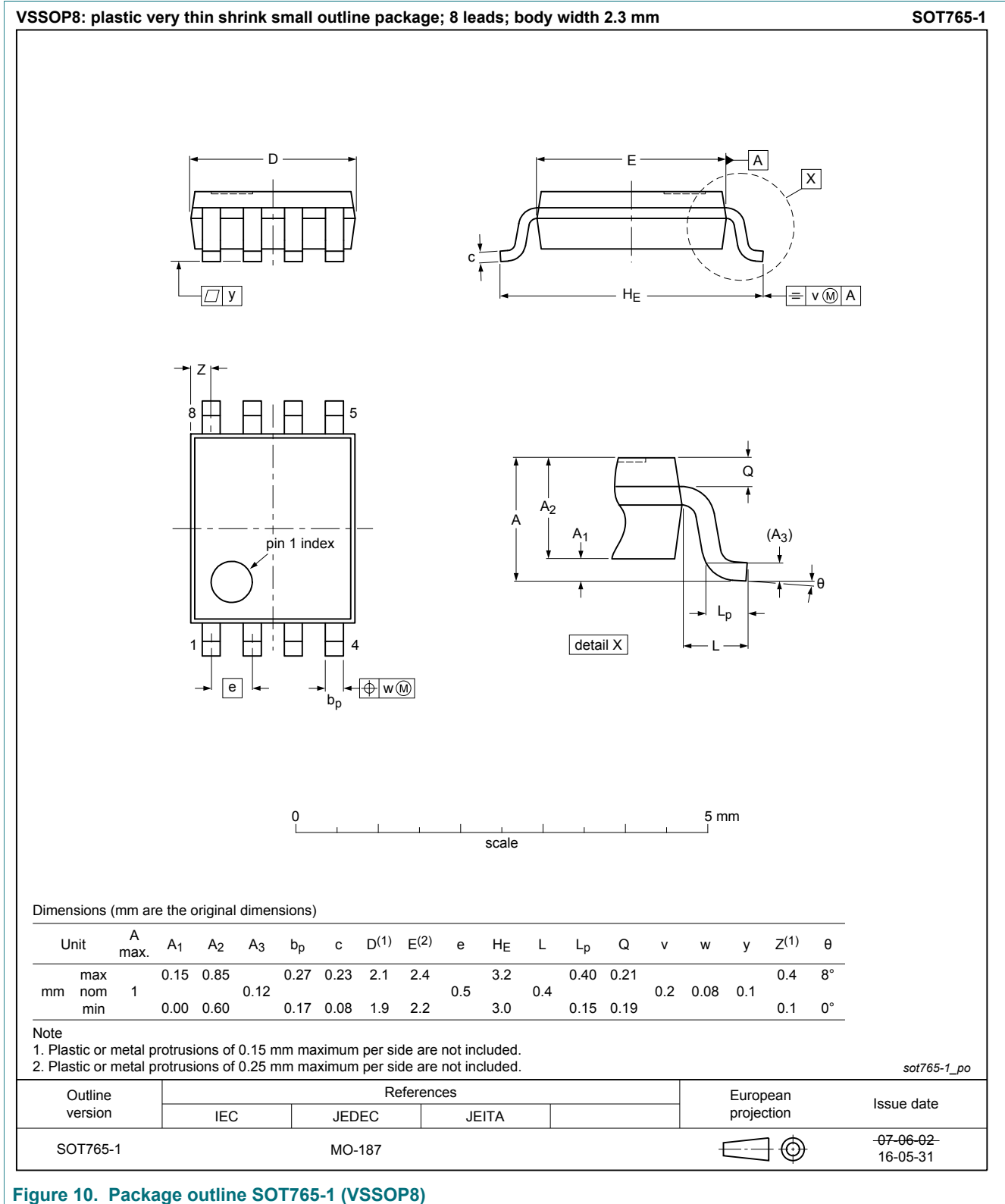
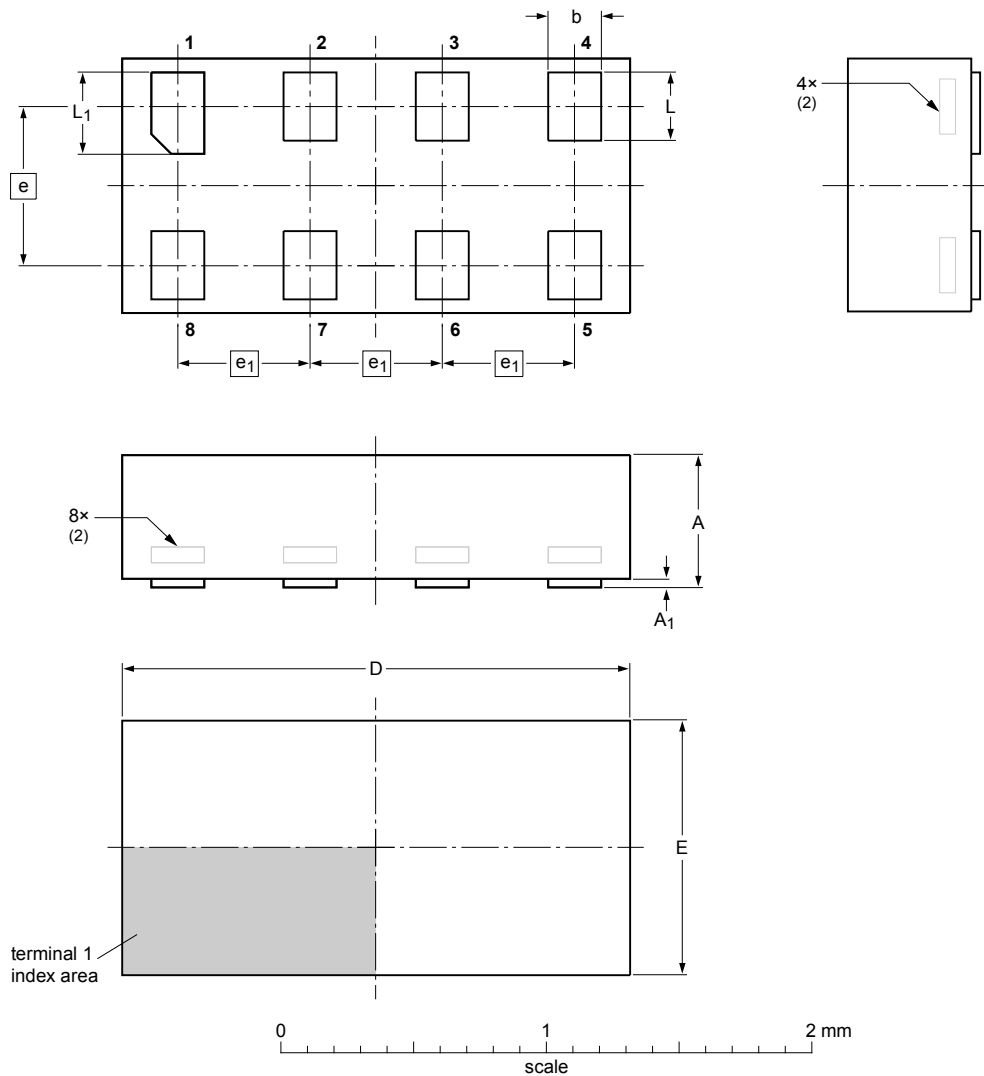


Figure 10. Package outline SOT765-1 (VSSOP8)

XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A ⁽¹⁾ max | A ₁ max | b | D | E | e | e ₁ | L | L ₁ |
|------|-------------------------|-----------------------|--------------|------------|--------------|-----|----------------|--------------|----------------|
| mm | 0.5 | 0.04 | 0.25 0.17 | 2.0 1.9 | 1.05 0.95 | 0.6 | 0.5 | 0.35 0.27 | 0.40 0.32 |

Notes

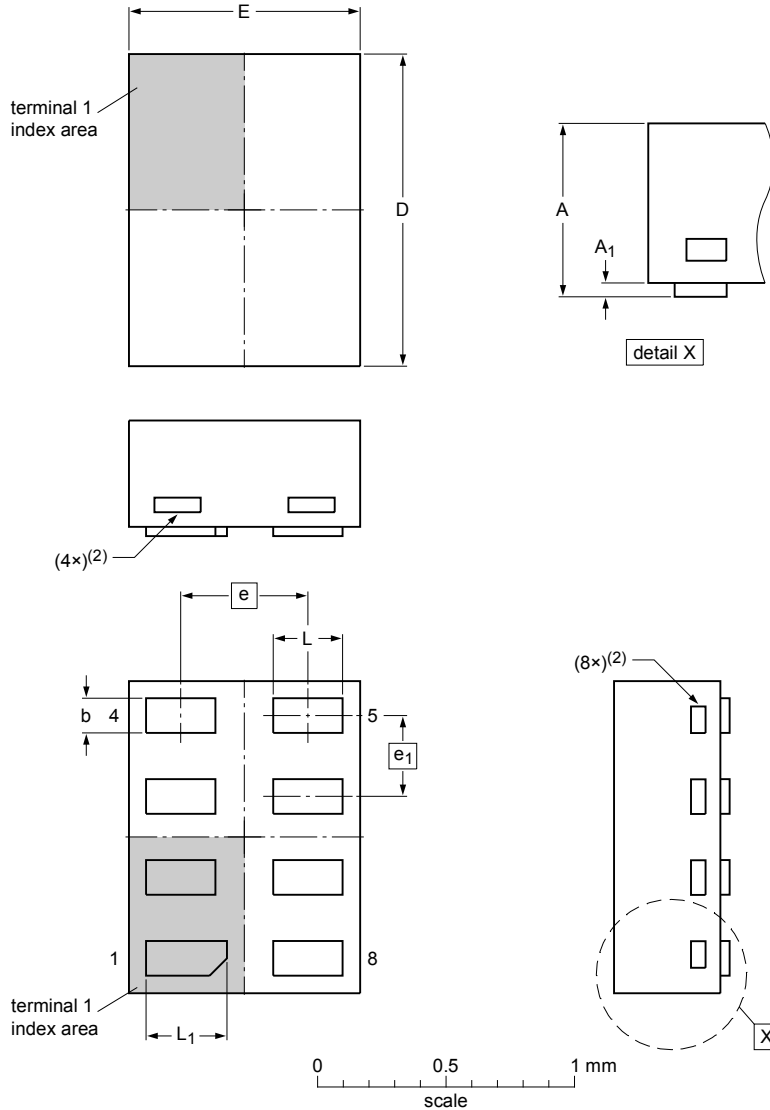
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

| OUTLINE VERSION | REFERENCES | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|--------|-------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT833-1 | --- | MO-252 | --- | | 07-11-14 07-12-07 |

Figure 11. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;
8 terminals; body 1.35 x 1 x 0.5 mm

SOT1089



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | e ₁ | L | L ₁ |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| max | 0.5 | 0.04 | 0.20 | 1.40 | 1.05 | | | 0.35 | 0.40 |
| nom | | | 0.15 | 1.35 | 1.00 | 0.55 | 0.35 | 0.30 | 0.35 |
| min | | | 0.12 | 1.30 | 0.95 | | | 0.27 | 0.32 |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

sot1089_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|--------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1089 | | MO-252 | | | | 10-04-09 10-04-12 |

Figure 12. Package outline SOT1089 (XSON8)

XQFN8: plastic, extremely thin quad flat package; no leads;
8 terminals; body 1.6 x 1.6 x 0.5 mm

SOT902-2

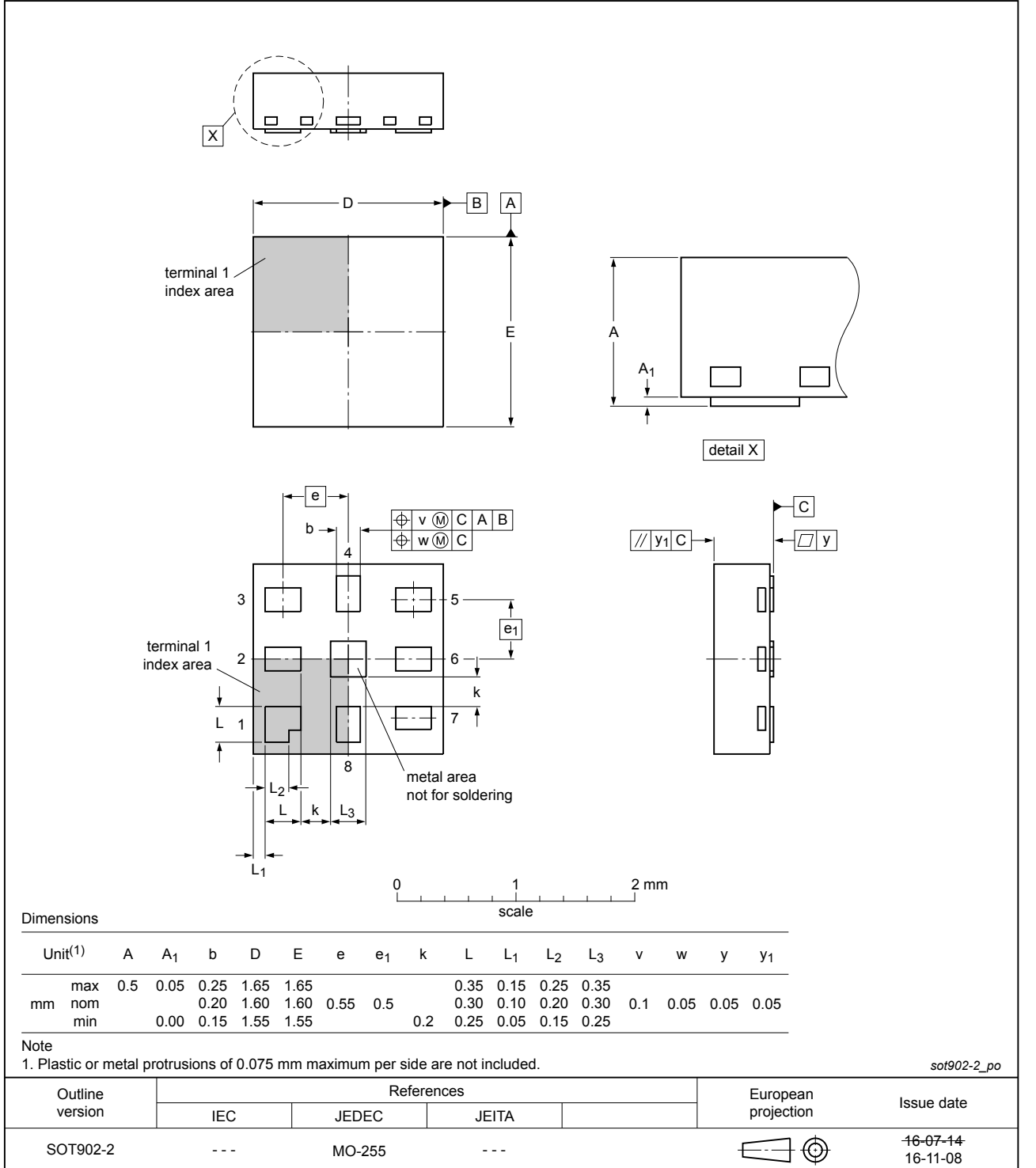
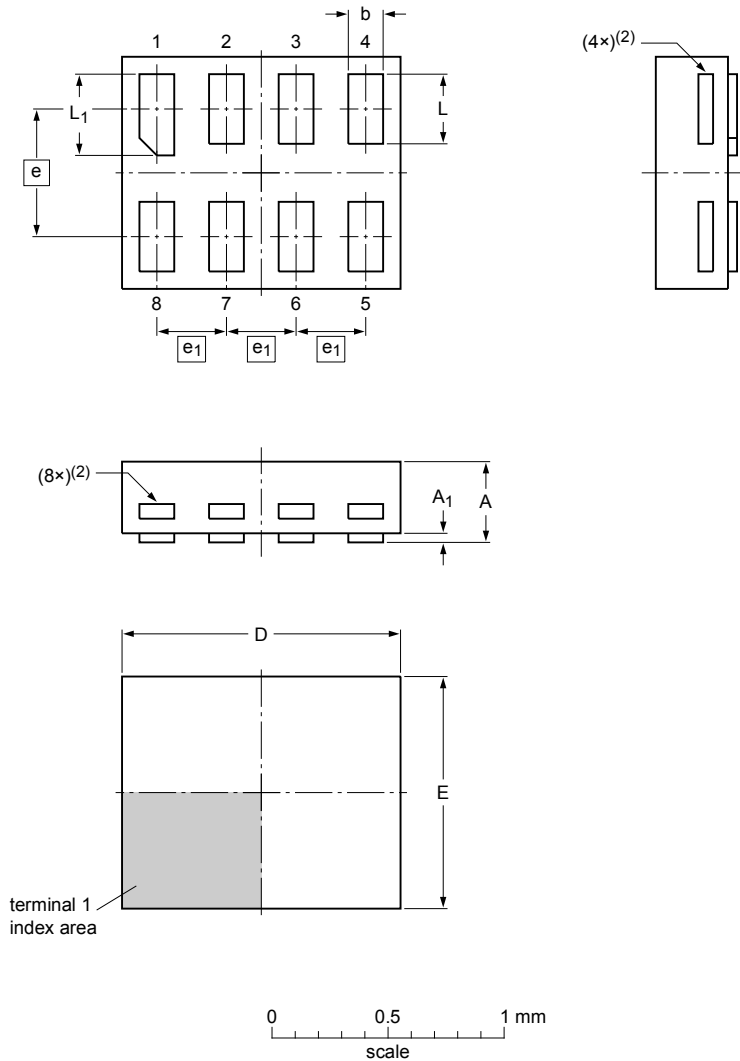


Figure 13. Package outline SOT902-2 (XQFN8)

XSON8: extremely thin small outline package; no leads;
8 terminals; body 1.2 x 1.0 x 0.35 mm

SOT1116



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | e ₁ | L | L ₁ |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| max | 0.35 | 0.04 | 0.20 | 1.25 | 1.05 | | | 0.35 | 0.40 |
| nom | | | 0.15 | 1.20 | 1.00 | 0.55 | 0.3 | 0.30 | 0.35 |
| min | | | 0.12 | 1.15 | 0.95 | | | 0.27 | 0.32 |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

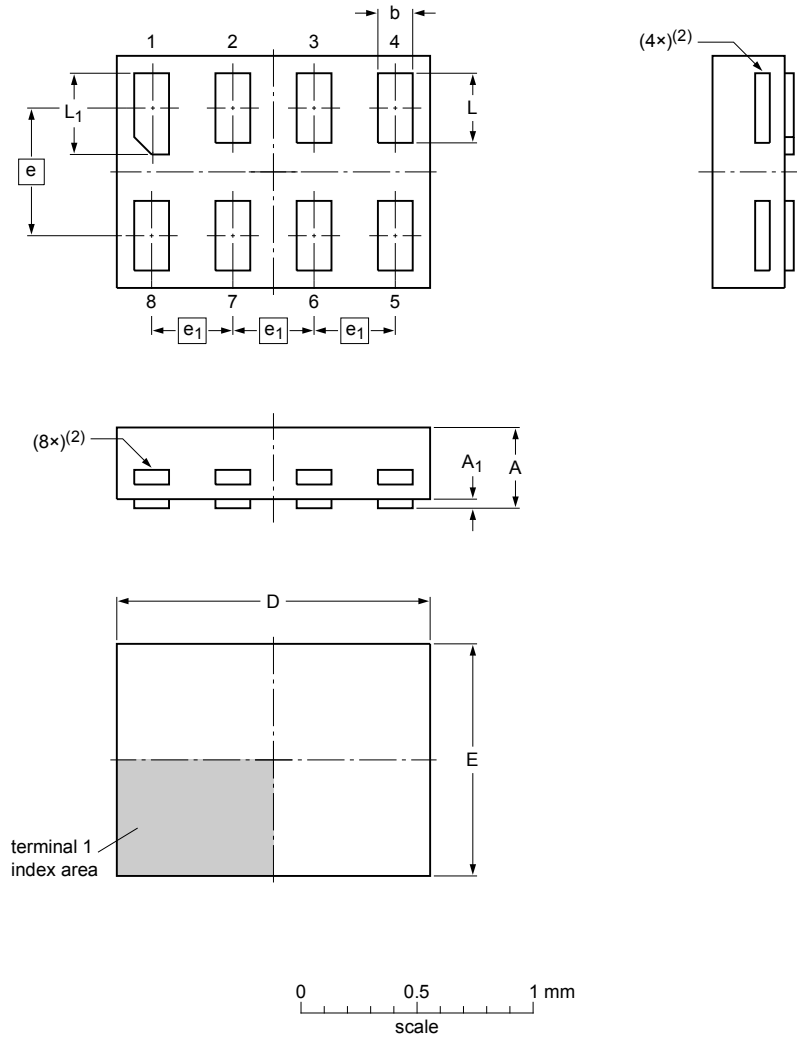
sot1116_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1116 | | | | | | -10-04-02- 10-04-07 |

Figure 14. Package outline SOT1116 (XSON8)

XSON8: extremely thin small outline package; no leads;
8 terminals; body 1.35 x 1.0 x 0.35 mm

SOT1203



Dimensions

| Unit | A ⁽¹⁾ | A ₁ | b | D | E | e | e ₁ | L | L ₁ |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm | max 0.35 | 0.04 | 0.20 | 1.40 | 1.05 | 0.35 | 0.40 | 0.35 | 0.40 |
| | nom 0.15 | 1.35 | 1.00 | 0.55 | 0.35 | 0.30 | 0.35 | | |
| | min 0.12 | 1.30 | 0.95 | 0.27 | 0.32 | | | | |

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

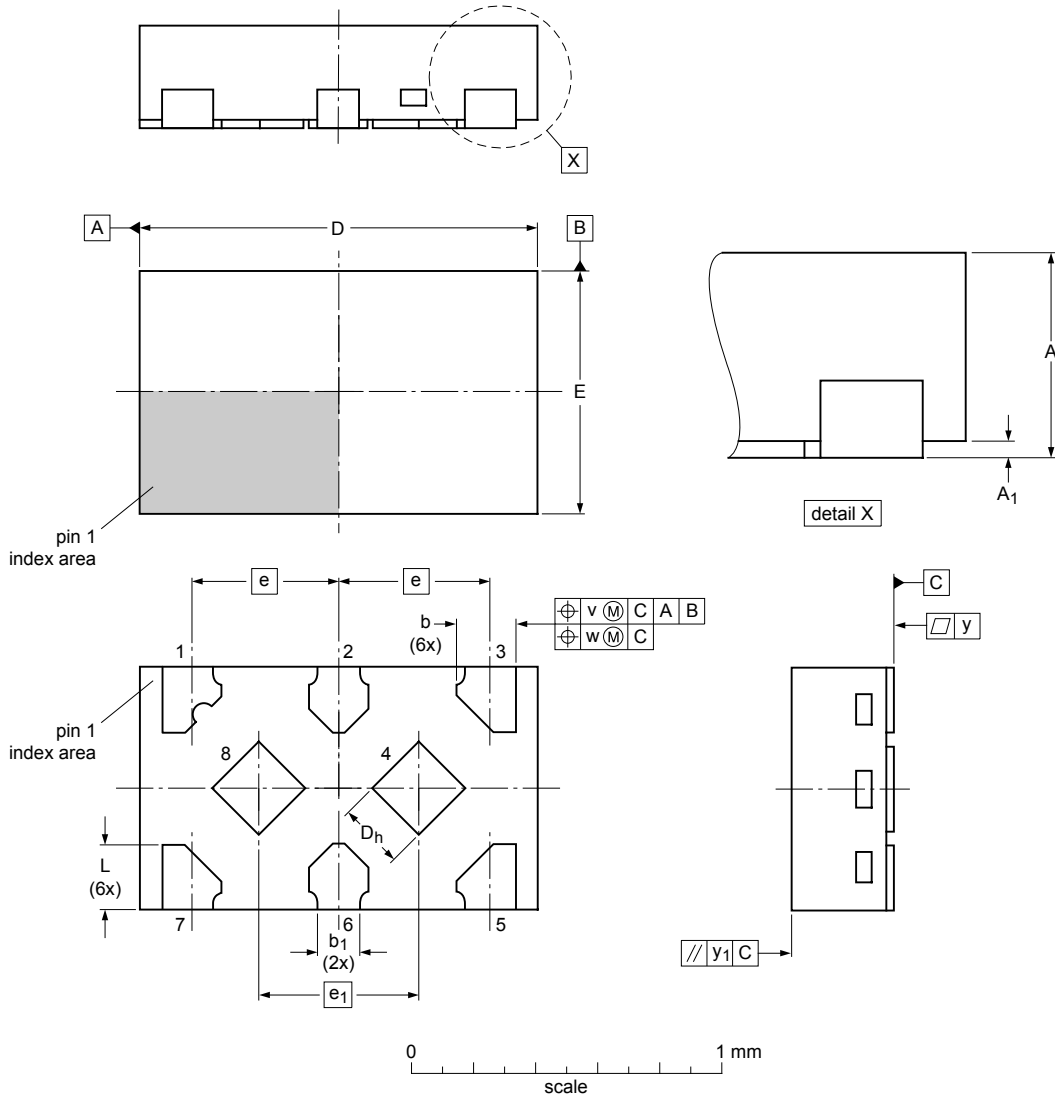
sot1203_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|-------|--|---------------------|------------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1203 | | | | | | -10-04-02- 10-04-06 |

Figure 15. Package outline SOT1203 (XSON8)

X2SON8: plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; body 1.35 x 0.8 x 0.35 mm

SOT1233



Dimensions (mm are the original dimensions)

| Unit | A | A ₁ | b | b ₁ | D | D _h | E | e | e ₁ | L | v | w | y | y ₁ |
|------|------|----------------|------|----------------|------|----------------|------|-----|----------------|------|-----|------|------|----------------|
| max | 0.35 | 0.04 | 0.25 | | 1.40 | 0.27 | 0.85 | | | 0.27 | | | | |
| nom | 0.32 | | 0.20 | 0.15 | 1.35 | 0.22 | 0.80 | 0.5 | 0.54 | 0.22 | 0.1 | 0.05 | 0.05 | 0.05 |
| min | 0.30 | 0.00 | 0.15 | (ref) | 1.30 | 0.17 | 0.75 | | | 0.17 | | | | |

sot1233_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|-------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT1233 | | --- | | | | 16-04-21 17-01-05 |

Figure 16. Package outline SOT1233 (X2SON8)

13 Abbreviations

Table 11. Abbreviations

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

14 Revision history

Table 12. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|---------------|
| 74AUP2G00 v.10 | 20170703 | Product data sheet | - | 74AUP2G00 v.9 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. Figure 7 and Figure 16 (drawings SOT1233/X2SON8) updated Type number 74AUP2G00GD removed. | | | |
| 74AUP2G00 v.9 | 20161028 | Product data sheet | - | 74AUP2G00 v.8 |
| Modifications: | <ul style="list-style-type: none"> Added type number 74AUP2G00GX (SOT1233/X2SON8) | | | |
| 74AUP2G00 v.8 | 20130205 | Product data sheet | - | 74AUP2G00 v.7 |
| Modifications: | <ul style="list-style-type: none"> For type number 74AUP2G00GD XSON8U has changed to XSON8. | | | |
| 74AUP2G00 v.7 | 20120608 | Product data sheet | - | 74AUP2G00 v.6 |
| 74AUP2G00 v.6 | 20111201 | Product data sheet | - | 74AUP2G00 v.5 |
| 74AUP2G00 v.5 | 20101021 | Product data sheet | - | 74AUP2G00 v.4 |
| 74AUP2G00 v.4 | 20080605 | Product data sheet | - | 74AUP2G00 v.3 |
| 74AUP2G00 v.3 | 20080403 | Product data sheet | - | 74AUP2G00 v.2 |
| 74AUP2G00 v.2 | 20070515 | Product data sheet | - | 74AUP2G00 v.1 |
| 74AUP2G00 v.1 | 20060825 | Product data sheet | - | - |

15 Legal information

15.1 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. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

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

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