# 74AUP1G373

## Low-power D-type transparent latch; 3-state

Rev. 4 — 15 July 2010 Product data sheet

## 1. General description

The 74AUP1G373 provides the single D-type transparent latch with 3-state output. While the latch-enable (LE) input is high, the Q output follows the data (D) input. When pin LE is LOW, the latch stores the information that was present at the D-input one set-up time preceding the HIGH-to-LOW transition of pin LE. When pin $\overline{OE}$ is LOW, the contents of the latch is available at the (Q) output. When pin $\overline{OE}$ is HIGH, the output goes to the high-impedance OFF-state. Operation of input pin $\overline{OE}$ does not affect the state of the latch.

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.

## 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 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Low static power consumption; $I_{CC}$ = 0.9 μA (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
- 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 | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74AUP1G373GW | –40 °C to +125 °C | SC-88 | plastic surface-mounted package; 6 leads | SOT363 |
| 74AUP1G373GM | –40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G373GF | –40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm | SOT891 |
| 74AUP1G373GN | –40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm | SOT1115 |
| 74AUP1G373GS | –40 °C to +125 °C | XSON6 | extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm | SOT1202 |

## 4. Marking

**Table 2. Marking**

| Type number | Marking code[1] |
|---|---|
| 74AUP1G373GW | aW |
| 74AUP1G373GM | aW |
| 74AUP1G373GF | aW |
| 74AUP1G373GN | aW |
| 74AUP1G373GS | aW |

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

## 5. Functional diagram

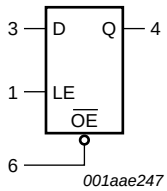



**Fig 1. Logic symbol**

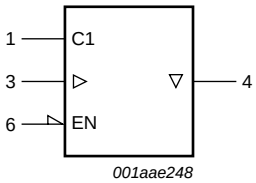



**Fig 2. IEC logic symbol**

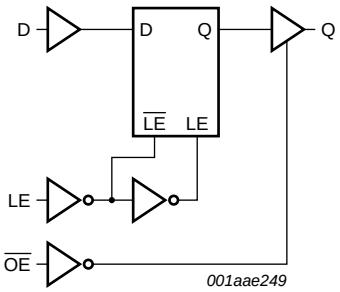



**Fig 3. Logic diagram**

# 6. Pinning information

## 6.1 Pinning

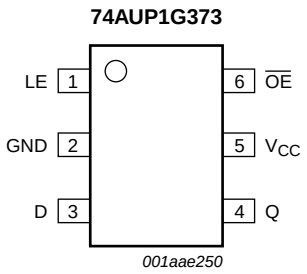
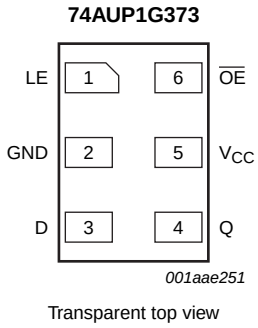
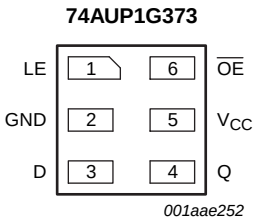



Fig 4. Pin configuration SOT363




Transparent top view

Fig 5. Pin configuration SOT886




Transparent top view

Fig 6. Pin configuration SOT891, SOT1115 and SOT1202

## 6.2 Pin description

Table 3. Pin description

| Symbol | Pin | Description |
|---|---|---|
| LE | 1 | latch enable input (active HIGH) |
| GND | 2 | ground (0 V) |
| D | 3 | data input |
| Q | 4 | latch output |
| $V_{CC}$ | 5 | supply voltage |
| $\overline{OE}$ | 6 | output enable input (active LOW) |

# 7. Functional description

Table 4. Function table[1]

| Operating modes | Input | | | Internal latch | Output |
|---|---|---|---|---|---|
| | $\overline{OE}$ | LE | D | | Q |
| Enable and read register (transparent mode) | L | H | L | L | L |
| | L | H | H | H | H |
| Latch and read register | L | L | l | L | L |
| | L | L | h | H | H |
| Latch register and disable outputs | H | X | X | X | Z |

[1] H = HIGH voltage level;
h = HIGH voltage level one setup time prior to the HIGH-to-LOW LE transition;
L = LOW voltage level;
l = LOW voltage level one setup time prior to the HIGH-to-LOW LE transition;
X = Don't care;
Z = high-impedance OFF-state.

## 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 SC-88 packages: above 87.5 °C the value of $P_{tot}$ derates linearly with 4.0 mW/K.
For XSON6 packages: above 118 °C the value of $P_{tot}$ derates linearly with 7.8 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 | - | 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 × $V_{CC}$ | - | - | V |
| | | $V_{CC}$ = 0.9 V to 1.95 V | 0.65 × $V_{CC}$ | - | - | 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 × $V_{CC}$ | V |
| | | $V_{CC}$ = 0.9 V to 1.95 V | - | - | 0.35 × $V_{CC}$ | 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 |

**Table 7. Static characteristics** *…continued*

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

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O = -20\ \mu A$; $V_{CC} = 0.8$ 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 $V_{IL}$ | | | | | |
| | | $I_O = 20\ \mu A$; $V_{CC} = 0.8$ 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 |
| $I_I$ | input leakage current | $V_I$ = GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V | | - | - | ±0.1 | μA |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_O = 0$ V 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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | additional supply current | $V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V | [1] | - | - | 40 | μA |
| $C_I$ | input capacitance | $V_{CC} = 0$ V to 3.6 V; $V_I$ = GND or $V_{CC}$ | | - | 0.8 | - | pF |
| $C_O$ | output capacitance | output enabled; $V_O$ = GND; $V_{CC} = 0$ V | | - | 1.7 | - | pF |
| | | output disabled; $V_{CC} = 0$ V to 3.6 V; $V_O$ = GND or $V_{CC}$ | | - | 1.5 | - | pF |
| **$T_{amb} = -40$ °C to +85 °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 |

**Table 7. Static characteristics** *…continued*

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

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O = -20\ \mu A$; $V_{CC} = 0.8$ V to 3.6 V | | $V_{CC} - 0.1$ | - | - | V |
| | | $I_O = -1.1$ mA; $V_{CC} = 1.1$ V | | $0.7 \times V_{CC}$ | - | - | 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 |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | | |
| | | $I_O = 20\ \mu A$; $V_{CC} = 0.8$ 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 | | - | - | 0.37 | 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 |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_O = 0$ V 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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | 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 | | $0.75 \times V_{CC}$ | - | - | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | | $0.70 \times V_{CC}$ | - | - | 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 | | - | - | $0.25 \times V_{CC}$ | V |
| | | $V_{CC} = 0.9$ V to 1.95 V | | - | - | $0.30 \times V_{CC}$ | 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 |

**Table 7. Static characteristics** *…continued*

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = -20\ \mu A$; $V_{CC} = 0.8\ V$ to $3.6\ V$ | $V_{CC} - 0.11$ | - | - | V |
| | | $I_O = -1.1\ mA$; $V_{CC} = 1.1\ V$ | $0.6 \times V_{CC}$ | - | - | 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 $V_{IL}$ | | | | |
| | | $I_O = 20\ \mu A$; $V_{CC} = 0.8\ V$ to $3.6\ V$ | - | - | 0.11 | V |
| | | $I_O = 1.1\ mA$; $V_{CC} = 1.1\ V$ | - | - | $0.33 \times V_{CC}$ | 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 |
| $I_{OZ}$ | OFF-state output current | $V_I = V_{IH}$ or $V_{IL}$; $V_O = 0\ V$ 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 |
| $\Delta I_{OFF}$ | 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 |
| $\Delta I_{CC}$ | 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 11.*

| Symbol | Parameter | Conditions | 25 °C | | | −40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| **$C_L$ = 5 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | D to Q; see Figure 7 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 21.4 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 2.8 | 6.6 | 13.5 | 2.6 | 13.8 | 2.6 | 15.2 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.4 | 4.6 | 7.8 | 2.1 | 8.3 | 2.1 | 9.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 1.9 | 3.7 | 6.2 | 1.6 | 6.7 | 1.6 | 7.3 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.8 | 2.9 | 4.1 | 1.5 | 4.5 | 1.5 | 4.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.5 | 2.5 | 3.5 | 1.2 | 4.0 | 1.2 | 4.5 | ns |
| | | LE to Q; see Figure 8 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 20.3 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 2.7 | 6.2 | 13.6 | 2.5 | 14.0 | 2.5 | 15.4 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.3 | 4.4 | 7.6 | 2.0 | 8.5 | 2.0 | 9.3 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 1.8 | 3.5 | 5.8 | 1.5 | 6.7 | 1.5 | 7.3 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.5 | 2.6 | 4.0 | 1.3 | 4.4 | 1.3 | 4.8 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.3 | 2.2 | 3.3 | 1.1 | 3.8 | 1.1 | 4.2 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Q; see Figure 10 [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 17.9 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.2 | 5.1 | 9.2 | 3.0 | 9.2 | 3.0 | 10.1 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.6 | 3.8 | 5.8 | 2.4 | 6.1 | 2.4 | 6.7 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.2 | 3.3 | 4.8 | 2.0 | 5.0 | 2.0 | 5.5 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.0 | 2.7 | 3.8 | 1.8 | 4.0 | 1.8 | 4.4 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.9 | 2.5 | 3.4 | 1.8 | 3.6 | 1.8 | 4.0 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Q; see Figure 10 [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 9.4 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 2.9 | 4.2 | 7.5 | 2.8 | 7.9 | 2.8 | 8.7 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.2 | 3.2 | 4.9 | 2.1 | 5.3 | 2.1 | 5.8 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.2 | 3.0 | 4.4 | 2.1 | 4.9 | 2.1 | 5.4 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.6 | 2.2 | 3.1 | 1.5 | 3.4 | 1.5 | 3.7 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.9 | 2.6 | 3.3 | 1.8 | 3.6 | 1.8 | 4.0 | ns |

**Table 8. Dynamic characteristics** *...continued*

*Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 11.*

| Symbol | Parameter | Conditions | 25 °C | | | −40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| **$C_L$ = 10 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | D to Q; see Figure 7 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 24.4 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.0 | 7.5 | 15.3 | 2.7 | 15.9 | 2.7 | 17.4 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.6 | 5.3 | 9.0 | 2.2 | 9.4 | 2.2 | 10.3 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.5 | 4.3 | 6.9 | 2.1 | 7.3 | 2.1 | 8.0 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.0 | 3.5 | 4.8 | 1.8 | 5.3 | 1.8 | 5.9 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.8 | 3.1 | 4.2 | 1.7 | 4.6 | 1.7 | 5.1 | ns |
| | | LE to Q; see Figure 8 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 23.3 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 2.9 | 7.1 | 15.4 | 2.7 | 16.1 | 2.7 | 17.7 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 2.5 | 5.0 | 8.8 | 2.1 | 9.5 | 2.1 | 10.4 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.3 | 4.1 | 6.6 | 2.0 | 7.3 | 2.0 | 8.1 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 1.9 | 3.1 | 4.7 | 1.6 | 5.2 | 1.6 | 5.8 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 1.7 | 2.8 | 4.0 | 1.4 | 4.4 | 1.4 | 4.9 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Q; see Figure 10 [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 21.2 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.7 | 6.0 | 10.6 | 3.4 | 10.6 | 3.4 | 11.7 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.1 | 4.5 | 6.7 | 2.8 | 7.0 | 2.8 | 7.7 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.7 | 3.9 | 5.5 | 2.5 | 5.8 | 2.5 | 6.4 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.4 | 3.3 | 4.5 | 2.2 | 4.7 | 2.2 | 5.2 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.3 | 3.1 | 4.1 | 2.2 | 4.3 | 2.2 | 4.7 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Q; see Figure 10 [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 11.3 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.9 | 5.3 | 8.7 | 3.8 | 9.2 | 3.8 | 10.1 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.0 | 4.1 | 5.8 | 2.9 | 6.2 | 2.9 | 6.8 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 3.2 | 4.2 | 5.7 | 3.1 | 6.0 | 3.1 | 6.6 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.3 | 3.0 | 4.0 | 2.2 | 4.3 | 2.2 | 4.7 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 3.0 | 3.8 | 4.7 | 2.9 | 5.0 | 2.9 | 5.5 | ns |

**Table 8. Dynamic characteristics** *...continued*

*Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 11.*

| Symbol | Parameter | Conditions | 25 °C | | | −40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| **$C_L$ = 15 pF** | | | | | | | | | | |
| $t_{pd}$ | propagation delay | D to Q; see Figure 7 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 27.3 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.5 | 8.3 | 16.9 | 3.2 | 17.5 | 3.2 | 19.2 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.1 | 5.9 | 9.6 | 2.7 | 10.5 | 2.7 | 11.6 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.6 | 4.8 | 7.6 | 2.2 | 8.5 | 2.2 | 9.3 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.5 | 3.9 | 5.5 | 2.2 | 5.9 | 2.2 | 6.5 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.2 | 3.6 | 4.9 | 1.8 | 5.5 | 1.8 | 6.0 | ns |
| | | LE to Q; see Figure 8 [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 26.1 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 3.3 | 7.9 | 17.3 | 3.0 | 18.0 | 3.0 | 19.8 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.0 | 5.6 | 9.7 | 2.5 | 10.7 | 2.5 | 11.8 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 2.5 | 4.6 | 7.4 | 2.2 | 8.3 | 2.2 | 9.1 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.3 | 3.6 | 5.3 | 2.0 | 5.9 | 2.0 | 6.4 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.1 | 3.2 | 4.6 | 1.8 | 5.1 | 1.8 | 5.6 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Q; see Figure 10 [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 24.6 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 4.1 | 6.8 | 12.1 | 3.8 | 12.1 | 3.8 | 13.3 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.5 | 5.1 | 7.5 | 3.2 | 7.9 | 3.2 | 8.7 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 3.1 | 4.4 | 6.1 | 2.8 | 6.5 | 2.8 | 7.2 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 2.8 | 3.7 | 5.0 | 2.5 | 5.3 | 2.5 | 5.8 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 2.6 | 3.5 | 4.7 | 2.5 | 4.9 | 2.5 | 5.4 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Q; see Figure 10 [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 13.1 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | 4.9 | 6.5 | 9.8 | 4.8 | 10.4 | 4.8 | 11.4 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | 3.9 | 5.0 | 6.8 | 3.8 | 7.3 | 3.8 | 8.0 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | 4.2 | 5.3 | 6.9 | 4.1 | 7.3 | 4.1 | 8.0 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | 3.0 | 3.8 | 4.8 | 2.9 | 5.1 | 2.9 | 5.6 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | 4.1 | 5.0 | 6.1 | 4.0 | 6.4 | 4.0 | 7.0 | ns |

**Table 8. Dynamic characteristics** *...continued*

*Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 11.*

| Symbol | Parameter | Conditions | | 25 °C | | | −40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| **$C_L$ = 30 pF** | | | | | | | | | | | |
| $t_{pd}$ | propagation delay | D to Q; see Figure 7 | [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 35.9 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 4.0 | 10.6 | 22.1 | 3.7 | 23.3 | 3.7 | 25.6 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 3.6 | 7.5 | 12.3 | 3.5 | 13.6 | 3.5 | 15.0 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 3.5 | 6.2 | 9.5 | 3.2 | 10.5 | 3.2 | 11.5 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 3.3 | 5.1 | 6.9 | 2.9 | 7.6 | 2.9 | 8.3 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 3.0 | 4.7 | 6.4 | 2.9 | 7.2 | 2.9 | 7.9 | ns |
| | | LE to Q; see Figure 8 | [2] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 34.8 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 3.9 | 10.2 | 22.2 | 3.7 | 23.5 | 3.7 | 25.9 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 3.5 | 7.2 | 12.4 | 3.4 | 13.7 | 3.4 | 15.1 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 3.3 | 5.9 | 9.5 | 3.0 | 10.5 | 3.0 | 11.6 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 3.1 | 4.8 | 6.8 | 2.7 | 7.5 | 2.7 | 8.2 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 2.9 | 4.4 | 6.1 | 2.6 | 7.0 | 2.6 | 7.7 | ns |
| $t_{en}$ | enable time | $\overline{OE}$ to Q; see Figure 10 | [3] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 34.5 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 5.5 | 9.1 | 16.2 | 4.9 | 16.2 | 4.9 | 17.8 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 4.6 | 6.7 | 9.9 | 4.2 | 10.5 | 4.2 | 11.6 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 4.2 | 5.7 | 7.9 | 3.7 | 8.6 | 3.7 | 9.5 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 3.6 | 4.9 | 6.4 | 3.4 | 6.9 | 3.4 | 7.6 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 3.4 | 4.7 | 6.1 | 3.3 | 6.5 | 3.3 | 7.2 | ns |
| $t_{dis}$ | disable time | $\overline{OE}$ to Q; see Figure 10 | [4] | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 19.2 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | 8.0 | 9.9 | 13.7 | 7.9 | 14.5 | 7.9 | 16.0 | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | 6.3 | 7.7 | 9.7 | 6.2 | 10.5 | 6.2 | 11.6 | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | 7.3 | 8.7 | 10.6 | 7.2 | 11.3 | 7.2 | 12.4 | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | 5.2 | 6.2 | 7.5 | 5.1 | 7.8 | 5.1 | 8.6 | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | 7.5 | 8.8 | 10.2 | 7.4 | 10.5 | 7.4 | 11.6 | ns |
| **$C_L$ = 5 pF, 10 pF, 15 pF and 30 pF** | | | | | | | | | | | |
| $t_W$ | pulse width | LE HIGH; see Figure 8 | | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | | - | 4.0 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | | - | 0.7 | - | 2.1 | - | 2.1 | - | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | | - | 0.5 | - | 1.3 | - | 1.3 | - | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | | - | 0.4 | - | 1.0 | - | 1.0 | - | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | | - | 0.3 | - | 0.8 | - | 0.8 | - | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | | - | 0.2 | - | 0.8 | - | 0.8 | - | ns |

**Table 8. Dynamic characteristics** *...continued*

*Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 11.*

| Symbol | Parameter | Conditions | 25 °C | | | –40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| $t_{su(H)}$ | set-up time HIGH | D to LE; see Figure 9 | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 4.6 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | - | 0.9 | - | 2.2 | - | 2.2 | - | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | - | 0.6 | - | 1.4 | - | 1.4 | - | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | 0.4 | - | 1.0 | - | 1.0 | - | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | 0 | - | 0.6 | - | 0.6 | - | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | - | –0.1 | - | 0.4 | - | 0.4 | - | ns |
| $t_{su(L)}$ | set-up time LOW | D to LE; see Figure 9 | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 4.0 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | - | 1.2 | - | 2.7 | - | 2.7 | - | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | - | 0.7 | - | 1.5 | - | 1.5 | - | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | 0.6 | - | 1.2 | - | 1.2 | - | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | 0.4 | - | 0.9 | - | 0.9 | - | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | - | 0.3 | - | 0.7 | - | 0.7 | - | ns |
| $t_h$ | hold time | D to LE HIGH or LOW; see Figure 9 | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | –4.6 | - | - | - | - | - | ns |
| | | $V_{CC}$ = 1.1 V to 1.3 V | - | –0.9 | - | –0.1 | - | –0.1 | - | ns |
| | | $V_{CC}$ = 1.4 V to 1.6 V | - | –0.6 | - | –0.1 | - | –0.1 | - | ns |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | –0.4 | - | 0 | - | 0 | - | ns |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | –0.2 | - | 0.2 | - | 0.2 | - | ns |
| | | $V_{CC}$ = 3.0 V to 3.6 V | - | –0.1 | - | 0.3 | - | 0.3 | - | ns |

**Table 8. Dynamic characteristics** *...continued*

*Voltages are referenced to GND (ground = 0 V); for test circuit see Figure 11.*

| Symbol | Parameter | Conditions | 25 °C | | | −40 °C to +125 °C | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ[1] | Max | Min (85 °C) | Max (85 °C) | Min (125 °C) | Max (125 °C) | |
| $C_{PD}$ | power dissipation capacitance | $f_i$ = 1 MHz; $V_I$ = GND to $V_{CC}$ [5][6] | | | | | | | | |
| | | output enabled | | | | | | | | |
| | | $V_{CC}$ = 0.8 V | - | 2.0 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.1 V to 1.3 V | - | 2.0 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.4 V to 1.6 V | - | 2.0 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 1.65 V to 1.95 V | - | 2.1 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 2.3 V to 2.7 V | - | 2.4 | - | - | - | - | - | pF |
| | | $V_{CC}$ = 3.0 V to 3.6 V | - | 2.8 | - | - | - | - | - | pF |

[1] All typical values are measured at nominal $V_{CC}$.

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

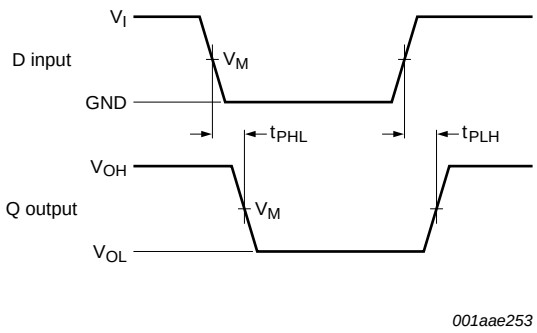
[3] $t_{en}$ is the same as $t_{PZH}$ and $t_{PZL}$.

[4] $t_{dis}$ is the same as $t_{PHZ}$ and $t_{PLZ}$.

[5] All specified values are the average typical values over all stated loads.

[6] $C_{PD}$ 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;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs;
N = number of inputs switching.

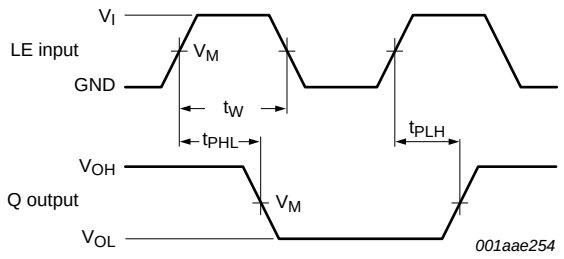
## 12. Waveforms




Measurement points are given in Table 9.

Logic levels: $V_{OL}$ and $V_{OH}$ are typical output voltage levels that occur with the output load.

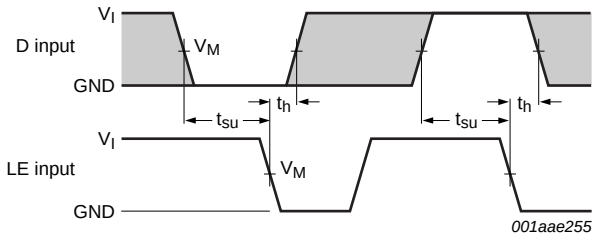
**Fig 7. The data input (D) to output (Q) propagation delays**




Measurement points are given in Table 9.

Logic levels: $V_{OL}$ and $V_{OH}$ are typical output voltage levels that occur with the output load.

**Fig 8. The latch enable input (LE) to output (Q) propagation delays, the latch enable input (LE) pulse width**



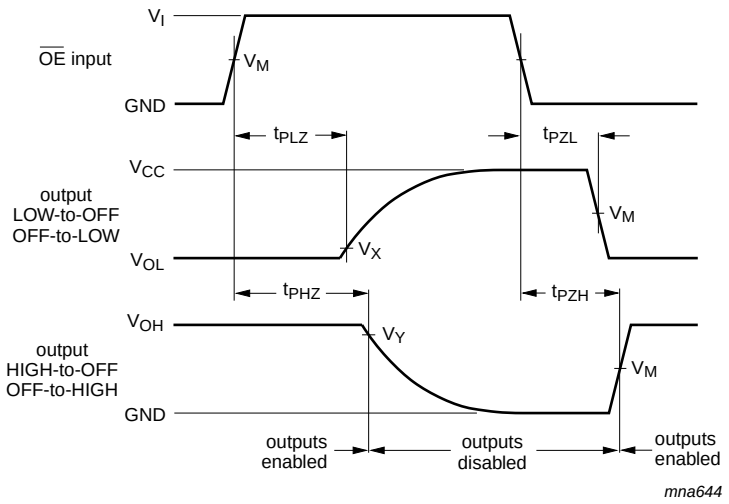

Measurement points are given in Table 9.

Logic levels: $V_{OL}$ and $V_{OH}$ are typical output voltage levels that occur with the output load.

**Fig 9. Data set-up and hold times for the D input to the LE input**

**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 | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{CC}$ | ≤ 3.0 ns |



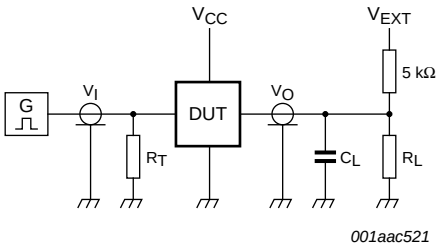

Measurement points are given in Table 10.

Logic levels: $V_{OL}$ and $V_{OH}$ are typical output voltage levels that occur with the output load.

**Fig 10. Turn-on and turn-off times**

**Table 10. Measurement points**

| Supply voltage | Input | Output | | |
|---|---|---|---|---|
| $V_{CC}$ | $V_M$ | $V_M$ | $V_X$ | $V_Y$ |
| 0.8 V to 1.6 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL}$ + 0.1 V | $V_{OH}$ − 0.1 V |
| 1.65 V to 2.7 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL}$ + 0.15 V | $V_{OH}$ − 0.15 V |
| 3.0 V to 3.6 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL}$ + 0.3 V | $V_{OH}$ − 0.3 V |




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 11. Test circuit for measuring switching times**

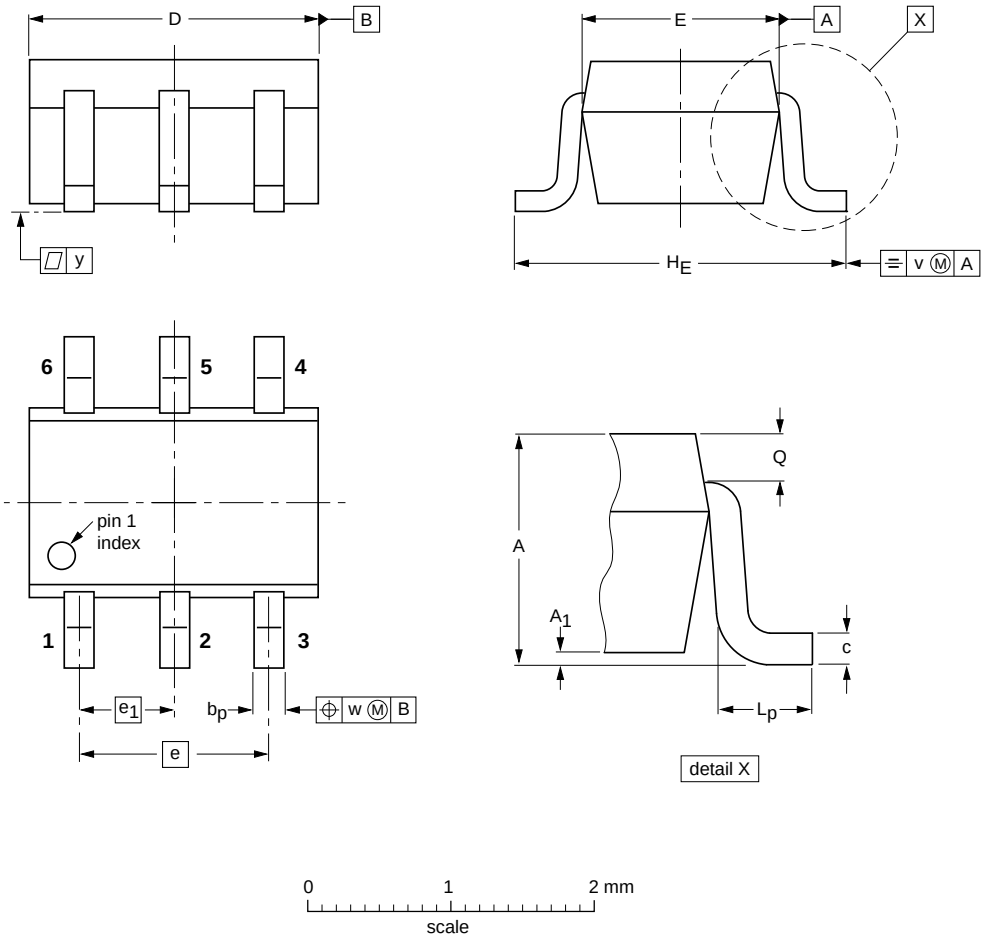
**Table 11. Test data**

| 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 kΩ, for measuring propagation delays, setup and hold times and pulse width $R_L$ = 1 MΩ.

## 13. Package outline

**Plastic surface-mounted package; 6 leads** **SOT363**



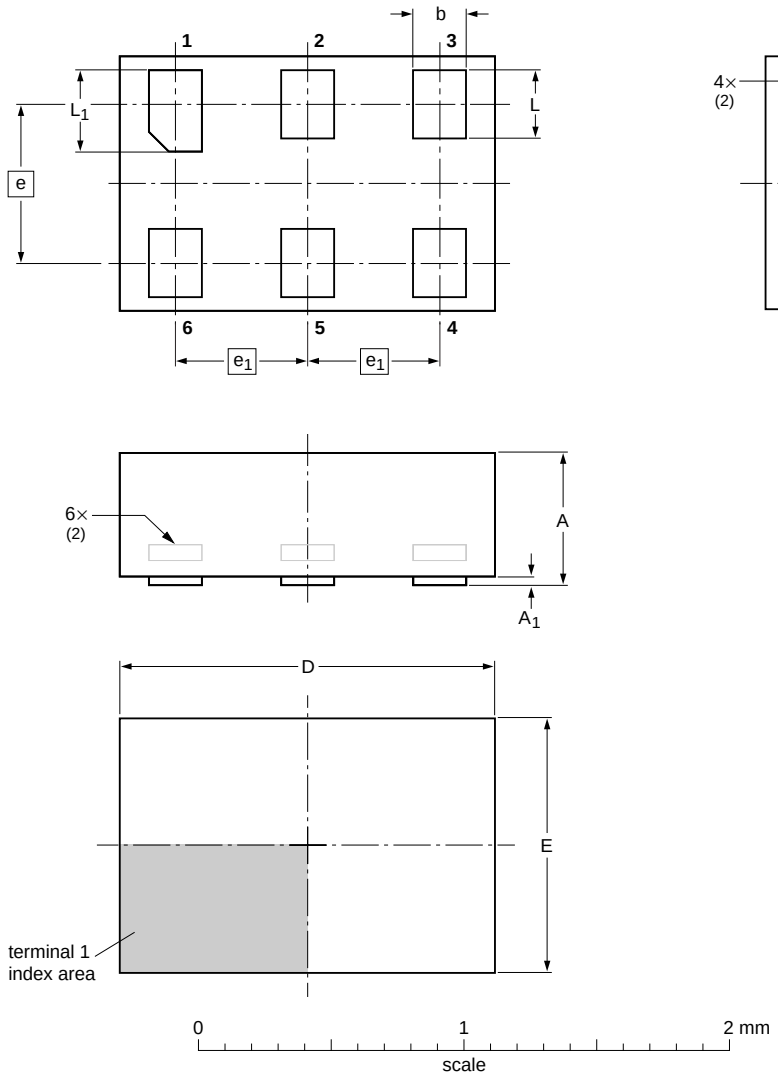

**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT363 | | | SC-88 | | | ~~04-11-08~~<br>06-03-16 |

**Fig 12. Package outline SOT363 (SC-88)**

**XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm** **SOT886**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A(1) max | A1 max | b | D | E | e | e1 | L | L1 |
|---|---|---|---|---|---|---|---|---|---|
| mm | 0.5 | 0.04 | 0.25<br>0.17 | 1.5<br>1.4 | 1.05<br>0.95 | 0.6 | 0.5 | 0.35<br>0.27 | 0.40<br>0.32 |

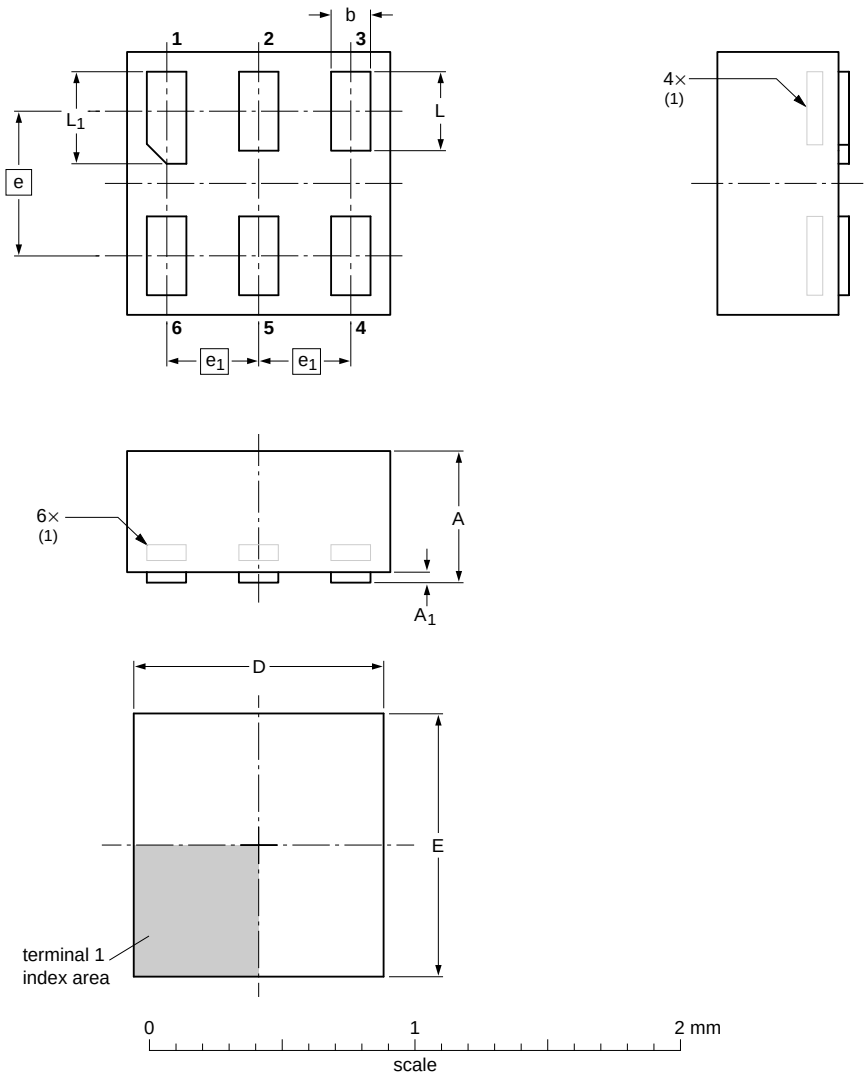
**Notes**

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

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT886 | | MO-252 | | | | ~~04-07-15~~<br>04-07-22 |

**Fig 13. Package outline SOT886 (XSON6)**

**XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm** **SOT891**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A max | $A_1$ max | b | D | E | e | $e_1$ | L | $L_1$ |
|---|---|---|---|---|---|---|---|---|---|
| mm | 0.5 | 0.04 | 0.20<br>0.12 | 1.05<br>0.95 | 1.05<br>0.95 | 0.55 | 0.35 | 0.35<br>0.27 | 0.40<br>0.32 |

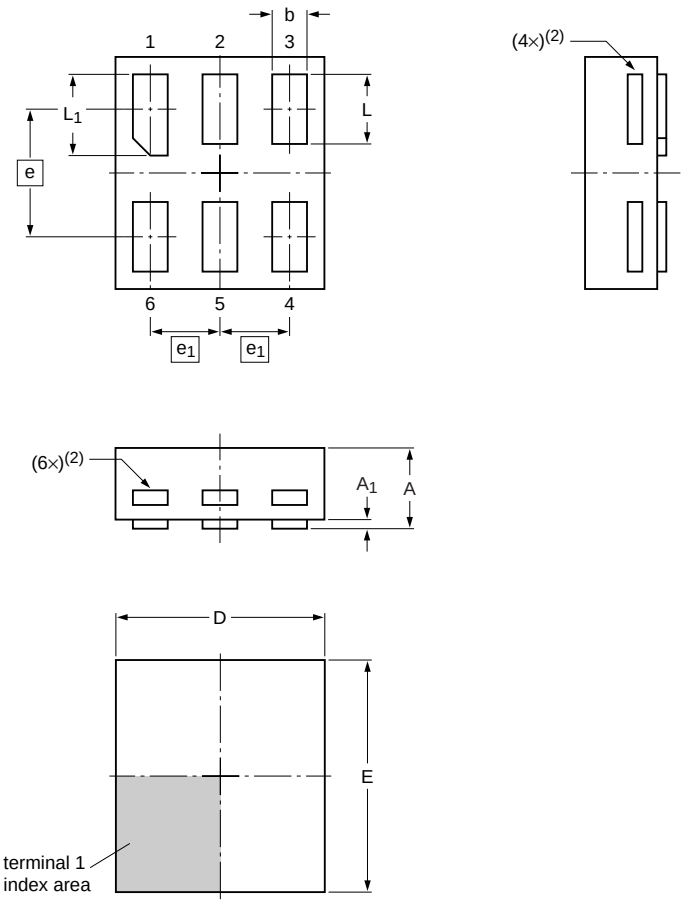
**Note**

1. Can be visible in some manufacturing processes.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT891 | | | | | | ~~05-04-06~~<br>07-05-15 |

**Fig 14. Package outline SOT891 (XSON6)**

**XSON6: extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm** **SOT1115**




Dimensions

| Unit | | $A^{(1)}$ | $A_1$ | b | D | E | e | $e_1$ | L | $L_1$ |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.35 | 0.04 | 0.20 | 0.95 | 1.05 | | | 0.35 | 0.40 |
| | nom | | | 0.15 | 0.90 | 1.00 | 0.55 | 0.3 | 0.30 | 0.35 |
| | min | | | 0.12 | 0.85 | 0.95 | | | 0.27 | 0.32 |

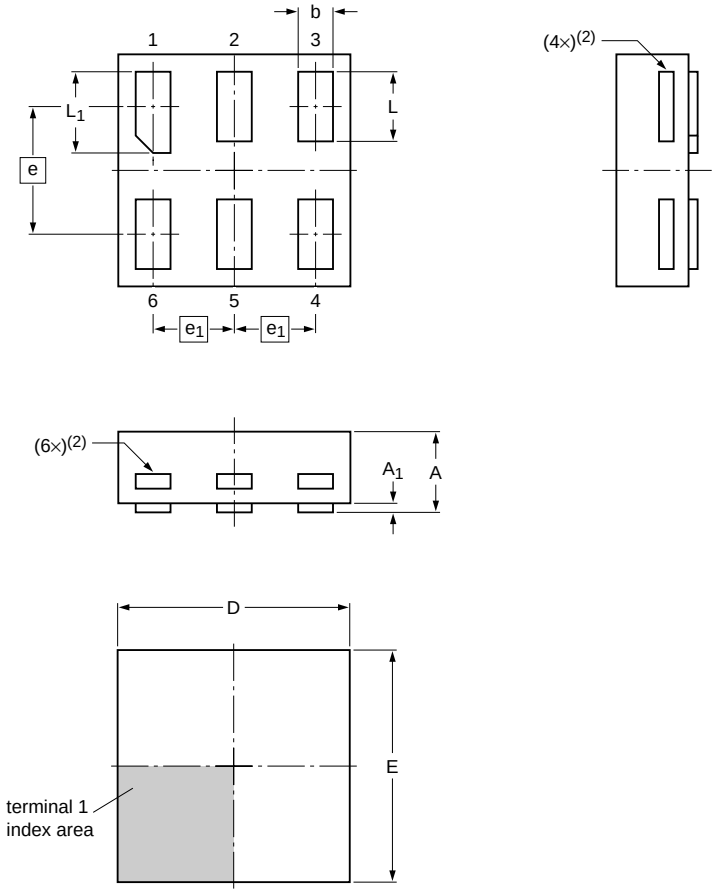
Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

*sot1115_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1115 | | | | | | ~~10-04-02~~ 10-04-07 |

**Fig 15. Package outline SOT1115 (XSON6)**

**XSON6: extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm** **SOT1202**




Dimensions

| Unit | | $A^{(1)}$ | $A_1$ | b | D | E | e | $e_1$ | L | $L_1$ |
|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.35 | 0.04 | 0.20 | 1.05 | 1.05 | | | 0.35 | 0.40 |
| | nom | | | 0.15 | 1.00 | 1.00 | 0.55 | 0.35 | 0.30 | 0.35 |
| | min | | | 0.12 | 0.95 | 0.95 | | | 0.27 | 0.32 |

Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

*sot1202_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1202 | | | | | | ~~10-04-02~~ 10-04-06 |

**Fig 16. Package outline SOT1202 (XSON6)**

## 14. Abbreviations

**Table 12. Abbreviations**

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

## 15. Revision history

**Table 13. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| 74AUP1G373 v.4 | 20100715 | Product data sheet | - | 74AUP1G373 v.3 |
| Modifications: | • Added type number 74AUP1G373GN (SOT1115/XSON6 package).<br>• Added type number 74AUP1G373GS (SOT1202/XSON6 package). | | | |
| 74AUP1G373 v.3 | 20080109 | Product data sheet | - | 74AUP1G373 v.2 |
| 74AUP1G373 v.2 | 20070720 | Product data sheet | - | 74AUP1G373 v.1 |
| 74AUP1G373 v.1 | 20061129 | 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. |
| 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 URL http://www.nxp.com.

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## 18. Contents





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