

74AUP1G240

Low-power inverting buffer/line driver; 3-state

Rev. 01 — 6 November 2006

Product data sheet

1. General description

The 74AUP1G240 is a high-performance, low-power, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families.

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.

The 74AUP1G240 provides the single inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (\overline{OE}). A HIGH level at pin \overline{OE} causes the output to assume a high-impedance OFF-state.

This device has the input-disable feature, which allows floating input signals. The inputs are disabled when the output enable input \overline{OE} is HIGH.

2. Features

- 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-A114-D exceeds 5000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
 - ◆ CDM JESD22-C101-C exceeds 1000 V
- Low static power consumption; $I_{CC} = 0.9 \mu\text{A}$ (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}
- Input-disable feature allows floating input conditions

- 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

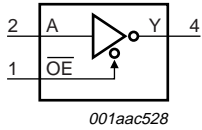
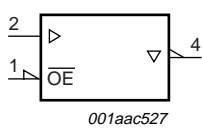
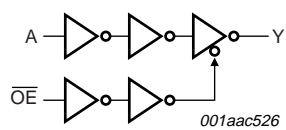
| Type number | Package | | | Version |
|--------------|-------------------|--------|---|----------|
| | Temperature range | Name | Description | |
| 74AUP1G240GW | -40 °C to +125 °C | TSSOP5 | plastic thin shrink small outline package; 5 leads; body width 1.25 mm | SOT353-1 |
| 74AUP1G240GM | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm | SOT886 |
| 74AUP1G240GF | -40 °C to +125 °C | XSON6 | plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm | SOT891 |

4. Marking

Table 2. Marking

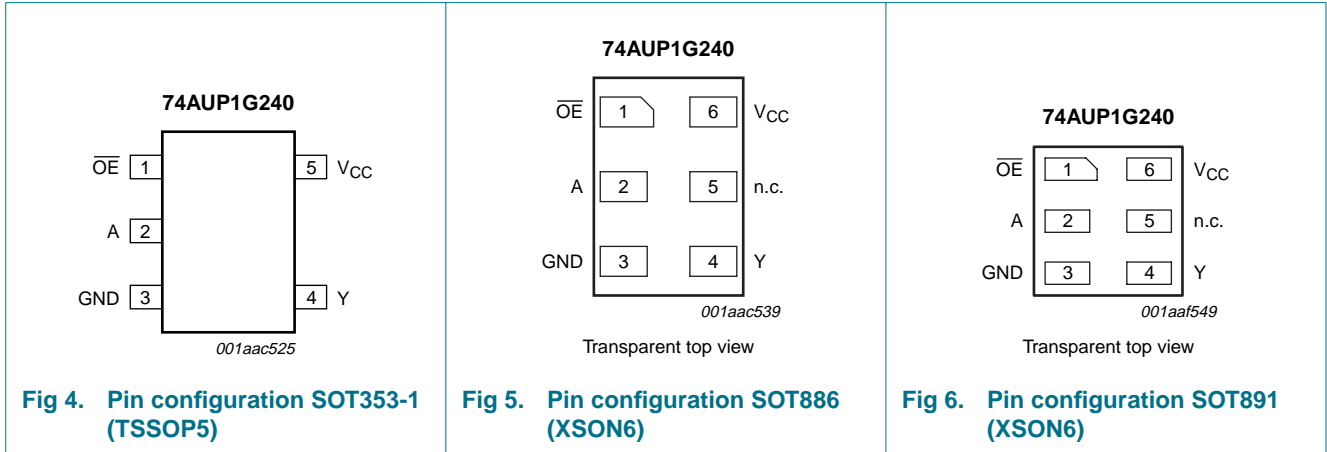
| Type number | Marking code |
|--------------|--------------|
| 74AUP1G240GW | p2 |
| 74AUP1G240GM | p2 |
| 74AUP1G240GF | p2 |

5. Functional diagram

| | | |
|--|--|--|
|  <p>001aac528</p> |  <p>001aac527</p> |  <p>001aac526</p> |
| <p>Fig 1. Logic symbol</p> | <p>Fig 2. IEC logic symbol</p> | <p>Fig 3. Logic diagram</p> |

6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description

| Symbol | Pin | | Description |
|--------|--------|-------|---------------------|
| | TSSOP5 | XSON6 | |
| OE | 1 | 1 | output enable input |
| A | 2 | 2 | data input A |
| GND | 3 | 3 | ground (0 V) |
| Y | 4 | 4 | data output Y |
| n.c. | - | 5 | not connected |
| VCC | 5 | 6 | supply voltage |

7. Functional description

Table 4. Function table^[1]

| Input | | | Output |
|-------|---|---|--------|
| OE | A | Y | |
| L | L | H | |
| L | H | L | |
| H | X | Z | |

[1] H = HIGH voltage level;
 L = LOW voltage level;
 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 | $V_O > V_{CC}$ or $V_O < 0$ 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.
For XSON6 packages: above 45 °C the value of P_{tot} derates linearly with 2.4 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 |

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 μA; V _{CC} = 0.8 V to 3.6 V | V _{CC} - 0.1 | - | - | V |
| | | I _O = -1.1 mA; V _{CC} = 1.1 V | 0.75 × V _{CC} | - | - | V |
| | | I _O = -1.7 mA; V _{CC} = 1.4 V | 1.11 | - | - | V |
| | | I _O = -1.9 mA; V _{CC} = 1.65 V | 1.32 | - | - | V |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 2.05 | - | - | V |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.9 | - | - | V |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.72 | - | - | V |
| | | I _O = -4.0 mA; V _{CC} = 3.0 V | 2.6 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V | - | - | 0.1 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.3 × V _{CC} | V |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.31 | V |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.31 | V |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.31 | V |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.44 | V |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.31 | V |
| | | I _O = 4.0 mA; V _{CC} = 3.0 V | - | - | 0.44 | V |
| I _I | input leakage current | V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V | - | - | ±0.1 | μA |
| I _{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 |
| ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.2 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V | - | - | 0.5 | μA |
| ΔI _{CC} | additional supply current | data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 40 | μA |
| | | $\overline{\text{OE}}$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 110 | μA |
| | | all inputs; V _I = GND to 3.6 V; $\overline{\text{OE}}$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V | [2] | - | 1 | 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 | - | 1.7 | - | pF |
| | | output disabled | - | 1.5 | - | pF |
| T_{amb} = -40 °C to +85 °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 |

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 _{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 |
| 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} - 0.1 | - | - | V |
| | | I _O = -1.1 mA; V _{CC} = 1.1 V | 0.7 × V _{CC} | - | - | V |
| | | I _O = -1.7 mA; V _{CC} = 1.4 V | 1.03 | - | - | V |
| | | I _O = -1.9 mA; V _{CC} = 1.65 V | 1.30 | - | - | V |
| | | I _O = -2.3 mA; V _{CC} = 2.3 V | 1.97 | - | - | V |
| | | I _O = -3.1 mA; V _{CC} = 2.3 V | 1.85 | - | - | V |
| | | I _O = -2.7 mA; V _{CC} = 3.0 V | 2.67 | - | - | V |
| 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 | - | - | 0.1 | V |
| | | I _O = 1.1 mA; V _{CC} = 1.1 V | - | - | 0.3 × V _{CC} | V |
| | | I _O = 1.7 mA; V _{CC} = 1.4 V | - | - | 0.37 | V |
| | | I _O = 1.9 mA; V _{CC} = 1.65 V | - | - | 0.35 | V |
| | | I _O = 2.3 mA; V _{CC} = 2.3 V | - | - | 0.33 | V |
| | | I _O = 3.1 mA; V _{CC} = 2.3 V | - | - | 0.45 | V |
| | | I _O = 2.7 mA; V _{CC} = 3.0 V | - | - | 0.33 | V |
| I _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 |
| ΔI _{OFF} | additional power-off leakage current | V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V | - | - | ±0.6 | μA |
| I _{CC} | supply current | V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V | - | - | 0.9 | μA |
| ΔI _{CC} | additional supply current | data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 50 | μA |
| | | \overline{OE} input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 120 | μA |
| | | all inputs; V _I = GND to 3.6 V; \overline{OE} = V _{CC} ; V _{CC} = 0.8 V to 3.6 V | [2] | - | 1 | 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 |

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 _{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 |
| 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 _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 |
| 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 | data input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 75 | μA |
| | | $\overline{\text{OE}}$ input; V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V | [1] | - | 180 | μA |
| | | all inputs; V _I = GND to 3.6 V; $\overline{\text{OE}}$ = V _{CC} ; V _{CC} = 0.8 V to 3.6 V | [2] | - | 1 | μA |

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

[2] To show I_{CC} remains very low when the input-disable feature is enabled.

11. Dynamic characteristics

Table 8. Dynamic characteristics

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

| Symbol | Parameter | Conditions | 25 °C | | | -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 | A to Y; see Figure 7 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 22.3 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.0 | 5.8 | 12.6 | 2.8 | 14.1 | 15.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.3 | 4.0 | 7.3 | 2.1 | 8.5 | 9.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 3.2 | 5.5 | 1.9 | 6.7 | 7.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 2.6 | 4.1 | 1.5 | 4.8 | 5.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.4 | 2.3 | 3.6 | 1.3 | 4.1 | 4.6 | ns |
| t _{en} | enable time | $\overline{\text{OE}}$ to Y; see Figure 8 ^[3] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 70.2 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.1 | 6.4 | 14.3 | 2.8 | 15.9 | 17.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.5 | 4.4 | 8.1 | 2.2 | 9.5 | 10.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.1 | 3.6 | 6.2 | 1.9 | 7.4 | 8.2 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 2.8 | 4.6 | 1.7 | 5.4 | 6.0 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.7 | 2.5 | 4.0 | 1.7 | 4.7 | 5.3 | ns |
| t _{dis} | disable time | $\overline{\text{OE}}$ to Y; see Figure 8 ^[4] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 14.8 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 2.0 | 4.3 | 7.4 | 2.3 | 8.3 | 9.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 1.6 | 3.2 | 5.2 | 1.7 | 5.9 | 6.5 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 1.5 | 3.0 | 4.8 | 1.5 | 5.5 | 6.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.1 | 2.2 | 3.5 | 1.4 | 4.0 | 4.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.3 | 2.5 | 3.9 | 1.4 | 4.5 | 5.0 | ns |
| C_L = 10 pF | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 7 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 25.7 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.5 | 6.6 | 14.5 | 3.2 | 16.3 | 18.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.2 | 4.6 | 8.4 | 2.0 | 9.9 | 10.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 3.8 | 6.4 | 1.8 | 7.7 | 8.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 3.1 | 4.8 | 1.7 | 5.7 | 6.4 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.7 | 2.8 | 4.3 | 1.7 | 5.0 | 5.5 | ns |

Table 8. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#)

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit |
|------------------------------|-------------------|---|-------|--------------------|------|-------------------|-------------|--------------|------|
| | | | Min | Typ ^[1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| t _{en} | enable time | \overline{OE} to Y; see Figure 8 ^[3] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 74.0 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.6 | 7.4 | 16.3 | 3.2 | 18.2 | 20.1 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.3 | 5.1 | 9.2 | 2.1 | 10.9 | 12.0 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.0 | 4.1 | 7.1 | 1.8 | 8.5 | 9.4 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.8 | 3.4 | 5.4 | 1.7 | 6.4 | 7.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 1.8 | 3.1 | 4.8 | 1.7 | 5.7 | 6.3 | ns |
| t _{dis} | disable time | \overline{OE} to Y; see Figure 8 ^[4] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 33.7 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.4 | 5.4 | 9.0 | 3.2 | 10.0 | 11.0 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 2.1 | 4.1 | 6.3 | 2.1 | 7.1 | 7.9 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.3 | 4.2 | 6.3 | 1.8 | 7.1 | 7.9 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 1.6 | 3.0 | 4.6 | 1.7 | 5.2 | 5.7 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.1 | 3.8 | 5.7 | 1.7 | 6.4 | 7.1 | ns |
| C_L = 15 pF | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 7 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 29.0 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 3.9 | 7.4 | 16.3 | 3.6 | 18.4 | 20.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.1 | 9.4 | 2.5 | 11.1 | 12.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.2 | 4.2 | 7.2 | 2.1 | 8.7 | 9.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.0 | 3.5 | 5.4 | 1.9 | 6.5 | 7.2 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.0 | 3.3 | 4.9 | 1.9 | 5.7 | 6.4 | ns |
| t _{en} | enable time | \overline{OE} to Y; see Figure 8 ^[3] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 77.8 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.0 | 8.2 | 18.2 | 3.6 | 20.4 | 22.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.6 | 10.3 | 2.5 | 12.2 | 13.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.3 | 4.6 | 7.9 | 2.1 | 9.5 | 10.5 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.1 | 3.9 | 6.0 | 2.0 | 7.2 | 7.9 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.1 | 3.6 | 5.5 | 1.9 | 6.4 | 7.1 | ns |
| t _{dis} | disable time | \overline{OE} to Y; see Figure 8 ^[4] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 62.5 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 4.3 | 6.6 | 10.4 | 3.6 | 11.6 | 12.8 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 3.0 | 5.0 | 7.4 | 2.5 | 8.4 | 9.3 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.0 | 5.3 | 7.8 | 2.1 | 8.7 | 9.7 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.1 | 3.8 | 5.7 | 2.0 | 6.4 | 7.1 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.9 | 5.0 | 7.4 | 1.9 | 8.3 | 9.1 | ns |

Table 8. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#)

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +125 °C | | | Unit |
|------------------------------|-------------------|---|-------|--------------------|------|-------------------|-------------|--------------|------|
| | | | Min | Typ ^[1] | Max | Min | Max (85 °C) | Max (125 °C) | |
| C_L = 30 pF | | | | | | | | | |
| t _{pd} | propagation delay | A to Y; see Figure 7 ^[2] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 39.1 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 5.0 | 9.7 | 21.6 | 4.6 | 24.3 | 26.8 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 4.0 | 6.7 | 12.3 | 3.0 | 14.6 | 16.1 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 2.9 | 5.5 | 9.5 | 2.7 | 11.5 | 12.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.7 | 4.6 | 7.1 | 2.5 | 8.6 | 9.5 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.6 | 4.3 | 6.4 | 2.5 | 7.7 | 8.5 | ns |
| t _{en} | enable time | \overline{OE} to Y; see Figure 8 ^[3] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 89.4 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 5.2 | 10.6 | 23.8 | 4.6 | 26.7 | 29.5 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 4.0 | 7.3 | 13.2 | 3.0 | 15.7 | 17.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 3.0 | 6.0 | 10.2 | 2.7 | 12.3 | 13.6 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 2.8 | 5.0 | 7.8 | 2.6 | 9.3 | 10.3 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 2.8 | 4.8 | 7.1 | 2.6 | 8.4 | 9.3 | ns |
| t _{dis} | disable time | \overline{OE} to Y; see Figure 8 ^[4] | | | | | | | |
| | | V _{CC} = 0.8 V | - | 68.9 | - | - | - | - | ns |
| | | V _{CC} = 1.1 V to 1.3 V | 6.0 | 9.3 | 15.0 | 4.6 | 16.5 | 18.2 | ns |
| | | V _{CC} = 1.4 V to 1.6 V | 4.4 | 7.7 | 11.0 | 3.0 | 12.2 | 13.4 | ns |
| | | V _{CC} = 1.65 V to 1.95 V | 5.1 | 8.8 | 12.4 | 2.7 | 13.7 | 15.1 | ns |
| | | V _{CC} = 2.3 V to 2.7 V | 3.6 | 6.2 | 9.0 | 2.6 | 10.0 | 11.0 | ns |
| | | V _{CC} = 3.0 V to 3.6 V | 5.2 | 8.8 | 12.7 | 2.6 | 14.0 | 15.4 | ns |

Table 8. Dynamic characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 9](#)

| Symbol | Parameter | Conditions | 25 °C | | | -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} | | [5] | | | | | |
| | | V _{CC} = 0.8 V | - | 2.7 | - | - | - | - | 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 | - | 3.2 | - | - | - | - | pF |
| | | V _{CC} = 2.3 V to 2.7 V | - | 3.7 | - | - | - | - | pF |
| | | V _{CC} = 3.0 V to 3.6 V | - | 4.2 | - | - | - | - | 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] 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.

12. Waveforms

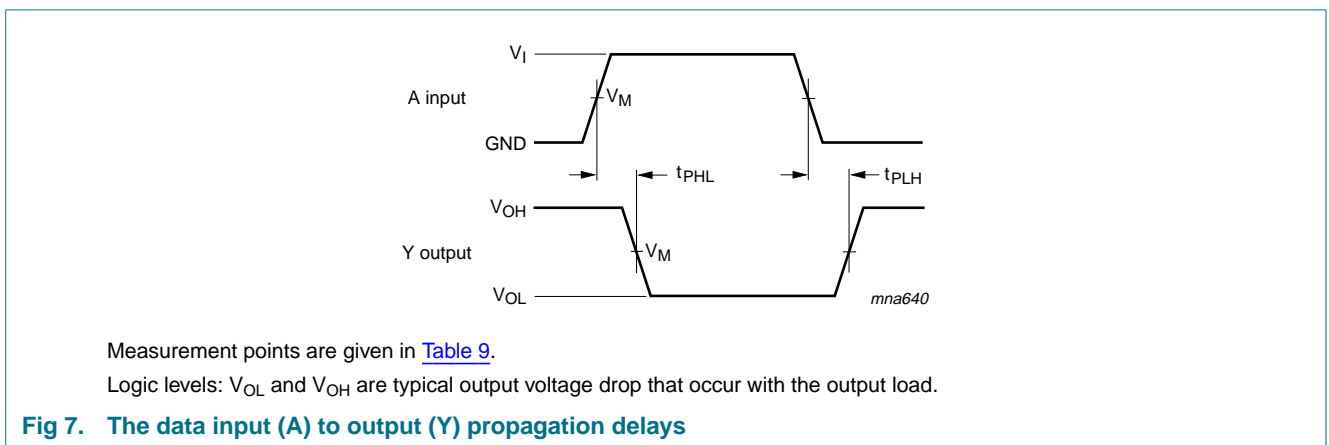
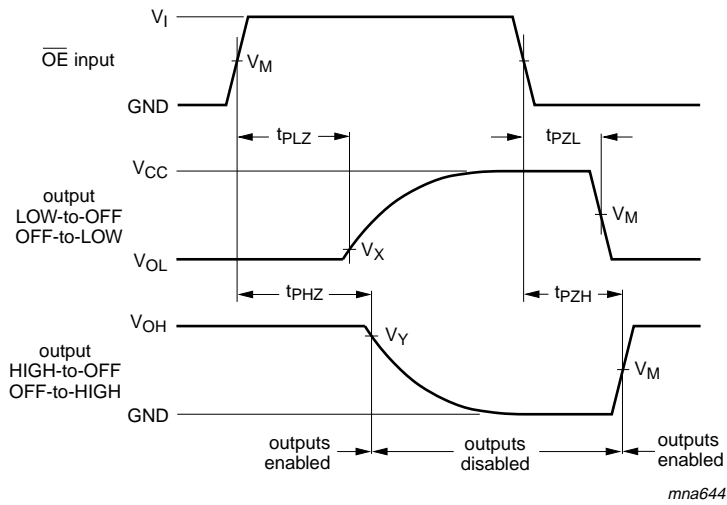


Table 9. Measurement points

| 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 |



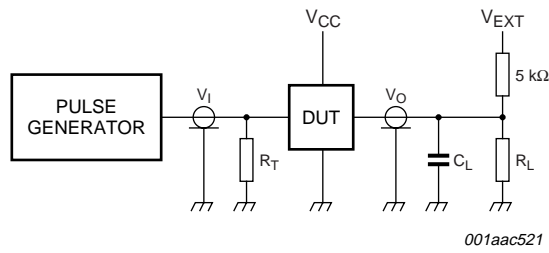
Measurement points are given in [Table 10](#).

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

Fig 8. Enable and disable time

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 | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.1 \text{ V}$ | $V_{OH} - 0.1 \text{ V}$ |
| 1.65 V to 2.7 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.15 \text{ V}$ | $V_{OH} - 0.15 \text{ V}$ |
| 3.0 V to 3.6 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $V_{OL} + 0.3 \text{ V}$ | $V_{OH} - 0.3 \text{ V}$ |



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 9. Load circuitry for 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

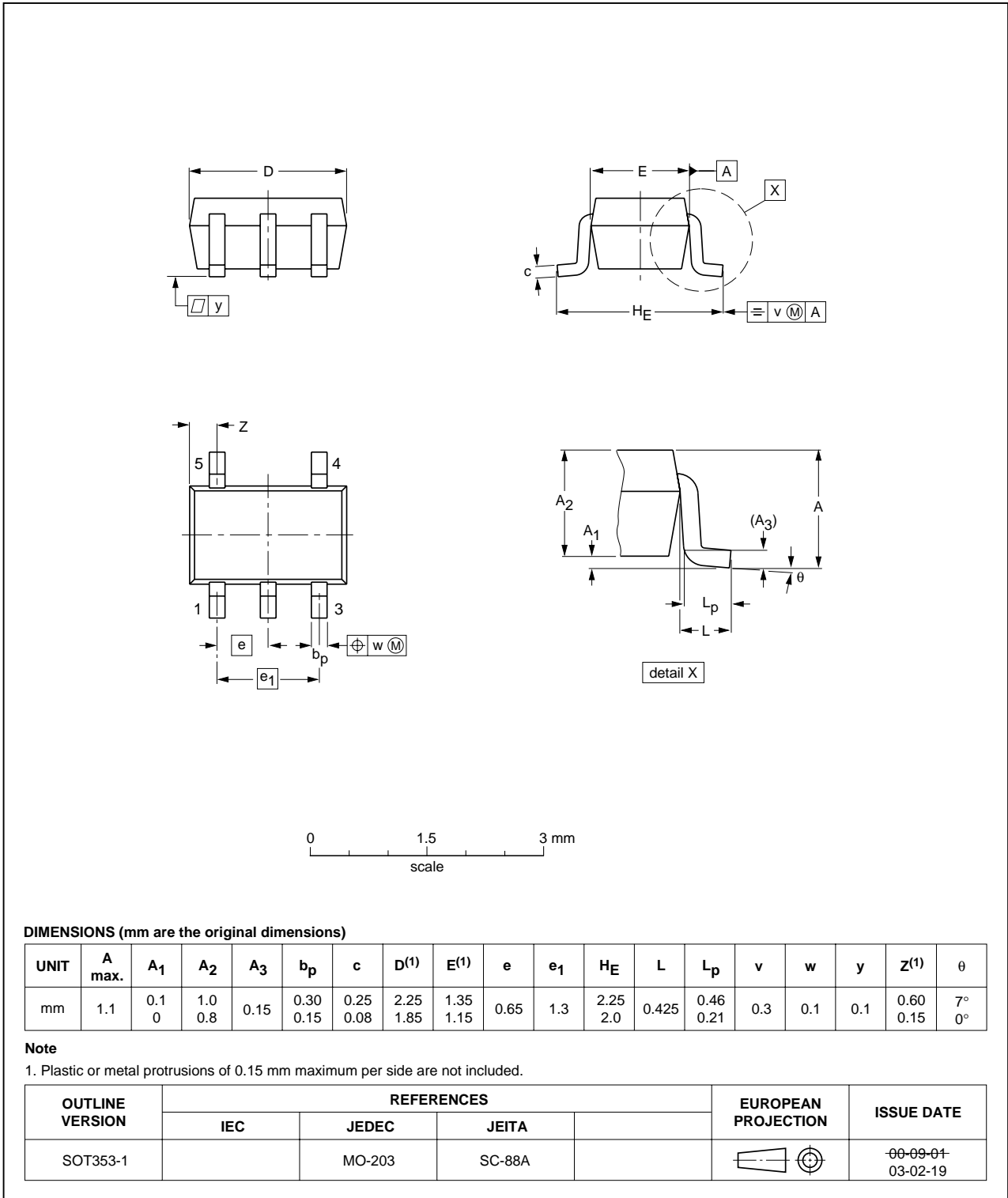


Fig 10. Package outline SOT353-1 (TSSOP5)

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

SOT886

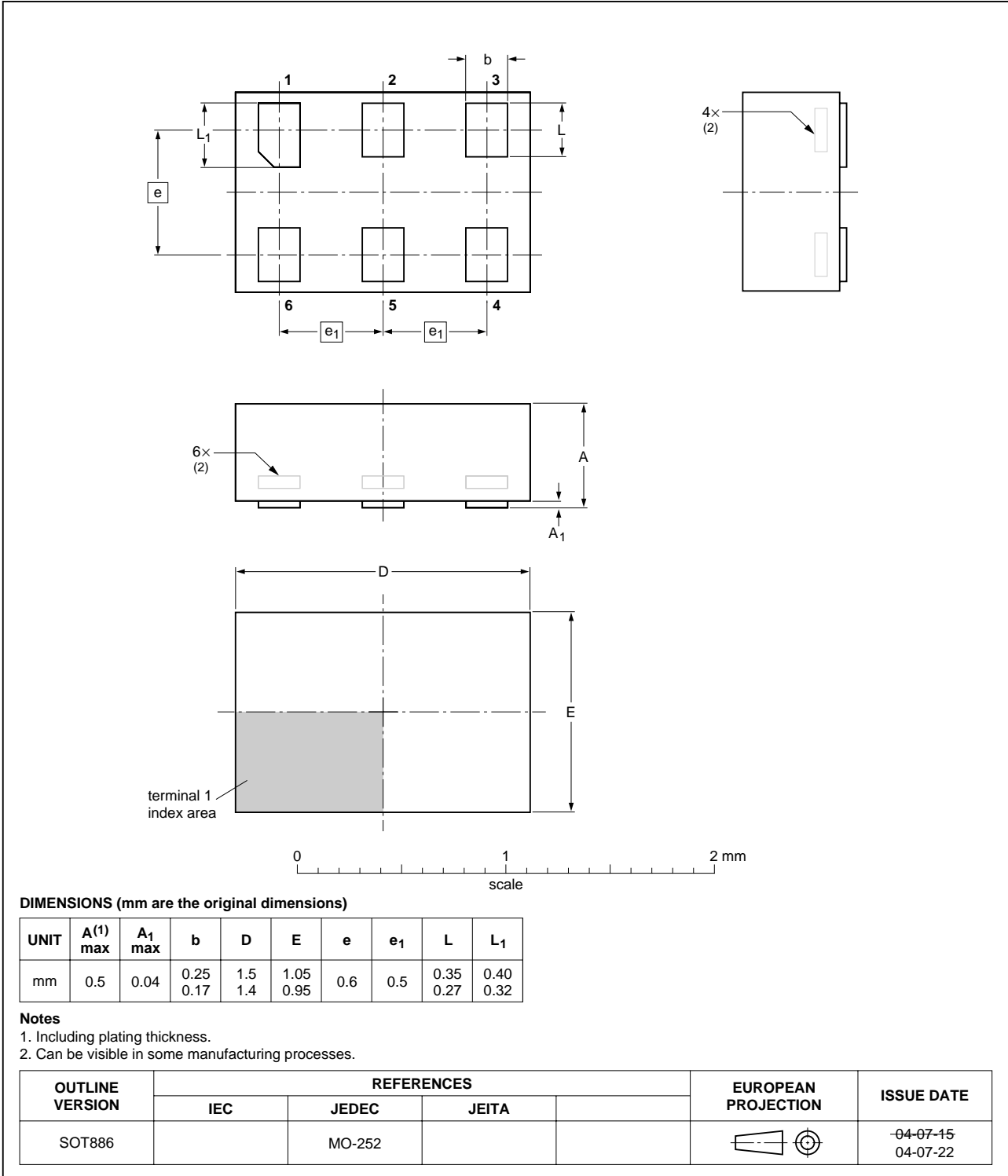


Fig 11. Package outline SOT886 (XSON6)

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

SOT891

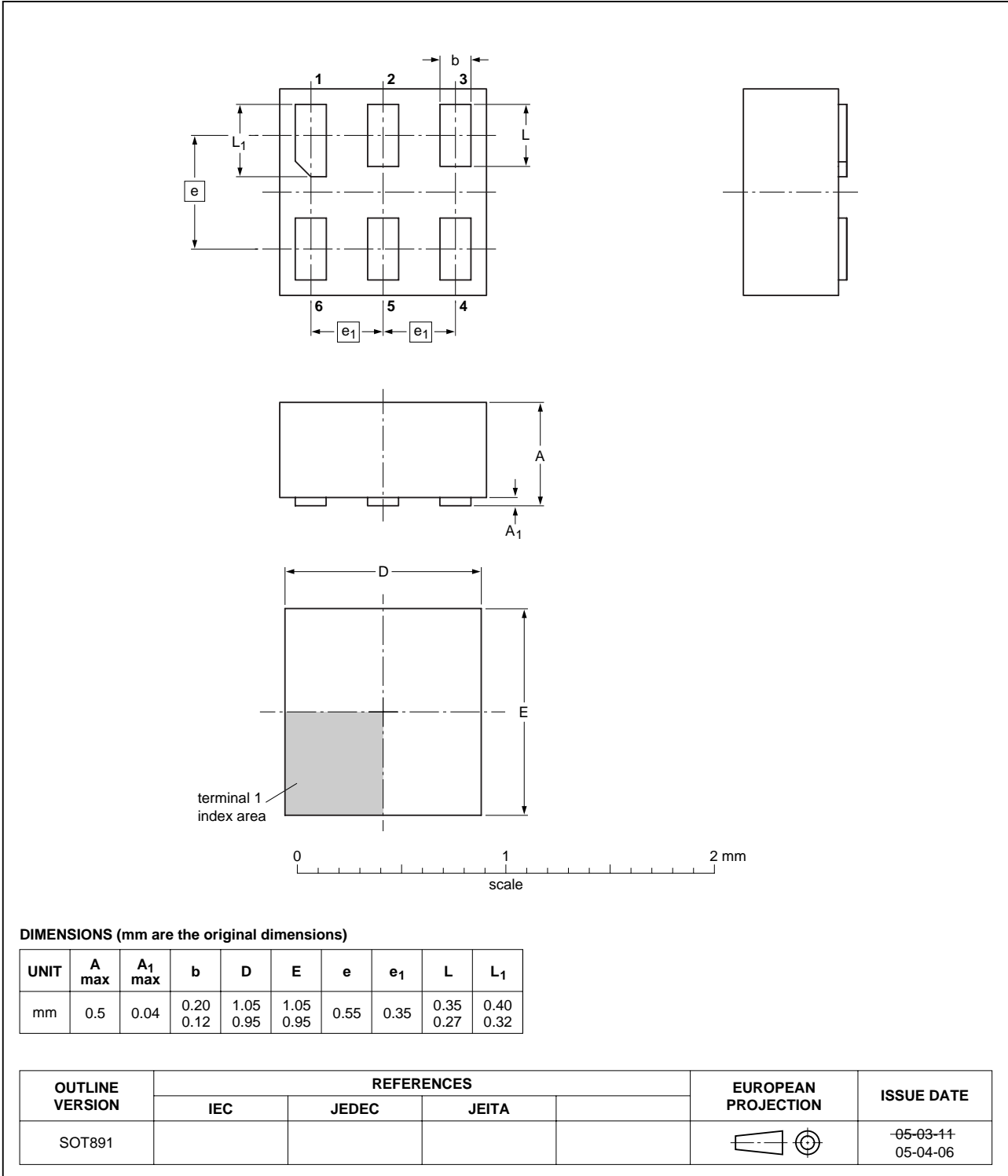


Fig 12. Package outline SOT891 (XSON6)

14. Abbreviations

Table 12. Abbreviations

| Acronym | Description |
|---------|---|
| CDM | Charged Device Model |
| CMOS | Complementary Metal Oxide Semiconductor |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| MM | Machine Model |
| TTL | Transistor-Transistor Logic |

15. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------|--------------|--------------------|---------------|------------|
| 74AUP1G240_1 | 20061106 | 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".

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