

# 74AUP1G373

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

Rev. 7 — 27 March 2020

Product data sheet

## 1. General description

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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 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

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- 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;  $I_{CC} = 0.9 \mu\text{A}$  (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of  $V_{CC}$
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- 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

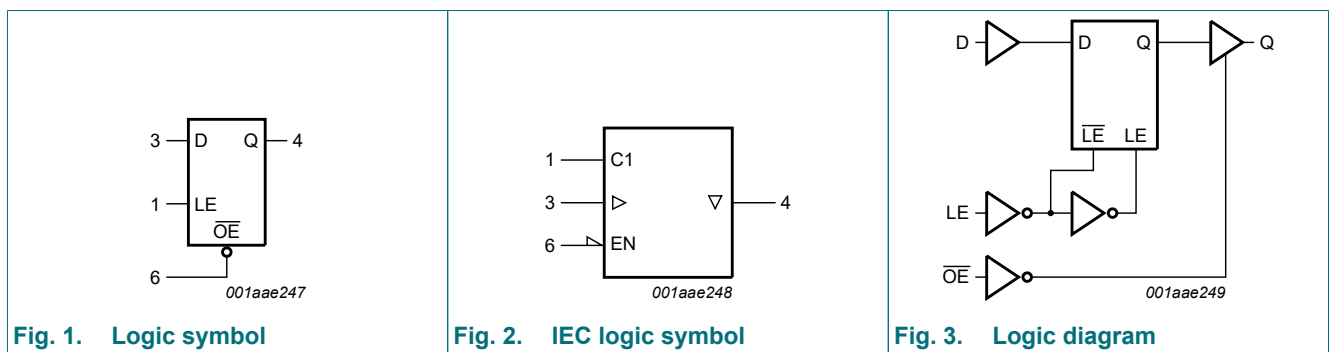
### 4. Marking

Table 2. Marking

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

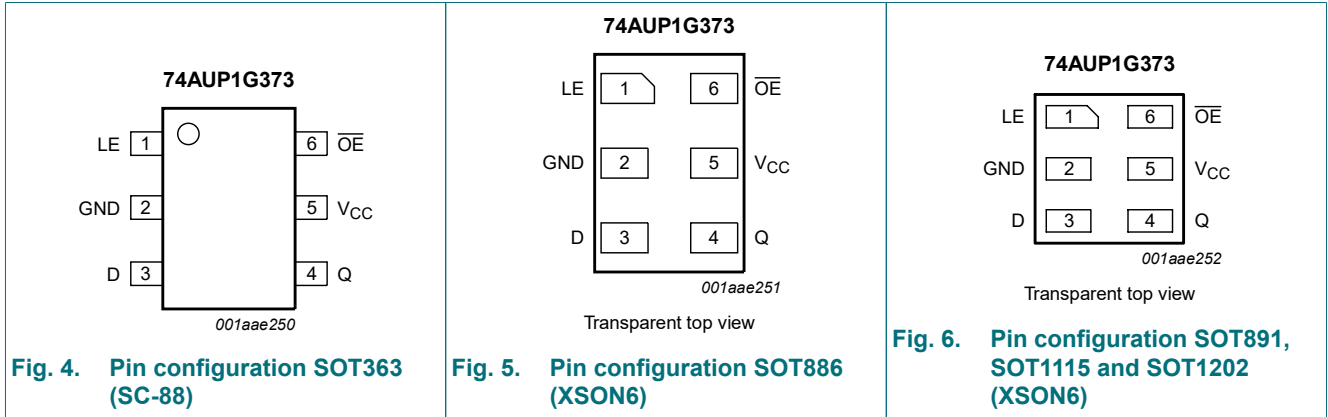
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

### 5. Functional diagram



## 6. Pinning information

### 6.1. Pinning



### 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 <sub>CC</sub>	5	supply voltage
$\overline{OE}$	6	output enable input (active LOW)

## 7. Functional description

Table 4. Function table

*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.*

Operating modes	Input			Internal latch	Output Q
	$\overline{OE}$	LE	D		
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

## 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 SOT363 (SC-88) package:  $P_{tot}$  derates linearly with 3.7 mW/K above 83 °C.

For SOT886 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

For SOT891 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

For SOT1115 (XSON6) package:  $P_{tot}$  derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package:  $P_{tot}$  derates linearly with 3.3 mW/K above 74 °C.

## 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	
<b>T<sub>amb</sub> = 25 °C</b>							
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.70 × V <sub>CC</sub>	-	-	V	
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.65 × V <sub>CC</sub>	-	-	V	
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V	
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V	
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 0.8 V	-	-	0.30 × V <sub>CC</sub>	V	
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.35 × V <sub>CC</sub>	V	
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V	
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V	
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>					
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.1	-	-	V	
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.75 × V <sub>CC</sub>	-	-	V	
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	1.11	-	-	V	
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.32	-	-	V	
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	2.05	-	-	V	
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.9	-	-	V	
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.72	-	-	V	
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>					
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.1	V	
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.3 × V <sub>CC</sub>	V	
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.31	V	
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.31	V	
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.31	V	
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.44	V	
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.31	V	
	I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.1	μA
	I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.1	μA
	I <sub>OFF</sub>	power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.2	μA
	ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.2	μA

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CC}$	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	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	40	$\mu\text{A}$
$C_I$	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	output enabled; $V_O = \text{GND}; V_{CC} = 0 \text{ V}$	-	1.7	-	pF
		output disabled; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}; V_O = \text{GND or } V_{CC}$	-	1.5	-	pF
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.7 \times V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.03	-	-	V
		$I_O = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.30	-	-	V
		$I_O = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.97	-	-	V
		$I_O = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.85	-	-	V
		$I_O = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.67	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = 20 \mu\text{A}; V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.1	V
		$I_O = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.3 \times V_{CC}$	V
		$I_O = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.37	V
		$I_O = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.35	V
		$I_O = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.33	V
		$I_O = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.45	V
		$I_O = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.33	V
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
		$V_I = V_{IH} \text{ or } V_{IL}; V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	$\pm 0.6$	$\mu\text{A}$
$I_{CC}$	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	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}; I_O = 0 \text{ A}; V_{CC} = 3.3 \text{ V}$ [1]	-	-	50	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 0.8 V	0.75 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	0.70 × V <sub>CC</sub>	-	-	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	-	-	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 0.8 V	-	-	0.25 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 0.9 V to 1.95 V	-	-	0.30 × V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	V
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-	0.9	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	V <sub>CC</sub> - 0.11	-	-	V
		I <sub>O</sub> = -1.1 mA; V <sub>CC</sub> = 1.1 V	0.6 × V <sub>CC</sub>	-	-	V
		I <sub>O</sub> = -1.7 mA; V <sub>CC</sub> = 1.4 V	0.93	-	-	V
		I <sub>O</sub> = -1.9 mA; V <sub>CC</sub> = 1.65 V	1.17	-	-	V
		I <sub>O</sub> = -2.3 mA; V <sub>CC</sub> = 2.3 V	1.77	-	-	V
		I <sub>O</sub> = -3.1 mA; V <sub>CC</sub> = 2.3 V	1.67	-	-	V
		I <sub>O</sub> = -2.7 mA; V <sub>CC</sub> = 3.0 V	2.40	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	0.11	V
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	0.33 × V <sub>CC</sub>	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.41	V
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.39	V
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.36	V
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		I <sub>O</sub> = 2.7 mA; V <sub>CC</sub> = 3.0 V	-	-	0.36	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.75	μA
		V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.75	μA
I <sub>OFF</sub>	power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V	-	-	±0.75	μA
ΔI <sub>OFF</sub>	additional power-off leakage current	V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V; V <sub>CC</sub> = 0 V to 0.2 V	-	-	±0.75	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 0.8 V to 3.6 V	-	-	1.4	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 3.3 V [1]	-	-	75	μA

[1] One input at V<sub>CC</sub> - 0.6 V, other input at V<sub>CC</sub> or GND.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

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

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



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

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

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

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

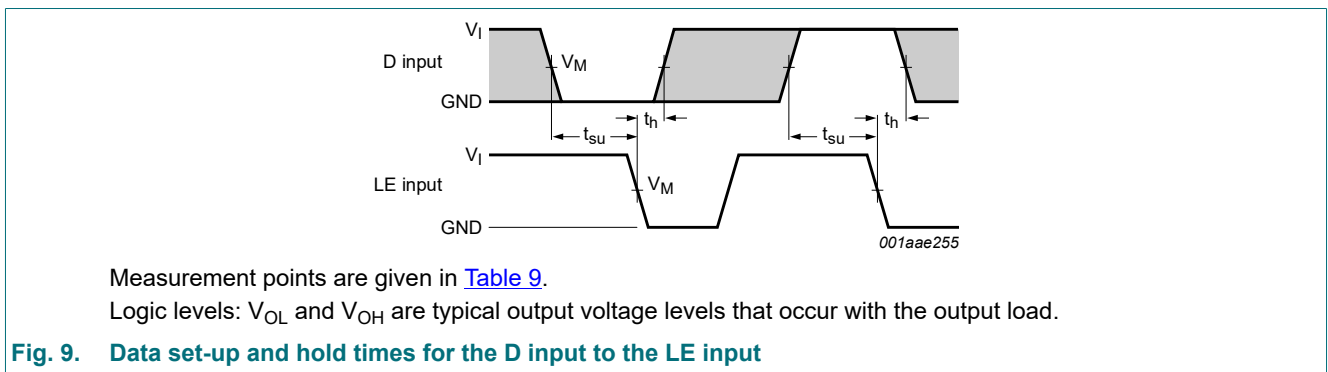
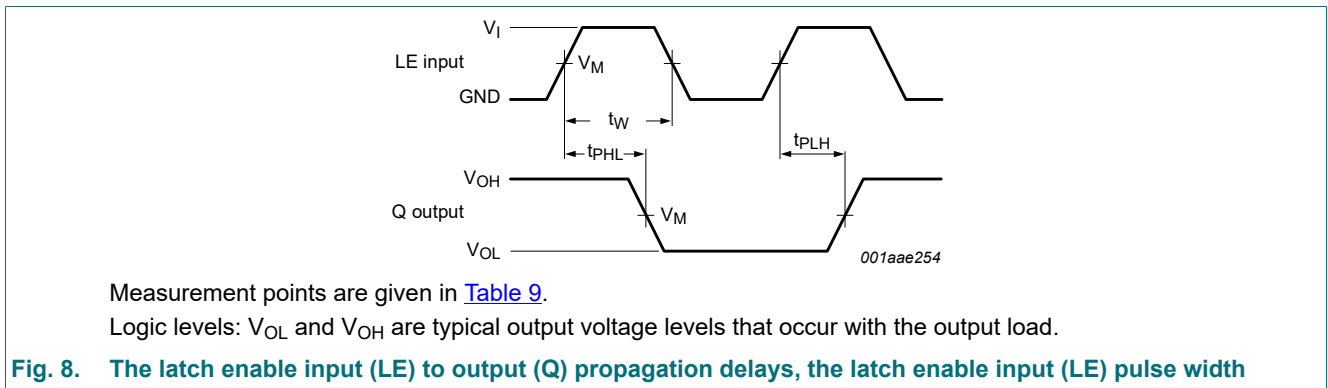
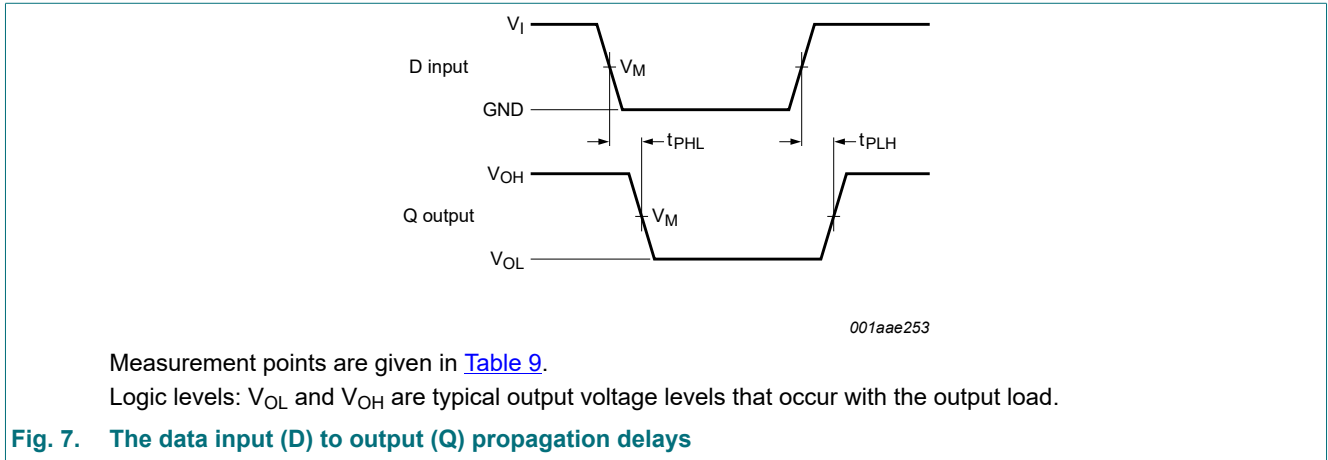
## Low-power D-type transparent latch; 3-state

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	Min	Max	
t <sub>su(H)</sub>	set-up time HIGH	D to LE; see Fig. 9								
		V <sub>CC</sub> = 0.8 V	-	4.6	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	0.9	-	2.2	-	2.2	-	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	0.6	-	1.4	-	1.4	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	0.4	-	1.0	-	1.0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	0	-	0.6	-	0.6	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-0.1	-	0.4	-	0.4	-	ns
t <sub>su(L)</sub>	set-up time LOW	D to LE; see Fig. 9								
		V <sub>CC</sub> = 0.8 V	-	4.0	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	1.2	-	2.7	-	2.7	-	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	0.7	-	1.5	-	1.5	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	0.6	-	1.2	-	1.2	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	0.4	-	0.9	-	0.9	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	0.3	-	0.7	-	0.7	-	ns
t <sub>h</sub>	hold time	D to LE HIGH or LOW; see Fig. 9								
		V <sub>CC</sub> = 0.8 V	-	-4.6	-	-	-	-	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	-0.9	-	-0.1	-	-0.1	-	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	-0.6	-	-0.1	-	-0.1	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	-0.4	-	0	-	0	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-0.2	-	0.2	-	0.2	-	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	-0.1	-	0.3	-	0.3	-	ns
C <sub>PD</sub>	power dissipation capacitance	f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> ; [5] [6] output enabled								
		V <sub>CC</sub> = 0.8 V	-	2.0	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.0	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.0	-	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	2.1	-	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	2.4	-	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	2.8	-	-	-	-	-	pF

- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
- [3] t<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.
- [4] t<sub>dis</sub> is the same as t<sub>PHZ</sub> and t<sub>PLZ</sub>.
- [5] All specified values are the average typical values over all stated loads.
- [6] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs;  
 N = number of inputs switching.

11.1. Waveforms



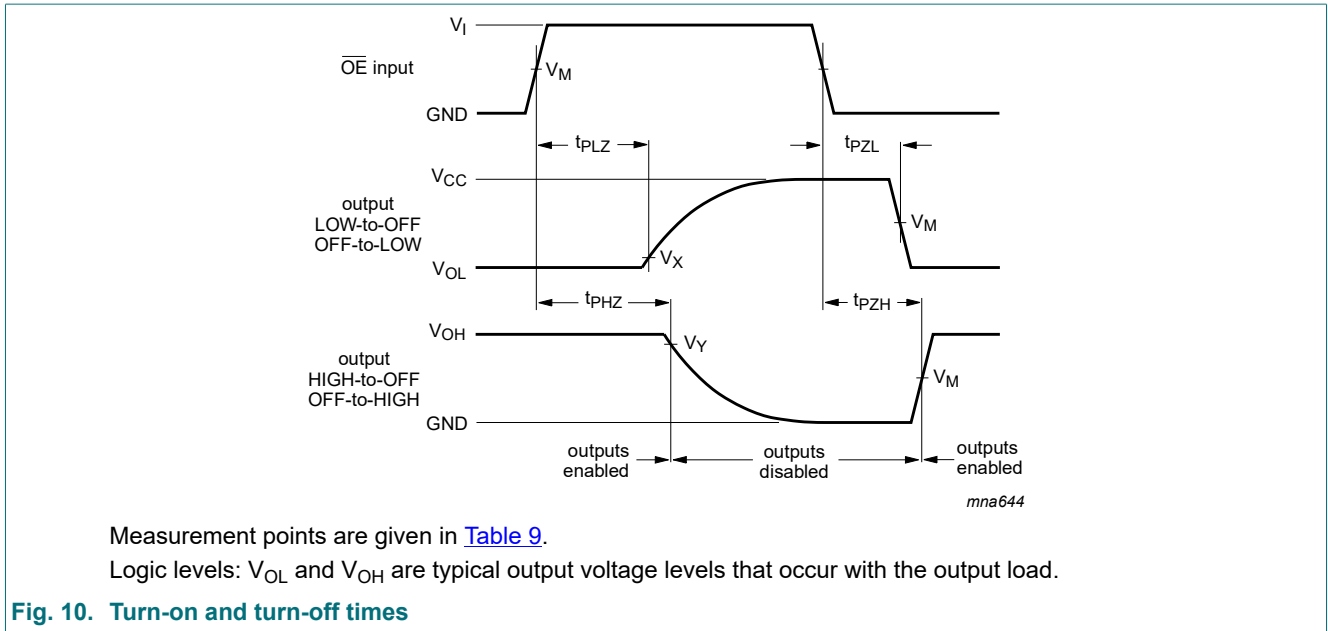


Table 9. Measurement points

Supply voltage	Input			Output		
$V_{CC}$	$V_M$	$V_I$	$t_r = t_f$	$V_M$	$V_X$	$V_Y$
0.8 V to 1.6 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.1$ V	$V_{OH} - 0.1$ V
1.65 V to 2.7 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.15$ V	$V_{OH} - 0.15$ V
3.0 V to 3.6 V	$0.5 \times V_{CC}$	$V_{CC}$	$\leq 3.0$ ns	$0.5 \times V_{CC}$	$V_{OL} + 0.3$ V	$V_{OH} - 0.3$ V

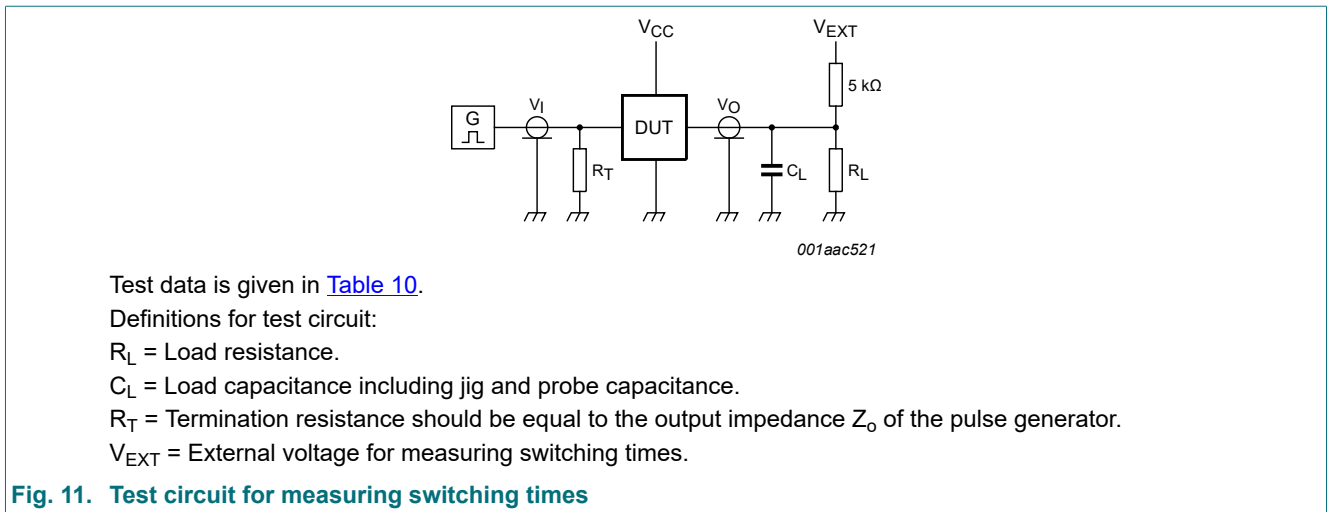


Table 10. Test data

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  $R_L = 5$  kΩ.  
 For measuring propagation delays, setup and hold times and pulse width  $R_L = 1$  MΩ.

## 12. Package outline

Plastic surface-mounted package; 6 leads

SOT363

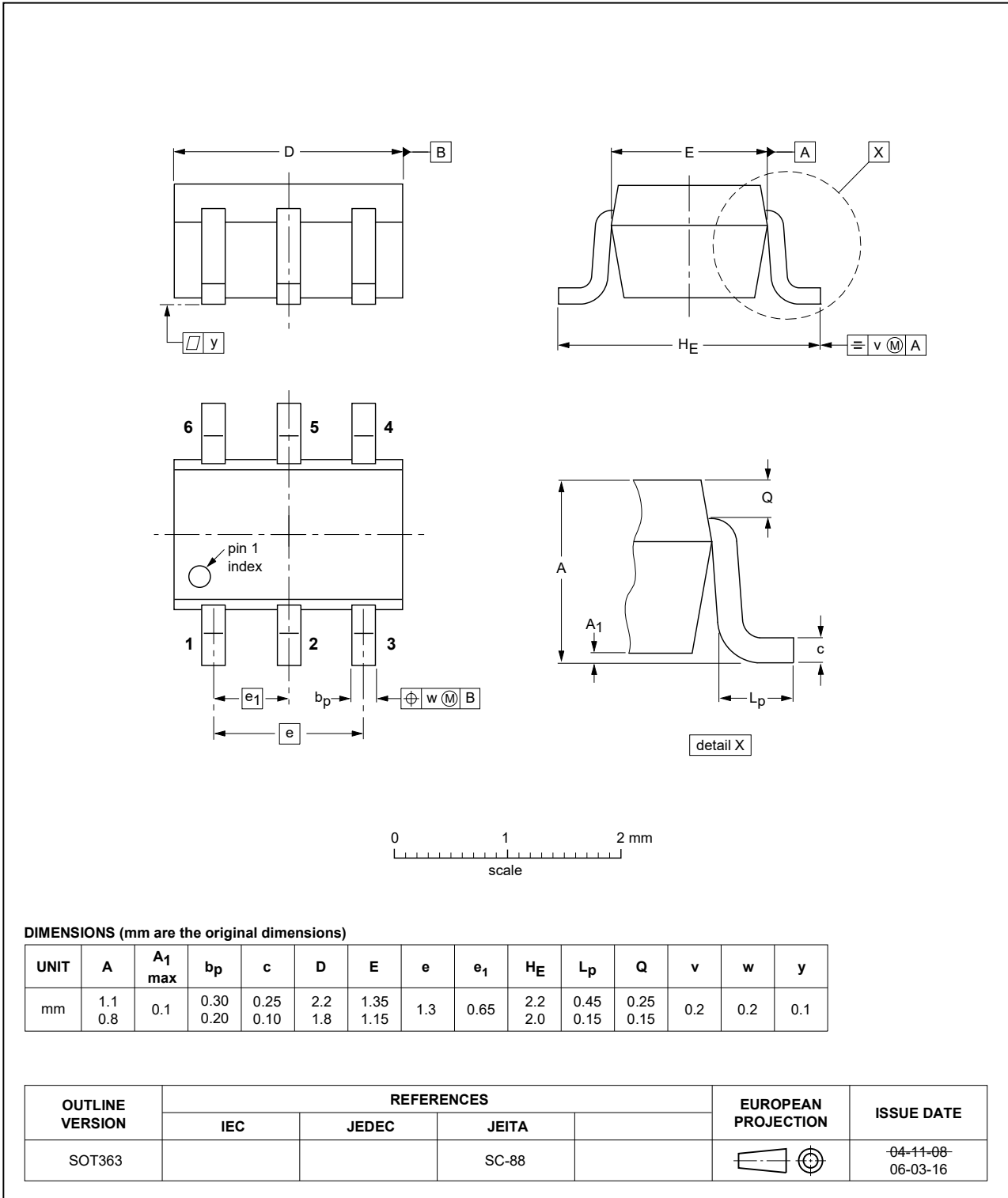


Fig. 12. Package outline SOT363 (SC-88)

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

SOT886

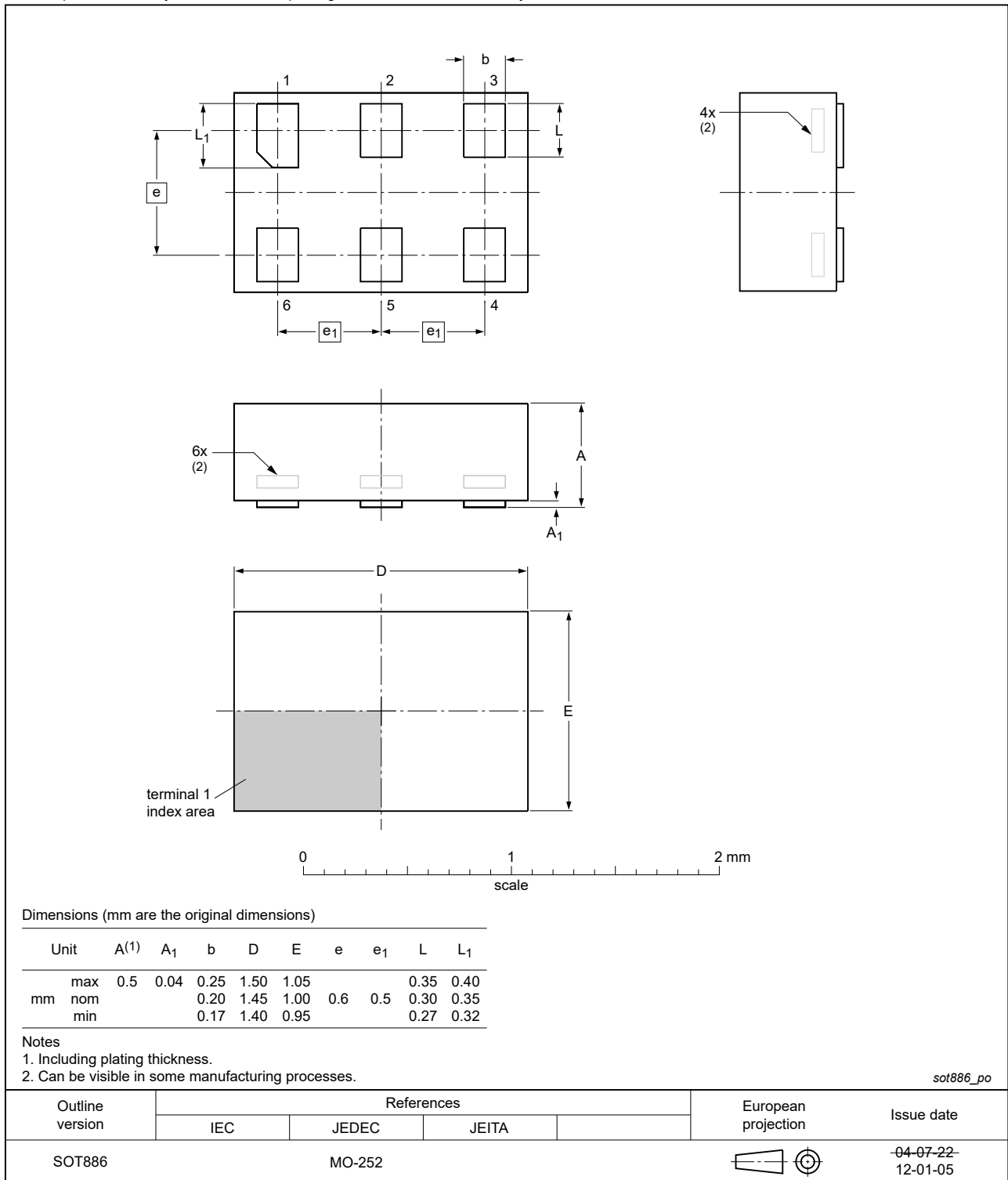


Fig. 13. Package outline SOT886 (XSON6)



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

SOT891

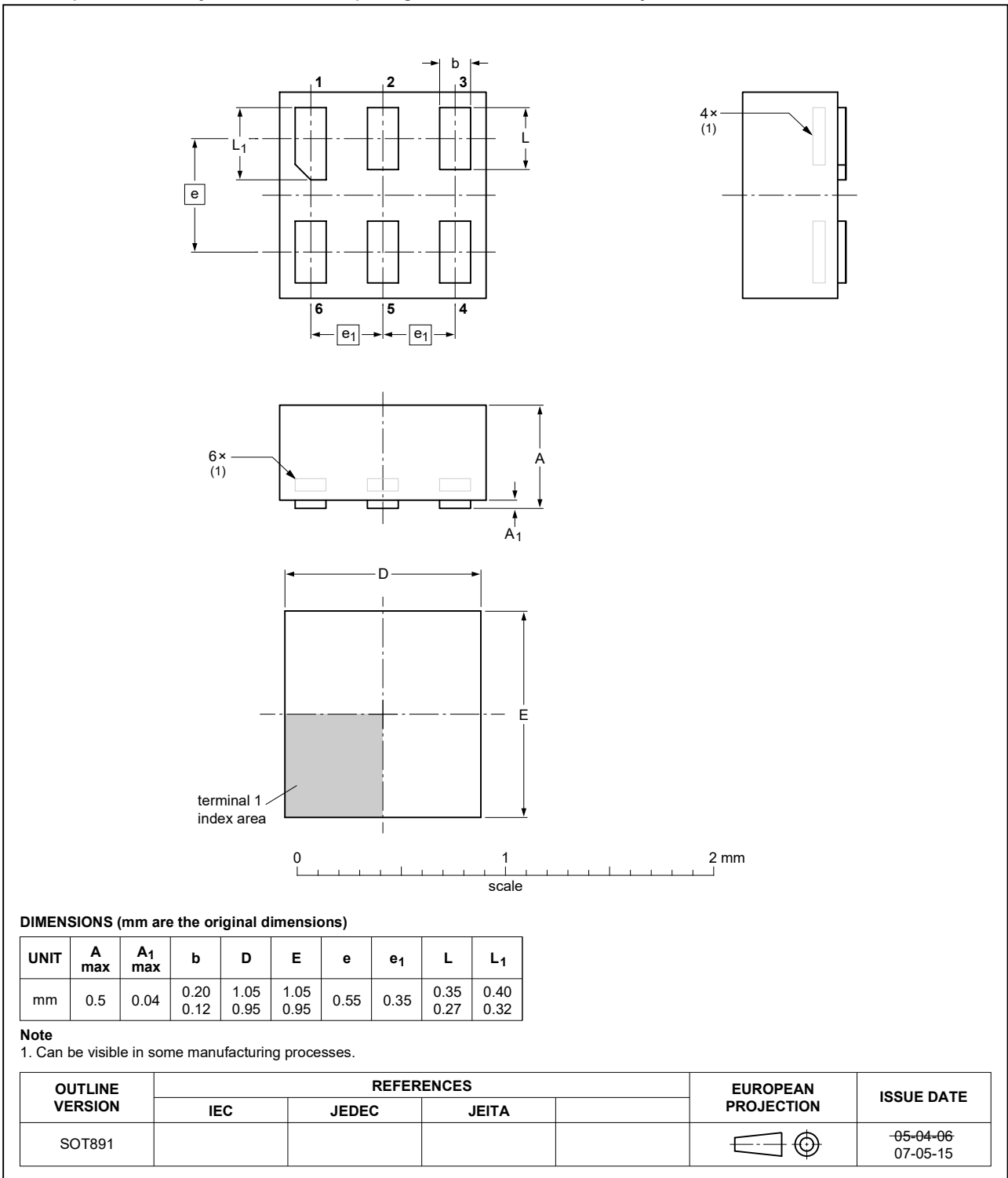


Fig. 14. Package outline SOT891 (XSON6)

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

SOT1115

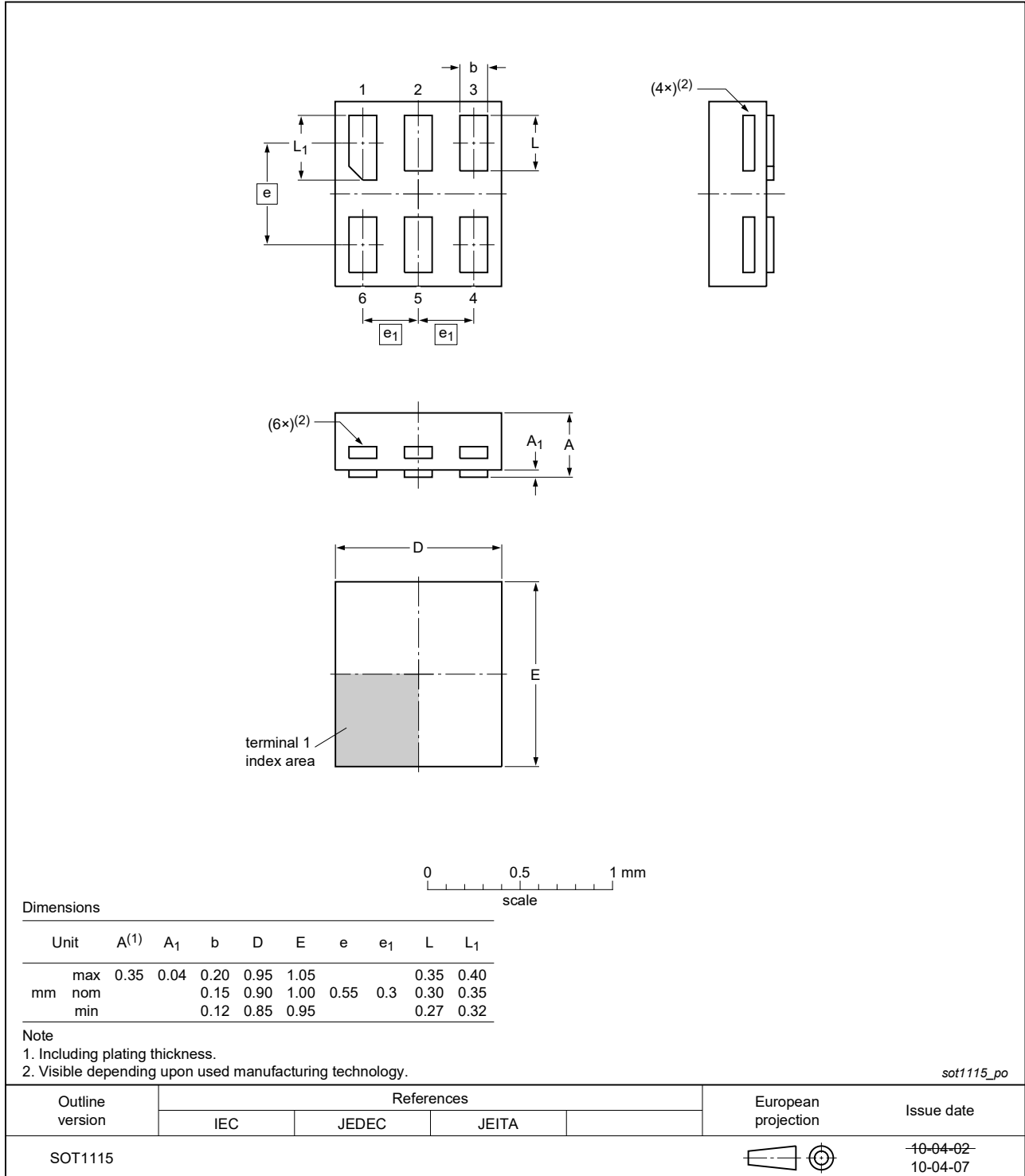


Fig. 15. Package outline SOT1115 (XSON6)

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

SOT1202

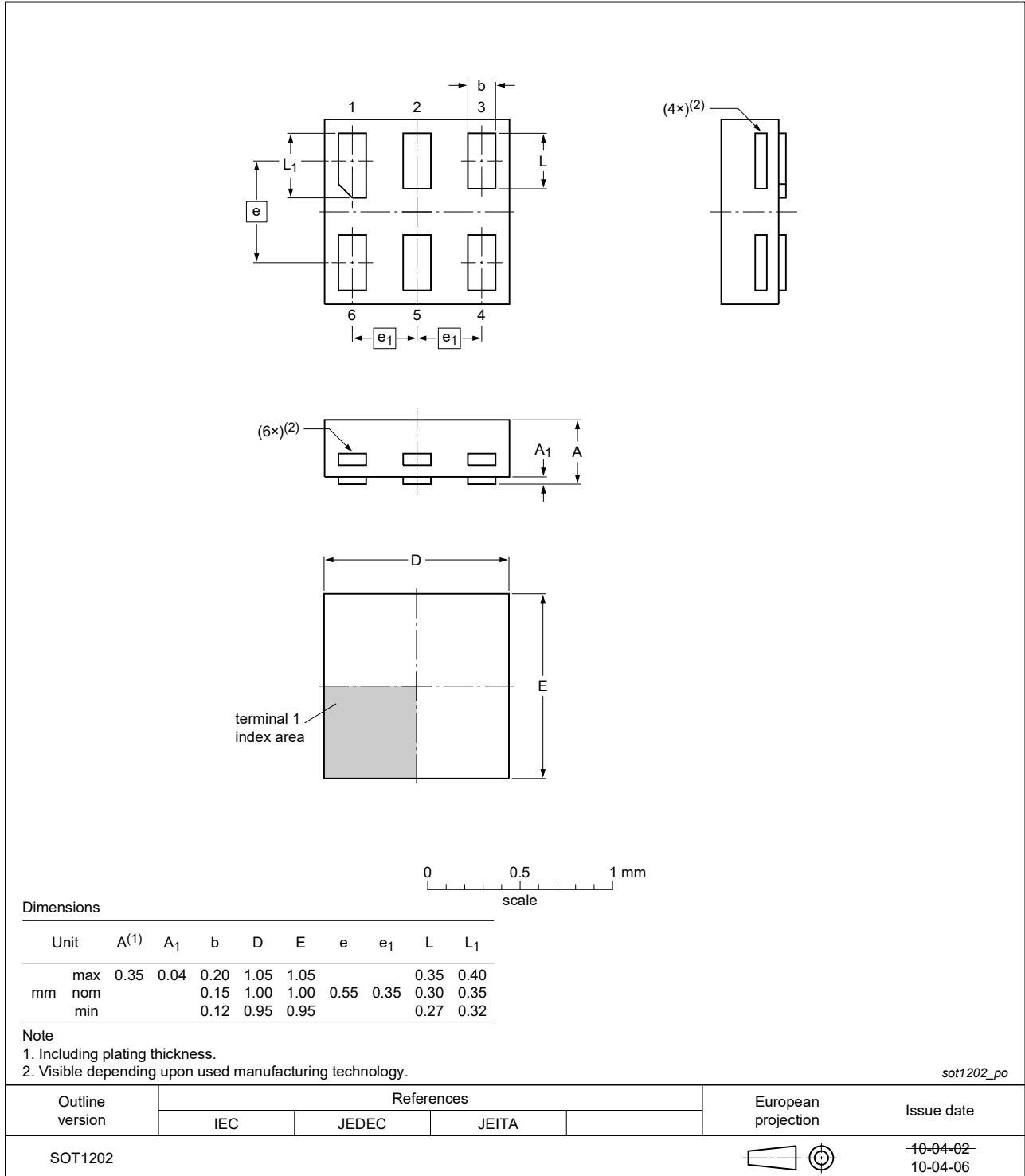


Fig. 16. Package outline SOT1202 (XSON6)

## 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
74AUP1G373 v.7	20200327	Product data sheet	-	74AUP1G373 v.6
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>			
74AUP1G373 v.6	20120704	Product data sheet	-	74AUP1G373 v.5
Modifications:	<ul style="list-style-type: none"> <li>Package outline drawing of SOT886 (<a href="#">Fig. 13</a>) modified.</li> </ul>			
74AUP1G373 v.5	20111125	Product data sheet	-	74AUP1G373 v.4
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74AUP1G373 v.4	20100715	Product data sheet	-	74AUP1G373 v.3
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	-	-

## 15. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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