

# 74AUP1G332

Low-power 3-input OR gate

Rev. 01.00 — 27 February 2006

Preliminary data sheet

## 1. General description

The 74AUP1G332 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 74AUP1G332 provides a single 3-input OR gate.

## 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-C Class 3A. Exceeds 4000 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  $V_{CC}$
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

**PHILIPS**

### 3. Quick reference data

**Table 1: Quick reference data**

$GND = 0\text{ V}$ ;  $T_{amb} = 25\text{ °C}$ ;  $t_r = t_f \leq 3\text{ ns}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PHL}$ , $t_{PLH}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 0.8\text{ V}$	-	17.6	-	ns
		$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 1.1\text{ V to }1.3\text{ V}$	2.3	5.2	10.2	ns
		$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 1.4\text{ V to }1.6\text{ V}$	1.7	3.7	6.0	ns
		$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.6	3.0	4.7	ns
		$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	2.3	3.3	ns
		$C_L = 5\text{ pF}$ ; $R_L = 1\text{ M}\Omega$ ; $V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.2	2.1	2.9	ns
$C_I$	input capacitance		-	1.0	-	pF
$C_{PD}$	power dissipation capacitance	$V_{CC} = 1.8\text{ V}$ ; $f = 1\text{ MHz}$	[1][2]	3.4	-	pF
		$V_{CC} = 3.3\text{ V}$ ; $f = 1\text{ MHz}$	[1][2]	4.3	-	pF

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = 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.

[2] The condition is  $V_I = GND$  to  $V_{CC}$ .

### 4. Ordering information

**Table 2: Ordering information**

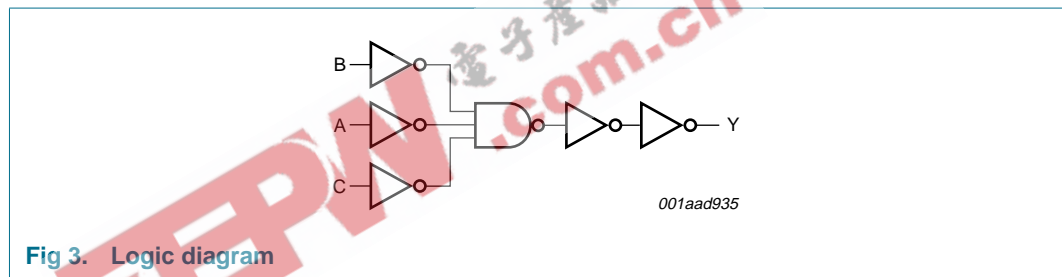
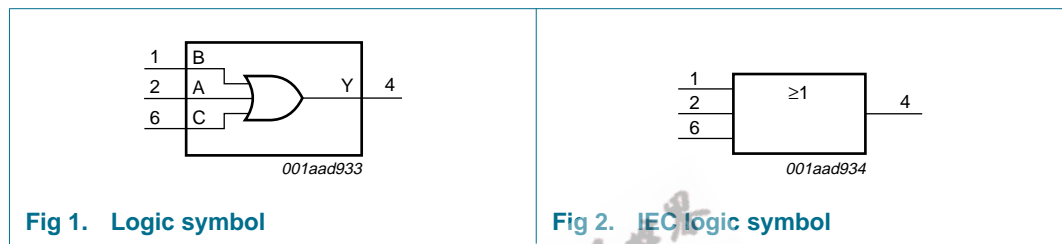
Type number	Package			Version
	Temperature range	Name	Description	
74AUP1G332GW	-40 °C to +125 °C	SC-88	plastic surface mounted package; 6 leads	SOT363
74AUP1G332GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body $1 \times 1.45 \times 0.5\text{ mm}$	SOT886
74AUP1G332GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body $1 \times 1 \times 0.5\text{ mm}$	SOT891

## 5. Marking

Table 3: Marking

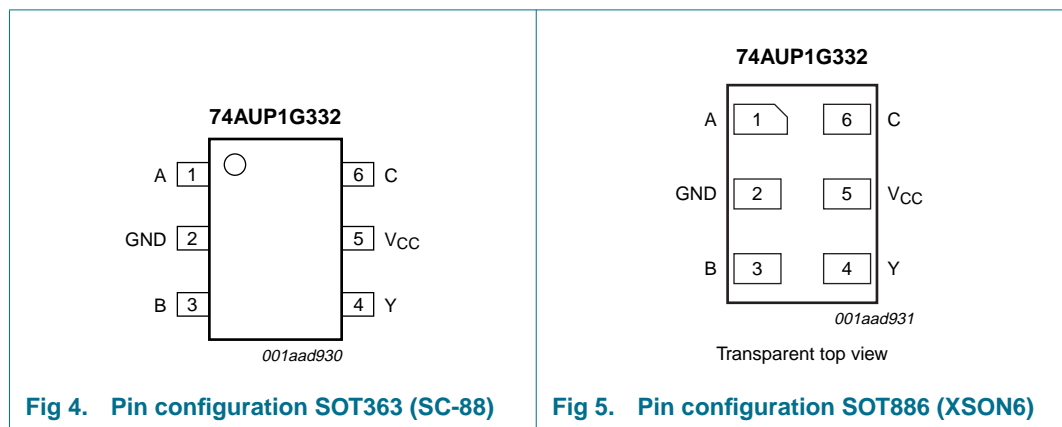
Type number	Marking code
74AUP1G332GW	aG
74AUP1G332GM	aG
74AUP1G332GF	aG

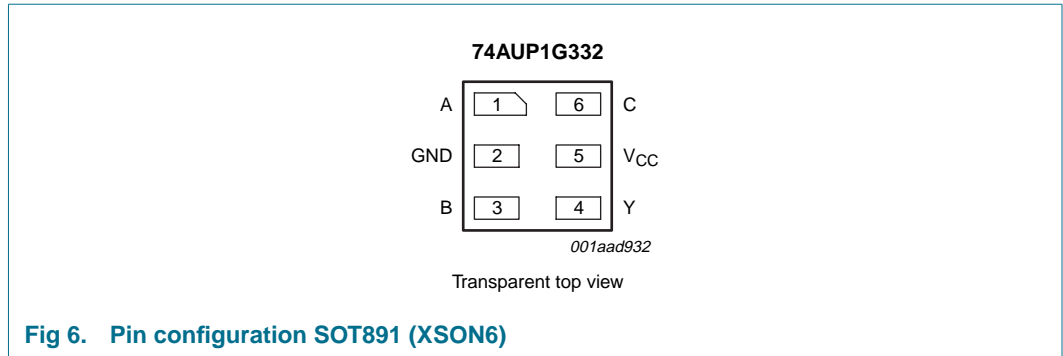
## 6. Functional diagram



## 7. Pinning information

### 7.1 Pinning





## 7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
A	1	data input A
GND	2	ground (0 V)
B	3	data input B
Y	4	data output Y
V <sub>CC</sub>	5	supply voltage
C	6	data input C

## 8. Functional description

### 8.1 Function table

Table 5: Function table [\[1\]](#)

Input			Output
A	B	C	Y
H	X	X	H
X	H	X	H
X	X	H	H
L	L	L	L

- [1] H = HIGH voltage level;  
L = LOW voltage level;  
X = don't care.

## 9. Limiting values

**Table 6: 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
$I_{CC}$	quiescent supply current		-	+50	mA
$I_{GND}$	ground current		-	-50	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C	[2] -	250	mW

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SC-88 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.

## 10. Recommended operating conditions

**Table 7: 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

## 11. Static characteristics

**Table 8: 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-state 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-state 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-state 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
		I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V	2.6	-	-	V
V <sub>OL</sub>	LOW-state 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>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.44	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>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
I <sub>CC</sub>	quiescent 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	-	-	0.5	μA
ΔI <sub>CC</sub>	additional quiescent 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	-	-	40	μA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 0 V to 3.6 V; V <sub>I</sub> = GND or V <sub>CC</sub>	-	1.0	-	pF
C <sub>O</sub>	output capacitance	V <sub>O</sub> = GND; V <sub>CC</sub> = 0 V	-	1.8	-	pF

**Table 8: Static characteristics ...continued**

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

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

**Table 8: Static characteristics ...continued**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-state 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-state 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-state 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-state 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> 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>	quiescent 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 quiescent 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	-	-	75	μA



## 12. Dynamic characteristics

**Table 9: Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#)

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
<b><math>T_{amb} = 25\text{ }^{\circ}\text{C}; C_L = 5\text{ pF}</math></b>						
$t_{PHL}, t_{PLH}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>				
		$V_{CC} = 0.8\text{ V}$	-	17.6	-	ns
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	2.3	5.2	10.2	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	1.7	3.7	6.0	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.6	3.0	4.7	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	2.3	3.3	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.2	2.1	2.9	ns
<b><math>T_{amb} = 25\text{ }^{\circ}\text{C}; C_L = 10\text{ pF}</math></b>						
$t_{PHL}, t_{PLH}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>				
		$V_{CC} = 0.8\text{ V}$	-	17.6	-	ns
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	2.5	6.1	11.9	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	2.2	4.3	7.1	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.1	3.5	5.4	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	2.9	4.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.5	2.6	3.7	ns
<b><math>T_{amb} = 25\text{ }^{\circ}\text{C}; C_L = 15\text{ pF}</math></b>						
$t_{PHL}, t_{PLH}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>				
		$V_{CC} = 0.8\text{ V}$	-	23.6	-	ns
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	2.9	6.9	13.5	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	2.5	4.9	7.8	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.2	4.0	6.2	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.0	3.3	4.7	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.9	3.1	4.2	ns
<b><math>T_{amb} = 25\text{ }^{\circ}\text{C}; C_L = 30\text{ pF}</math></b>						
$t_{PHL}, t_{PLH}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>				
		$V_{CC} = 0.8\text{ V}$	-	36.3	-	ns
		$V_{CC} = 1.1\text{ V to }1.3\text{ V}$	3.6	9.2	17.9	ns
		$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	3.2	6.4	10.4	ns
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	3.0	5.3	8.3	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.8	4.4	6.2	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.6	4.2	5.5	ns

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

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
C <sub>PD</sub>	power dissipation capacitance	f = 1 MHz	[2] [3]			
		V <sub>CC</sub> = 0.8 V	-	3.1	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	3.2	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	3.2	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.4	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.8	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.3	-	pF

- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2] 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> = load capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.
- [3] The condition is V<sub>I</sub> = GND to V<sub>CC</sub>.

**Table 10: Dynamic characteristics**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#)

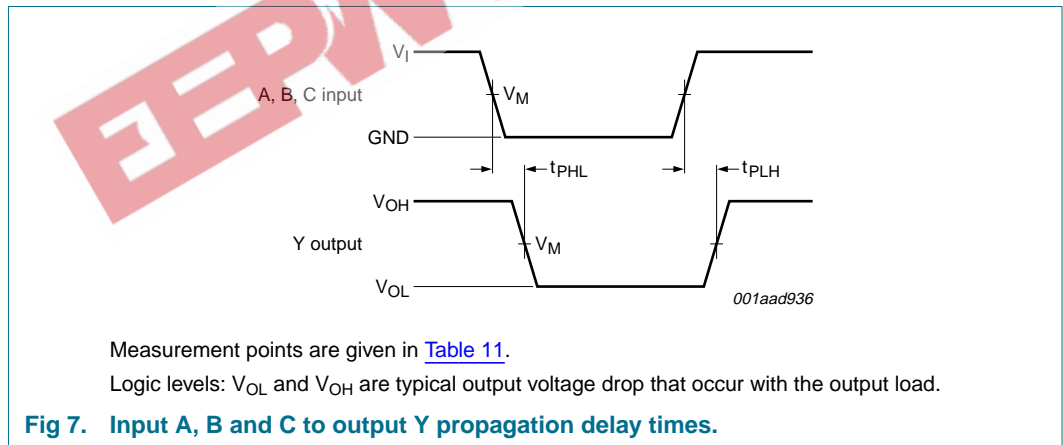
Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b>C<sub>L</sub> = 5 pF</b>							
t <sub>PHL</sub> , t <sub>PLH</sub>	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.0	10.3	2.0	10.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.9	6.4	1.9	6.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.4	5.2	1.4	5.4	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.2	3.7	1.2	3.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.1	3.1	1.1	3.3	ns
<b>C<sub>L</sub> = 10 pF</b>							
t <sub>PHL</sub> , t <sub>PLH</sub>	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.4	12.0	2.4	12.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.0	7.3	2.0	7.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	5.8	1.9	6.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.5	4.5	1.5	4.7	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.4	3.9	1.4	4.1	ns

**Table 10: Dynamic characteristics ...continued**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#)

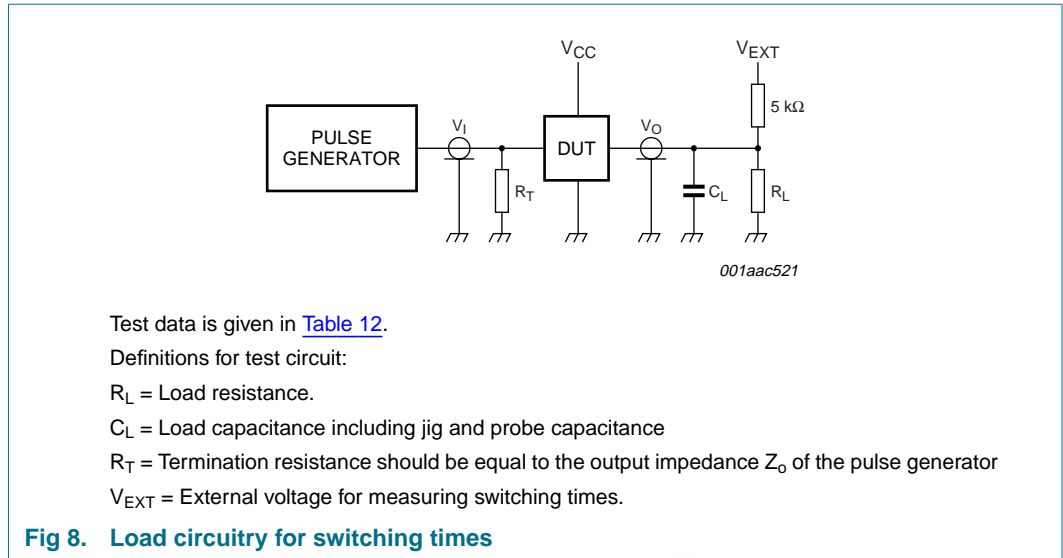
Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b><math>C_L = 15 \text{ pF}</math></b>							
$t_{\text{PHL}}, t_{\text{PLH}}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>					
		$V_{\text{CC}} = 1.1 \text{ V to } 1.3 \text{ V}$	2.7	13.6	2.7	13.6	ns
		$V_{\text{CC}} = 1.4 \text{ V to } 1.6 \text{ V}$	2.4	8.5	2.4	8.8	ns
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	2.1	6.8	2.1	7.1	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	5.2	1.6	5.4	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	1.7	4.5	1.7	4.8	ns
<b><math>C_L = 30 \text{ pF}</math></b>							
$t_{\text{PHL}}, t_{\text{PLH}}$	HIGH-to-LOW and LOW-to-HIGH propagation delay A, B and C to Y	see <a href="#">Figure 7</a>					
		$V_{\text{CC}} = 1.1 \text{ V to } 1.3 \text{ V}$	3.5	18.4	3.5	18.7	ns
		$V_{\text{CC}} = 1.4 \text{ V to } 1.6 \text{ V}$	3.3	11.4	3.3	11.9	ns
		$V_{\text{CC}} = 1.65 \text{ V to } 1.95 \text{ V}$	2.9	9.1	2.9	9.6	ns
		$V_{\text{CC}} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	6.7	1.6	7.1	ns
		$V_{\text{CC}} = 3.0 \text{ V to } 3.6 \text{ V}$	1.4	6.4	1.4	6.7	ns

### 13. Waveforms



**Table 11: Measurement points**

Supply voltage	Output	Input		
$V_{\text{CC}}$	$V_{\text{M}}$	$V_{\text{M}}$	$V_{\text{I}}$	$t_r = t_f$
0.8 V to 3.6 V	$0.5 \times V_{\text{CC}}$	$0.5 \times V_{\text{CC}}$	$V_{\text{CC}}$	$\leq 3.0 \text{ ns}$



**Fig 8. Load circuitry for switching times**

**Table 12: 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  $R_L = 1 \text{ M}\Omega$

14. Package outline

Plastic surface mounted package; 6 leads

SOT363

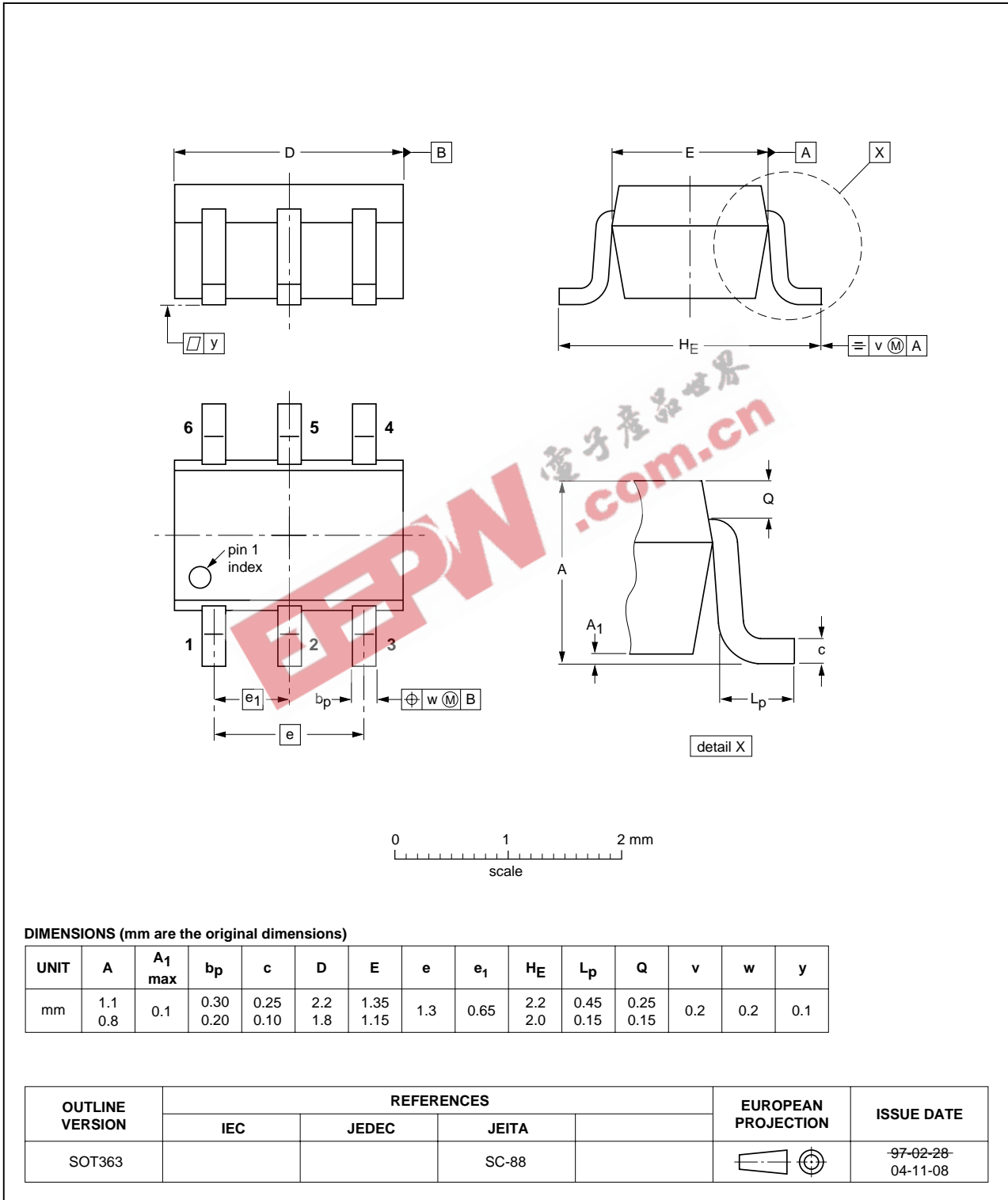


Fig 9. Package outline SOT363 (SC-88)

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

SOT886

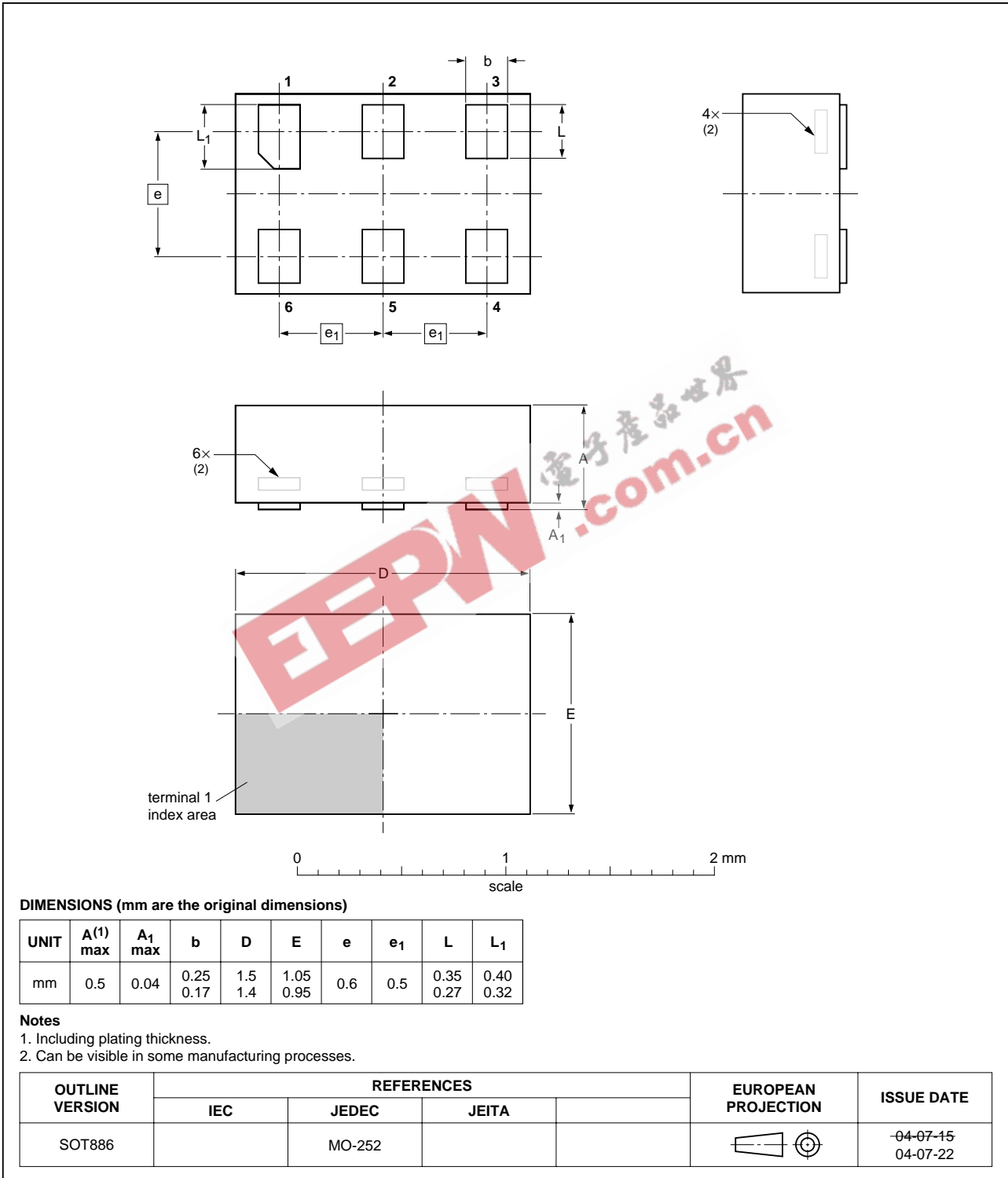


Fig 10. Package outline SOT886 (XSON6)

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

SOT891

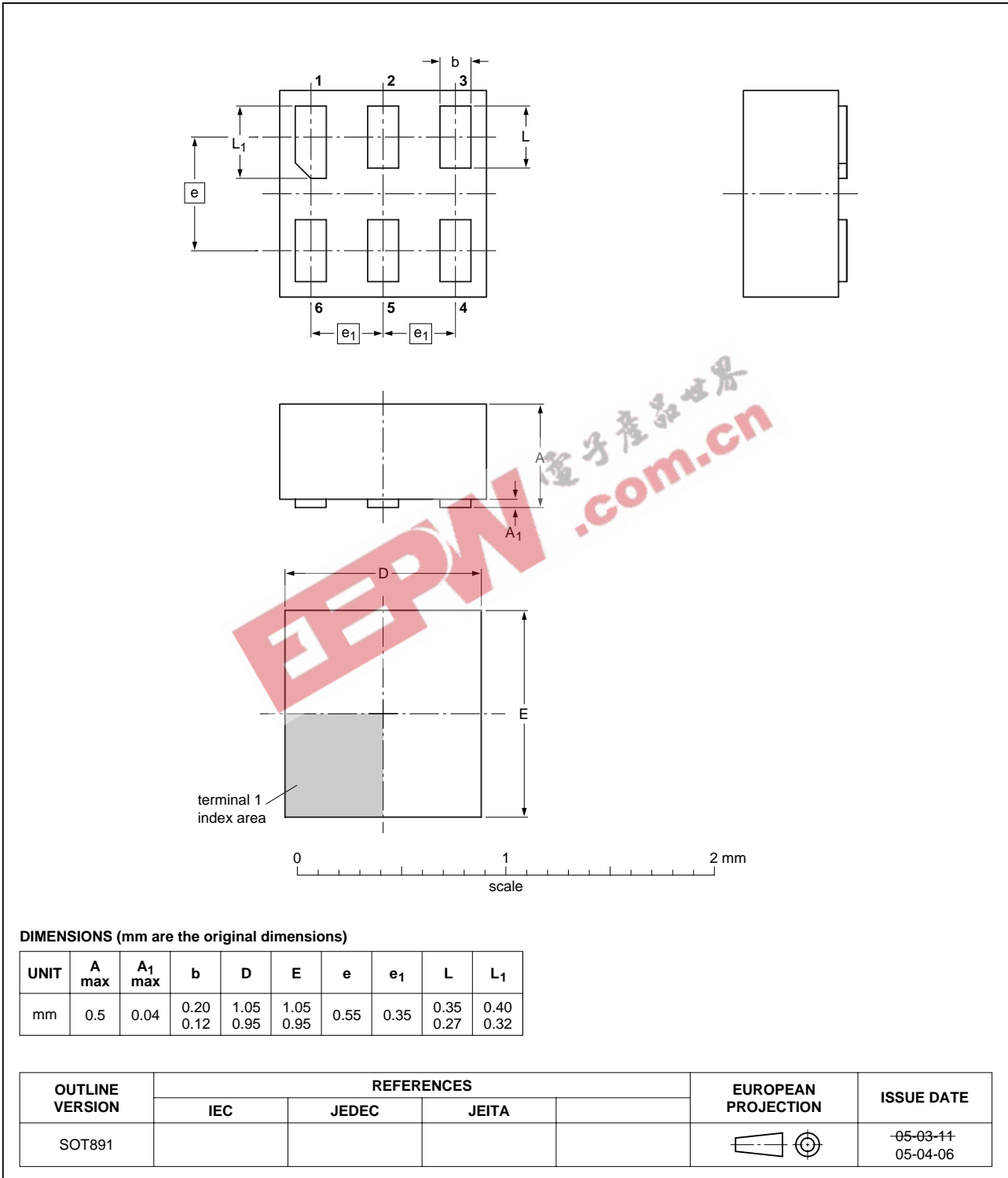


Fig 11. Package outline SOT891 (XSON6)

## 15. Abbreviations

**Table 13: 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

## 16. Revision history

**Table 14: Revision history**

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74AUP1G332_1	20060227	Preliminary data sheet	-	-	-

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## 17. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
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