

# 74AUP1G3208

Low-power 3-input OR-AND gate

Rev. 7 — 7 March 2017

Product data sheet

## 1 General description

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The 74AUP1G3208 provides the Boolean function:  $Y = (A + B) \times C$ . The user can choose the logic functions OR, AND and OR-AND. All inputs can be connected to  $V_{CC}$  or GND.

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			Version
	Temperature range	Name	Description	
74AUP1G3208GW	-40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74AUP1G3208GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G3208GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891
74AUP1G3208GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115
74AUP1G3208GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202
74AUP1G3208GX	-40 °C to +125 °C	X2SON6	plastic thermal extremely thin small outline package; no leads; 6 terminals; body 1 × 0.8 × 0.35 mm	SOT1255

### 4 Marking

Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AUP1G3208GW	a2
74AUP1G3208GM	a2
74AUP1G3208GF	a2
74AUP1G3208GN	a2
74AUP1G3208GS	a2
74AUP1G3208GX	a2

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

### 5 Functional diagram

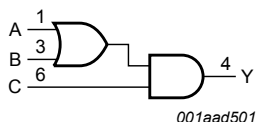


Figure 1. Logic symbol

## 6 Pinning information

### 6.1 Pinning

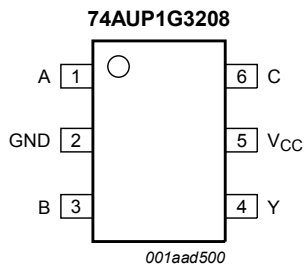


Figure 2. Pin configuration SOT363

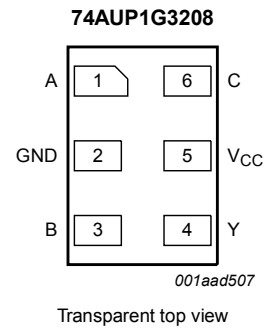


Figure 3. Pin configuration SOT886

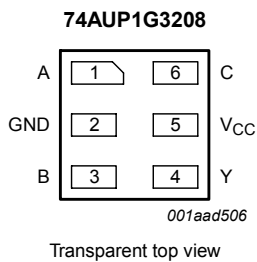


Figure 4. Pin configuration SOT891, SOT1115 and SOT1202

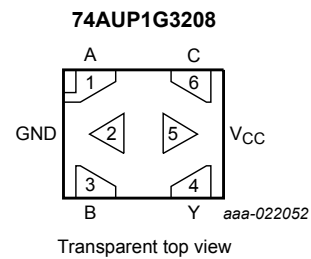


Figure 5. Pin configuration SOT1255 (X2SON6)

### 6.2 Pin description

Table 3. 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

## 7 Functional description

Table 4. Function table <sup>[1]</sup>

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

[1] H = HIGH voltage level;  
L = LOW voltage level.

### 7.1 Logic configurations

Table 5. Function selection table

Logic function	Figure
2-input AND	see <a href="#">Figure 6</a> and <a href="#">Figure 7</a>
2-input OR	see <a href="#">Figure 8</a>
3-input gate with the Boolean function: $Y = (A + B) \times C$	see <a href="#">Figure 9</a>

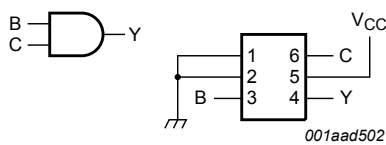


Figure 6. 2-input AND gate

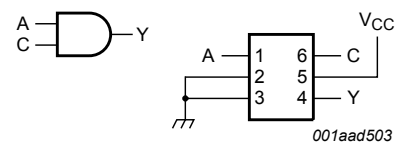


Figure 7. 2-input AND gate

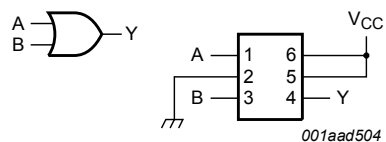


Figure 8. 2-input OR gate

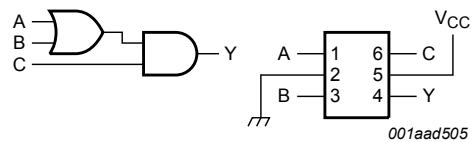


Figure 9. 3-input gate with the Boolean function:  $Y = (A + B) \times C$

## 8 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
$V_I$	input voltage		[1] -0.5	+4.6	V
$V_O$	output voltage	Active mode and Power-down mode	[1] -0.5	+4.6	V
$I_{IK}$	input clamping current	$V_I < 0$ V	-50	-	mA
$I_{OK}$	output clamping current	$V_O < 0$ V	-50	-	mA
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	±20	mA
$I_{CC}$	supply current		-	50	mA
$I_{GND}$	ground current		-50	-	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C	[2] -	250	mW

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

[2] For SC-88 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
For XSON6 and X2SON6 packages: above 118 °C the value of  $P_{tot}$  derates linearly with 7.8 mW/K.

## 9 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	-	200	ns/V

## 10 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
$T_{amb} = 25\text{ }^{\circ}\text{C}$						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8\text{ V}$	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8\text{ V}$	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 0.9\text{ V to }1.95\text{ V}$	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}\text{ or }V_{IL}$				
		$I_O = -20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1\text{ mA}; V_{CC} = 1.1\text{ V}$	$0.75 \times V_{CC}$	-	-	V
		$I_O = -1.7\text{ mA}; V_{CC} = 1.4\text{ V}$	1.11	-	-	V
		$I_O = -1.9\text{ mA}; V_{CC} = 1.65\text{ V}$	1.32	-	-	V
		$I_O = -2.3\text{ mA}; V_{CC} = 2.3\text{ V}$	2.05	-	-	V
		$I_O = -3.1\text{ mA}; V_{CC} = 2.3\text{ V}$	1.9	-	-	V
		$I_O = -2.7\text{ mA}; V_{CC} = 3.0\text{ V}$	2.72	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}\text{ or }V_{IL}$				
		$I_O = 20\text{ }\mu\text{A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.1	V
		$I_O = 1.1\text{ mA}; V_{CC} = 1.1\text{ V}$	-	-	$0.3 \times V_{CC}$	V
		$I_O = 1.7\text{ mA}; V_{CC} = 1.4\text{ V}$	-	-	0.31	V
		$I_O = 1.9\text{ mA}; V_{CC} = 1.65\text{ V}$	-	-	0.31	V
		$I_O = 2.3\text{ mA}; V_{CC} = 2.3\text{ V}$	-	-	0.31	V
		$I_O = 3.1\text{ mA}; V_{CC} = 2.3\text{ V}$	-	-	0.44	V
		$I_O = 2.7\text{ mA}; V_{CC} = 3.0\text{ V}$	-	-	0.31	V
	$I_O = 4.0\text{ mA}; V_{CC} = 3.0\text{ V}$	-	-	0.44	V	
$I_I$	input leakage current	$V_I = \text{GND to }3.6\text{ V}; V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	$\pm 0.1$	$\mu\text{A}$
$I_{OFF}$	power-off leakage current	$V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}; V_{CC} = 0\text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I\text{ or }V_O = 0\text{ V to }3.6\text{ V}; V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	$\pm 0.2$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND or }V_{CC}; I_O = 0\text{ A}; V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	0.5	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta I_{CC}$	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	-	$\text{pF}$
$C_O$	output capacitance	$V_O = \text{GND}$ ; $V_{CC} = 0 \text{ V}$	-	1.7	-	$\text{pF}$
$T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}$						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.70 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.65 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.6	-	-	$\text{V}$
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.0	-	-	$\text{V}$
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.30 \times V_{CC}$	$\text{V}$
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	-	-	$0.35 \times V_{CC}$	$\text{V}$
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	$\text{V}$
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	-	0.9	$\text{V}$
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH} \text{ or } V_{IL}$				
		$I_O = -20 \mu\text{A}$ ; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	$V_{CC} - 0.1$	-	-	$\text{V}$
		$I_O = -1.1 \text{ mA}$ ; $V_{CC} = 1.1 \text{ V}$	$0.7 \times V_{CC}$	-	-	$\text{V}$
		$I_O = -1.7 \text{ mA}$ ; $V_{CC} = 1.4 \text{ V}$	1.03	-	-	$\text{V}$
		$I_O = -1.9 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$	1.30	-	-	$\text{V}$
		$I_O = -2.3 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	1.97	-	-	$\text{V}$
		$I_O = -3.1 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	1.85	-	-	$\text{V}$
		$I_O = -2.7 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	2.67	-	-	$\text{V}$
$V_{OL}$	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	$\text{V}$
		$I_O = 1.1 \text{ mA}$ ; $V_{CC} = 1.1 \text{ V}$	-	-	$0.3 \times V_{CC}$	$\text{V}$
		$I_O = 1.7 \text{ mA}$ ; $V_{CC} = 1.4 \text{ V}$	-	-	0.37	$\text{V}$
		$I_O = 1.9 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$	-	-	0.35	$\text{V}$
		$I_O = 2.3 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	-	-	0.33	$\text{V}$
		$I_O = 3.1 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	-	-	0.45	$\text{V}$
		$I_O = 2.7 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	-	-	0.33	$\text{V}$
	$I_O = 4.0 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	-	-	0.45	$\text{V}$	
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$I_{\text{OFF}}$	power-off leakage current	$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{\text{OFF}}$	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	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 3.3 \text{ V}$	-	-	50	$\mu\text{A}$
$T_{\text{amb}} = -40 \text{ }^\circ\text{C}$ to $+125 \text{ }^\circ\text{C}$						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9 \text{ V}$ to $1.95 \text{ V}$	$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3 \text{ V}$ to $2.7 \text{ V}$	1.6	-	-	V
		$V_{CC} = 3.0 \text{ V}$ to $3.6 \text{ V}$	2.0	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 0.8 \text{ V}$	-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9 \text{ V}$ to $1.95 \text{ V}$	-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 2.3 \text{ V}$ to $2.7 \text{ V}$	-	-	0.7	V
		$V_{CC} = 3.0 \text{ V}$ to $3.6 \text{ V}$	-	-	0.9	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -20 \mu\text{A}$ ; $V_{CC} = 0.8 \text{ V}$ to $3.6 \text{ V}$	$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1 \text{ mA}$ ; $V_{CC} = 1.1 \text{ V}$	$0.6 \times V_{CC}$	-	-	V
		$I_O = -1.7 \text{ mA}$ ; $V_{CC} = 1.4 \text{ V}$	0.93	-	-	V
		$I_O = -1.9 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$	1.17	-	-	V
		$I_O = -2.3 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	1.77	-	-	V
		$I_O = -3.1 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	1.67	-	-	V
		$I_O = -2.7 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	2.40	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 20 \mu\text{A}$ ; $V_{CC} = 0.8 \text{ V}$ to $3.6 \text{ V}$	-	-	0.11	V
		$I_O = 1.1 \text{ mA}$ ; $V_{CC} = 1.1 \text{ V}$	-	-	$0.33 \times V_{CC}$	V
		$I_O = 1.7 \text{ mA}$ ; $V_{CC} = 1.4 \text{ V}$	-	-	0.41	V
		$I_O = 1.9 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$	-	-	0.39	V
		$I_O = 2.3 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	-	-	0.36	V
		$I_O = 3.1 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$	-	-	0.50	V
		$I_O = 2.7 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	-	-	0.36	V
$I_I$	input leakage current	$V_I = \text{GND}$ to $3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V}$ to $3.6 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
		$V_I$ or $V_O = 0 \text{ V}$ to $3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$\Delta I_{OFF}$	additional power-off leakage current	$V_I$ or $V_O = 0 \text{ V}$ to $3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V}$ to $0.2 \text{ V}$	-	-	$\pm 0.75$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = \text{GND}$ or $V_{CC}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 0.8 \text{ V}$ to $3.6 \text{ V}$	-	-	1.4	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 3.3 \text{ V}$	-	-	75	$\mu\text{A}$

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



## 11 Dynamic characteristics

**Table 9. 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 <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
<b><math>C_L = 5 \text{ pF}</math></b>									
$t_{pd}$	propagation delay	A, B or C to Y; see <a href="#">Figure 10</a> <sup>[2]</sup>							
		$V_{CC} = 0.8 \text{ V}$	-	18.5	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.2	5.4	10.6	2.2	10.9	11.1	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	1.9	3.8	6.4	1.8	6.9	7.2	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.5	3.1	5.1	1.4	5.6	5.9	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.3	2.4	3.7	1.2	4.1	4.4	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.2	2.2	3.2	1.1	3.4	3.6	ns
<b><math>C_L = 10 \text{ pF}</math></b>									
$t_{pd}$	propagation delay	A, B or C to Y; see <a href="#">Figure 10</a> <sup>[2]</sup>							
		$V_{CC} = 0.8 \text{ V}$	-	22.1	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.6	6.3	12.4	2.5	12.8	13.1	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.3	4.4	7.4	2.1	8.0	8.4	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.0	3.6	5.9	1.8	6.4	6.8	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7	3.0	4.4	1.6	4.8	5.1	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.6	2.7	3.9	1.4	4.2	4.4	ns
<b><math>C_L = 15 \text{ pF}</math></b>									
$t_{pd}$	propagation delay	A, B or C to Y; see <a href="#">Figure 10</a> <sup>[2]</sup>							
		$V_{CC} = 0.8 \text{ V}$	-	25.6	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.0	7.1	14.1	2.8	14.6	14.9	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.6	5.0	8.4	2.4	9.1	9.5	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.2	4.1	6.7	2.1	7.4	7.8	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	2.0	3.4	5.0	1.9	5.5	5.9	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.9	3.2	4.5	1.7	4.8	5.0	ns
<b><math>C_L = 30 \text{ pF}</math></b>									
$t_{pd}$	propagation delay	A, B or C to Y; see <a href="#">Figure 10</a> <sup>[2]</sup>							
		$V_{CC} = 0.8 \text{ V}$	-	34.1	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.9	9.3	18.9	3.7	19.7	20.1	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	3.4	6.5	11.0	3.2	12.1	12.7	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	3.0	5.4	8.9	2.9	9.7	10.3	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	2.8	4.5	6.5	2.6	7.1	7.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.6	4.3	5.8	2.4	6.4	6.7	ns

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
C <sub>L</sub> = 5 pF, 10 pF, 15 pF and 30 pF									
C <sub>PD</sub>	power dissipation capacitance	f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[3]</sup>							
		V <sub>CC</sub> = 0.8 V	-	2.6	-	-	-	-	pF
		V <sub>CC</sub> = 1.1 V to 1.3 V	-	2.7	-	-	-	-	pF
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	2.8	-	-	-	-	pF
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	3.0	-	-	-	-	pF
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	3.5	-	-	-	-	pF
		V <sub>CC</sub> = 3.0 V to 3.6 V	-	4.0	-	-	-	-	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] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

N = number of inputs switching;

$\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

11.1 Waveforms and test circuit

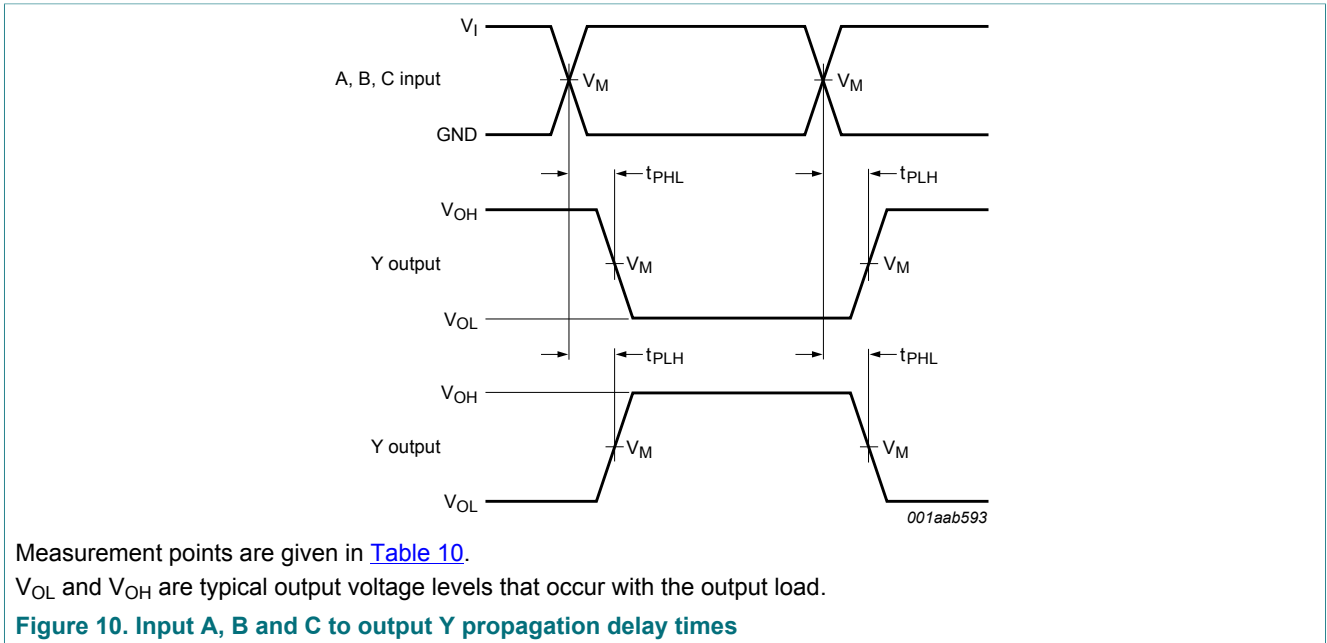
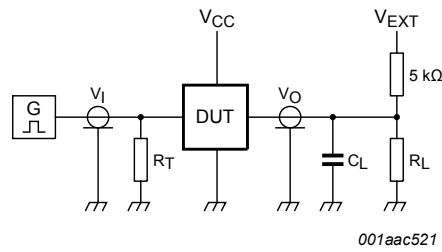


Table 10. Measurement points

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



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.

**Figure 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  $R_L = 5 \text{ k}\Omega$ .  
For measuring propagation delays, setup and hold times and pulse width  $R_L = 1 \text{ M}\Omega$ .

12 Package outline

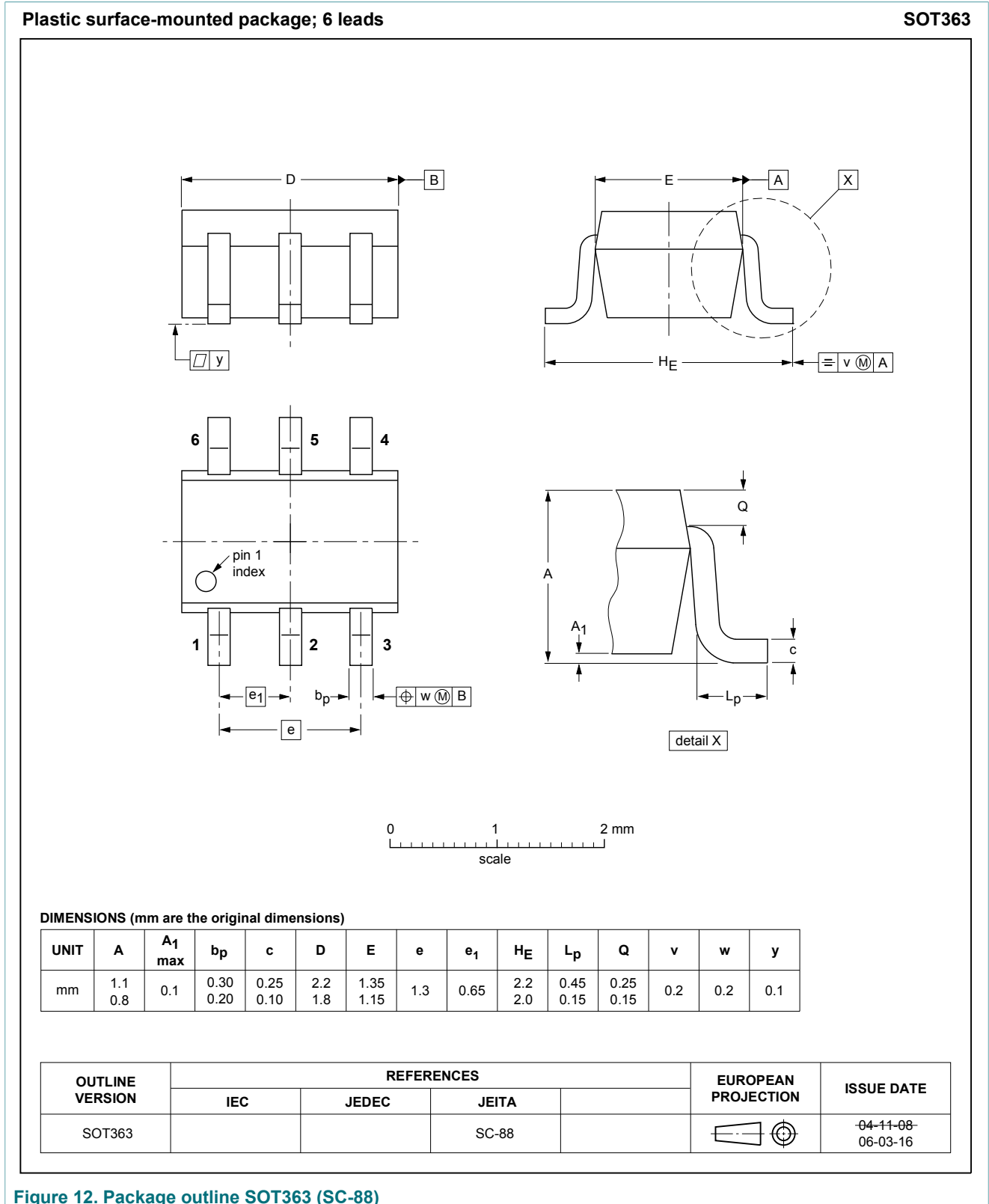
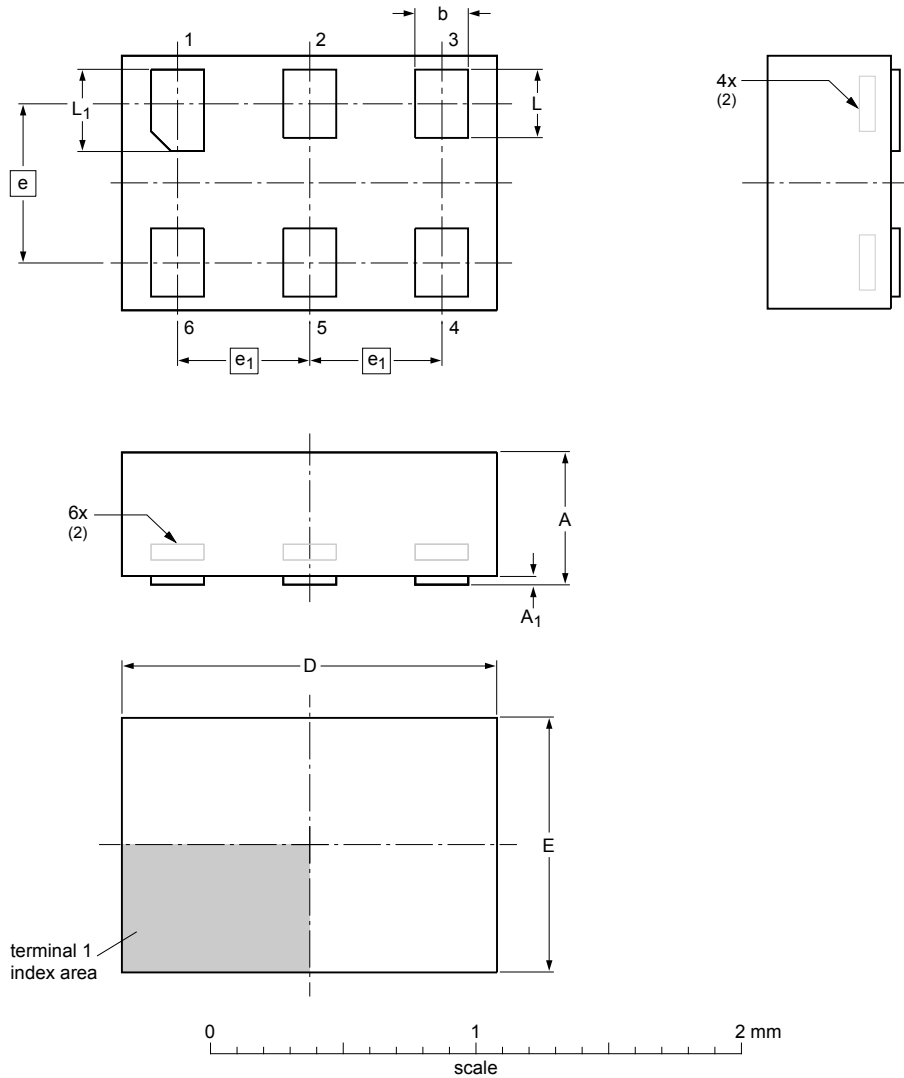


Figure 12. Package outline SOT363 (SC-88)

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 <sup>(1)</sup>	A <sub>1</sub>	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
max	0.5	0.04	0.25	1.50	1.05			0.35	0.40
mm nom			0.20	1.45	1.00	0.6	0.5	0.30	0.35
min			0.17	1.40	0.95			0.27	0.32

Notes

- Including plating thickness.
- Can be visible in some manufacturing processes.

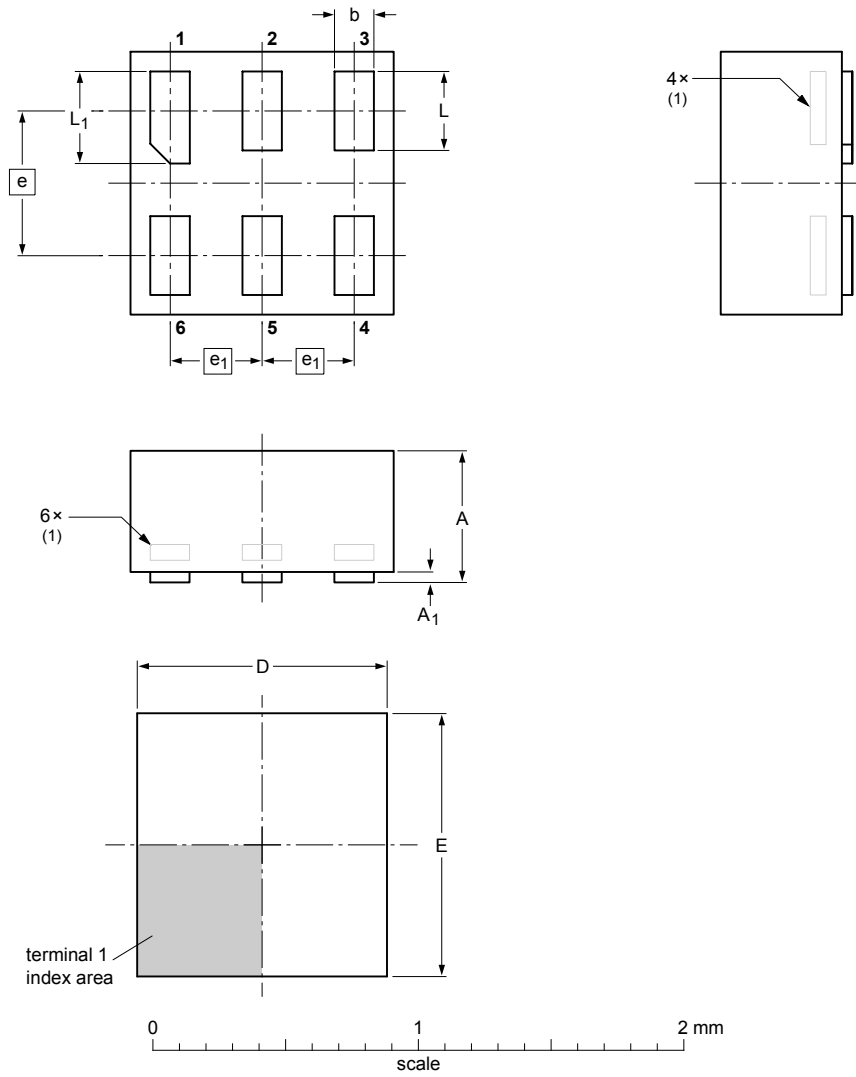
sot886\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT886		MO-252			<del>04-07-22</del> 12-01-05

Figure 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 <sub>1</sub> max	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	0.5	0.04	0.20 0.12	1.05 0.95	1.05 0.95	0.55	0.35	0.35 0.27	0.40 0.32

**Note**

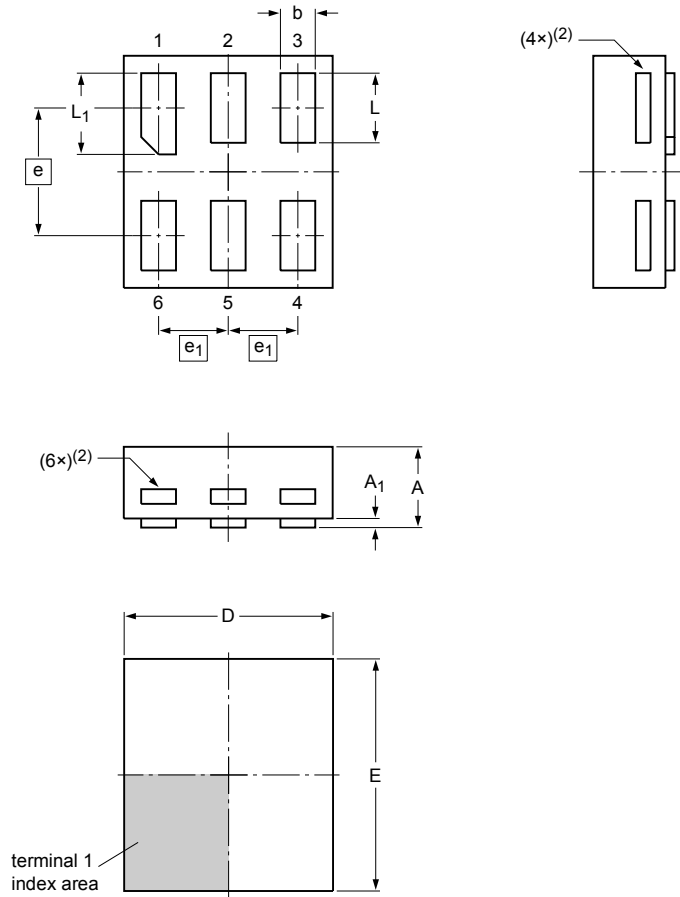
1. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT891					-05-04-06 07-05-15

Figure 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 <sup>(1)</sup>	A <sub>1</sub>	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
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

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

sot1115\_po

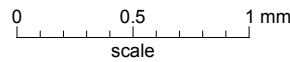
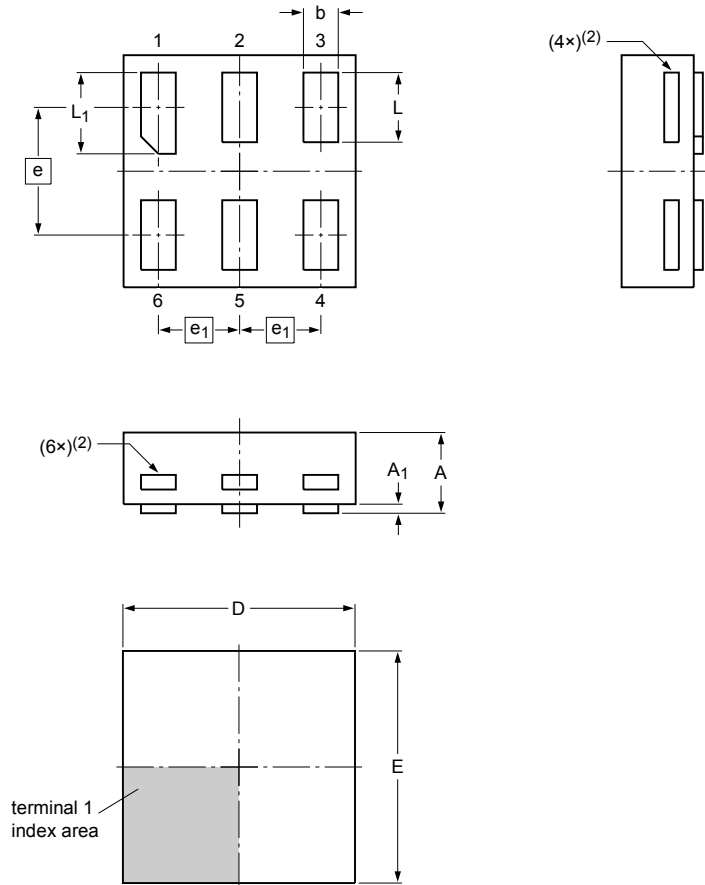
Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1115					-10-04-02- 10-04-07

Figure 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 <sup>(1)</sup>	A <sub>1</sub>	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
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

- Including plating thickness.
- 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

Figure 16. Package outline SOT1202 (XSON6)

X2SON6: plastic thermal enhanced extremely thin small outline package; no leads; 6 terminals; body 1.0 x 0.8 x 0.35 mm

SOT1255

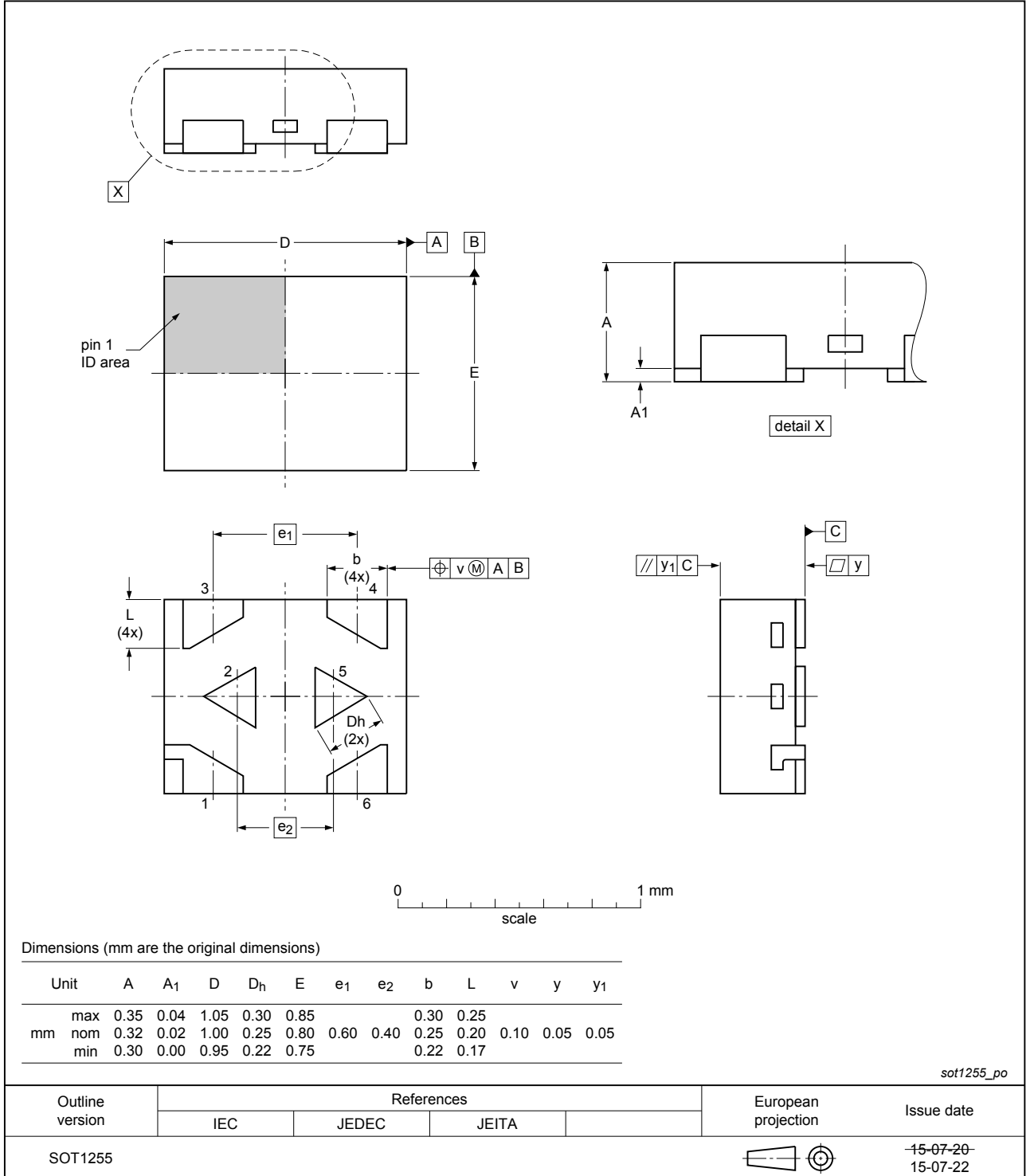


Figure 17. Package outline SOT1255 (X2SON6)

## 13 Abbreviations

Table 12. 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 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G3208 v.7	20170307	Product data sheet	-	74AUP1G3208 v.6
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
74AUP1G3208 v.6	20160309	Product data sheet	-	74AUP1G3208 v.5
Modifications:	<ul style="list-style-type: none"> <li>Added type number 74AUP1G3208GX (SOT1255/X2SON6)</li> </ul>			
74AUP1G3208 v.5	20120622	Product data sheet	-	74AUP1G3208 v.4
Modifications:	<ul style="list-style-type: none"> <li>Package outline drawing of SOT886 (<a href="#">Figure 13</a>) modified.</li> </ul>			
74AUP1G3208 v.4	20111123	Product data sheet	-	74AUP1G3208 v.3
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74AUP1G3208 v.3	20101011	Product data sheet	-	74AUP1G3208 v.2
74AUP1G3208 v.2	20090703	Product data sheet	-	74AUP1G3208 v.1
74AUP1G3208 v.1	20061129	Product data sheet	-	-

## 15 Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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## Contents

1	<b>General description</b> .....	1
2	<b>Features and benefits</b> .....	1
3	<b>Ordering information</b> .....	2
4	<b>Marking</b> .....	2
5	<b>Functional diagram</b> .....	2
6	<b>Pinning information</b> .....	3
6.1	Pinning .....	3
6.2	Pin description .....	3
7	<b>Functional description</b> .....	4
7.1	Logic configurations .....	4
8	<b>Limiting values</b> .....	5
9	<b>Recommended operating conditions</b> .....	5
10	<b>Static characteristics</b> .....	6
11	<b>Dynamic characteristics</b> .....	9
11.1	Waveforms and test circuit .....	11
12	<b>Package outline</b> .....	13
13	<b>Abbreviations</b> .....	19
14	<b>Revision history</b> .....	19
15	<b>Legal information</b> .....	20

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Date of release: 7 March 2017

Document identifier: 74AUP1G3208



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