

# 74AUP1G08

Low-power 2-input AND gate

Rev. 7 — 30 November 2017

Product data sheet

## 1 General description

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The 74AUP1G08 provides the single 2-input AND function.

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	
74AUP1G08GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G08GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm	SOT886
74AUP1G08GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm	SOT891
74AUP1G08GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm	SOT1115
74AUP1G08GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm	SOT1202
74AUP1G08GX	-40 °C to +125 °C	X2SON5	X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm	SOT1226

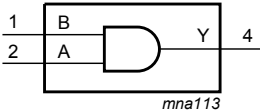
### 4 Marking

Table 2. Marking


Type number	Marking code <sup>[1]</sup>
74AUP1G08GW	pE
74AUP1G08GM	pE
74AUP1G08GF	pE
74AUP1G08GN	pE
74AUP1G08GS	pE
74AUP1G08GX	pE

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

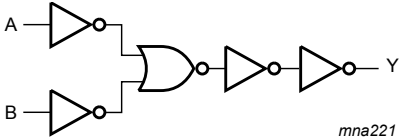
### 5 Functional diagram



**Figure 1. Logic symbol**



**Figure 2. IEC logic symbol**



**Figure 3. Logic diagram**

## 6 Pinning information

### 6.1 Pinning

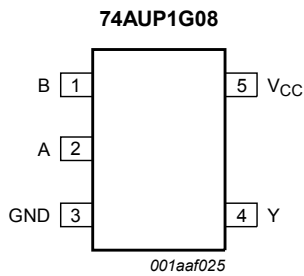


Figure 4. Pin configuration SOT353-1 (TSSOP5)

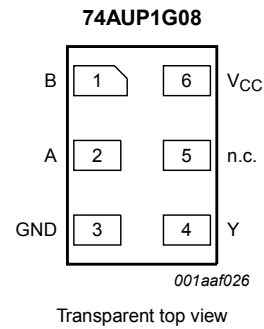


Figure 5. Pin configuration SOT886 (XSON6)

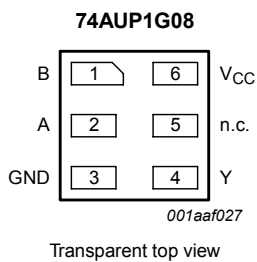


Figure 6. Pin configuration SOT891, SOT1115 and SOT1202 (XSON6)

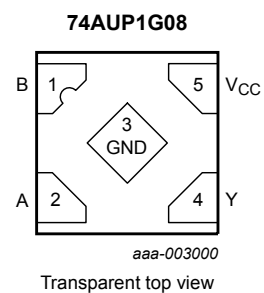


Figure 7. Pin configuration SOT1226 (X2SON5)

### 6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5 and X2SON5	XSON6	
B	1	1	data input
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V <sub>CC</sub>	5	6	supply voltage

## 7 Functional description

**Table 4. Function table**

*H = HIGH voltage level; L = LOW voltage level.*

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

## 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 $V_{CC}$	-	$\pm 20$	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 TSSOP5 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.

For XSON6 and X2SON5 packages: above 118 °C the value of  $P_{tot}$  derates linearly with 7.8 mW/K.

## 9 Recommended operating conditions

**Table 6. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		0.8	3.6	V
$V_I$	input voltage		0	3.6	V
$V_O$	output voltage	Active mode	0	$V_{CC}$	V
		Power-down mode; $V_{CC} = 0$ V	0	3.6	V
$T_{amb}$	ambient temperature		-40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 0.8$ V to 3.6 V	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
<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
		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>	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

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	-	$\text{pF}$
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 0.8 \text{ V}$	$0.70 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 0.9 \text{ V to } 1.95 \text{ V}$	$0.65 \times V_{CC}$	-	-	$\text{V}$
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	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	$\text{V}$
$I_I$	input leakage current	$V_I = \text{GND to } 3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
		$V_I \text{ or } V_O = 0 \text{ V to } 3.6 \text{ V}$ ; $V_{CC} = 0 \text{ V}$	-	-	$\pm 0.5$	$\mu\text{A}$
$\Delta I_{OFF}$	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	$\mu\text{A}$

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$\Delta I_{CC}$	additional supply current	$V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 3.3 \text{ V}$ <sup>[1]</sup>	-	-	50	$\mu\text{A}$
<b><math>T_{\text{amb}} = -40 \text{ }^\circ\text{C}</math> to <math>+125 \text{ }^\circ\text{C}</math></b>						
$V_{IH}$	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	$V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ; $V_{CC} = 3.3 \text{ V}$ <sup>[1]</sup>	-	-	75	$\mu\text{A}$

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

## 11 Dynamic characteristics

**Table 8. Dynamic characteristics**

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 5 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>				
		V <sub>CC</sub> = 0.8 V	-	17.0	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.6	5.1	10.8	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.6	3.7	6.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.3	3.0	5.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.1	2.4	4.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.2	3.5	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 10 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>				
		V <sub>CC</sub> = 0.8 V	-	20.6	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.4	6.0	12.5	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.0	4.3	7.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.7	3.6	6.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	2.9	4.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.3	2.7	4.2	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 15 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>				
		V <sub>CC</sub> = 0.8 V	-	24.1	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.4	6.8	14.2	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.3	4.9	8.6	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.9	4.0	6.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	3.4	5.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	3.1	4.8	ns
<b>T<sub>amb</sub> = 25 °C; C<sub>L</sub> = 30 pF</b>						
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[2]</sup>				
		V <sub>CC</sub> = 0.8 V	-	34.4	-	ns
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.6	9.1	19.4	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	3.4	6.4	11.5	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.6	5.3	9.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.3	4.5	7.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.2	4.2	6.2	ns



Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
C <sub>PD</sub>	power dissipation capacitance	f = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[3]</sup>				
		V <sub>CC</sub> = 0.8 V	-	2.5	-	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	-	2.9	-	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).

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

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;

Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

**Table 9. Dynamic characteristics**

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

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>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.1	11.7	2.1	12.9	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.5	7.5	1.5	8.3	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.3	6.1	1.3	6.7	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	4.8	1.0	5.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	0.9	4.3	0.9	4.8	ns
<b>C<sub>L</sub> = 10 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	2.2	13.6	2.2	15.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	1.8	8.9	1.8	9.8	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.6	7.2	1.6	7.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.3	5.7	1.3	6.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.2	4.7	1.2	5.2	ns

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Max	Min	Max	
<b>C<sub>L</sub> = 15 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	3.1	15.7	3.1	17.3	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.1	10.1	2.1	11.2	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.8	8.2	1.8	9.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.6	6.5	1.6	7.2	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.5	5.9	1.5	6.5	ns
<b>C<sub>L</sub> = 30 pF</b>							
t <sub>pd</sub>	propagation delay	A, B to Y; see <a href="#">Figure 8</a> <sup>[1]</sup>					
		V <sub>CC</sub> = 1.1 V to 1.3 V	4.1	21.8	4.1	24.0	ns
		V <sub>CC</sub> = 1.4 V to 1.6 V	2.9	13.6	2.9	15.0	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.4	10.9	2.4	12.1	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	2.2	8.6	2.2	9.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.1	7.5	2.1	8.3	ns

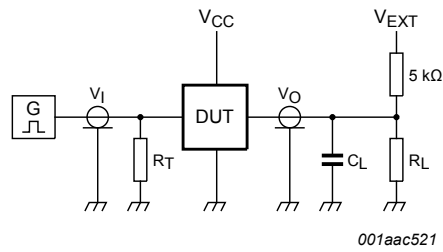
[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

### 11.1 Waveforms and test circuit



Table 10. Measurement points

Supply voltage	Output	Input		
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>
0.8 V to 3.6 V	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>CC</sub>	≤ 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 9. 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

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	H <sub>E</sub>	L	L <sub>p</sub>	v	w	y	Z <sup>(1)</sup>	θ
mm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

Note

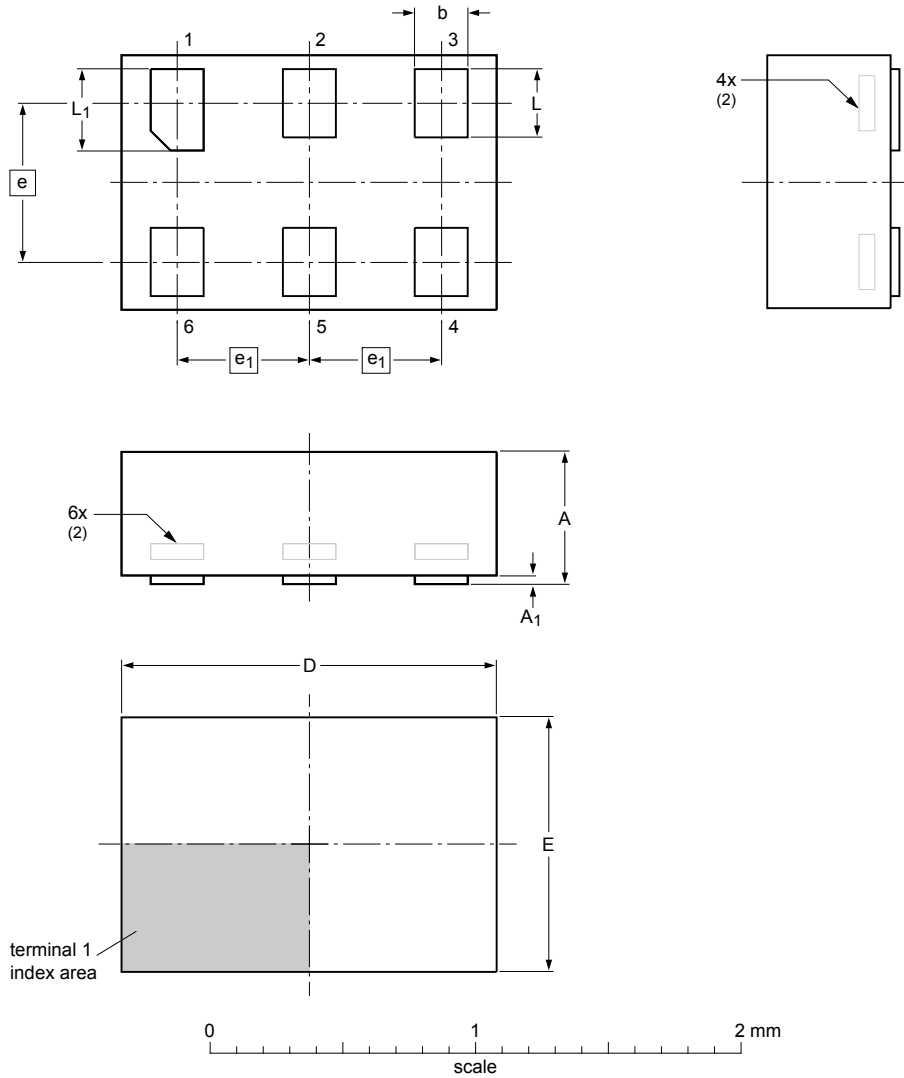
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT353-1		MO-203	SC-88A		00-09-01 03-02-19

Figure 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



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
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

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

sot886\_po

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

Figure 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



**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 12. 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 13. 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

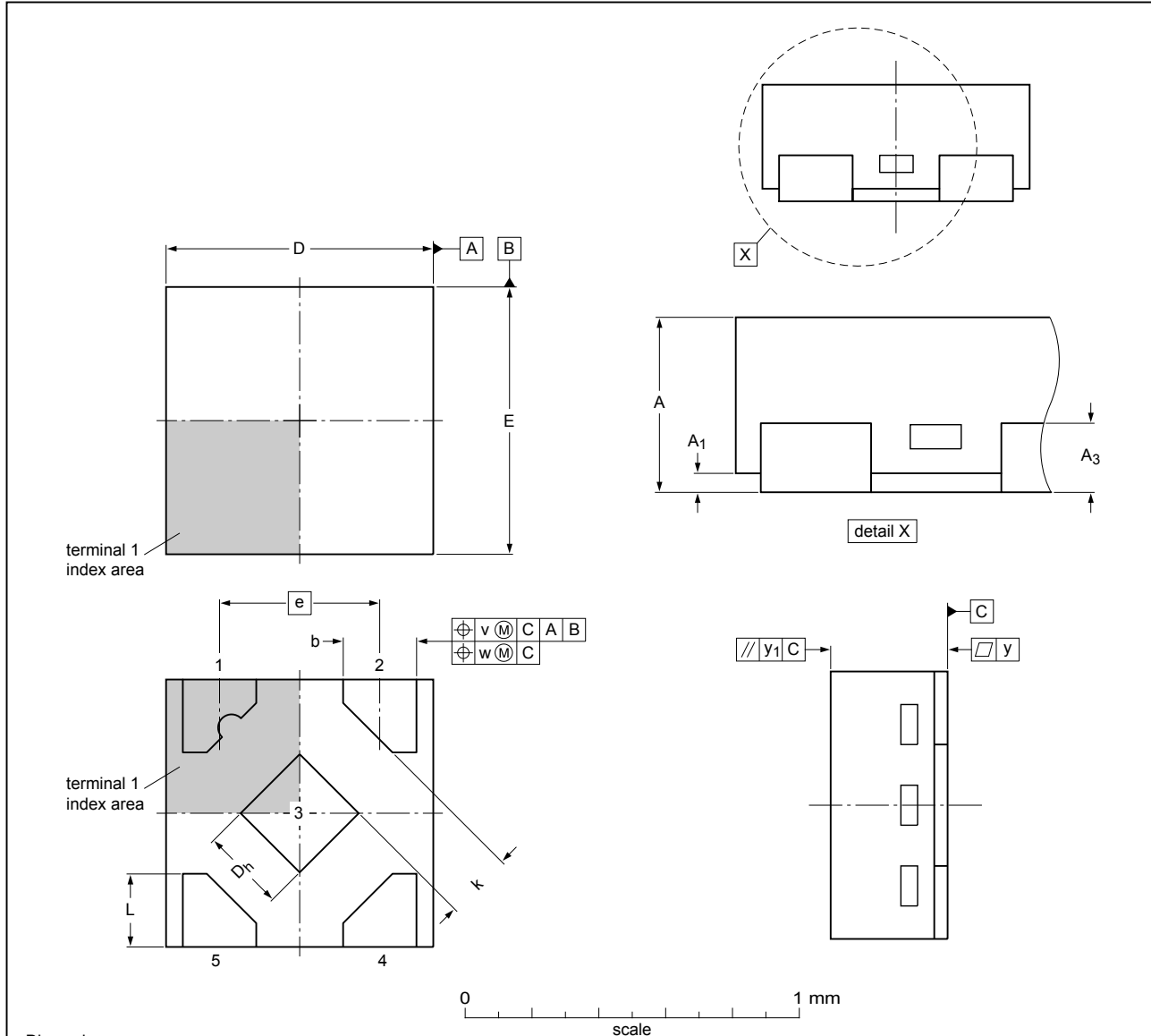
Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1202						-10-04-02- 10-04-06

Figure 14. Package outline SOT1202 (XSON6)



X2SON5: plastic thermal enhanced extremely thin small outline package; no leads;  
5 terminals; body 0.8 x 0.8 x 0.35 mm

SOT1226



Dimensions

Unit	A <sup>(1)</sup>	A <sub>1</sub>	A <sub>3</sub>	D	D <sub>h</sub>	E	b	e	k	L	v	w	y	y <sub>1</sub>
max	0.35	0.04	0.128	0.85	0.30	0.85	0.27			0.27				
mm nom				0.80	0.25	0.80	0.22	0.48		0.22	0.1	0.05	0.05	0.05
min			0.040	0.75	0.20	0.75	0.17		0.20	0.17				

Note

1. Dimension A is including plating thickness.
2. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

sot1226\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	EIAJ			
SOT1226						12-04-10 12-04-25

Figure 15. Package outline SOT1226 (X2SON5)

## 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
74AUP1G08 v.7	20171130	Product data sheet	-	74AUP1G08 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> </ul>			
74AUP1G08 v.6	20120622	Product data sheet	-	74AUP1G08 v.5
Modifications:	<ul style="list-style-type: none"> <li>Package outline drawing of SOT1226 (<a href="#">Figure 15</a>) modified.</li> </ul>			
74AUP1G08 v.5	20120412	Product data sheet	-	74AUP1G08 v.4
Modifications:	<ul style="list-style-type: none"> <li>Added type number 74AUP1G08GX (SOT1226)</li> <li>Package outline drawing of SOT886 (<a href="#">Figure 11</a>) modified.</li> </ul>			
74AUP1G08 v.4	20111115	Product data sheet	-	74AUP1G08 v.3
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74AUP1G08 v.3	20101007	Product data sheet	-	74AUP1G08 v.2
74AUP1G08 v.2	20060629	Product data sheet	-	74AUP1G08 v.1
74AUP1G08 v.1	20050720	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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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

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