# **74AUP2G17**

# Low-power dual Schmitt trigger Rev. 6 — 4 December 2012

**Product data sheet** 

#### **General description** 1.

The 74AUP2G17 provides two Schmitt trigger buffers. It is capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

This device ensures a very low static and dynamic power consumption across the entire V<sub>CC</sub> range from 0.8 V to 3.6 V.

This device is fully specified for partial power-down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

The inputs switch at different points for positive and negative-going signals. The difference between the positive voltage  $V_{T_{+}}$  and the negative voltage  $V_{T_{-}}$  is defined as the input hysteresis voltage V<sub>H</sub>.

#### 2. Features and benefits

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- 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;  $I_{CC} = 0.9 \mu A$  (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<sub>CC</sub>
- I<sub>OFF</sub> 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
74AUP2G17GW	–40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74AUP2G17GM	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 $\times$ 1.45 $\times$ 0.5 mm	SOT886
74AUP2G17GF	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 $\times$ 1 $\times$ 0.5 mm	SOT891
74AUP2G17GN	–40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body $0.9 \times 1.0 \times 0.35$ mm	SOT1115
74AUP2G17GS	–40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 $\times$ 1.0 $\times$ 0.35 mm	SOT1202

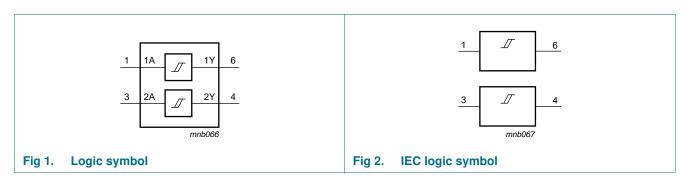
### 4. Marking

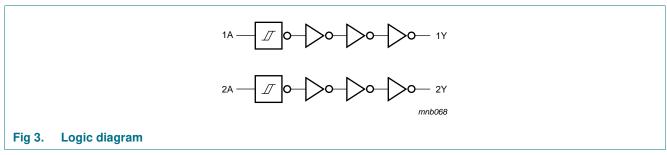
Table 2. Marking

Type number	Marking code <sup>[1]</sup>
74AUP2G17GW	pV
74AUP2G17GM	pV
74AUP2G17GF	pV
74AUP2G17GN	pV
74AUP2G17GS	pV

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

### 5. Functional diagram



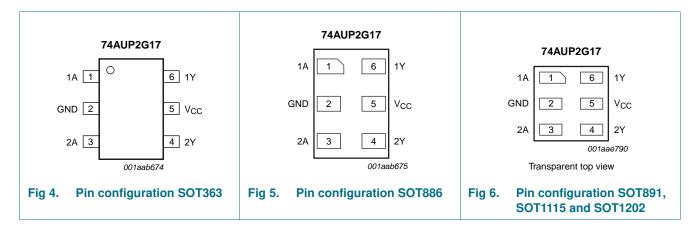


74AUP2G17

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### 6. Pinning information

#### 6.1 Pinning



### 6.2 Pin description

Table 3. Pin description

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

### 7. Functional description

Table 4. Function table[1]

Input	Output
nA	nY
L	L
Н	Н

<sup>[1]</sup> H = HIGH voltage level; L = LOW voltage level.

### 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		<u>11</u> –0.5	+4.6	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < 0 V	-50	-	mA
Vo	output voltage	Active mode and Power-down mode	<u>11</u> –0.5	+4.6	V
Io	output current	$V_O = 0 V \text{ to } V_{CC}$	-	±20	mA
I <sub>CC</sub>	supply current		-	50	mA
$I_{GND}$	ground current		-50	-	mA
$T_{stg}$	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	$T_{amb} = -40  ^{\circ}\text{C} \text{ to } +125  ^{\circ}\text{C}$	[2] _	250	mW

<sup>[1]</sup> The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		8.0	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 <sub>CC</sub> = 0 V	0	3.6	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C

### 10. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$T_{amb} = 2$	5 °C					
$V_{OH}$	HIGH-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O = -20 \ \mu A; \ V_{CC} = 0.8 \ V \ to \ 3.6 \ V$	$V_{CC}-0.1$	-	-	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
		$I_O = -4.0$ mA; $V_{CC} = 3.0$ V	2.6	-	-	V
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<sup>[2]</sup> For SC-88 packages: above 87.5 °C the value of P<sub>tot</sub> derates linearly with 4.0 mW/K. For XSON6 packages: above 118 °C the value of P<sub>tot</sub> derates linearly with 7.8 mW/K.

**Table 7. Static characteristics** ...continued
At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Тур	Max	Uni
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O$ = 20 $\mu$ A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.1	٧
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	$0.3 \times V_{CC}$	٧
		$I_{O} = 1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	-	-	0.31	٧
		$I_{O} = 1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.31	٧
		$I_{O} = 2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.31	٧
		$I_{O} = 3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.44	٧
		$I_{O} = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.31	٧
		$I_{O} = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.44	٧
l <sub>l</sub>	input leakage current	$V_I = GND$ to 3.6 V; $V_{CC} = 0$ V to 3.6 V	-	-	±0.1	μΑ
OFF	power-off leakage current	$V_{I}$ or $V_{O} = 0 \text{ V to } 3.6 \text{ V}; V_{CC} = 0 \text{ V}$	-	-	±0.2	μΑ
$\Delta I_{OFF}$	additional power-off leakage current	$V_1 \text{ or } V_0 = 0 \text{ V to } 3.6 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.2 \text{ V}$	-	-	±0.2	μΑ
Icc	supply current	$V_{I}$ = GND or $V_{CC}$ ; $I_{O}$ = 0 A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.5	μΑ
Δl <sub>CC</sub>	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ - $V_{CC} = 3.3 \text{ V}$		-	40	μА
Cı	input capacitance	$V_I = GND \text{ or } V_{CC}; V_{CC} = 0 \text{ V to } 3.6 \text{ V}$	-	1.1	-	рF
Co	output capacitance	$V_O = GND; V_{CC} = 0 V$	-	1.7	-	рF
T <sub>amb</sub> = -	40 °C to +85 °C					
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O = -20 \mu A$ ; $V_{CC} = 0.8 \text{ V}$ to 3.6 V	V <sub>CC</sub> - 0.1	-	-	٧
		$I_{O} = -1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	$0.7 \times V_{CC}$	-	-	٧
		$I_{O} = -1.7 \text{ mA}; V_{CC} = 1.4 \text{ V}$	1.03	-	-	٧
		$I_{O} = -1.9 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.30	-	-	٧
		$I_{O} = -2.3 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.97	-	-	٧
		$I_{O} = -3.1 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.85	-	-	٧
		$I_{O} = -2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.67	-	-	٧
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.55	-	-	٧
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O = 20 \mu A$ ; $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.1	٧
		I <sub>O</sub> = 1.1 mA; V <sub>CC</sub> = 1.1 V	-	-	$0.3 \times V_{CC}$	٧
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 V	-	-	0.37	٧
		I <sub>O</sub> = 1.9 mA; V <sub>CC</sub> = 1.65 V	-	-	0.35	٧
		I <sub>O</sub> = 2.3 mA; V <sub>CC</sub> = 2.3 V	-	-	0.33	٧
		I <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.45	٧
		$I_O = 2.7 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$	-	-	0.33	٧
		$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.45	٧
l <sub>l</sub>	input leakage current	V <sub>I</sub> = GND to 3.6 V; V <sub>CC</sub> = 0 V to 3.6 V	-	-	±0.5	μΑ
l <sub>OFF</sub>	power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.5	μА

 Table 7.
 Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$\Delta I_{OFF}$	additional power-off leakage current	$V_1$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.6	μΑ
I <sub>CC</sub>	supply current	$V_I = GND \text{ or } V_{CC}; I_O = 0 \text{ A};$ $V_{CC} = 0.8 \text{ V to } 3.6 \text{ V}$	-	-	0.9	μΑ
$\Delta I_{CC}$	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ $V_{CC} = 3.3 \text{ V}$	-	-	50	μΑ
T <sub>amb</sub> = -	40 °C to +125 °C					
$V_{OH}$	HIGH-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O = -20~\mu\text{A};V_{CC} = 0.8~V$ to 3.6 $V$	$V_{CC} - 0.11$	-	-	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
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.30	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{T+}$ or $V_{T-}$				
		$I_O$ = 20 $\mu$ A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	0.11	V
		$I_{O} = 1.1 \text{ mA}; V_{CC} = 1.1 \text{ V}$	-	-	$0.33 \times V_{CC}$	V
		I <sub>O</sub> = 1.7 mA; V <sub>CC</sub> = 1.4 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 <sub>O</sub> = 3.1 mA; V <sub>CC</sub> = 2.3 V	-	-	0.50	V
		$I_{O} = 2.7 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.36	V
		$I_{O} = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.50	V
l <sub>l</sub>	input leakage current	$V_I$ = GND to 3.6 V; $V_{CC}$ = 0 V to 3.6 V	-	-	±0.75	μΑ
I <sub>OFF</sub>	power-off leakage current	$V_I$ or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V	-	-	±0.75	μΑ
$\Delta I_{OFF}$	additional power-off leakage current	$V_1$ or $V_0 = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V	-	-	±0.75	μΑ
I <sub>CC</sub>	supply current	$V_I$ = GND or $V_{CC}$ ; $I_O$ = 0 A; $V_{CC}$ = 0.8 V to 3.6 V	-	-	1.4	μΑ
$\Delta I_{CC}$	additional supply current	$V_{I} = V_{CC} - 0.6 \text{ V}; I_{O} = 0 \text{ A};$ $V_{CC} = 3.3 \text{ V}$	-	-	75	μА

### 11. Dynamic characteristics

Table 8. Dynamic characteristics

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

Symbol	Parameter	Conditions		25 °C		-40 °C to +125 °C			Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)	
$C_L = 5 p$	F		•	'					
t <sub>pd</sub>	propagation delay	nA to nY; see Figure 7							
	propagament ectal)	$V_{CC} = 0.8 \text{ V}$	-	19.0	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.6	5.7	10.6	2.5	10.9	11.1	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.4	4.2	6.5	2.3	7.1	7.4	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.0	3.6	5.5	1.9	6.1	6.3	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.9	3.0	4.2	1.8	4.6	4.8	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.8	2.7	3.6	1.5	3.8	4.0	ns
C <sub>L</sub> = 10	pF								
t <sub>pd</sub>	propagation delay	nA to nY; see Figure 7							
		$V_{CC} = 0.8 \text{ V}$	-	22.5	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	2.9	6.6	12.4	2.7	12.9	13.0	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	2.6	4.8	7.8	2.4	8.3	8.7	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.5	4.2	6.3	2.4	6.8	7.1	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	2.3	3.5	4.8	2.1	5.3	5.6	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.1	3.3	4.4	2.0	4.6	4.8	ns
C <sub>L</sub> = 15	pF								
$t_{pd}$	propagation delay	nA to nY; see Figure 7							
		$V_{CC} = 0.8 \text{ V}$	-	26.0	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.2	7.4	14.1	3.1	14.7	14.9	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	3.1	5.4	8.7	2.8	9.5	9.9	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	2.7	4.7	7.1	2.7	7.8	8.2	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	2.6	4.0	5.6	2.5	6.0	6.3	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	2.5	3.7	4.9	2.2	5.2	5.5	ns
C <sub>L</sub> = 30	pF								
$t_{pd}$	propagation delay	nA to nY; see Figure 7							
		$V_{CC} = 0.8 \text{ V}$	-	36.3	-	-	-	-	ns
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	3.9	9.7	19.0	3.7	19.8	20.1	ns
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	3.5	7.0	11.2	3.6	12.4	13.0	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	3.5	6.0	9.2	3.4	10.1	10.7	ns
		$V_{CC}$ = 2.3 V to 2.7 V	3.4	5.1	7.0	3.2	7.5	7.9	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	3.3	4.8	6.2	3.1	7.1	7.5	ns

 Table 8.
 Dynamic characteristics ...continued

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

Symbol	Parameter	Conditions	25 °C		Conditions 2		-40	0 °C to +1	25 °C	Unit
			Min	Typ[1]	Max	Min	Max (85 °C)	Max (125 °C)		
$C_L = 5 pl$	F, 10 pF, 15 pF and	30 pF	'			,				
C <sub>PD</sub> power dissipation		$f_i = 1 \text{ MHz}$ ; $V_I = \text{GND to } V_{CC}$	[3]							
	capacitance	$V_{CC} = 0.8 \text{ V}$	-	2.5	-	-	-	-	pF	
		$V_{CC} = 1.1 \text{ V to } 1.3 \text{ V}$	-	2.7	-	-	-	-	pF	
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	2.8	-	-	-	-	pF	
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	3.0	-	-	-	-	pF	
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	3.5	-	-	-	-	pF	
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	4.0	-	-	-	-	pF	

- [1] All typical values are measured at nominal V<sub>CC</sub>.
- [2]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$
- [3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ).

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

f<sub>i</sub> = input frequency in MHz;

 $f_o = output frequency in MHz;$ 

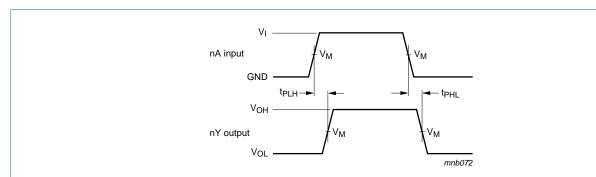
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

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

### 12. Waveforms



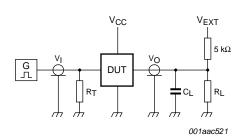
Measurement points are given in Table 9.

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

Fig 7. The data input (nA) to output (nY) propagation delays

Table 9. Measurement points

Supply voltage	Output	Input					
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	VI	$t_r = t_f$			
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V <sub>CC</sub>	≤ 3.0 ns			



Test data is given in Table 10.

Definitions for test circuit:

R<sub>L</sub> = Load resistance.

 $C_L$  = Load capacitance including jig and probe capacitance.

 $R_T$  = Termination resistance should be equal to the output impedance  $Z_0$  of the pulse generator.

 $V_{EXT}$  = External voltage for measuring switching times.

Fig 8. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Load		V <sub>EXT</sub>		
V <sub>CC</sub>	CL	R <sub>L</sub> [1]	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	$t_{PZL}, t_{PLZ}$
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 k $\Omega$ or 1 M $\Omega$	open	GND	$2\times V_{CC}$

<sup>[1]</sup> For measuring enable and disable times  $R_L$  = 5 k $\Omega$ , for measuring propagation delays, setup and hold times and pulse width  $R_L$  = 1 M $\Omega$ .

### 13. Transfer characteristics

Table 11. Transfer characteristics

Voltages are referenced to GND (ground = 0 V; for test circuit see <u>Figure 8</u>.

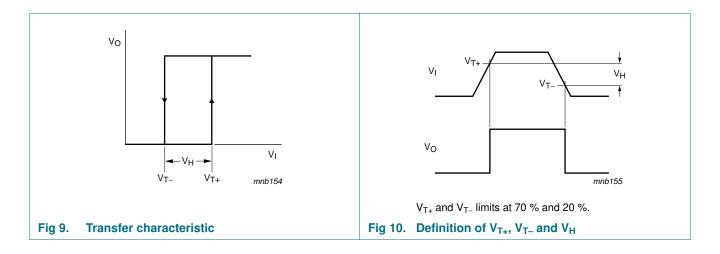
Symbol	Parameter	Conditions		25 °C		-40 °C to +125 °C			Unit
			Min	Тур	Max	Min	Max (85 °C)	Max (125 °C)	
V <sub>T+</sub> positive-going	see Figure 9 and Figure 10								
	threshold voltage	$V_{CC} = 0.8 \text{ V}$	0.30	-	0.60	0.30	0.60	0.62	V
		V <sub>CC</sub> = 1.1 V	0.53	-	0.90	0.53	0.90	0.92	V
		$V_{CC} = 1.4 \text{ V}$	0.74	-	1.11	0.74	1.11	1.13	V
	V <sub>CC</sub> = 1.65 V	0.91	-	1.29	0.91	1.29	1.31	V	
	$V_{CC} = 2.3 \text{ V}$	1.37	-	1.77	1.37	1.77	1.80	V	
	$V_{CC} = 3.0 \text{ V}$	1.88	-	2.29	1.88	2.29	2.32	V	
V <sub>T</sub> _ negative-going threshold voltage	negative-going	see Figure 9 and Figure 10							
	threshold voltage	$V_{CC} = 0.8 \text{ V}$	0.10	-	0.60	0.10	0.60	0.60	V
		V <sub>CC</sub> = 1.1 V	0.26	-	0.65	0.26	0.65	0.65	V
		V <sub>CC</sub> = 1.4 V	0.39	-	0.75	0.39	0.75	0.75	V
		V <sub>CC</sub> = 1.65 V	0.47	-	0.84	0.47	0.84	0.84	V
		$V_{CC} = 2.3 \text{ V}$	0.69	-	1.04	0.69	1.04	1.04	V
		$V_{CC} = 3.0 \text{ V}$	0.88	-	1.24	0.88	1.24	1.24	V

 Table 11.
 Transfer characteristics ...continued

Voltages are referenced to GND (ground = 0 V; for test circuit see <u>Figure 8</u>.

Symbol	Parameter	Conditions	25 °C		-40 °C to +125 °C			Unit	
				Тур	Max	Min	Max (85 °C)	Max (125 °C)	
V <sub>H</sub> hysteresis voltage	(V <sub>T+</sub> – V <sub>T-</sub> ); see <u>Figure 9</u> , <u>Figure 10</u> , <u>Figure 11</u> and <u>Figure 12</u>								
		V <sub>CC</sub> = 0.8 V	0.07	-	0.50	0.07	0.50	0.50	V
	V <sub>CC</sub> = 1.1 V	0.08	-	0.46	0.08	0.46	0.46	V	
	V <sub>CC</sub> = 1.4 V	0.18	-	0.56	0.18	0.56	0.56	V	
	V <sub>CC</sub> = 1.65 V	0.27	-	0.66	0.27	0.66	0.66	V	
		V <sub>CC</sub> = 2.3 V	0.53	-	0.92	0.53	0.92	0.92	V
		V <sub>CC</sub> = 3.0 V	0.79	-	1.31	0.79	1.31	1.31	V

### 14. Waveforms transfer characteristics



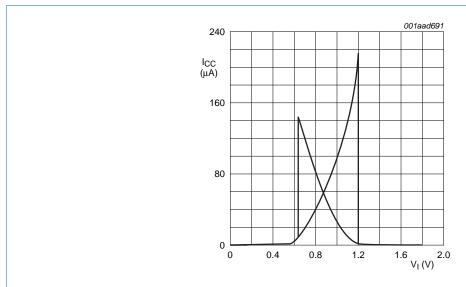


Fig 11. Typical transfer characteristics;  $V_{CC} = 1.8 \text{ V}$ 

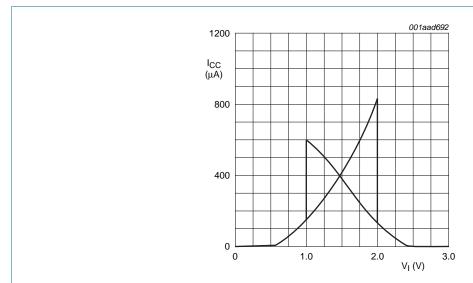


Fig 12. Typical transfer characteristics;  $V_{CC} = 3.0 \text{ V}$ 

### 15. Application information

The slow input rise and fall times cause additional power dissipation, this can be calculated using the following formula:

 $P_{add} = f_i \times (t_r \times \Delta I_{CC(AV)} + t_f \times \Delta I_{CC(AV)}) \times V_{CC} \text{ where:}$ 

 $P_{add}$  = additional power dissipation ( $\mu$ W);

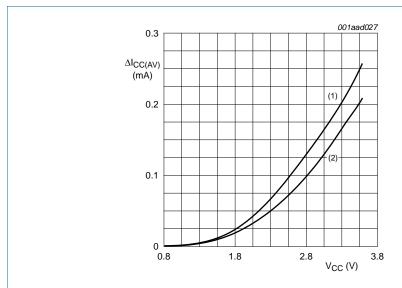
 $f_i = input frequency (MHz);$ 

 $t_r$  = input rise time (ns); 10 % to 90 %;

 $t_f$  = input fall time (ns); 90 % to 10 %;

 $\Delta I_{CC(AV)}$  = average additional supply current ( $\mu A$ ).

Average  $\Delta I_{CC(AV)}$  differs with positive or negative input transitions, as shown in Figure 13.



- (1) Positive-going edge.
- (2) Negative-going edge.

Linear change of  $V_{\rm I}$  between 0.8 V and 2.0 V. All values given are typical, unless otherwise specified.

Fig 13. Average  $I_{CC}$  as a function of  $V_{CC}$ 

### 16. Package outline

#### Plastic surface-mounted package; 6 leads

**SOT363** 

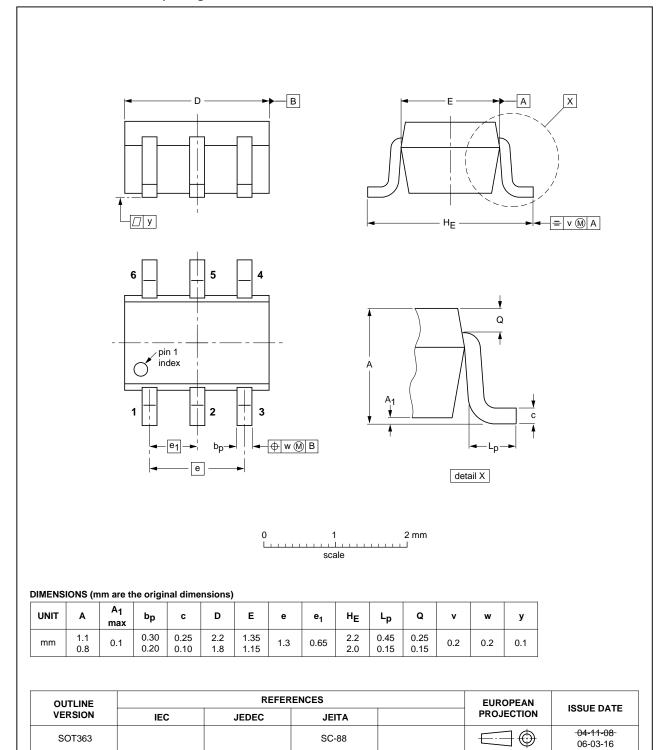


Fig 14. Package outline SOT363 (SC-88)

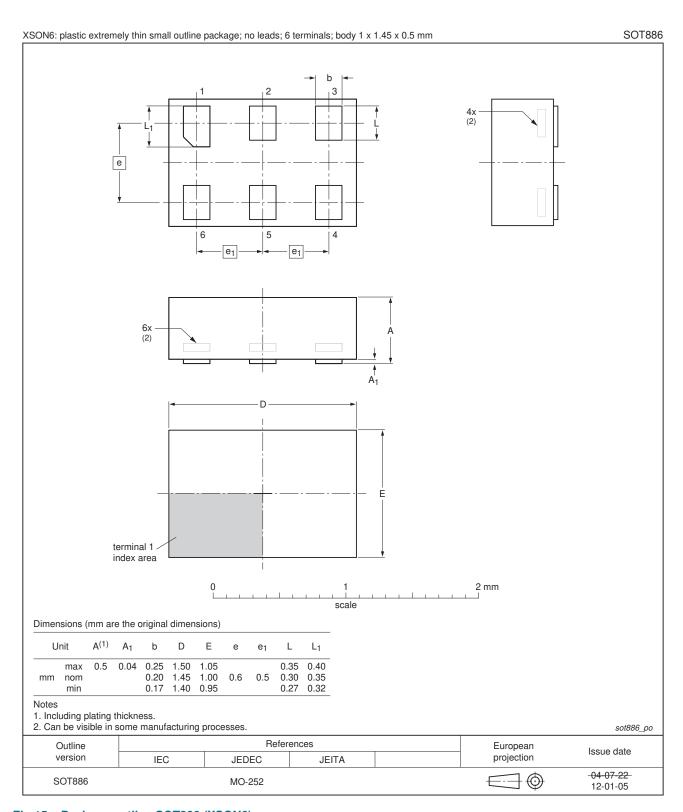


Fig 15. Package outline SOT886 (XSON6)

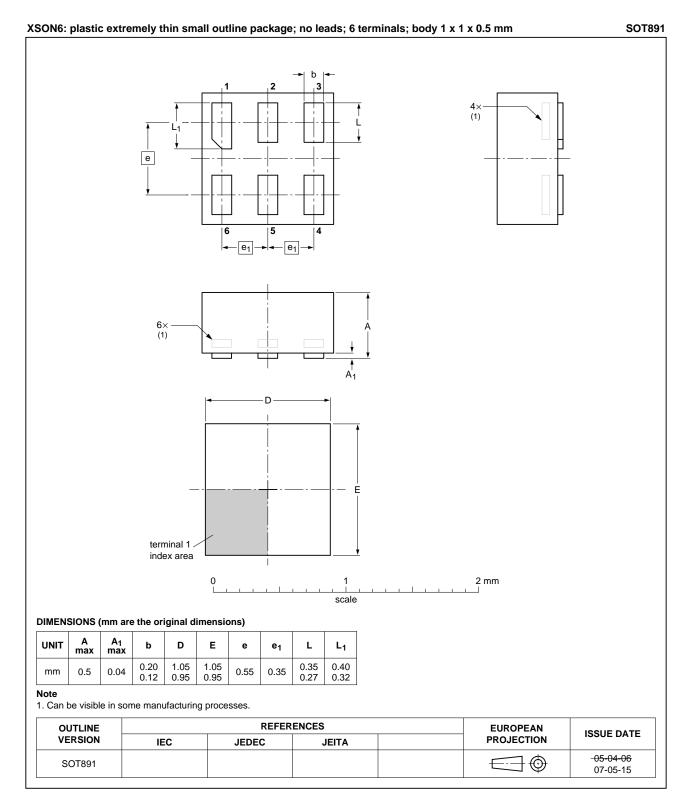


Fig 16. Package outline SOT891 (XSON6)

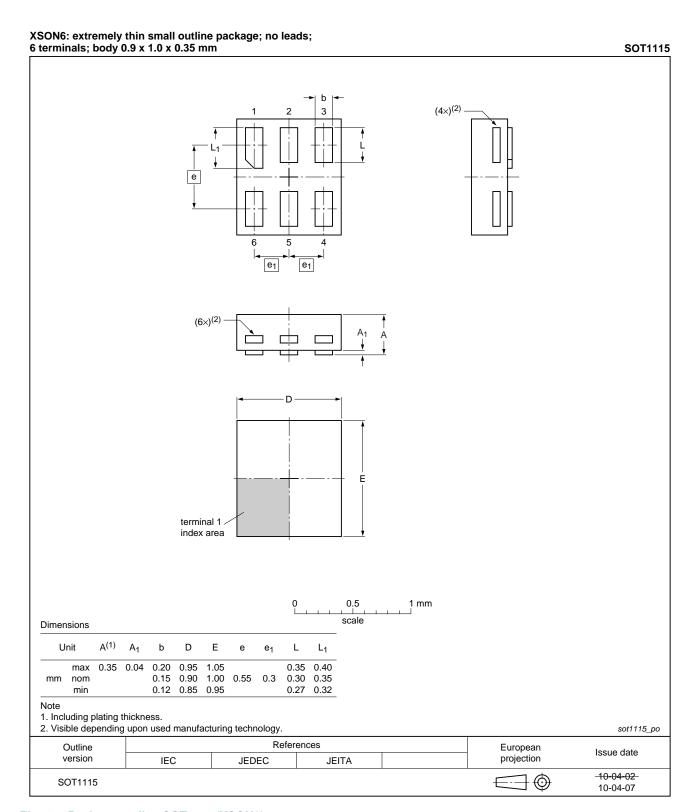


Fig 17. Package outline SOT1115 (XSON6)

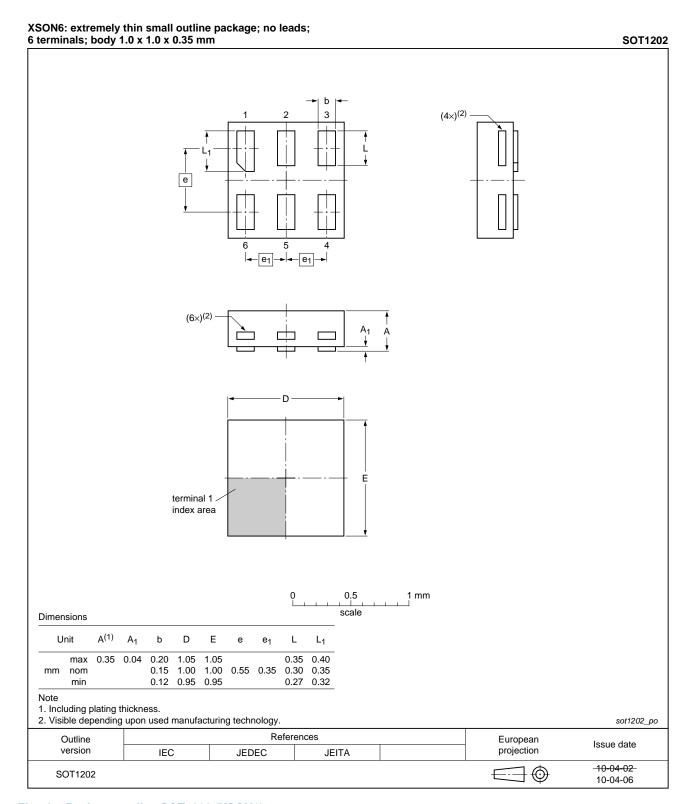


Fig 18. Package outline SOT1202 (XSON6)

### 17. Abbreviations

#### Table 12. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model

### 18. Revision history

#### Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP2G17 v.5	20121204	Product data sheet	-	74AUP2G17 v.4
Modifications:	<ul> <li>Package outl</li> </ul>	ine drawing of SOT886 ( <u>Figur</u>	e 15) modified.	
74AUP2G17 v.5	20111205	Product data sheet	-	74AUP2G17 v.4
74AUP2G17 v.4	20101103	Product data sheet	-	74AUP2G17 v.3
74AUP2G17 v.3	20090706	Product data sheet	-	74AUP2G17 v.2
74AUP2G17 v.2	20080110	Product data sheet	-	74AUP2G17 v.1
74AUP2G17 v.1	20061107	Product data sheet	-	-

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

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions"
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#### Low-power dual Schmitt trigger

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## **74AUP2G17**

### Low-power dual Schmitt trigger

### 21. Contents

1	General description 1
2	Features and benefits
3	Ordering information 2
4	Marking 2
5	Functional diagram 2
6	Pinning information
6.1	Pinning
6.2	Pin description
7	Functional description 3
8	Limiting values 4
9	Recommended operating conditions 4
10	Static characteristics 4
11	Dynamic characteristics
12	Waveforms
13	Transfer characteristics 9
14	Waveforms transfer characteristics 10
15	Application information
16	Package outline
17	Abbreviations
18	Revision history
19	Legal information
19.1	Data sheet status
19.2	Definitions
19.3	Disclaimers19
19.4	Trademarks
20	Contact information 20
21	Contents

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