

74AUP1G14

Low-power Schmitt trigger inverter

Rev. 03 — 8 July 2009

Product data sheet

1. General description

The 74AUP1G14 provides a single inverting Schmitt trigger which accepts standard input signals. 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_{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 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_H .

2. Features

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- ESD protection:
 - ◆ HBM JESD22-A114E Class 3A exceeds 5000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
 - ◆ CDM JESD22-C101C 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 $+125\text{ }^\circ\text{C}$

3. Applications

- Wave and pulse shaper
- Astable multivibrator
- Monostable multivibrator

4. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AUP1G14GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74AUP1G14GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G14GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891

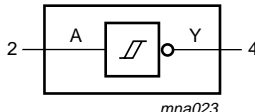
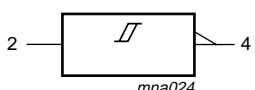
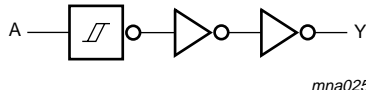
5. Marking

Table 2. Marking

Type number	Marking code ^[1]
74AUP1G14GW	pF
74AUP1G14GM	pF
74AUP1G14GF	pF

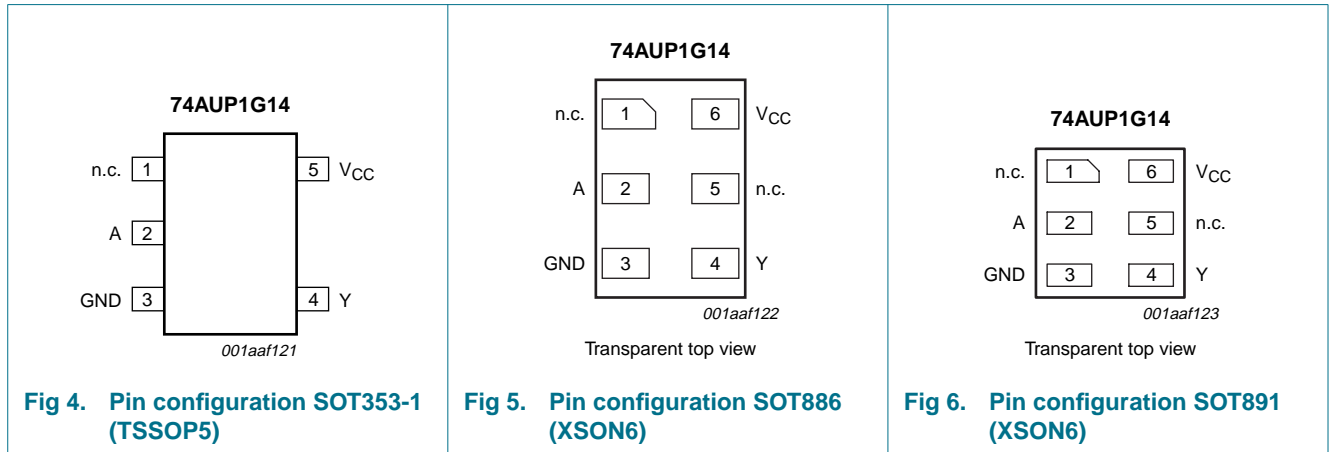
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

6. Functional diagram

 <p><i>mna023</i></p>	 <p><i>mna024</i></p>	 <p><i>mna025</i></p>
Fig 1. Logic symbol	Fig 2. IEC logic symbol	Fig 3. Logic diagram

7. Pinning information

7.1 Pinning



7.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	TSSOP5	XSON6	
n.c.	1	1	not connected
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V _{CC}	5	6	supply voltage

8. Functional description

Table 4. Function table^[1]

Input	Output
A	Y
L	H
H	L

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

9. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

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

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

[2] For TSSOP5 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

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

10. 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

11. 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
$T_{amb} = 25$ °C						
V_{OH}	HIGH-level output voltage	$V_I = V_{T+}$ or V_{T-}				
		$I_O = -20$ μ A; $V_{CC} = 0.8$ V to 3.6 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V	$0.75 \times V_{CC}$	-	-	V
		$I_O = -1.7$ mA; $V_{CC} = 1.4$ V	1.11	-	-	V
		$I_O = -1.9$ mA; $V_{CC} = 1.65$ V	1.32	-	-	V
		$I_O = -2.3$ mA; $V_{CC} = 2.3$ V	2.05	-	-	V
		$I_O = -3.1$ mA; $V_{CC} = 2.3$ V	1.9	-	-	V
		$I_O = -2.7$ mA; $V_{CC} = 3.0$ V	2.72	-	-	V
		$I_O = -4.0$ mA; $V_{CC} = 3.0$ V	2.6	-	-	V

Table 7. Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{OL}	LOW-level output voltage	V _I = V _{T+} or V _{T-}				
		I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		I _O = 1.1 mA; V _{CC} = 1.1 V	-	-	0.3 × V _{CC}	V
		I _O = 1.7 mA; V _{CC} = 1.4 V	-	-	0.31	V
		I _O = 1.9 mA; V _{CC} = 1.65 V	-	-	0.31	V
		I _O = 2.3 mA; V _{CC} = 2.3 V	-	-	0.31	V
		I _O = 3.1 mA; V _{CC} = 2.3 V	-	-	0.44	V
		I _O = 2.7 mA; V _{CC} = 3.0 V	-	-	0.31	V
I _O = 4.0 mA; V _{CC} = 3.0 V	-	-	0.44	V		
I _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V	-	-	±0.1	μA
I _{OFF}	power-off leakage current	V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V	-	-	±0.2	μA
ΔI _{OFF}	additional power-off leakage current	V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V to 0.2 V	-	-	±0.2	μA
I _{CC}	supply current	V _I = GND or V _{CC} ; I _O = 0 A; V _{CC} = 0.8 V to 3.6 V	-	-	0.5	μA
ΔI _{CC}	additional supply current	V _I = V _{CC} - 0.6 V; I _O = 0 A; V _{CC} = 3.3 V	-	-	40	μA
C _I	input capacitance	V _I = GND or V _{CC} ; V _{CC} = 0 V to 3.6 V	-	1.1	-	pF
C _O	output capacitance	V _O = GND; V _{CC} = 0 V	-	1.7	-	pF
T_{amb} = -40 °C to +85 °C						
V _{OH}	HIGH-level output voltage	V _I = V _{T+} or V _{T-}				
		I _O = -20 μA; V _{CC} = 0.8 V to 3.6 V	V _{CC} - 0.1	-	-	V
		I _O = -1.1 mA; V _{CC} = 1.1 V	0.7 × V _{CC}	-	-	V
		I _O = -1.7 mA; V _{CC} = 1.4 V	1.03	-	-	V
		I _O = -1.9 mA; V _{CC} = 1.65 V	1.30	-	-	V
		I _O = -2.3 mA; V _{CC} = 2.3 V	1.97	-	-	V
		I _O = -3.1 mA; V _{CC} = 2.3 V	1.85	-	-	V
		I _O = -2.7 mA; V _{CC} = 3.0 V	2.67	-	-	V
I _O = -4.0 mA; V _{CC} = 3.0 V	2.55	-	-	V		
V _{OL}	LOW-level output voltage	V _I = V _{T+} or V _{T-}				
		I _O = 20 μA; V _{CC} = 0.8 V to 3.6 V	-	-	0.1	V
		I _O = 1.1 mA; V _{CC} = 1.1 V	-	-	0.3 × V _{CC}	V
		I _O = 1.7 mA; V _{CC} = 1.4 V	-	-	0.37	V
		I _O = 1.9 mA; V _{CC} = 1.65 V	-	-	0.35	V
		I _O = 2.3 mA; V _{CC} = 2.3 V	-	-	0.33	V
		I _O = 3.1 mA; V _{CC} = 2.3 V	-	-	0.45	V
		I _O = 2.7 mA; V _{CC} = 3.0 V	-	-	0.33	V
I _O = 4.0 mA; V _{CC} = 3.0 V	-	-	0.45	V		
I _I	input leakage current	V _I = GND to 3.6 V; V _{CC} = 0 V to 3.6 V	-	-	±0.5	μA
I _{OFF}	power-off leakage current	V _I or V _O = 0 V to 3.6 V; V _{CC} = 0 V	-	-	±0.5	μA

Table 7. Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
ΔI_{OFF}	additional power-off leakage current	V_I or $V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	± 0.6	μA		
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	μA		
ΔI_{CC}	additional supply current	$V_I = V_{CC} - 0.6\text{ V}$; $I_O = 0\text{ A}$; $V_{CC} = 3.3\text{ V}$	-	-	50	μA		
$T_{amb} = -40\text{ }^\circ\text{C to }+125\text{ }^\circ\text{C}$								
V_{OH}	HIGH-level output voltage	$V_I = V_{T+}$ or V_{T-}						
		$I_O = -20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	$V_{CC} - 0.11$	-	-	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	$V_I = V_{T+}$ or V_{T-}						
		$I_O = 20\text{ }\mu\text{A}$; $V_{CC} = 0.8\text{ V to }3.6\text{ V}$	-	-	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	$V_I = \text{GND to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }3.6\text{ V}$	-	-	± 0.75	μA		
		I_{OFF}	power-off leakage current	V_I or $V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V}$	-	-	± 0.75	μA
		ΔI_{OFF}	additional power-off leakage current	V_I or $V_O = 0\text{ V to }3.6\text{ V}$; $V_{CC} = 0\text{ V to }0.2\text{ V}$	-	-	± 0.75	μA
		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	μA
		ΔI_{CC}	additional supply current	$V_I = V_{CC} - 0.6\text{ V}$; $I_O = 0\text{ A}$; $V_{CC} = 3.3\text{ V}$	-	-	75	μA

12. 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 pF									
t _{pd}	propagation delay	A to Y; see Figure 7							
		V _{CC} = 0.8 V	-	19.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	2.7	5.9	11.0	2.4	11.1	11.2	ns
		V _{CC} = 1.4 V to 1.6 V	2.6	4.3	6.6	2.4	7.1	7.4	ns
		V _{CC} = 1.65 V to 1.95 V	2.1	3.7	5.4	2.0	6.0	6.2	ns
		V _{CC} = 2.3 V to 2.7 V	2.0	3.0	4.1	1.7	4.5	4.7	ns
		V _{CC} = 3.0 V to 3.6 V	1.9	2.8	3.6	1.5	3.9	4.0	ns
C_L = 10 pF									
t _{pd}	propagation delay	A to Y; see Figure 7							
		V _{CC} = 0.8 V	-	23.4	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	2.9	6.8	12.7	2.8	12.8	12.9	ns
		V _{CC} = 1.4 V to 1.6 V	2.8	5.0	7.7	2.6	8.2	8.6	ns
		V _{CC} = 1.65 V to 1.95 V	2.7	4.2	6.2	2.5	6.7	7.1	ns
		V _{CC} = 2.3 V to 2.7 V	2.3	3.6	4.8	2.1	5.2	5.5	ns
		V _{CC} = 3.0 V to 3.6 V	2.1	3.3	4.3	2.0	4.5	4.7	ns
C_L = 15 pF									
t _{pd}	propagation delay	A to Y; see Figure 7							
		V _{CC} = 0.8 V	-	26.9	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	3.3	7.6	14.3	3.0	14.5	14.7	ns
		V _{CC} = 1.4 V to 1.6 V	3.3	5.5	8.6	2.9	9.4	9.8	ns
		V _{CC} = 1.65 V to 1.95 V	2.8	4.7	7.0	2.8	7.7	8.1	ns
		V _{CC} = 2.3 V to 2.7 V	2.7	4.0	5.5	2.4	5.9	6.2	ns
		V _{CC} = 3.0 V to 3.6 V	2.6	3.8	4.8	2.2	5.2	5.4	ns
C_L = 30 pF									
t _{pd}	propagation delay	A to Y; see Figure 7							
		V _{CC} = 0.8 V	-	37.3	-	-	-	-	ns
		V _{CC} = 1.1 V to 1.3 V	4.0	9.8	18.7	3.9	19.6	20.0	ns
		V _{CC} = 1.4 V to 1.6 V	3.7	7.1	11.2	3.8	12.3	12.9	ns
		V _{CC} = 1.65 V to 1.95 V	3.6	6.0	9.1	3.6	10.0	10.6	ns
		V _{CC} = 2.3 V to 2.7 V	3.5	5.2	6.9	3.2	7.5	7.9	ns
		V _{CC} = 3.0 V to 3.6 V	3.3	4.8	6.1	3.1	7.1	7.4	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			−40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
C_L = 5 pF, 10 pF, 15 pF and 30 pF									
C _{PD}	power dissipation capacitance	f _i = 1 MHz; V _I = GND to V _{CC} ^[3]							
		V _{CC} = 0.8 V	-	2.6	-	-	-	-	pF
		V _{CC} = 1.1 V to 1.3 V	-	2.7	-	-	-	-	pF
		V _{CC} = 1.4 V to 1.6 V	-	2.9	-	-	-	-	pF
		V _{CC} = 1.65 V to 1.95 V	-	3.1	-	-	-	-	pF
		V _{CC} = 2.3 V to 2.7 V	-	3.7	-	-	-	-	pF
		V _{CC} = 3.0 V to 3.6 V	-	4.3	-	-	-	-	pF

- [1] All typical values are measured at nominal V_{CC}.
- [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 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_i = input frequency in MHz;
 f_o = output frequency in MHz;
 C_L = output load capacitance in pF;
 V_{CC} = supply voltage in V;
 N = number of inputs switching;
 Σ(C_L × V_{CC}² × f_o) = sum of the outputs.

13. Waveforms

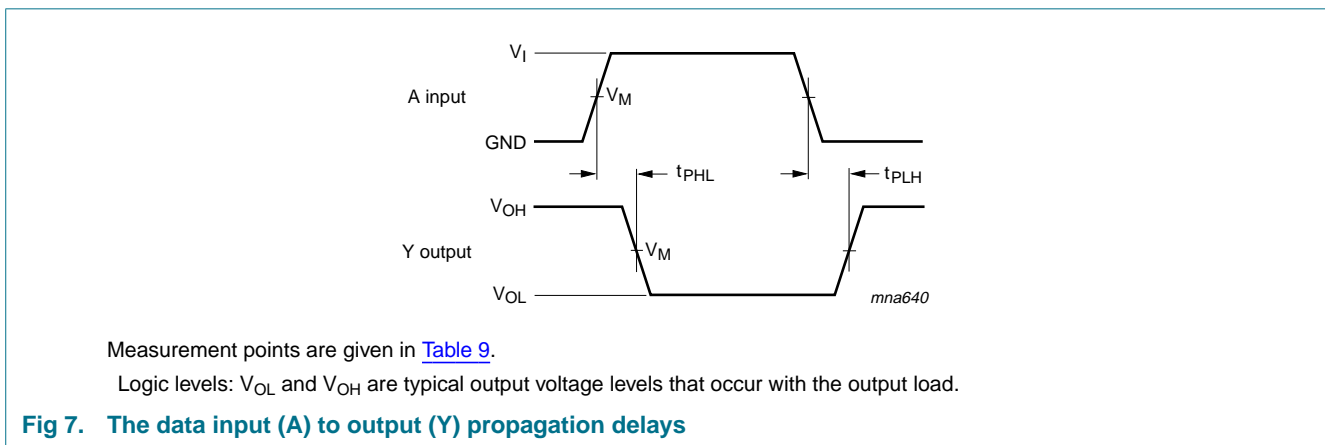
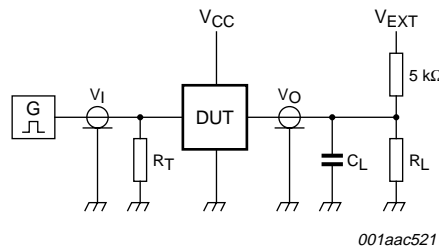


Table 9. Measurement points

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 × V _{CC}	0.5 × V _{CC}	V _{CC}	≤ 3.0 ns



Test data is given in [Table 10](#).

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.

Fig 8. Load circuitry for switching times

Table 10. Test data

Supply voltage	Load		V_{EXT}		
V_{CC}	C_L	R_L [1]	t_{PLH} , t_{PHL}	t_{PZH} , t_{PHZ}	t_{PZL} , t_{PLZ}
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open	GND	$2 \times V_{CC}$

[1] For measuring enable and disable times $R_L = 5 \text{ k}\Omega$, for measuring propagation delays, setup and hold times and pulse width $R_L = 1 \text{ M}\Omega$.

14. Transfer characteristics

Table 11. Transfer characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = 25 \text{ }^\circ\text{C}$						
V_{T+}	positive-going threshold voltage	see Figure 9 and Figure 10				
		$V_{CC} = 0.8 \text{ V}$	0.30	-	0.60	V
		$V_{CC} = 1.1 \text{ V}$	0.53	-	0.90	V
		$V_{CC} = 1.4 \text{ V}$	0.74	-	1.11	V
		$V_{CC} = 1.65 \text{ V}$	0.91	-	1.29	V
		$V_{CC} = 2.3 \text{ V}$	1.37	-	1.77	V
V_{T-}	negative-going threshold voltage	see Figure 9 and Figure 10				
		$V_{CC} = 0.8 \text{ V}$	0.10	-	0.60	V
		$V_{CC} = 1.1 \text{ V}$	0.26	-	0.65	V
		$V_{CC} = 1.4 \text{ V}$	0.39	-	0.75	V
		$V_{CC} = 1.65 \text{ V}$	0.47	-	0.84	V
		$V_{CC} = 2.3 \text{ V}$	0.69	-	1.04	V
	$V_{CC} = 3.0 \text{ V}$	0.88	-	1.24	V	

Table 11. Transfer characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _H	hysteresis voltage (V _{T+} - V _{T-})	see Figure 9 , Figure 10 , Figure 11 and Figure 12				
		V _{CC} = 0.8 V	0.07	-	0.50	V
		V _{CC} = 1.1 V	0.08	-	0.46	V
		V _{CC} = 1.4 V	0.18	-	0.56	V
		V _{CC} = 1.65 V	0.27	-	0.66	V
		V _{CC} = 2.3 V	0.53	-	0.92	V
		V _{CC} = 3.0 V	0.79	-	1.31	V
T_{amb} = -40 °C to +85 °C						
V _{T+}	positive-going threshold voltage	see Figure 9 and Figure 10				
		V _{CC} = 0.8 V	0.30	-	0.60	V
		V _{CC} = 1.1 V	0.53	-	0.90	V
		V _{CC} = 1.4 V	0.74	-	1.11	V
		V _{CC} = 1.65 V	0.91	-	1.29	V
		V _{CC} = 2.3 V	1.37	-	1.77	V
		V _{CC} = 3.0 V	1.88	-	2.29	V
V _{T-}	negative-going threshold voltage	see Figure 9 and Figure 10				
		V _{CC} = 0.8 V	0.10	-	0.60	V
		V _{CC} = 1.1 V	0.26	-	0.65	V
		V _{CC} = 1.4 V	0.39	-	0.75	V
		V _{CC} = 1.65 V	0.47	-	0.84	V
		V _{CC} = 2.3 V	0.69	-	1.04	V
		V _{CC} = 3.0 V	0.88	-	1.24	V
V _H	hysteresis voltage (V _{T+} - V _{T-})	see Figure 9 , Figure 10 , Figure 11 and Figure 12				
		V _{CC} = 0.8 V	0.07	-	0.50	V
		V _{CC} = 1.1 V	0.08	-	0.46	V
		V _{CC} = 1.4 V	0.18	-	0.56	V
		V _{CC} = 1.65 V	0.27	-	0.66	V
		V _{CC} = 2.3 V	0.53	-	0.92	V
		V _{CC} = 3.0 V	0.79	-	1.31	V
T_{amb} = -40 °C to +125 °C						
V _{T+}	positive-going threshold voltage	see Figure 9 and Figure 10				
		V _{CC} = 0.8 V	0.30	-	0.62	V
		V _{CC} = 1.1 V	0.53	-	0.92	V
		V _{CC} = 1.4 V	0.74	-	1.13	V
		V _{CC} = 1.65 V	0.91	-	1.31	V
		V _{CC} = 2.3 V	1.37	-	1.80	V
		V _{CC} = 3.0 V	1.88	-	2.32	V

Table 11. Transfer characteristics ...continued
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{T-}	negative-going threshold voltage	see Figure 9 and Figure 10				
		$V_{CC} = 0.8\text{ V}$	0.10	-	0.60	V
		$V_{CC} = 1.1\text{ V}$	0.26	-	0.65	V
		$V_{CC} = 1.4\text{ V}$	0.39	-	0.75	V
		$V_{CC} = 1.65\text{ V}$	0.47	-	0.84	V
		$V_{CC} = 2.3\text{ V}$	0.69	-	1.04	V
		$V_{CC} = 3.0\text{ V}$	0.88	-	1.24	V
V_H	hysteresis voltage ($V_{T+} - V_{T-}$)	see Figure 9 , Figure 10 , Figure 11 and Figure 12				
		$V_{CC} = 0.8\text{ V}$	0.07	-	0.50	V
		$V_{CC} = 1.1\text{ V}$	0.08	-	0.46	V
		$V_{CC} = 1.4\text{ V}$	0.18	-	0.56	V
		$V_{CC} = 1.65\text{ V}$	0.27	-	0.66	V
		$V_{CC} = 2.3\text{ V}$	0.53	-	0.92	V
		$V_{CC} = 3.0\text{ V}$	0.79	-	1.31	V

15. Waveforms transfer characteristics

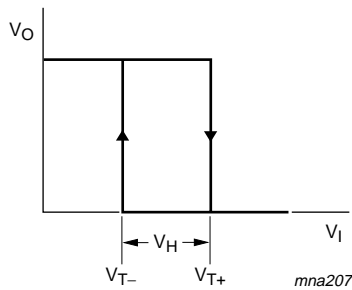
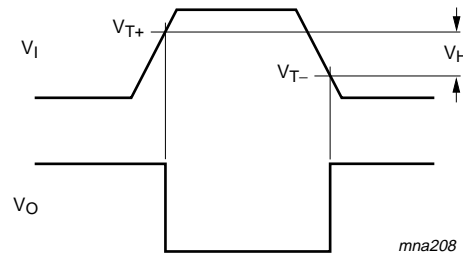


Fig 9. Transfer characteristic



V_{T+} and V_{T-} limits at 70 % and 20 %.

Fig 10. Definition of V_{T+} , V_{T-} and V_H

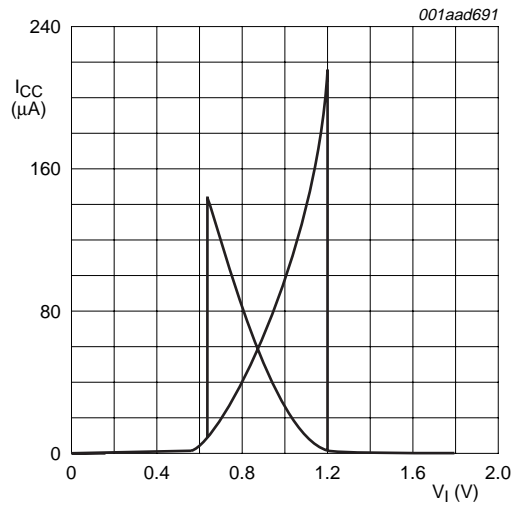


Fig 11. Typical transfer characteristics; $V_{CC} = 1.8\text{ V}$

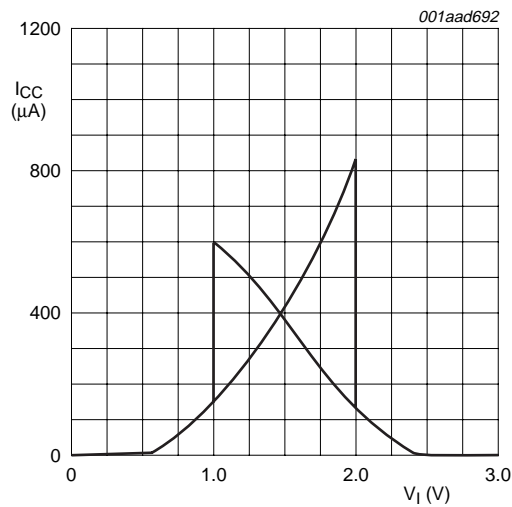


Fig 12. Typical transfer characteristics; $V_{CC} = 3.0\text{ V}$

16. Application information

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

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

P_{ad} = additional power dissipation (μW);

f_i = input frequency (MHz);

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

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

$I_{CC(AV)}$ = average additional supply current (μA).

Average I_{CC} differs with positive or negative input transitions, as shown in [Figure 13](#).

An example of a relaxation circuit using the 74AUP1G14 is shown in [Figure 14](#).

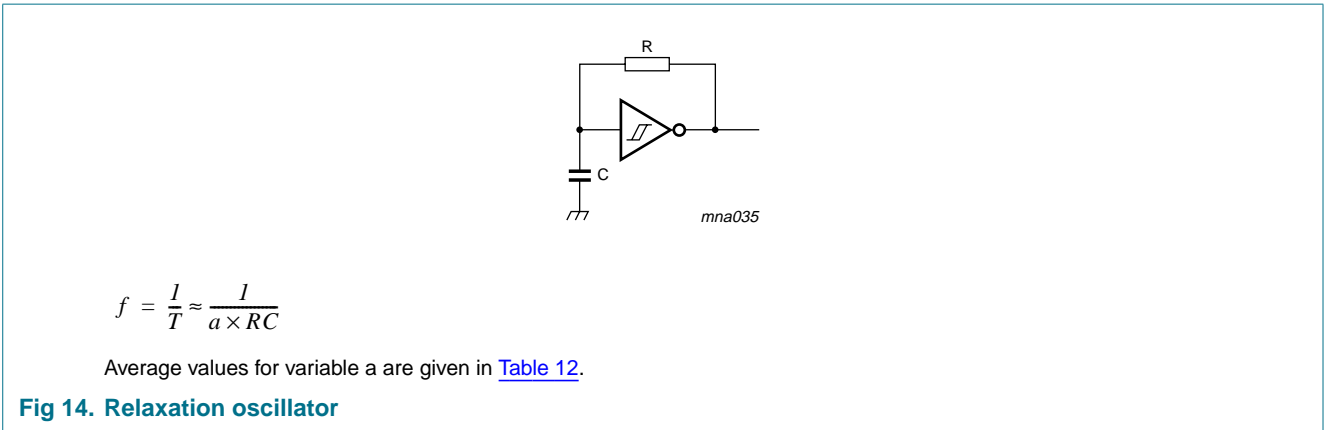
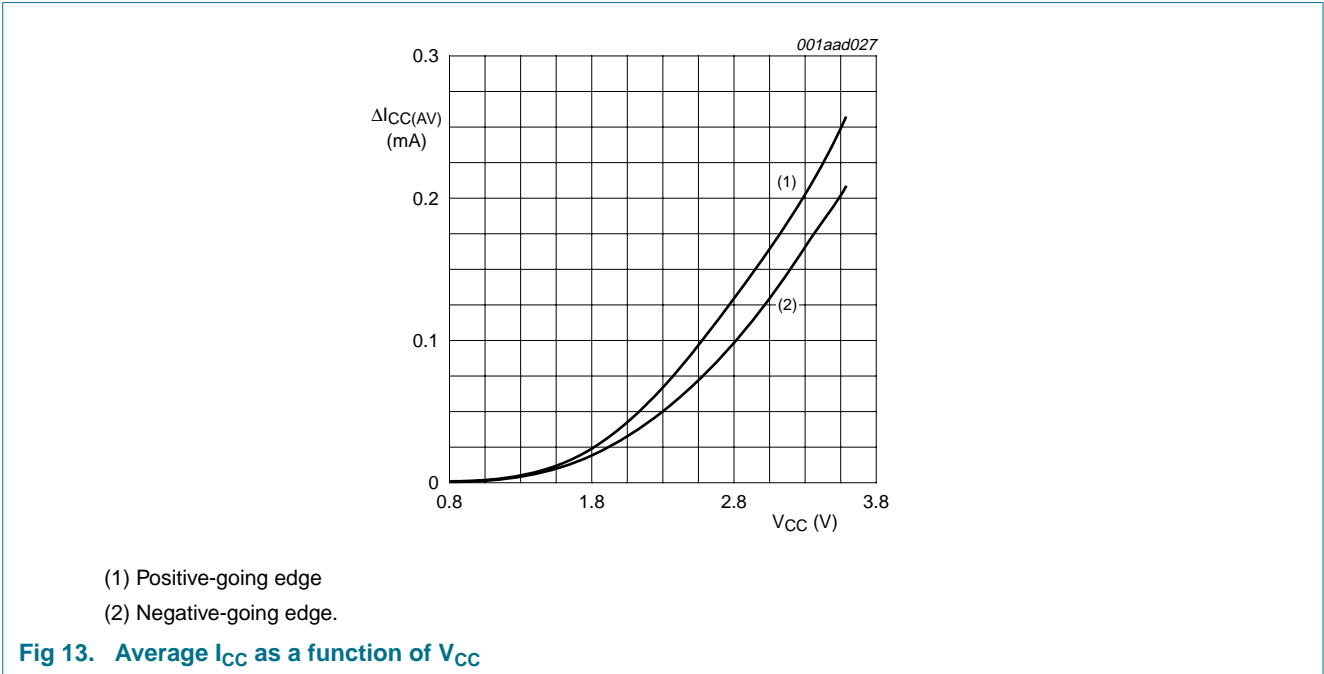


Table 12. Variable values

Supply voltage	Variable a
1.1 V	1.28
1.5 V	1.22
1.8 V	1.24
2.8 V	1.34
3.3 V	1.45

17. Package outline

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

SOT353-1

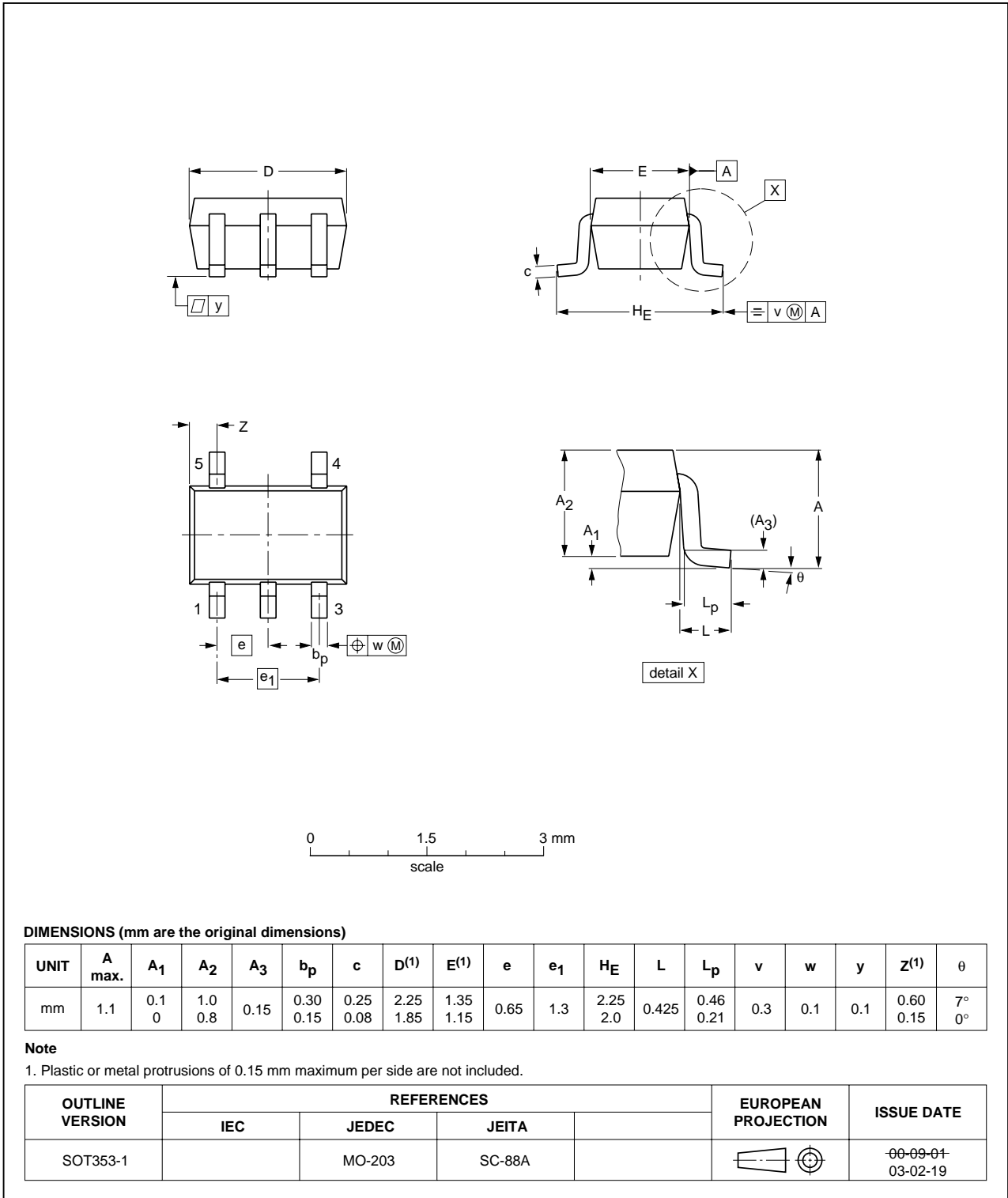


Fig 15. Package outline SOT353-1 (TSSOP5)

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

SOT886

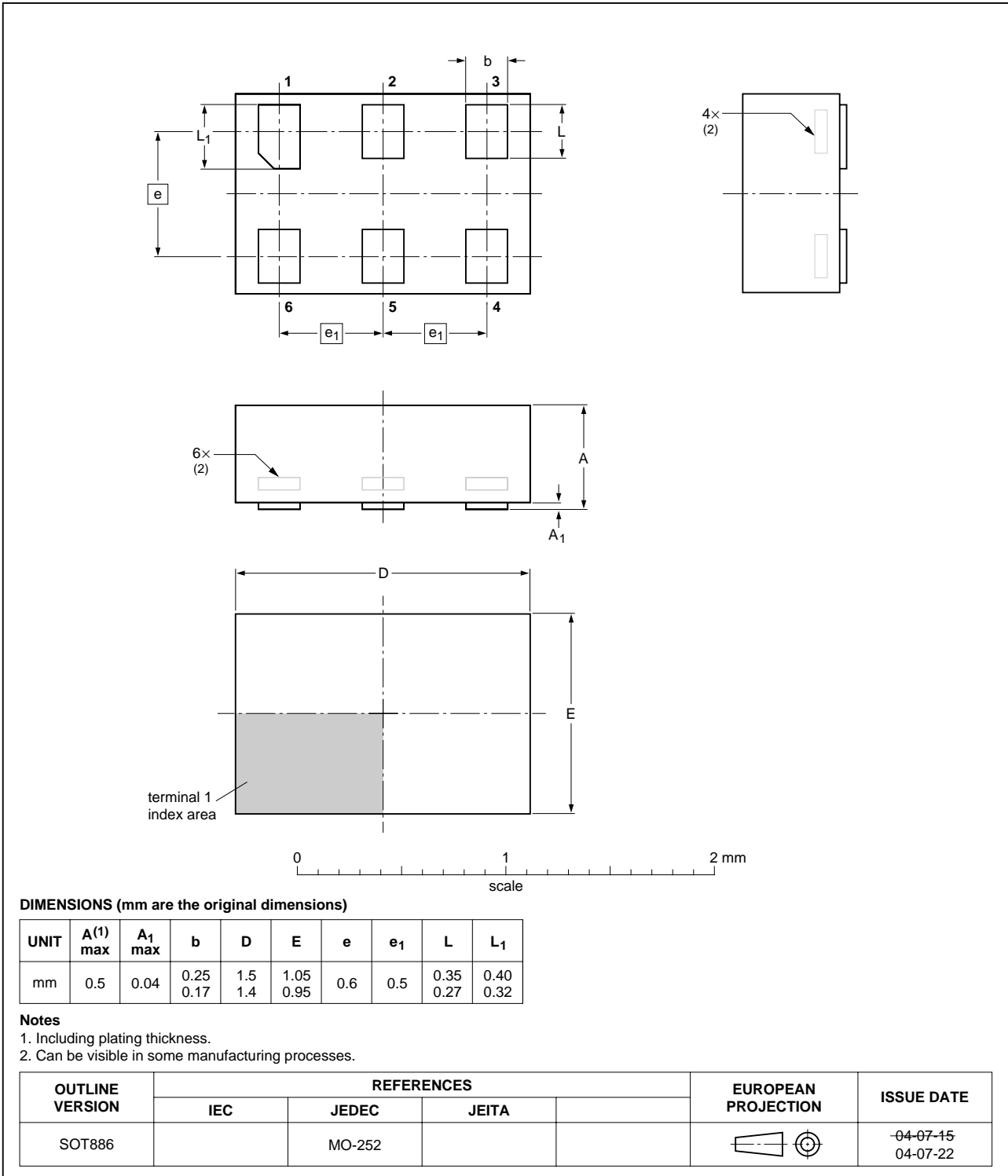


Fig 16. Package outline SOT886 (XSON6)

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

SOT891

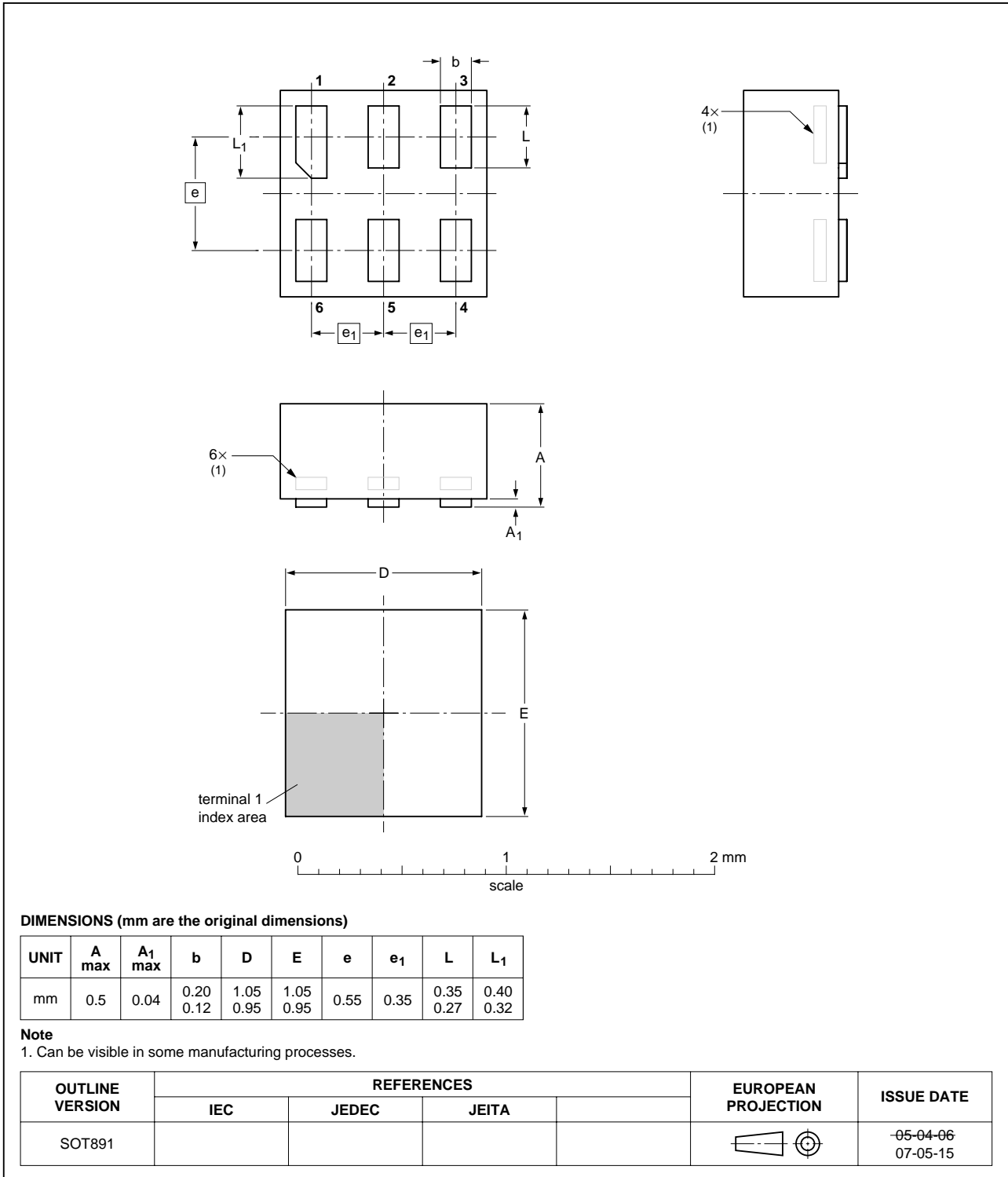


Fig 17. Package outline SOT891 (XSON6)

18. 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

19. Revision history

Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AUP1G14_3	20090708	Product data sheet	-	74AUP1G14_2
Modifications:	<ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. Legal texts have been adapted to the new company name where appropriate. Section 9 "Limiting values": Changed: Derating factor of XSON6 packages. Section 11 "Static characteristics": Changed: conditions for HIGH-level output voltage and LOW-level output voltage. 			
74AUP1G14_2	20060828	Product data sheet	-	74AUP1G14_1
74AUP1G14_1	20050718	Product data sheet	-	-

20. Legal information

20.1 Data sheet status

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

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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Date of release: 8 July 2009
 Document identifier: 74AUP1G14_3