

# 74LVC1G34

## Single buffer

Rev. 01 — 7 September 2005

Product data sheet

## 1. General description

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The 74LVC1G34 is a high-performance, low-voltage, Si-gate CMOS device and superior to most advanced CMOS compatible TTL families.

The input can be driven from either 3.3 V or 5 V devices. This feature allows the use of this device in a mixed 3.3 V and 5 V environment.

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.

Schmitt-trigger action at all inputs makes the circuit highly tolerant to slower input rise and fall times.

The 74LVC1G34 provides a single buffer.

## 2. Features

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- Wide supply voltage range from 1.65 V to 5.5 V
- 5 V tolerant inputs for interfacing with 5 V logic
- High noise immunity
- Complies with JEDEC standard:
  - ◆ JESD8-7 (1.65 V to 1.95 V)
  - ◆ JESD8-5 (2.3 V to 2.7 V)
  - ◆ JESD8-B/JESD36 (2.7 V to 3.6 V)
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- ESD protection:
  - ◆ HBM JESD22-A114-C exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
- CMOS low-power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Multiple package options
- Specified from  $-40$  °C to  $+85$  °C and  $-40$  °C to  $+125$  °C

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### 3. Quick reference data

**Table 1: Quick reference data**
 $GND = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}; t_r = t_f \leq 2.5\text{ ns.}$ 

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PHL}, t_{PLH}$	propagation delay	$C_L = 50\text{ pF}; R_L = 500\text{ }\Omega;$ $V_{CC} = 3.3\text{ V}$				
	A to Y		-	2.0	-	ns
$C_i$	input capacitance		-	4	-	pF
$C_{PD}$	power dissipation capacitance	$V_{CC} = 3.3\text{ V}$	[1] [2]	15	-	pF

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

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V;

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

### 4. Ordering information

**Table 2: Ordering information**

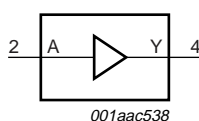
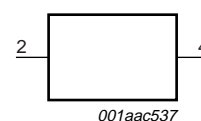
Type number	Package			
	Temperature range	Name	Description	Version
74LVC1G34GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74LVC1G34GV	-40 °C to +125 °C	SC-74A	plastic surface mounted package; 5 leads	SOT753
74LVC1G34GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body $1 \times 1.45 \times 0.5\text{ mm}$	SOT886

### 5. Marking

**Table 3: Marking**

Type number	Marking code
74LVC1G34GW	YN
74LVC1G34GV	YN
74LVC1G34GM	YN

### 6. Functional diagram


**Fig 1. Logic symbol**

**Fig 2. IEC logic symbol**

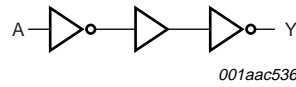


Fig 3. Logic diagram

## 7. Pinning information

### 7.1 Pinning

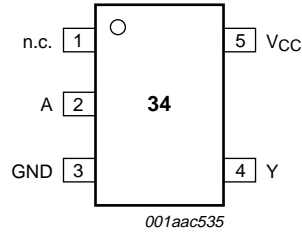


Fig 4. Pin configuration TSSOP5 and SC-74A

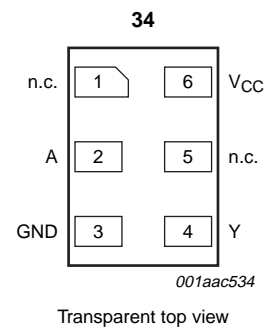


Fig 5. Pin configuration XSON6

### 7.2 Pin description

Table 4: Pin description

Symbol	Pin			Description
	TSSOP5	SC-74A	XSON6	
n.c.	1	1	1	not connected
A	2	2	2	data input A
GND	3	3	3	ground (0 V)
Y	4	4	4	data output Y
n.c.	-	-	5	not connected
V <sub>CC</sub>	5	5	6	supply voltage

## 8. Functional description

### 8.1 Function table

Table 5: Function table <sup>[1]</sup>

Input	Output
A	Y
L	L
H	H

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

## 9. Limiting values

Table 6: Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+6.5	V
$V_I$	input voltage		<sup>[1]</sup> -0.5	+6.5	V
$V_O$	output voltage	active mode	<sup>[1]</sup> <sup>[2]</sup> -0.5	$V_{CC} + 0.5$	V
		Power-down mode	<sup>[1]</sup> <sup>[2]</sup> -0.5	+6.5	V
$I_{IK}$	input clamping current	$V_I < 0$ V	-	-50	mA
$I_{OK}$	output clamping current	$V_O > V_{CC}$ or $V_O < 0$ V	-	±50	mA
$I_O$	output current	$V_O = 0$ V to $V_{CC}$	-	±50	mA
$I_{CC}, I_{GND}$	$V_{CC}$ or GND current		-	±100	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C	<sup>[3]</sup> -	250	mW

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

[2] When  $V_{CC} = 0$  V (Power-down mode), the output voltage can be 5.5 V in normal operation.

[3] For TSSOP5 packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
For XSON6 packages: above 45 °C the value of  $P_{tot}$  derates linearly with 2.4 mW/K.

## 10. Recommended operating conditions

**Table 7: Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CC}$	supply voltage		1.65	-	5.5	V
$V_I$	input voltage		0	-	5.5	V
$V_O$	output voltage	active mode	0	-	$V_{CC}$	V
		Power-down mode; $V_{CC} = 0$ V	0	-	5.5	V
$T_{amb}$	ambient temperature		-40	-	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 1.65$ V to 2.7 V	-	-	20	ns/V
		$V_{CC} = 2.7$ V to 5.5 V	-	-	10	ns/V

## 11. Static characteristics

**Table 8: Static characteristics**

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
<b><math>T_{amb} = -40</math> °C to <math>+85</math> °C</b>						
$V_{IH}$	HIGH-state input voltage	$V_{CC} = 1.65$ V to 1.95 V	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3$ V to 2.7 V	1.7	-	-	V
		$V_{CC} = 2.7$ V to 3.6 V	2.0	-	-	V
		$V_{CC} = 4.5$ V to 5.5 V	$0.7 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-state input voltage	$V_{CC} = 1.65$ V to 1.95 V	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3$ V to 2.7 V	-	-	0.7	V
		$V_{CC} = 2.7$ V to 3.6 V	-	-	0.8	V
		$V_{CC} = 4.5$ V to 5.5 V	-	-	$0.3 \times V_{CC}$	V
$V_{OH}$	HIGH-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -100$ $\mu$ A; $V_{CC} = 1.65$ V to 5.5 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -4$ mA; $V_{CC} = 1.65$ V	1.2	1.54	-	V
		$I_O = -8$ mA; $V_{CC} = 2.3$ V	1.9	2.15	-	V
		$I_O = -12$ mA; $V_{CC} = 2.7$ V	2.2	2.50	-	V
		$I_O = -24$ mA; $V_{CC} = 3.0$ V	2.3	2.62	-	V
		$I_O = -32$ mA; $V_{CC} = 4.5$ V	3.8	4.11	-	V
$V_{OL}$	LOW-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 100$ $\mu$ A; $V_{CC} = 1.65$ V to 5.5 V	-	-	0.10	V
		$I_O = 4$ mA; $V_{CC} = 1.65$ V	-	0.07	0.45	V
		$I_O = 8$ mA; $V_{CC} = 2.3$ V	-	0.12	0.30	V
		$I_O = 12$ mA; $V_{CC} = 2.7$ V	-	0.17	0.40	V
		$I_O = 24$ mA; $V_{CC} = 3.0$ V	-	0.33	0.55	V
		$I_O = 32$ mA; $V_{CC} = 4.5$ V	-	0.39	0.55	V
$I_{LI}$	input leakage current	$V_I = 5.5$ V or GND; $V_{CC} = 5.5$ V	-	$\pm 0.1$	$\pm 5$	$\mu$ A
$I_{OFF}$	power-off leakage current	$V_I$ or $V_O = 5.5$ V; $V_{CC} = 0$ V	-	$\pm 0.1$	$\pm 10$	$\mu$ A

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

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

Symbol	Parameter	Conditions	Min	Typ <sup>[1]</sup>	Max	Unit
$I_{CC}$	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	0.1	10	$\mu$ A
$\Delta I_{CC}$	additional quiescent supply current	$V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 2.3$ V to 5.5 V	-	5	500	$\mu$ A
$C_i$	input capacitance		-	4	-	pF
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>						
$V_{IH}$	HIGH-state input voltage	$V_{CC} = 1.65$ V to 1.95 V	$0.65 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3$ V to 2.7 V	1.7	-	-	V
		$V_{CC} = 2.7$ V to 3.6 V	2.0	-	-	V
		$V_{CC} = 4.5$ V to 5.5 V	$0.7 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-state input voltage	$V_{CC} = 1.65$ V to 1.95 V	-	-	$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3$ V to 2.7 V	-	-	0.7	V
		$V_{CC} = 2.7$ V to 3.6 V	-	-	0.8	V
		$V_{CC} = 4.5$ V to 5.5 V	-	-	$0.3 \times V_{CC}$	V
$V_{OH}$	HIGH-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -100$ $\mu$ A; $V_{CC} = 1.65$ V to 5.5 V	$V_{CC} - 0.1$	-	-	V
		$I_O = -4$ mA; $V_{CC} = 1.65$ V	0.95	-	-	V
		$I_O = -8$ mA; $V_{CC} = 2.3$ V	1.7	-	-	V
		$I_O = -12$ mA; $V_{CC} = 2.7$ V	1.9	-	-	V
		$I_O = -24$ mA; $V_{CC} = 3.0$ V	2.0	-	-	V
$V_{OL}$	LOW-state output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 100$ $\mu$ A; $V_{CC} = 1.65$ V to 5.5 V	-	-	0.10	V
		$I_O = 4$ mA; $V_{CC} = 1.65$ V	-	-	0.70	V
		$I_O = 8$ mA; $V_{CC} = 2.3$ V	-	-	0.45	V
		$I_O = 12$ mA; $V_{CC} = 2.7$ V	-	-	0.60	V
		$I_O = 24$ mA; $V_{CC} = 3.0$ V	-	-	0.80	V
$I_{LI}$	input leakage current	$V_I = 5.5$ V or GND; $V_{CC} = 5.5$ V	-	-	$\pm 100$	$\mu$ A
		$V_I$ or $V_O = 5.5$ V; $V_{CC} = 0$ V	-	-	$\pm 200$	$\mu$ A
$I_{CC}$	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	200	$\mu$ A
$\Delta I_{CC}$	additional quiescent supply current	$V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 2.3$ V to 5.5 V	-	-	5000	$\mu$ A

[1] All typical values are measured at  $T_{amb} = 25$  °C.

## 12. Dynamic characteristics

**Table 9: Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 7](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math> [1]</b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay					
	A to Y	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	4.0	8.6	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0.5	2.6	4.4	ns
		$V_{CC} = 2.7\text{ V}$	0.5	2.3	4.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	0.5	2.0	4.1	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	0.5	1.6	3.2	ns
$C_{PD}$	power dissipation capacitance	$V_{CC} = 3.3\text{ V}$	[2] [3] -	15	-	pF
<b><math>T_{amb} = -40\text{ °C to }+125\text{ °C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay					
	A to Y	see <a href="#">Figure 6</a>				
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	-	11.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0.5	-	5.6	ns
		$V_{CC} = 2.7\text{ V}$	0.5	-	5.6	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	0.5	-	5.2	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	0.5	-	4.1	ns

[1] All typical values are measured at  $T_{amb} = 25\text{ °C}$  and nominal  $V_{CC}$ .

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

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

$f_i$  = input frequency in MHz;

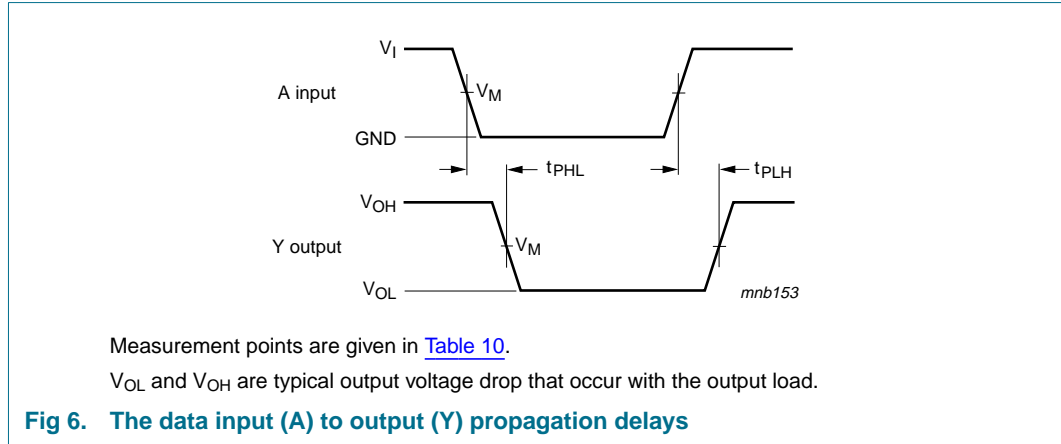
$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V.

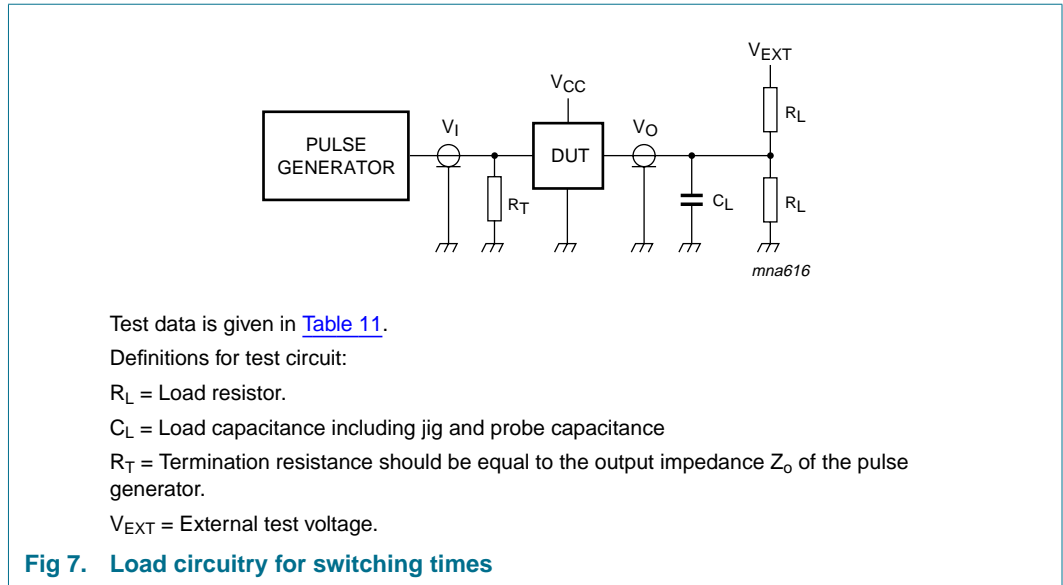
[3] The condition is  $V_I = \text{GND to } V_{CC}$ .

### 13. Waveforms



**Table 10: Measurement points**

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	1.5 V	1.5 V
4.5 V to 5.5 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$



**Table 11: Test data**

Supply voltage	Input		Load		$V_{EXT}$
$V_{CC}$	$V_I$	$t_r = t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$
1.65 V to 1.95 V	$V_{CC}$	$\leq 2.0$ ns	30 pF	1 k $\Omega$	open
2.3 V to 2.7 V	$V_{CC}$	$\leq 2.0$ ns	30 pF	500 $\Omega$	open
2.7 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open
4.5 V to 5.5 V	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open

14. Package outline

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

SOT353-1

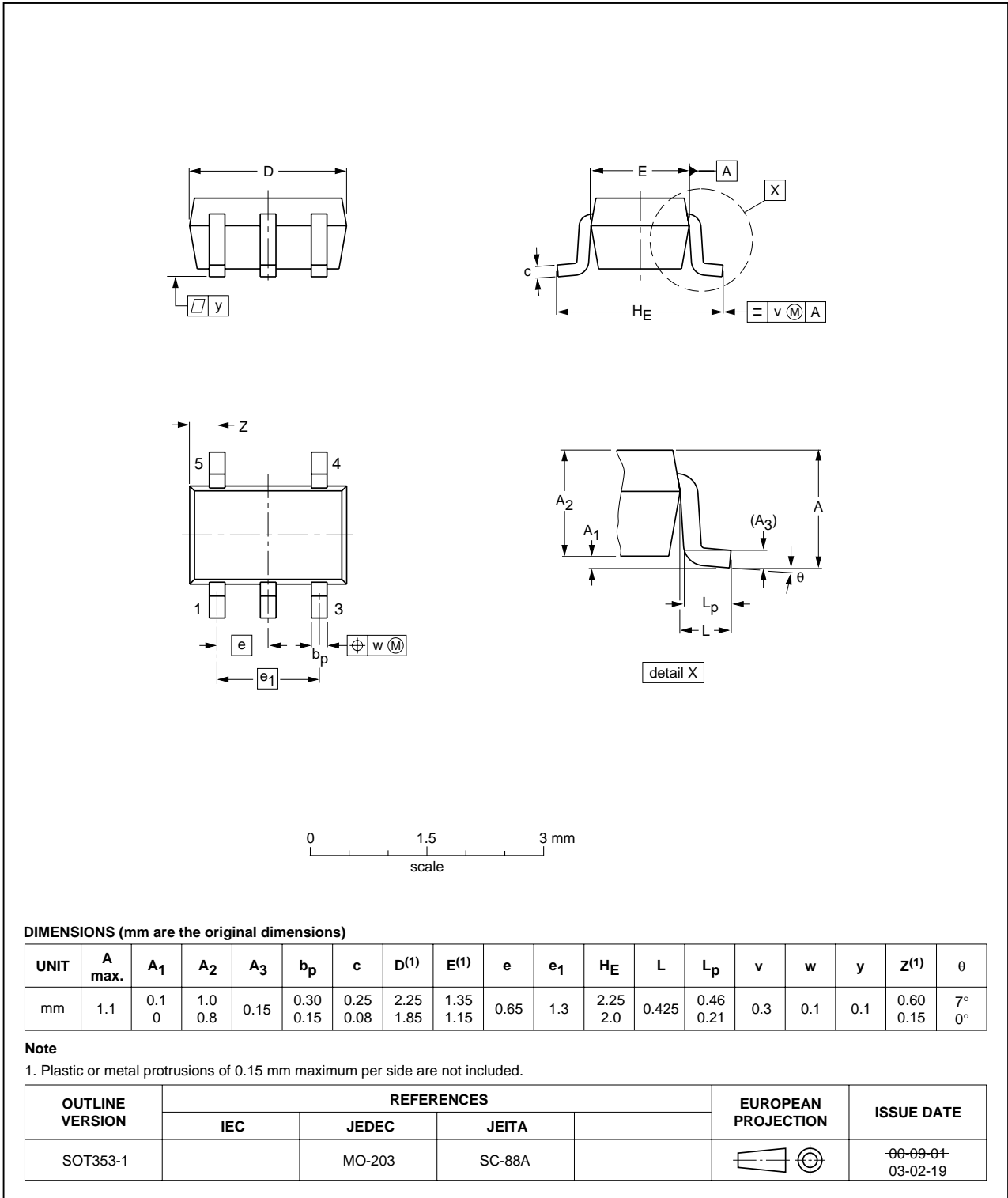


Fig 8. Package outline SOT353 (TSSOP5)

Plastic surface mounted package; 5 leads

SOT753

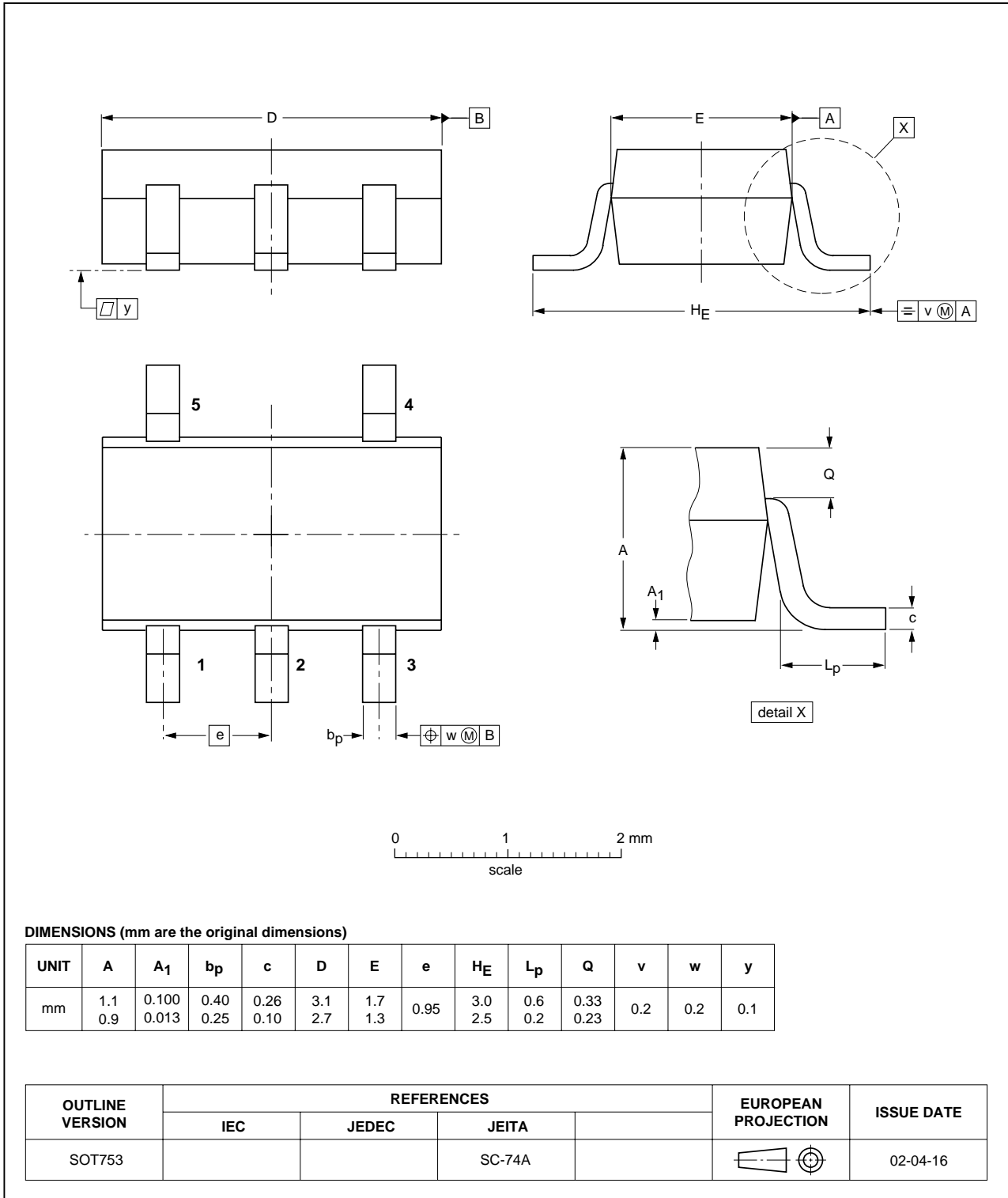


Fig 9. Package outline SOT753 (SC-74A)

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

SOT886

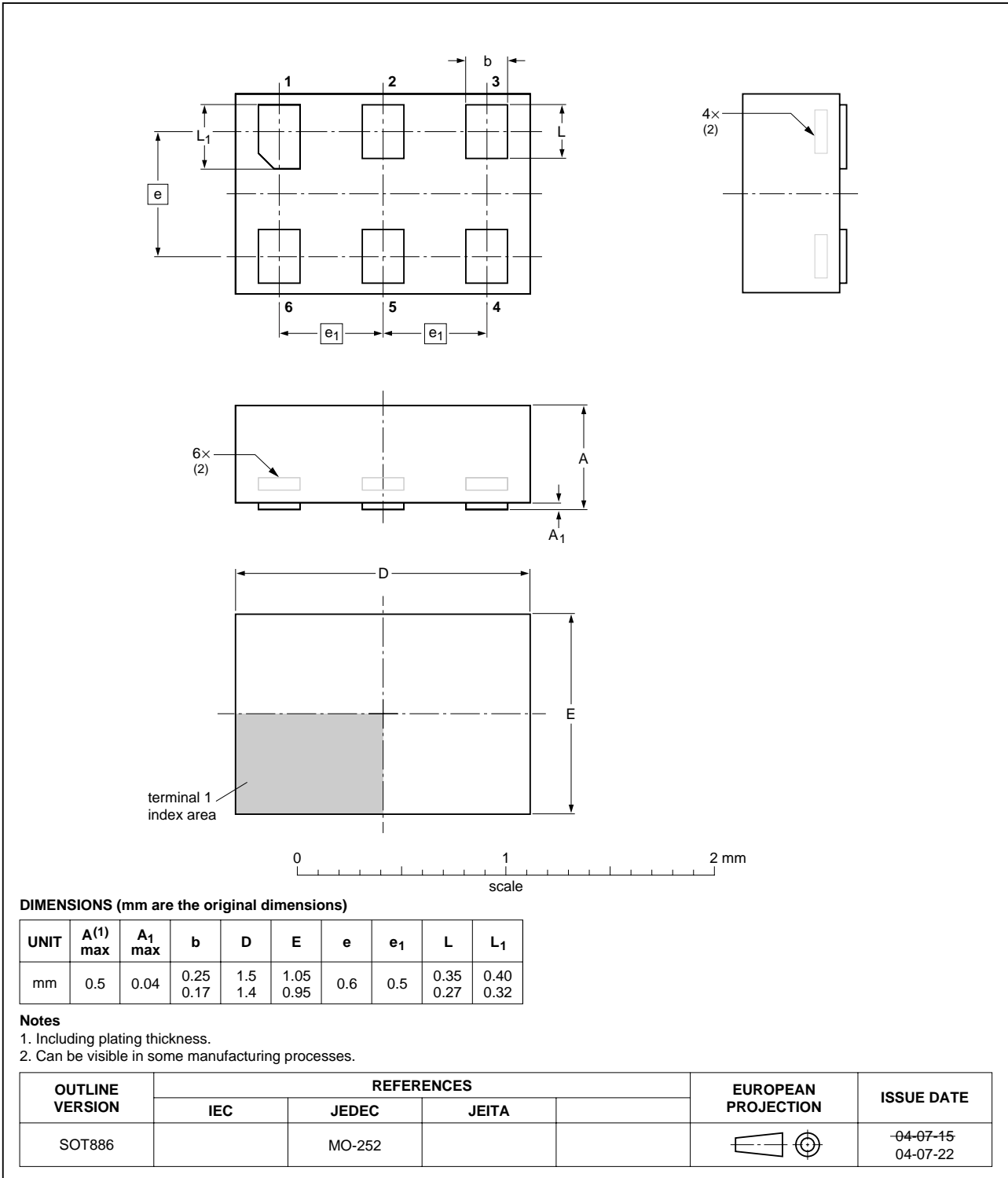


Fig 10. Package outline SOT886 (XSON6)

## 15. Abbreviations

Table 12: Abbreviations

Acronym	Description
CMOS	Complementary Metal Oxide Semiconductor
TTL	Transistor Transistor Logic
HBM	Human Body Model
ESD	ElectroStatic Discharge
MM	Machine Model
CDM	Charged Device Model
DUT	Device Under Test

## 16. Revision history

Table 13: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74LVC1G34_1	20050907	Product data sheet	-	-	-

## 17. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 18. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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