

# 74LVC1G157

## Single 2-input multiplexer

Rev. 10 — 10 June 2021

Product data sheet

## 1. General description

The 74LVC1G157 is a single 2-input multiplexer. Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments.

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

This device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

## 2. Features and benefits

- Wide supply voltage range from 1.65 V to 5.5 V
- 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)
  - JESD8B/JESD36 (2.7 V to 3.6 V)
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Overvoltage tolerant inputs to 5.5 V
- $I_{OFF}$  circuitry provides partial Power-down mode operation
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- 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
74LVC1G157GW	$-40$ °C to $+125$ °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74LVC1G157GV	$-40$ °C to $+125$ °C	SC-74; TSOP6	plastic surface-mounted package; 6 leads	SOT457
74LVC1G157GM	$-40$ °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
74LVC1G157GN	$-40$ °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
74LVC1G157GS	$-40$ °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

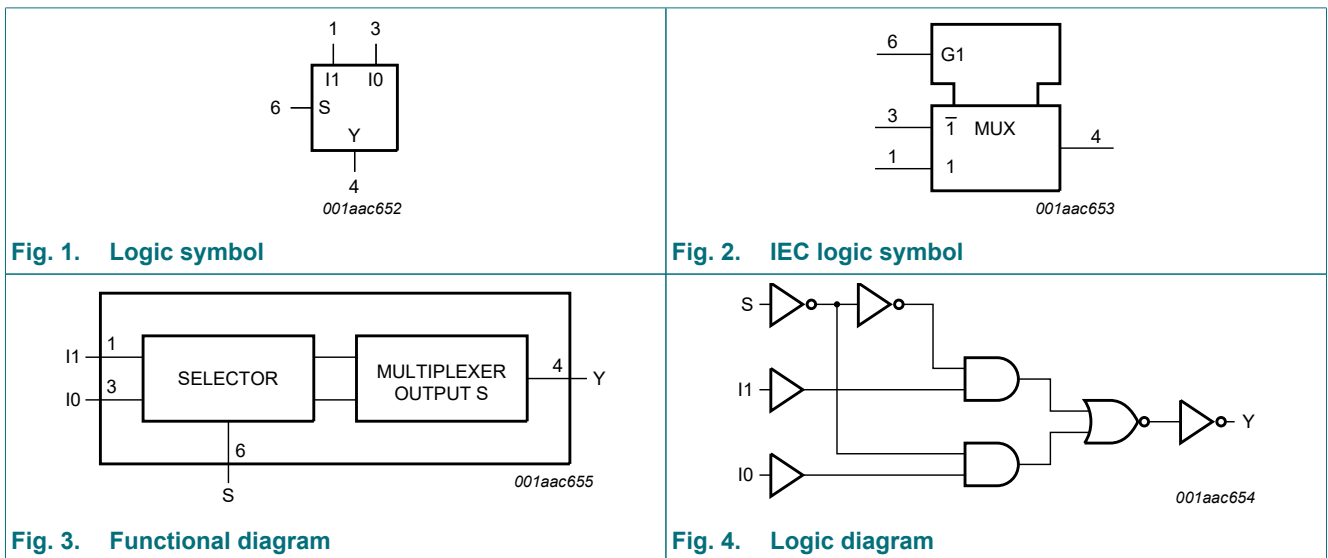
## 4. Marking

Table 2. Marking

Type number	Marking code [1]
74LVC1G157GW	YP
74LVC1G157GV	YP
74LVC1G157GM	YP
74LVC1G157GN	YP
74LVC1G157GS	YP

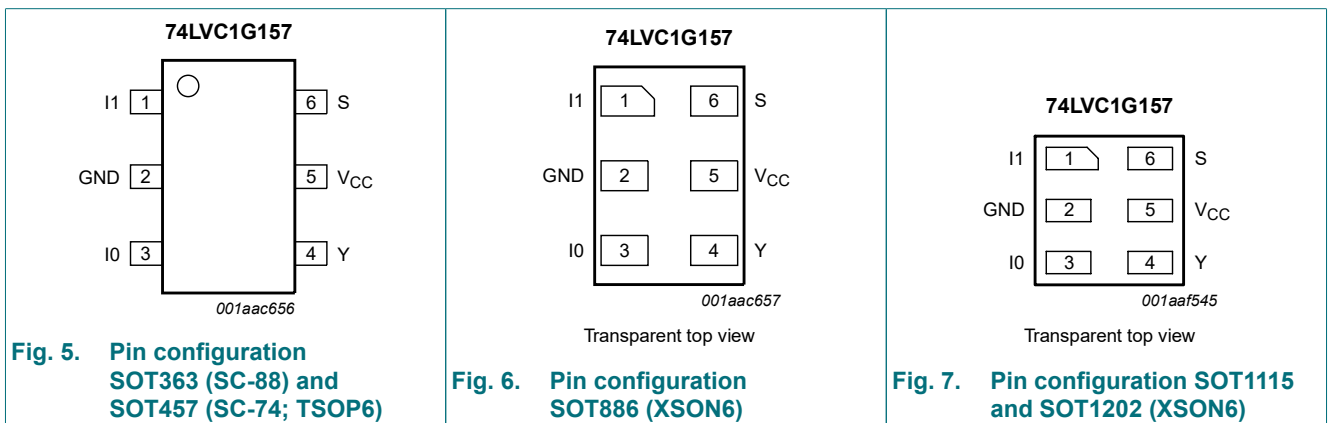
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram



## 6. Pinning information

### 6.1. Pinning



## 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
I1	1	data input from source 1
GND	2	ground (0 V)
I0	3	data input from source 0
Y	4	multiplexer output
V <sub>CC</sub>	5	supply voltage
S	6	common data select input

## 7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care.

Inputs			Output
S	I1	I0	Y
L	X	L	L
L	X	H	H
H	L	X	L
H	H	X	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 <sub>CC</sub>	supply voltage		-0.5	+6.5	V	
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA	
V <sub>I</sub>	input voltage	[1]	-0.5	+6.5	V	
I <sub>OK</sub>	output clamping current	V <sub>O</sub> > V <sub>CC</sub> or V <sub>O</sub> < 0 V	-	±50	mA	
V <sub>O</sub>	output voltage	Active mode	[1]	-0.5	V <sub>CC</sub> + 0.5	V
		Power-down mode; V <sub>CC</sub> = 0 V	[1]	-0.5	+6.5	V
I <sub>O</sub>	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±50	mA	
I <sub>CC</sub>	supply current		-	100	mA	
I <sub>GND</sub>	ground current		-100	-	mA	
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = -40 °C to +125 °C	[2]	-	250	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C	

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

[2] For SOT363 (SC-88) package: P<sub>tot</sub> derates linearly with 3.7 mW/K above 83 °C.  
 For SOT457 (SC-74; TSOP6) package: P<sub>tot</sub> derates linearly with 4.1 mW/K above 89 °C.  
 For SOT886 (XSON6) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.  
 For SOT1115 (XSON6) package: P<sub>tot</sub> derates linearly with 3.2 mW/K above 71 °C.  
 For SOT1202 (XSON6) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C.

## 9. Recommended operating conditions

Table 6. 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	-	-	$V_{CC}$	V
		Power-down mode; $V_{CC} = 0$ V	-	-	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

## 10. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 1.65$ V to 1.95 V	$0.65V_{CC}$	-	-	$0.65V_{CC}$	-	V
		$V_{CC} = 2.3$ V to 2.7 V	1.7	-	-	1.7	-	V
		$V_{CC} = 2.7$ V to 3.6 V	2.0	-	-	2.0	-	V
		$V_{CC} = 4.5$ V to 5.5 V	$0.7V_{CC}$	-	-	$0.7V_{CC}$	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 1.65$ V to 1.95 V	-	-	$0.35V_{CC}$	-	$0.35V_{CC}$	V
		$V_{CC} = 2.3$ V to 2.7 V	-	-	0.7	-	0.7	V
		$V_{CC} = 2.7$ V to 3.6 V	-	-	0.8	-	0.8	V
		$V_{CC} = 4.5$ V to 5.5 V	-	-	$0.3V_{CC}$	-	$0.3V_{CC}$	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$						
		$I_O = -100$ $\mu$ A; $V_{CC} = 1.65$ V to 5.5 V	$V_{CC}-0.1$	-	-	$V_{CC}-0.1$	-	V
		$I_O = -4$ mA; $V_{CC} = 1.65$ V	1.2	1.54	-	0.95	-	V
		$I_O = -8$ mA; $V_{CC} = 2.3$ V	1.9	2.15	-	1.7	-	V
		$I_O = -12$ mA; $V_{CC} = 2.7$ V	2.2	2.50	-	1.9	-	V
		$I_O = -24$ mA; $V_{CC} = 3.0$ V	2.3	2.62	-	2.0	-	V
		$I_O = -32$ mA; $V_{CC} = 4.5$ V	3.8	4.11	-	3.4	-	V
$V_{OL}$	LOW-level 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	-	0.10	V
		$I_O = 4$ mA; $V_{CC} = 1.65$ V	-	0.07	0.45	-	0.70	V
		$I_O = 8$ mA; $V_{CC} = 2.3$ V	-	0.12	0.30	-	0.45	V
		$I_O = 12$ mA; $V_{CC} = 2.7$ V	-	0.17	0.40	-	0.60	V
		$I_O = 24$ mA; $V_{CC} = 3.0$ V	-	0.33	0.55	-	0.80	V
		$I_O = 32$ mA; $V_{CC} = 4.5$ V	-	0.39	0.55	-	0.80	V

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	
I <sub>I</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	±0.1	±1	-	±1	µA
I <sub>OFF</sub>	power-off leakage current	V <sub>CC</sub> = 0 V; V <sub>I</sub> or V <sub>O</sub> = 5.5 V	-	±0.1	±2	-	±2	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = 5.5 V or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 1.65 V to 5.5 V	-	0.1	4	-	4	µA
ΔI <sub>CC</sub>	additional supply current	per pin; V <sub>CC</sub> = 2.3 V to 5.5 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A	-	5	500	-	500	µA
C <sub>I</sub>	input capacitance	V <sub>CC</sub> = 3.3 V; V <sub>I</sub> = GND to V <sub>CC</sub>	-	2.5	-	-	-	pF

[1] All typical values are measured at T<sub>amb</sub> = 25 °C.

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 9.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t <sub>pd</sub>	propagation delay	I <sub>0</sub> , I <sub>1</sub> to Y; see Fig. 8 [2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.5	4.3	11.0	1.5	13.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.9	6.1	1.0	7.6	ns
		V <sub>CC</sub> = 2.7 V	1.0	3.1	5.6	1.0	7.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.7	5.0	1.0	6.3	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.5	2.2	4.0	0.5	5.0	ns
		S to Y; see Fig. 8 [2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.5	4.3	11.0	1.5	13.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	2.9	6.9	1.0	8.6	ns
		V <sub>CC</sub> = 2.7 V	1.0	3.3	5.9	1.0	7.4	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	2.9	5.0	1.0	6.3	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.5	2.3	4.0	0.5	5.0	ns
C <sub>PD</sub>	power dissipation capacitance	V <sub>I</sub> = GND to V <sub>CC</sub> ; V <sub>CC</sub> = 3.3 V [3]	-	18	-	-	-	pF

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.8 V, 2.5 V, 2.7 V, 3.3 V and 5.0 V respectively.

[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).

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

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 Volts;

N = number of inputs switching;

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

11.1. Waveforms and test circuit

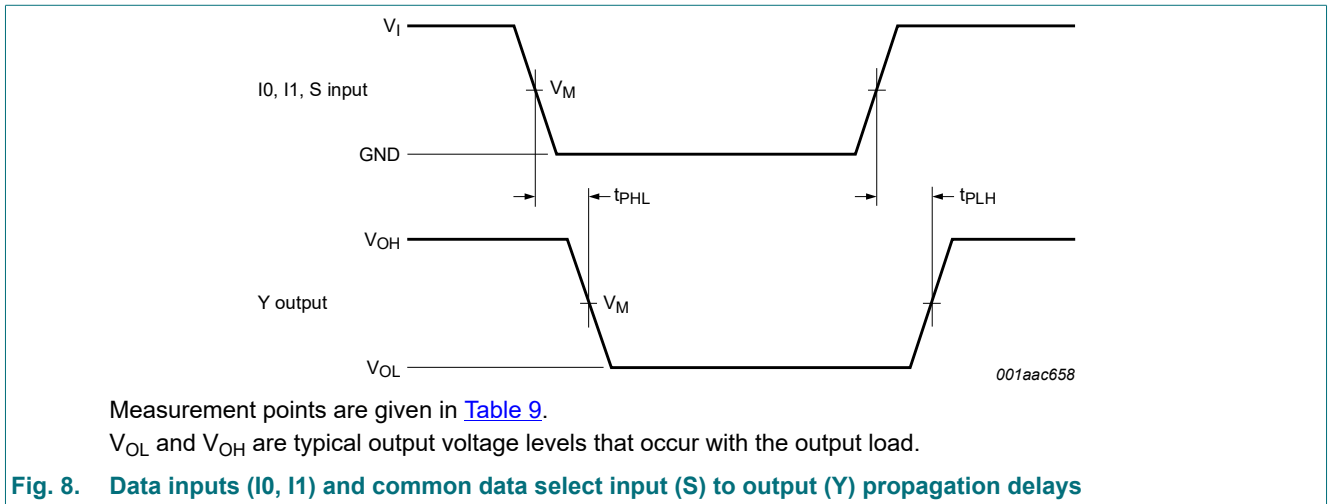


Table 9. Measurement points

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
1.65 V to 1.95 V	$0.5V_{CC}$	$0.5V_{CC}$
2.3 V to 2.7 V	$0.5V_{CC}$	$0.5V_{CC}$
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	$0.5V_{CC}$	$0.5V_{CC}$

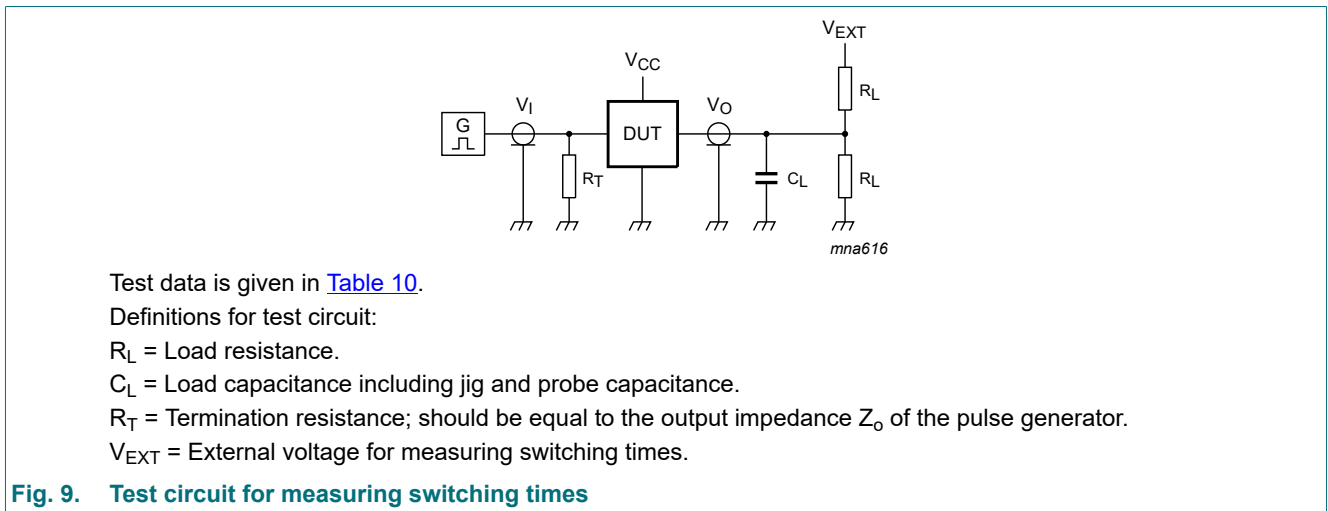


Table 10. Test data

Supply voltage	Input	Load	$V_{EXT}$
$V_{CC}$	$V_I$	$t_r = t_f$	$t_{PLH}, t_{PHL}$
1.65 V to 1.95 V	$V_{CC}$	$\leq 2.0$ ns	open
2.3 V to 2.7 V	$V_{CC}$	$\leq 2.0$ ns	open
2.7 V	2.7 V	$\leq 2.5$ ns	open
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	open
4.5 V to 5.5 V	$V_{CC}$	$\leq 2.5$ ns	open

## 12. Package outline

Plastic surface-mounted package; 6 leads

SOT363

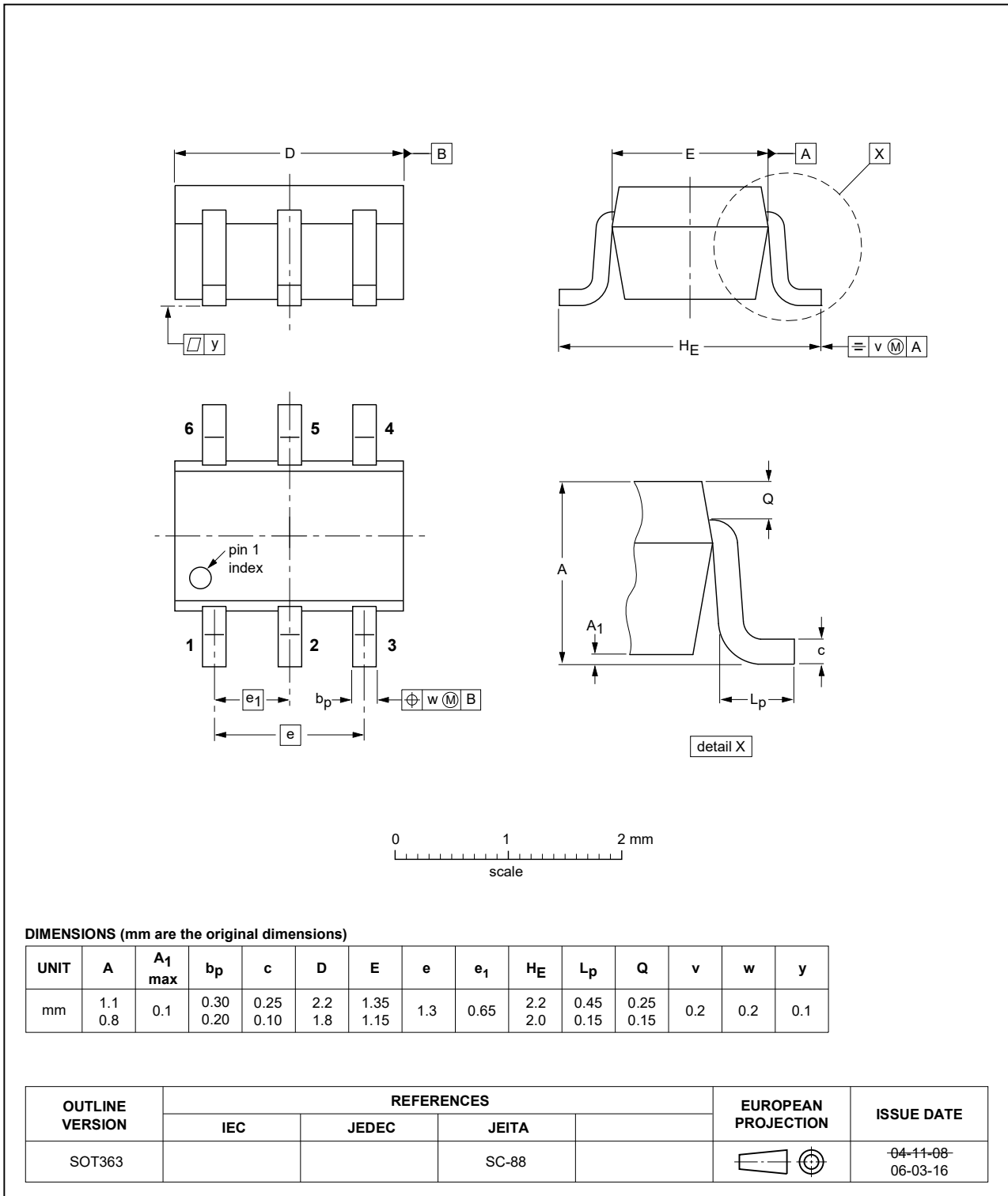


Fig. 10. Package outline SOT363 (SC-88)

Plastic, surface-mounted package (SC-74; TSOP6); 6 leads

SOT457

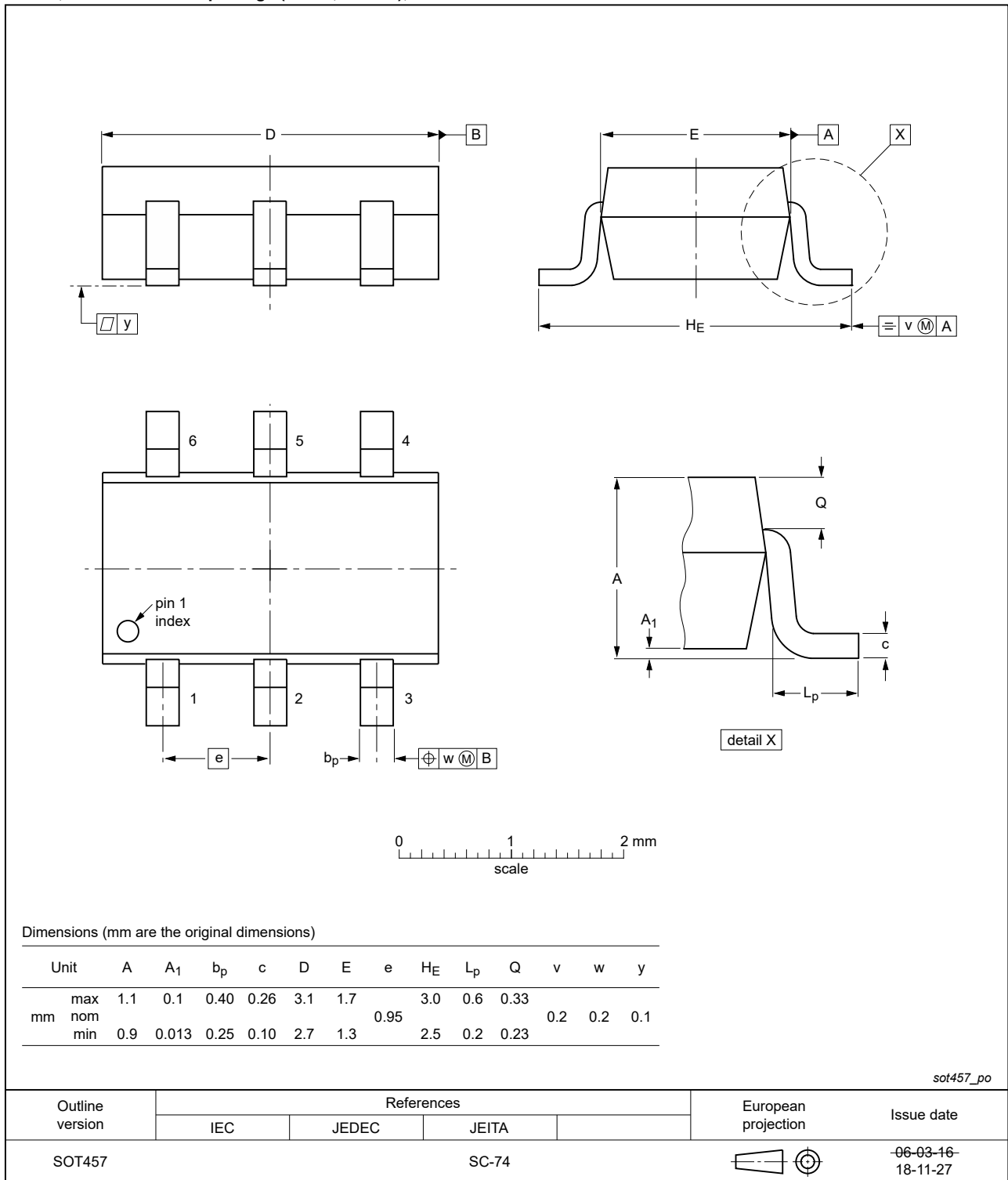


Fig. 11. Package outline SOT457 (SC-74; TSOP6)



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

SOT886

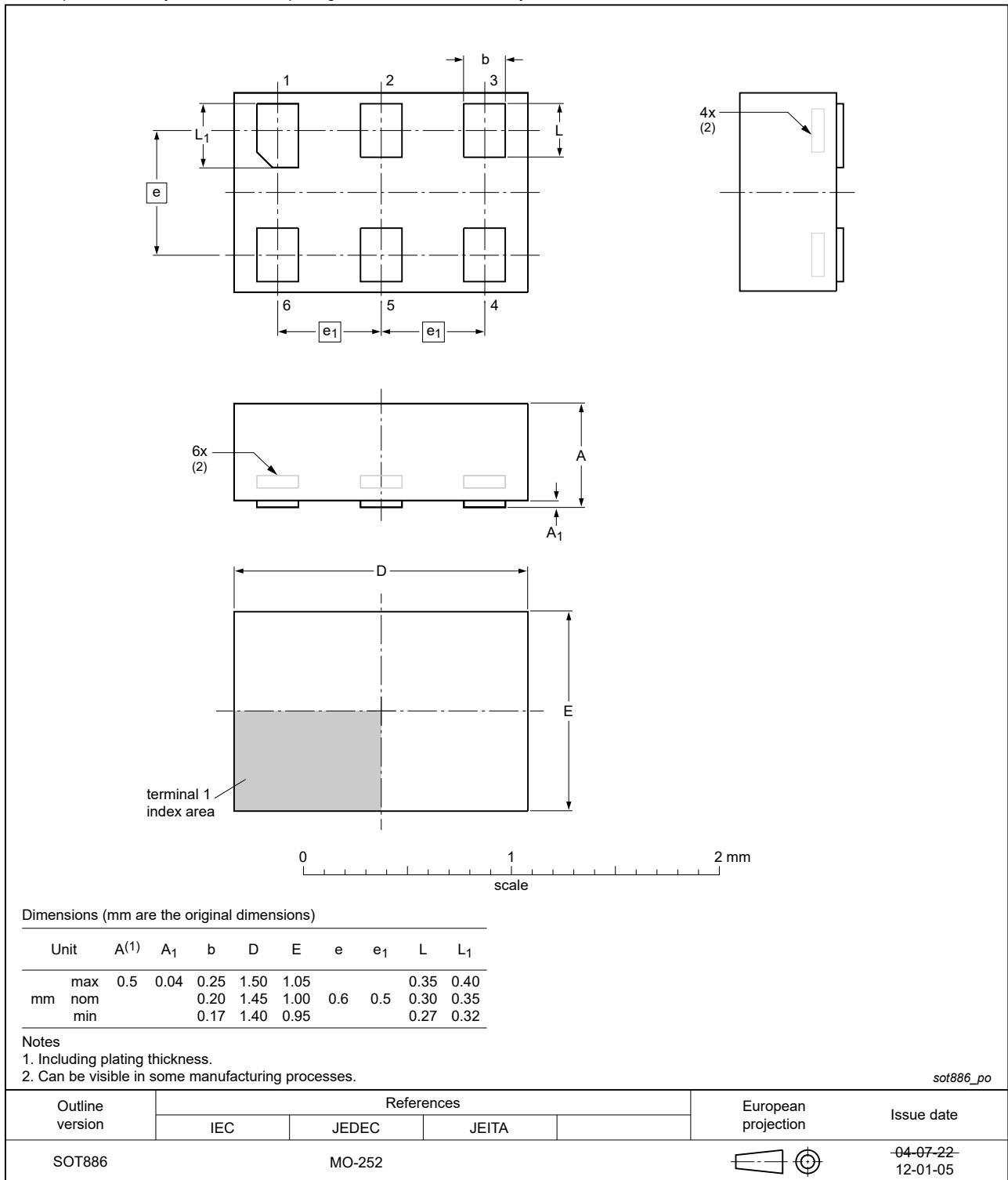


Fig. 12. Package outline SOT886 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 0.9 x 1.0 x 0.35 mm

SOT1115

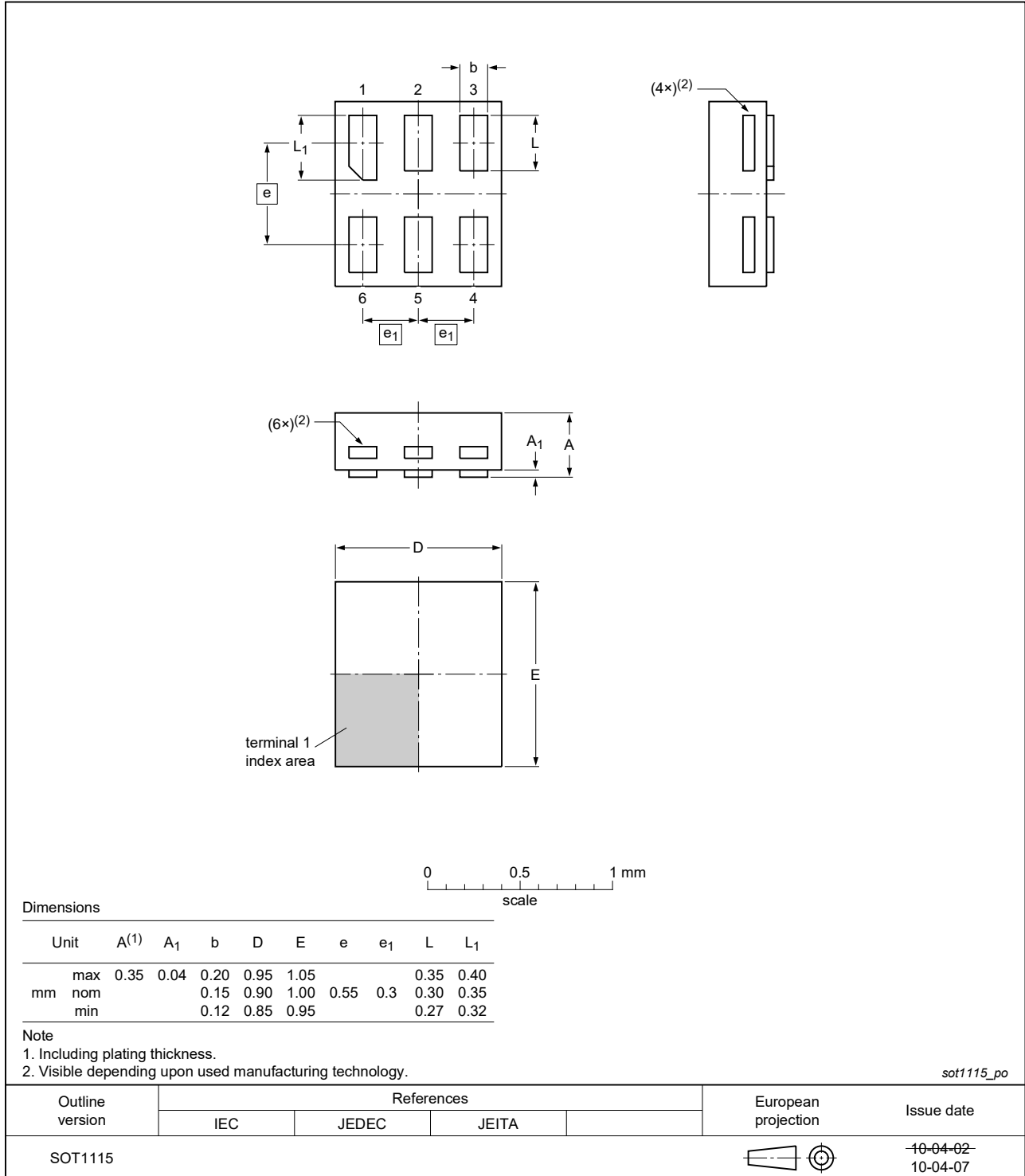


Fig. 13. Package outline SOT1115 (XSON6)

XSON6: extremely thin small outline package; no leads;  
6 terminals; body 1.0 x 1.0 x 0.35 mm

SOT1202

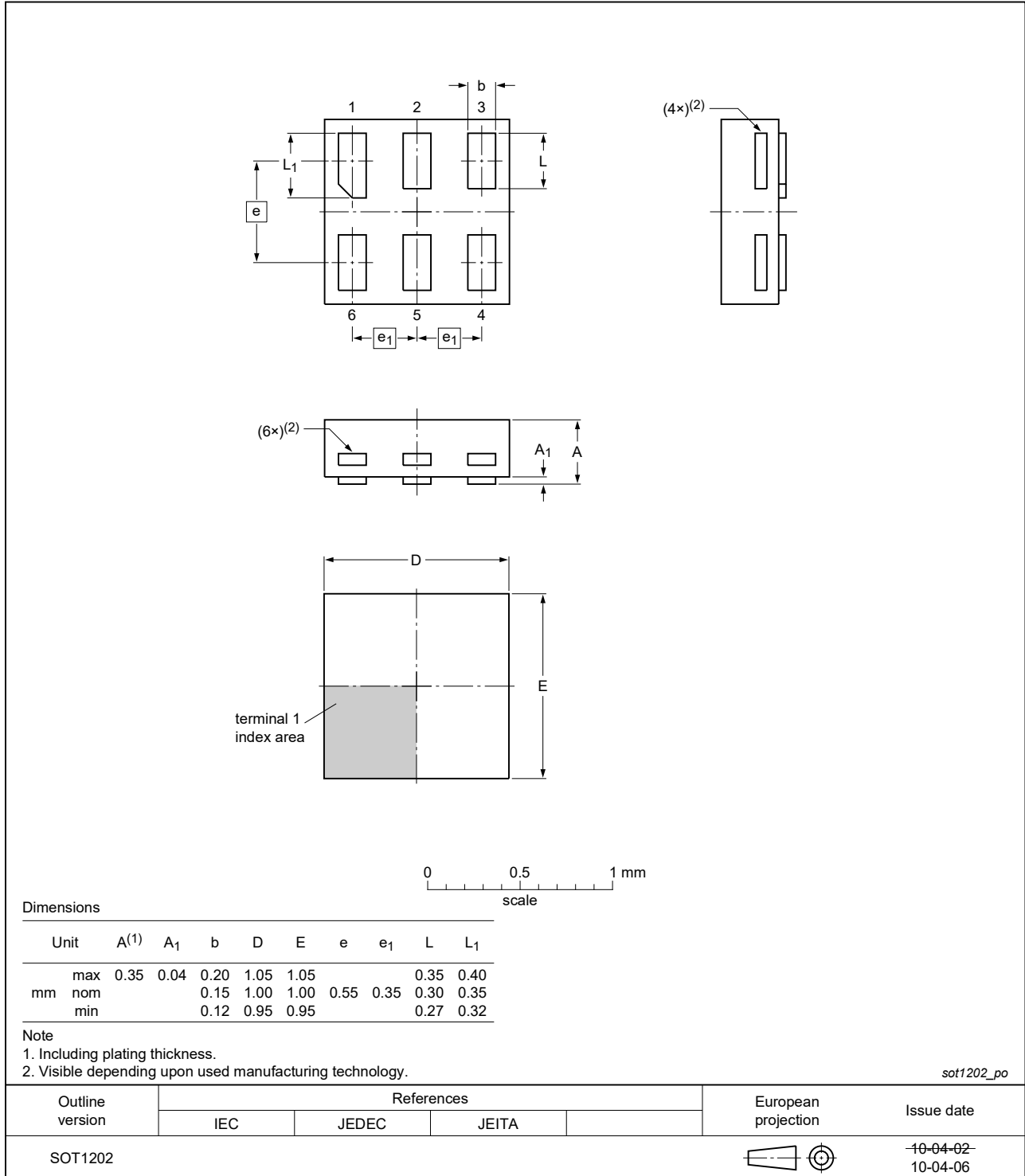


Fig. 14. Package outline SOT1202 (XSON6)

## 13. Abbreviations

Table 11. Abbreviations

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

## 14. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC1G157 v.10	20210610	Product data sheet	-	74LVC1G157 v.9
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Section 1</a> updated.</li> <li>• Type number 74LVC1G157GF (SOT891 / XSON6) removed.</li> </ul>			
74LVC1G157 v.9	20191008	Product data sheet	-	74LVC1G157 v.8
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> <li>• Package outline drawing <a href="#">SOT457</a> (SC-74) updated</li> </ul>			
74LVC1G157 v.8	20171031	Product data sheet	-	74LVC1G157 v.7
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>			
74LVC1G157 v.7	20161202	Product data sheet	-	74LVC1G157 v.6
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Table 7</a>: The maximum limits for leakage current and supply current have changed.</li> </ul>			
74LVC1G157 v.6	20121231	Product data sheet	-	74LVC1G157 v.5
Modifications:	<ul style="list-style-type: none"> <li>• Package outline drawing of SOT886 (<a href="#">Fig. 12</a>) modified.</li> </ul>			
74LVC1G157 v.5	20111206	Product data sheet	-	74LVC1G157 v.4
Modifications:	<ul style="list-style-type: none"> <li>• Legal pages updated.</li> </ul>			
74LVC1G157 v.4	20101028	Product data sheet	-	74LVC1G157 v.3
74LVC1G157 v.3	20070712	Product data sheet	-	74LVC1G157 v.2
74LVC1G157 v.2	20061011	Product data sheet	-	74LVC1G157 v.1
74LVC1G157 v.1	20050425	Product data sheet	-	-

## 15. Legal information

### 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 <https://www.nexperia.com>.

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