74LVC1G157

Single 2-input multiplexer

Rev. 9 — 8 October 2019 Product data sheet

1. General description

The 74LVC1G157 is a single 2-input multiplexer which select data from two data inputs (I0 and I1) under control of a common data select input (S). The state of the common data select input determines the particular register from which the data comes. The output (Y) presents the selected data in the true (non-inverted) form.

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 applications.

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.

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)
- ±24 mA output drive (V_{CC} = 3.0 V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5 V
- 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	plastic surface-mounted package (SC-74; TSOP6); 6 leads	SOT457
74LVC1G157GM	-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
74LVC1G157GF	-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
74LVC1G157GN	-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
74LVC1G157GS	-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

4. Marking

Table 2. Marking

Type number	Marking code [1]
74LVC1G157GW	YP
74LVC1G157GV	YP
74LVC1G157GM	YP
74LVC1G157GF	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

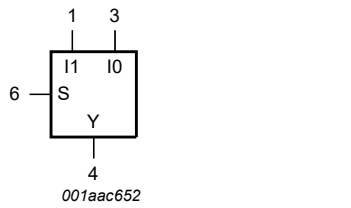


Fig. 1. Logic symbol

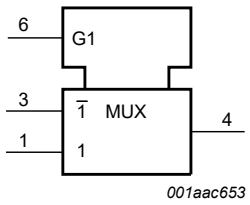


Fig. 2. IEC logic symbol

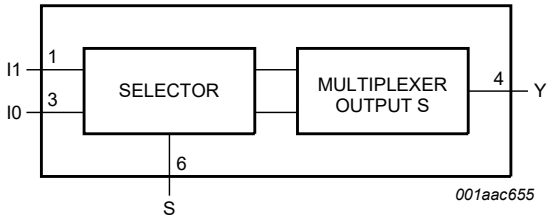


Fig. 3. Functional diagram

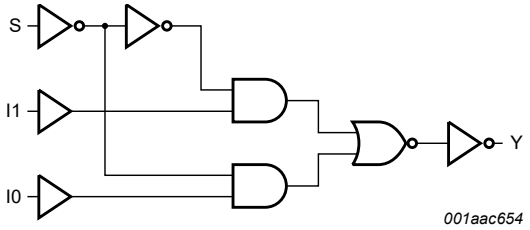


Fig. 4. Logic diagram

6. Pinning information

6.1. Pinning

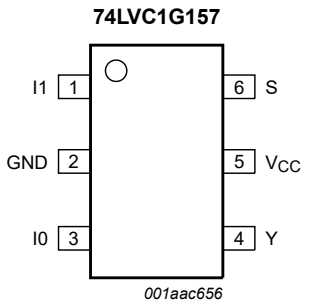
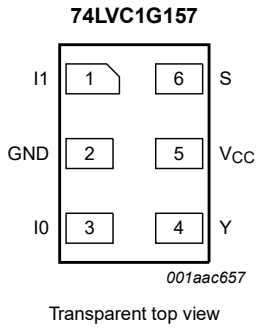
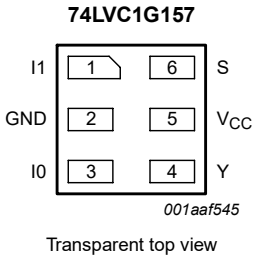


Fig. 5. Pin configuration SOT363 (SC-88) and SOT457 (SC-74)



Transparent top view

Fig. 6. Pin configuration SOT886 (XSON6)



Transparent top view

Fig. 7. Pin configuration SOT891, SOT1115 and SOT1202 (XSON6)

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_{CC}	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_{CC}	supply voltage			-0.5	+6.5	V
I_{IK}	input clamping current	$V_I < 0$ V		-50	-	mA
V_I	input voltage		[1]	-0.5	+6.5	V
I_{OK}	output clamping current	$V_O > V_{CC}$ or $V_O < 0$ V		-	±50	mA
V_O	output voltage	Active mode	[1]	-0.5	V_{CC} + 0.5	V
		Power-down mode; V_{CC} = 0 V	[1]	-0.5	+6.5	V
I_O	output current	V_O = 0 V to V_{CC}		-	±50	mA
I_{CC}	supply current			-	100	mA
I_{GND}	ground current			-100	-	mA
P_{tot}	total power dissipation	T_{amb} = -40 °C to +125 °C	[2]	-	250	mW
T_{stg}	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 (TSSOP6) packages: P_{tot} derates linearly with 3.7 mW/K above 83 °C.
For SOT457 (TSOP6) packages: P_{tot} derates linearly with 4.1 mW/K above 89 °C.
For SOT886 (XSON6) packages: P_{tot} derates linearly with 3.3 mW/K above 74 °C.
For SOT891 (XSON6) packages: P_{tot} derates linearly with 3.3 mW/K above 74 °C.
For SOT1115 (XSON6) packages: P_{tot} derates linearly with 3.2 mW/K above 71 °C.
For SOT1202 (XSON6) packages: P_{tot} 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 µA; 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 µA; 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
I_I	input leakage current	V_I = 5.5 V or GND; V_{CC} = 0 V to 5.5 V	-	±0.1	±1	-	±1	µA
I_{OFF}	power-off leakage current	V_{CC} = 0 V; V_I or V_O = 5.5 V	-	±0.1	±2	-	±2	µA
I_{CC}	supply current	V_I = 5.5 V or GND; I_O = 0 A; V_{CC} = 1.65 V to 5.5 V	-	0.1	4	-	4	µA
ΔI_{CC}	additional supply current	per pin; V_{CC} = 2.3 V to 5.5 V; $V_I = V_{CC}$ - 0.6 V; I_O = 0 A	-	5	500	-	500	µA
C_I	input capacitance	V_{CC} = 3.3 V; V_I = GND to V_{CC}	-	2.5	-	-	-	pF

[1] All typical values are measured at T_{amb} = 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_{pd}	propagation delay	I0, I1 to Y; see Fig. 8 [2]						
		V_{CC} = 1.65 V to 1.95 V	1.5	4.3	11.0	1.5	13.0	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	2.9	6.1	1.0	7.6	ns
		V_{CC} = 2.7 V	1.0	3.1	5.6	1.0	7.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	2.7	5.0	1.0	6.3	ns
		V_{CC} = 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_{CC} = 1.65 V to 1.95 V	1.5	4.3	11.0	1.5	13.0	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	2.9	6.9	1.0	8.6	ns
		V_{CC} = 2.7 V	1.0	3.3	5.9	1.0	7.4	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	2.9	5.0	1.0	6.3	ns
		V_{CC} = 4.5 V to 5.5 V	0.5	2.3	4.0	0.5	5.0	ns
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; V_{CC} = 3.3 V [3]	-	18	-	-	-	pF

[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.8 V, 2.5 V, 2.7 V, 3.3 V and 5.0 V respectively.

[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;

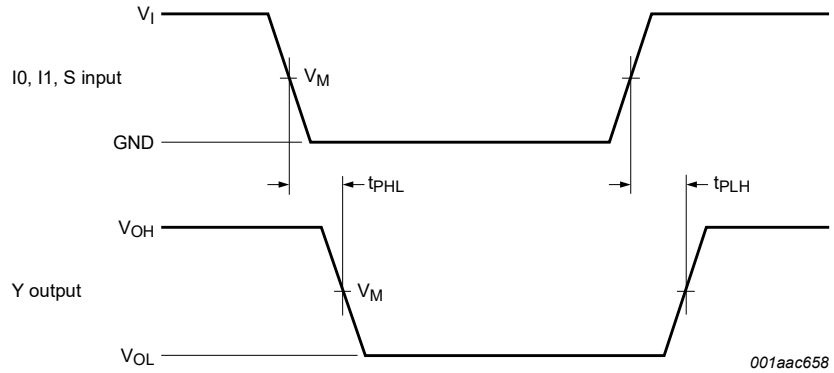
C_L = output load capacitance in pF;

V_{CC} = supply voltage in Volts;

N = number of inputs switching;

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

11.1. Waveforms and test circuit



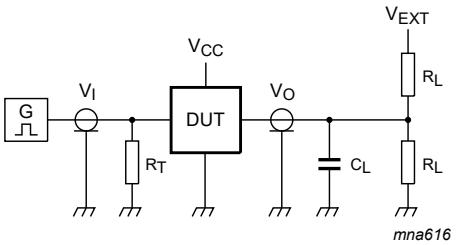
Measurement points are given in Table 9.

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

Fig. 8. Data inputs (I0, I1) and common data select input (S) to output (Y) propagation delays

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	$0.5V_{CC}$	$0.5V_{CC}$



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.

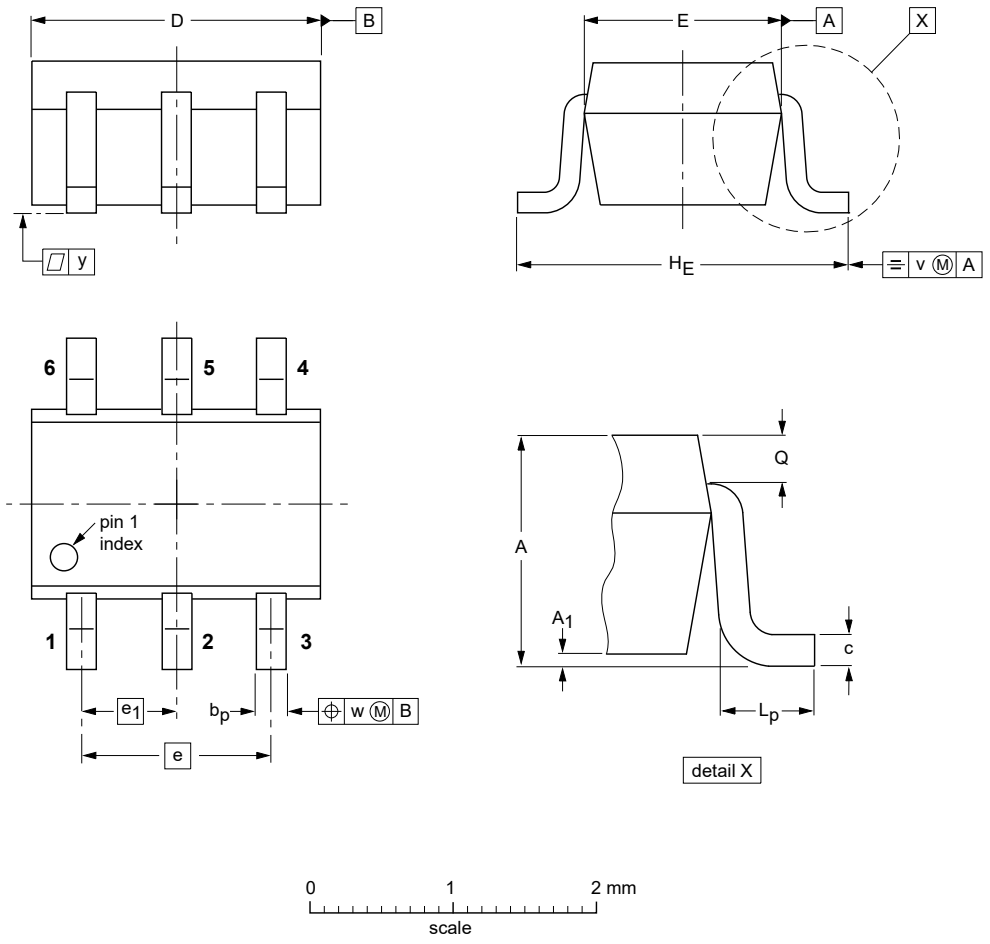
Fig. 9. Test circuit for measuring switching times

Table 10. 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}	≤ 2.0 ns	30 pF	1 kΩ	open
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open

12. Package outline

Plastic surface-mounted package; 6 leads **SOT363**



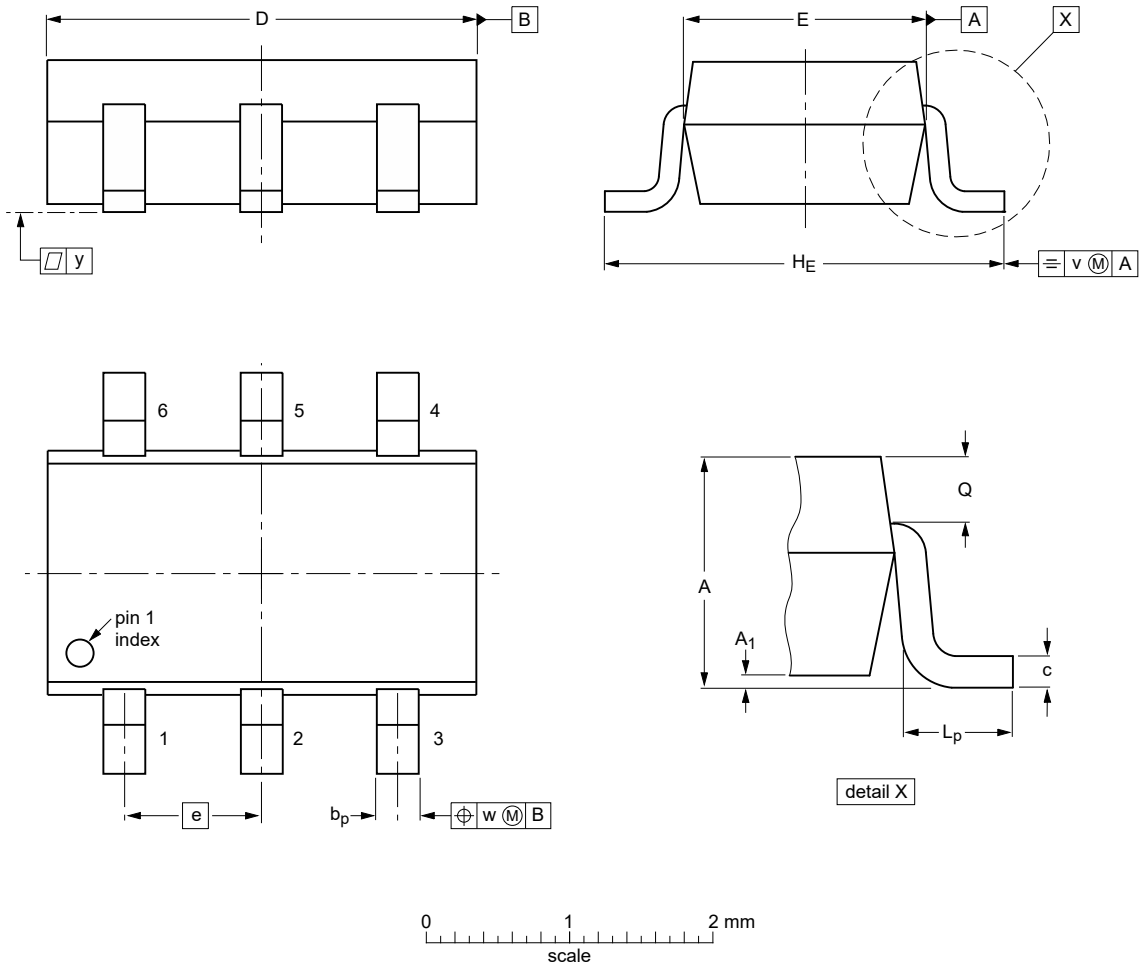
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT363			SC-88			~~04-11-08~~ 06-03-16

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

Plastic, surface-mounted package (SC-74; TSOP6); 6 leads **SOT457**



Dimensions (mm are the original dimensions)

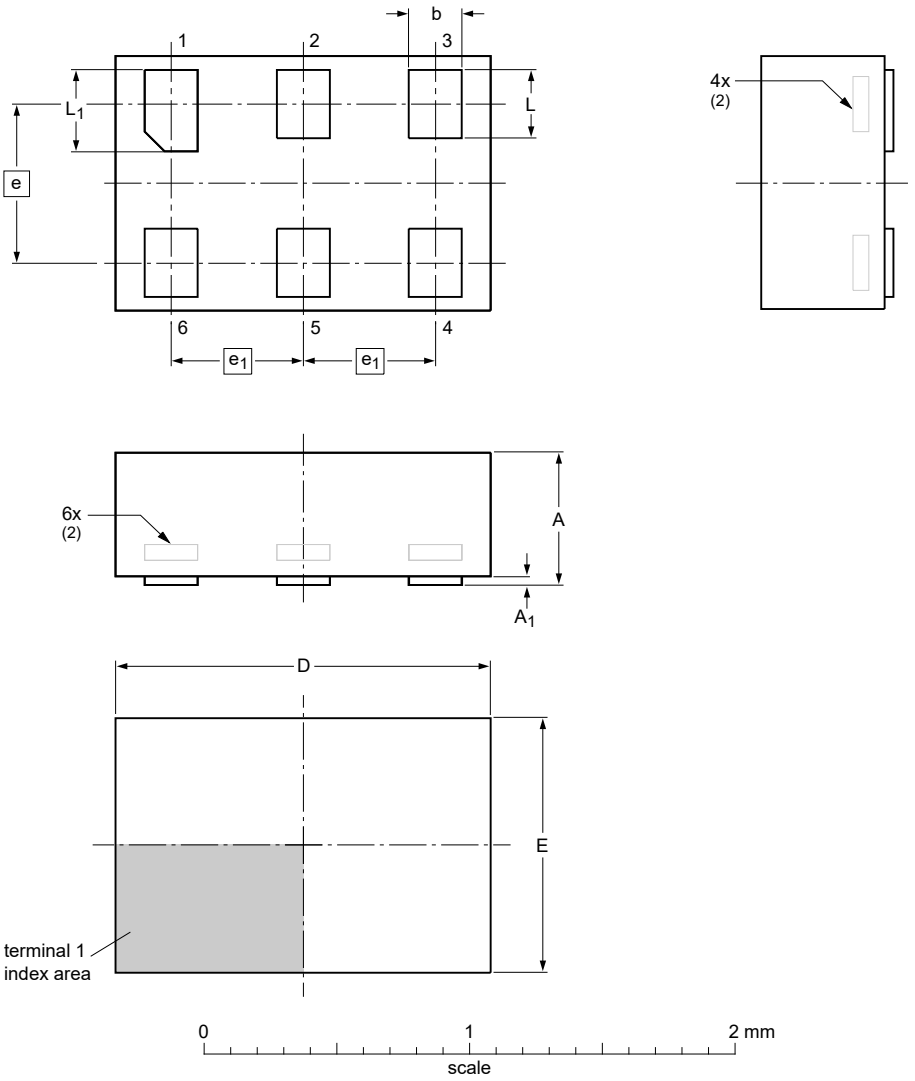
Unit		A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	max	1.1	0.1	0.40	0.26	3.1	1.7		3.0	0.6	0.33	0.2	0.2	0.1
	nom							0.95						
	min	0.9	0.013	0.25	0.10	2.7	1.3		2.5	0.2	0.23			

sot457_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT457			SC-74			~~06-03-16~~ 18-11-27

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

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(1)	A_1	b	D	E	e	e_1	L	L_1
mm	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

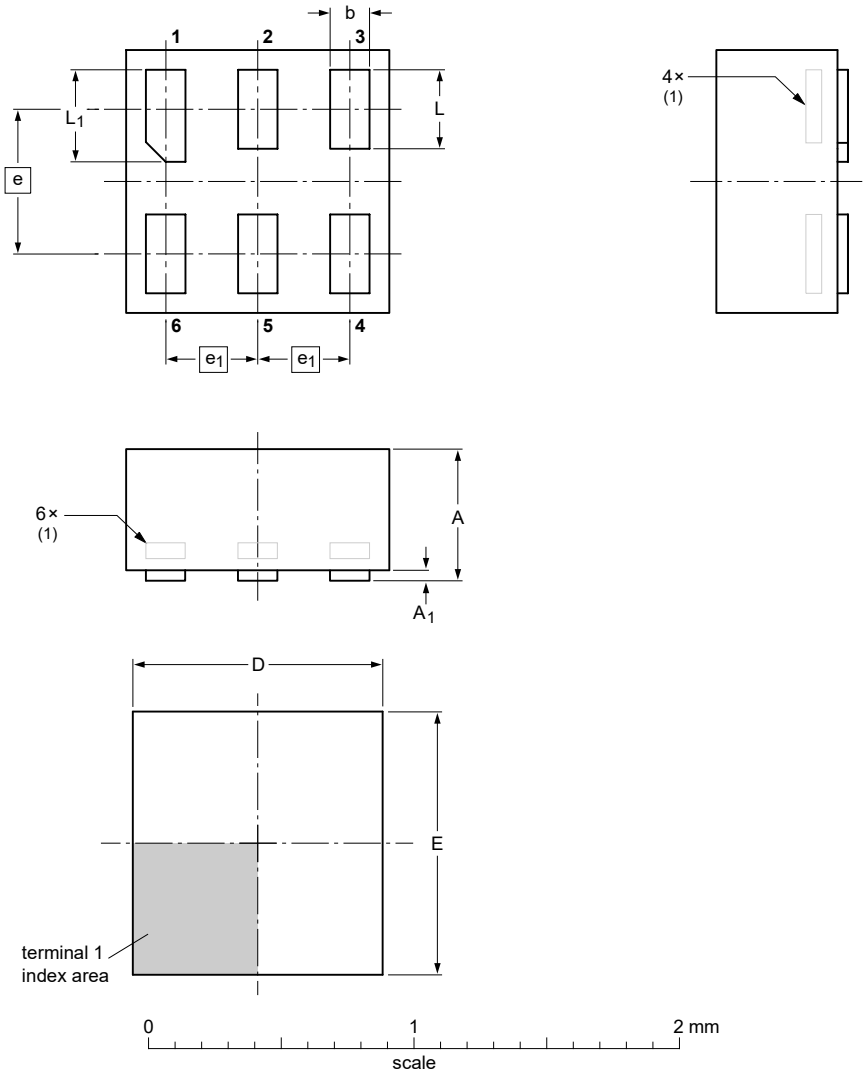
Notes
1. Including plating thickness.
2. Can be visible in some manufacturing processes.

sot886_po

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

Fig. 12. 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_1 max	b	D	E	e	e_1	L	L_1
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

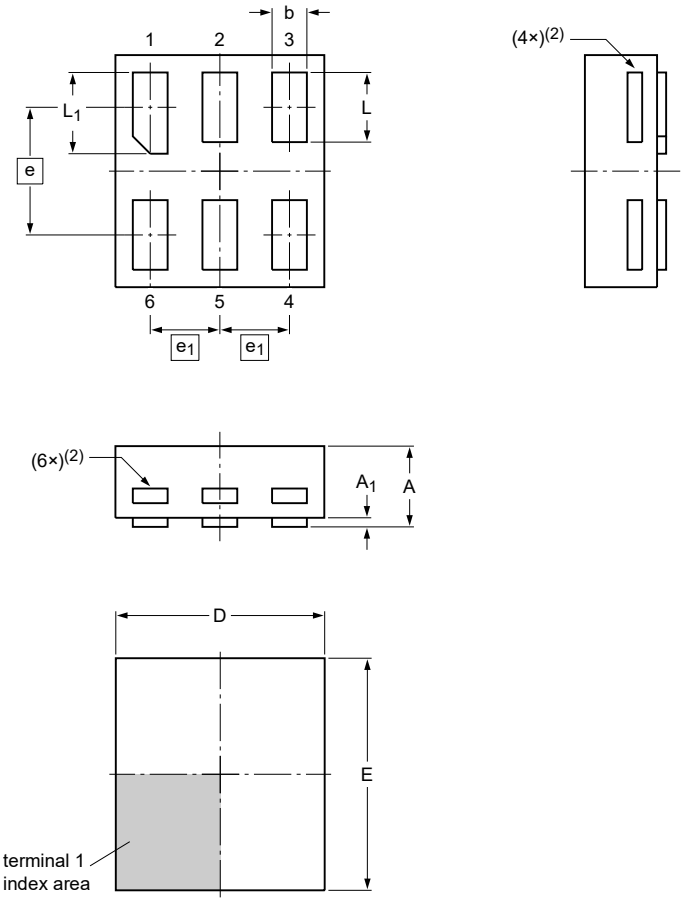
Note

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

Fig. 13. 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		$A^{(1)}$	A_1	b	D	E	e	e_1	L	L_1
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

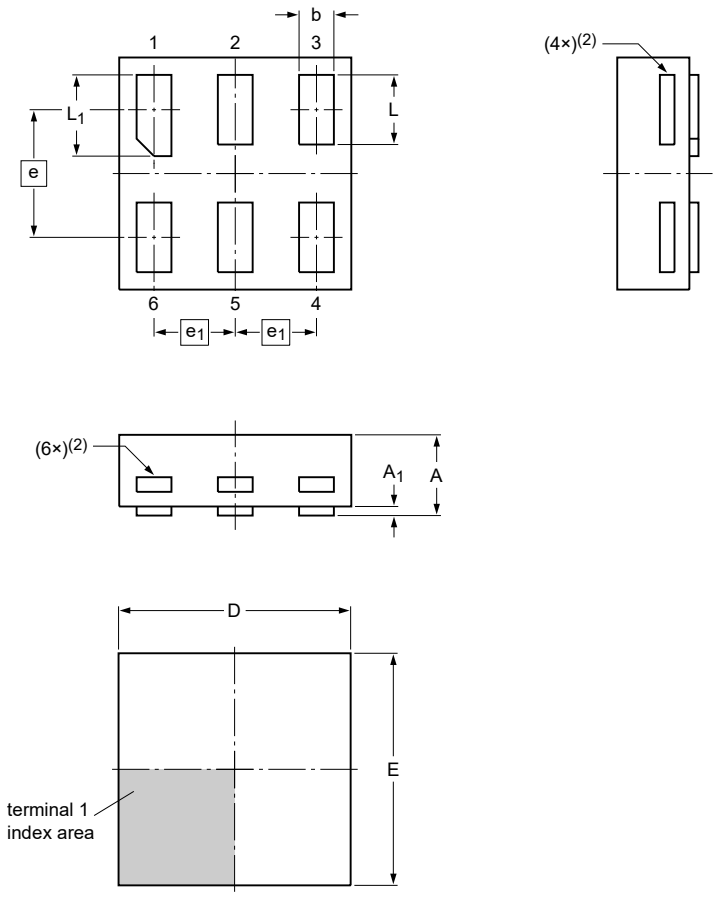
Note
1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

sot1115_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1115						~~10-04-02~~ 10-04-07

Fig. 14. 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(1)	A1	b	D	E	e	e1	L	L1
mm	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
1. Including plating thickness.
2. 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

Fig. 15. 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.9	20191008	Product data sheet	-	74LVC1G157 v.8
Modifications:	• Table 5: Derating values for P_{tot} total power dissipation updated. • Package outline drawing SOT457 (SC-74) updated			
74LVC1G157 v.8	20171031	Product data sheet	-	74LVC1G157 v.7
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate.			
74LVC1G157 v.7	20161202	Product data sheet	-	74LVC1G157 v.6
Modifications:	• Table 7: The maximum limits for leakage current and supply current have changed.			
74LVC1G157 v.6	20121231	Product data sheet	-	74LVC1G157 v.5
Modifications:	• Package outline drawing of SOT886 (Fig. 12) modified.			
74LVC1G157 v.5	20111206	Product data sheet	-	74LVC1G157 v.4
Modifications:	• Legal pages updated.			
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".
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