74LVC1G18-Q100

1-of-2 non-inverting demultiplexer with 3-state deselected output

Rev. 2 — 9 December 2016 | Product data sheet

1. General description

The 74LVC1G18-Q100 is a 1-of-2 non-inverting demultiplexer with a 3-state output. The device buffers the data on input pin A. It is passed to either output 1Y or 2Y, depending on whether the state of the select input (pin S) is LOW or HIGH. Input can be driven from either 3.3 V or 5 V devices. These features allow the use of these devices 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.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from –40 °C to +85 °C and from –40 °C to +125 °C
- Wide supply voltage range from 1.65 V to 5.5 V
- 5 V tolerant input/output 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)
  - JESD8B/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - MIL-STD-883, method 3015 exceeds 2000 V
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V (C = 200 pF, R = 0 Ω)
- ±24 mA output drive (V_{CC} = 3.0 V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- SOT363 and SOT457 package

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC1G18GW-Q100	–40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363
74LVC1G18GV-Q100	–40 °C to +125 °C	SC-74	plastic surface-mounted package (TSOP6); 6 leads	SOT457

4. Marking

Table 2. Marking

Type number	Marking code[1]
74LVC1G18GW-Q100	VW
74LVC1G18GV-Q100	V18

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

5. Functional diagram

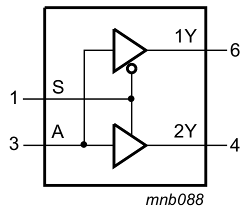


Fig 1. Logic symbol

6. Pinning information

6.1 Pinning

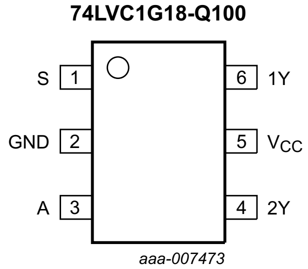


Fig 2. Pin configuration

6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
S	1	data select
GND	2	ground (0 V)
A	3	data input
2Y	4	data output
V_{CC}	5	supply voltage
1Y	6	data output

7. Functional description

Table 4. Function table[1]

Input		Output	
S	**A**	**1Y**	**2Y**
L	L	L	Z
L	H	H	Z
H	L	Z	L
H	H	Z	H

[1] H = HIGH voltage level; L = LOW voltage level; Z = high-impedance OFF-state

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][2]	–0.5	V_{CC} + 0.5	V
		Power-down mode	[1][2]	–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
T_{stg}	storage temperature			–65	+150	°C
P_{tot}	total power dissipation	T_{amb} = –40 °C to +125 °C	[3]	-	300	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 SC-74 and SC-88 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.

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	0	-	V_{CC}	V_O
		V_{CC} = 0 V; Power-down mode	0	-	5.5	V_O
T_{amb}	ambient temperature		–40	-	+125	°C
Δt/ΔV	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	Min	Typ[1]	Max	Unit
T_{amb} = –40 °C to +85 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 1.65 V to 1.95 V	0.65 × 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 × V_{CC}	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V	-	-	0.35 × 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 × V_{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
		I_O = –4 mA; V_{CC} = 1.65 V	1.2	-	-	V
		I_O = –8 mA; V_{CC} = 2.3 V	1.9	-	-	V
		I_O = –12 mA; V_{CC} = 2.7 V	2.2	-	-	V
		I_O = –24 mA; V_{CC} = 3.0 V	2.3	-	-	V
		I_O = –32 mA; V_{CC} = 4.5 V	3.8	-	-	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	-	-	0.1	V
		I_O = 4 mA; V_{CC} = 1.65 V	-	-	0.45	V
		I_O = 8 mA; V_{CC} = 2.3 V	-	-	0.3	V
		I_O = 12 mA; V_{CC} = 2.7 V	-	-	0.4	V
		I_O = 24 mA; V_{CC} = 3.0 V	-	-	0.55	V
		I_O = 32 mA; V_{CC} = 4.5 V	-	-	0.55	V

Table 7. Static characteristics *…continued*

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

Symbol	Parameter	Conditions	Min	Typ[1]	Max	Unit
I_I	input leakage current	V_{CC} = 0 V to 5.5 V; V_I = 5.5 V or GND	-	±0.1	±1	μA
I_{OZ}	OFF-state output current	V_{CC} = 3.6 V; V_I = V_{IH} or V_{IL}; V_O = 5.5 V or GND	-	±0.1	±2	μA
I_{OFF}	power-off leakage current	V_{CC} = 0 V; V_I or V_O = 5.5 V	-	±0.1	±2	μA
I_{CC}	supply current	V_I = 5.5 V or GND; V_{CC} = 1.65 V to 5.5 V; I_O = 0 A	-	0.1	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	μA
C_I	input capacitance	V_{CC} = 3.3 V; V_I = GND to V_{CC}	-	2.5	-	pF
T_{amb} = −40 °C to +125 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 1.65 V to 1.95 V	0.65 × 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 × V_{CC}	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V	-	-	0.35 × 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 × V_{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
		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
		I_O = −32 mA; V_{CC} = 4.5 V	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	-	-	0.1	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_O = 32 mA; V_{CC} = 4.5 V	-	-	0.80	V
I_I	input leakage current	V_{CC} = 0 V to 5.5 V; V_I = 5.5 V or GND	-	-	±1	μA
I_{OZ}	OFF-state output current	V_{CC} = 3.6 V; V_I = V_{IH} or V_{IL}; V_O = 5.5 V or GND	-	-	±2	μA
I_{OFF}	power-off leakage current	V_{CC} = 0 V; V_I or V_O = 5.5 V	-	-	±2	μA
I_{CC}	supply current	V_I = 5.5 V or GND; V_{CC} = 1.65 V to 5.5 V; I_O = 0 A	-	-	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	-	-	500	μA

[1] All typical values are measured at V_{CC} = 3.3 V and T_{amb} = 25 °C.

11. Dynamic characteristics

Table 8. Dynamic characteristics
Voltages are referenced to GND (ground = 0 V). For test circuit, see Figure 5.

Symbol	Parameter	Conditions	−40 °C to +85 °C			−40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_{pd}	propagation delay	A to nY; see Figure 3 [2]						
		V_{CC} = 1.65 V to 1.95 V	1.0	5.1	10.0	1.0	12.5	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	3.2	5.5	0.5	6.9	ns
		V_{CC} = 2.7 V	1.0	3.2	5.4	0.5	6.8	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	3.0	5.0	0.5	6.3	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	2.3	3.8	0.5	4.8	ns
t_{en}	enable time	S to nY; see Figure 3 [3]						
		V_{CC} = 1.65 V to 1.95 V	1.0	5.8	11.0	1.0	13.8	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	3.6	6.2	0.5	7.8	ns
		V_{CC} = 2.7 V	1.0	3.6	6.0	0.5	7.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	3.1	5.2	0.5	6.5	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	2.4	3.6	0.5	4.5	ns
t_{dis}	disable time	S to nY; see Figure 3 [4]						
		V_{CC} = 1.65 V to 1.95 V	1.0	4.8	9.0	1.0	11.3	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	2.7	5.3	0.5	6.6	ns
		V_{CC} = 2.7 V	1.0	3.5	5.2	0.5	6.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	3.3	4.9	0.5	6.1	ns
		V_{CC} = 4.5 V to 5.5 V	0.5	2.2	3.3	0.5	4.1	ns
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC}; V_{CC} = 3.3 V [5]	-	28.8	-	-	-	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.

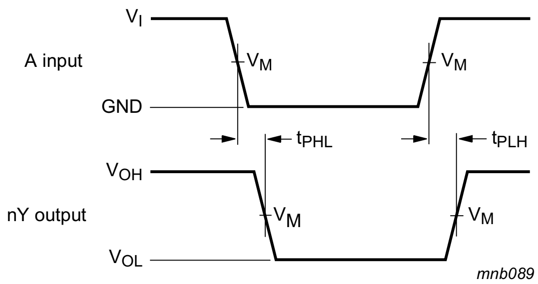
[2] t_{pd} is the same as t_{PLH} and t_{PHL}

[3] t_{en} is the same as t_{PZH} and t_{PZL}

[4] t_{dis} is the same as t_{PLZ} and t_{PHZ}

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ 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;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

12. AC waveforms

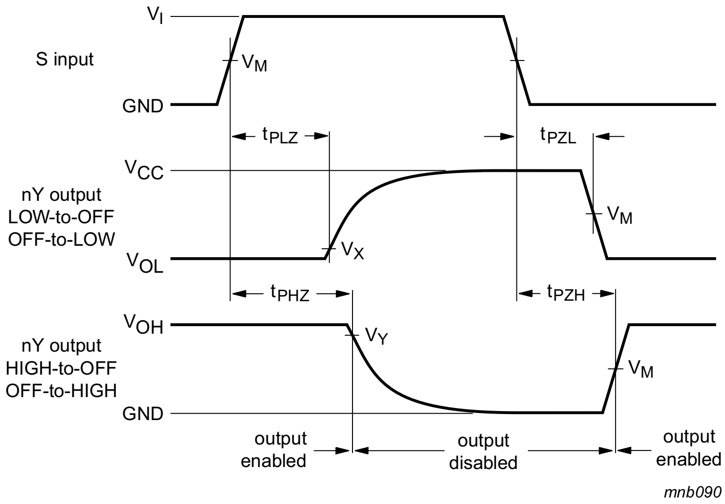


Measurement points are given in Table 9. V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig 3. Input A to output Y propagation delays

Table 9. Measurement points

V_{CC}	V_M	Input	
		V_I	$t_r = t_f$
1.65 V to 1.95 V	$0.5 \times V_{CC}$	V_{CC}	$\leq$ 2.0 ns
2.3 V to 2.7 V	$0.5 \times V_{CC}$	V_{CC}	$\leq$ 2.0 ns
2.7 V	1.5 V	2.7 V	$\leq$ 2.5 ns
3.0 V to 3.6 V	1.5 V	2.7 V	$\leq$ 2.5 ns
4.5 V to 5.5 V	$0.5 \times V_{CC}$	V_{CC}	$\leq$ 2.5 ns



Measurement points are given in Table 9. V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

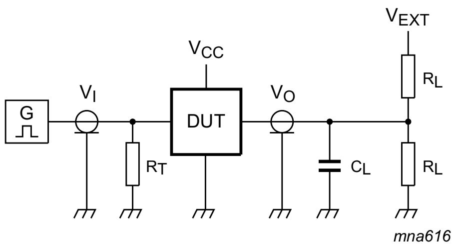
$V_X = V_{OL} + 0.3$ V at $V_{CC} \geq 2.7$ V.

$V_X = V_{OL} + 0.15$ V at $V_{CC} < 2.7$ V.

$V_Y = V_{OH} - 0.3$ V at $V_{CC} \geq 2.7$ V.

$V_Y = V_{OH} - 0.15$ V at $V_{CC} < 2.7$ V.

Fig 4. 3-state enable and disable times



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.

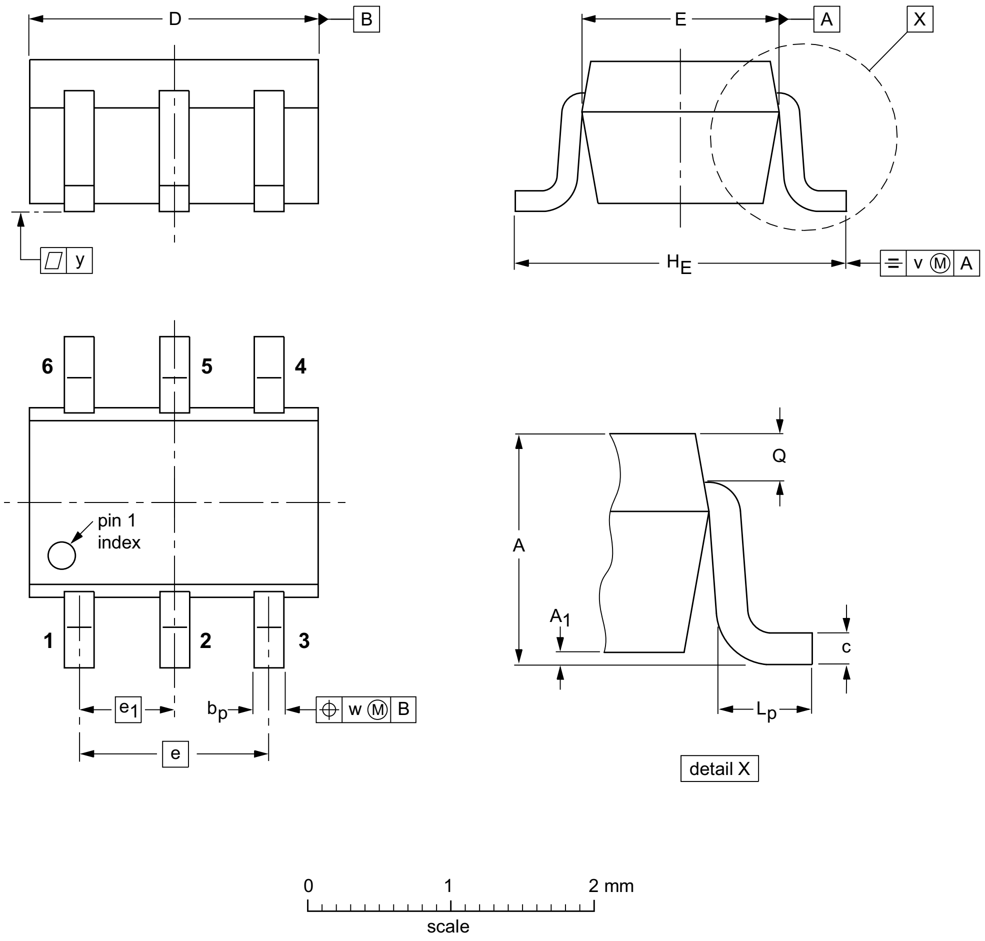
Fig 5. Test circuit for measuring switching times

Table 10. Test data

V_{CC}	Input		Load		V_{EXT}		
	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
1.65 V to 1.95 V	V_{CC}	≤ 2.0 ns	30 pF	1 kΩ	open	GND	2 × V_{CC}
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	2 × V_{CC}
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V_{CC}

13. Package outline

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



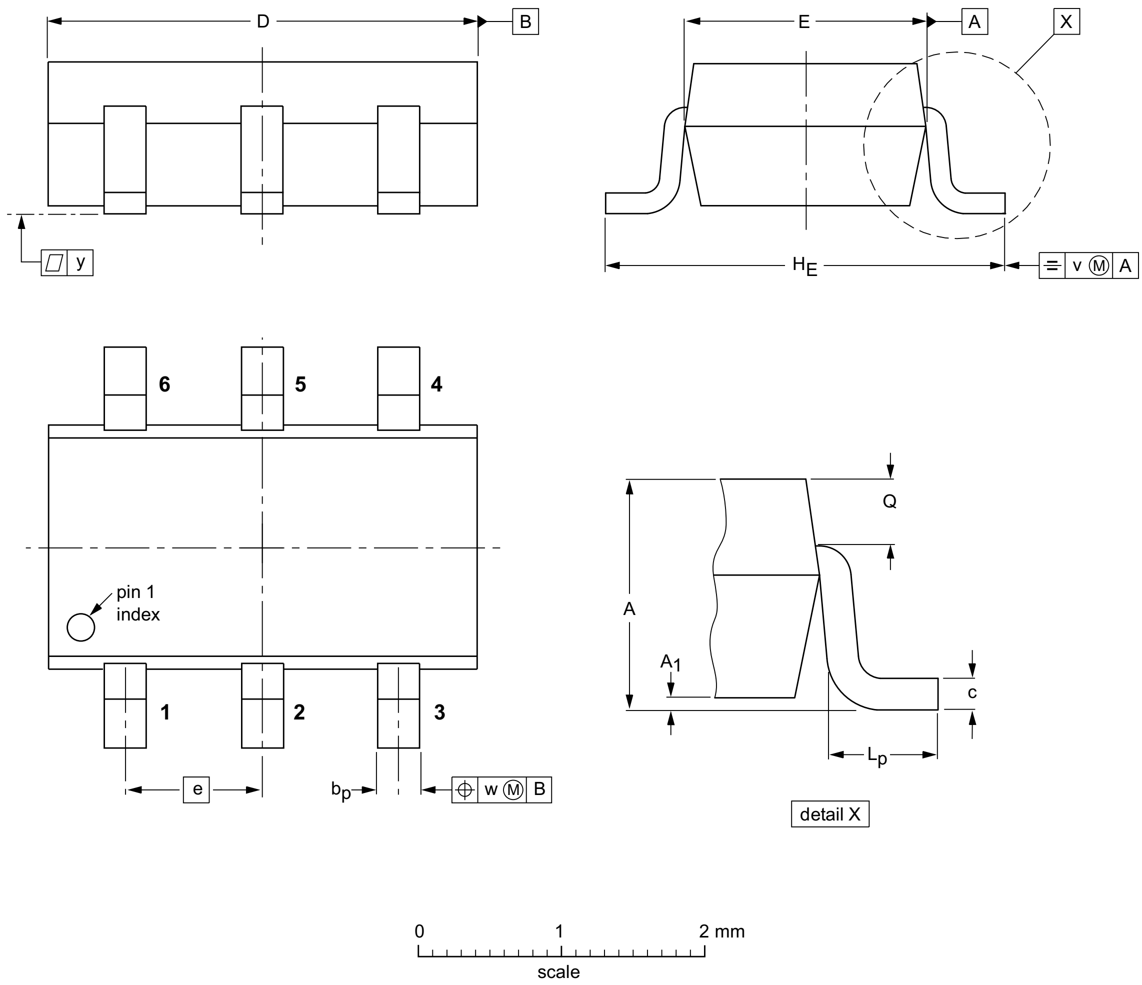
DIMENSIONS (mm are the original dimensions)

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 6. Package outline SOT363 (SC-88)

Plastic surface-mounted package (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	1.1 0.9	0.1 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT457			SC-74			~~05-11-07~~ 06-03-16

Fig 7. Package outline SOT457 (SC-74)

14. 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
MIL	Military
TTL	Transistor-Transistor Logic

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC1G18_Q100 v.2	20161209	Product data sheet	-	74LVC1G18_Q100 v.1
Modifications:	• Table 7: The maximum limits for leakage current and supply current have changed.			
74LVC1G18_Q100 v.1	20130516	Product data sheet	-	-

16. Legal information

16.1 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.nexperia.com.

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17. Contact information

For more information, please visit: **http://www.nexperia.com**

For sales office addresses, please send an email to: **salesaddresses@nexperia.com**

18. Contents

For more information, please visit: http://www.nexperia.com
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