

74LVC1G79GS,132 Datasheet



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DiGi Electronics Part Number 74LVC1G79GS,132-DG

Manufacturer Nexperia USA Inc.

Manufacturer Product Number 74LVC1G79GS,132

Description IC FF D-TYPE SNGL 1BIT 6XSON

Detailed Description Flip Flop 1 Element D-Type 1 Bit Positive Edge 6-XF

DFN



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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
74LVC1G79GS,132	Nexperia USA Inc.
Series:	Product Status:
74LVC	Active
Function:	Type:
Standard	D-Type
Output Type:	Number of Elements:
Non-Inverted	1
Number of Bits per Element:	Clock Frequency:
1	500 MHz
Max Propagation Delay @ V, Max CL:	Trigger Type:
3.8ns @ 5V, 50pF	Positive Edge
Current - Output High, Low:	Voltage - Supply:
32mA, 32mA	1.65V ~ 5.5V
Current - Quiescent (Iq):	Input Capacitance:
500 μΑ	5 pF
Operating Temperature:	Mounting Type:
-40°C ~ 125°C (TA)	Surface Mount
Supplier Device Package:	Package / Case:
6-XSON, SOT1202 (1x1)	6-XFDFN
Base Product Number:	
74LVC1G79	

Environmental & Export classification

8542.39.0001

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	

74LVC1G79

Single D-type flip-flop; positive-edge trigger

Rev. 15 — 18 August 2023

Product data sheet

1. General description

The 74LVC1G79 is a single positive-edge triggered D-type flip-flop. Data at the D-input that meets the set-up and hold time requirements on the LOW-to-HIGH clock transition will be stored in the flip-flop and appear at the Q output. 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
- Overvoltage tolerant inputs to 5.5 V
- · High noise immunity
- · CMOS low power dissipation
- ±24 mA output drive (V_{CC} = 3.0 V)
- · Direct interface with TTL levels
- Latch-up performance exceeds 250 mA
- I_{OFF} circuitry provides partial Power-down mode operation
- Complies with JEDEC standard:
 - JESD8-7 (1.65 V to 1.95 V)
 - JESD8-5 (2.3 V to 2.7 V)
 - JESD8C (2.7 V to 3.6 V)
 - JESD36 (4.5 V to 5.5 V)
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C.



Single D-type flip-flop; positive-edge trigger

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC1G79GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74LVC1G79GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753
74LVC1G79GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	<u>SOT886</u>
74LVC1G79GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	<u>SOT1115</u>
74LVC1G79GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202
74LVC1G79GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.32 mm	SOT1226-3

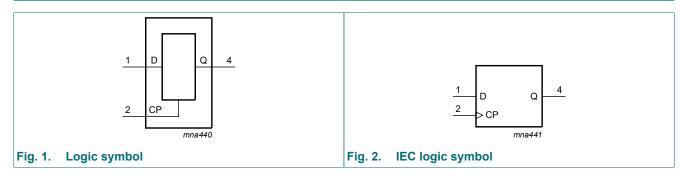
4. Marking

Table 2. Marking codes

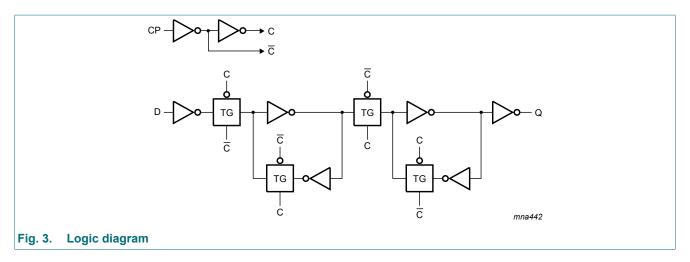
Type number	Marking[1]
74LVC1G79GW	VP
74LVC1G79GV	V79
74LVC1G79GM	VP
74LVC1G79GN	VP
74LVC1G79GS	VP
74LVC1G79GX	VP

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

5. Functional diagram

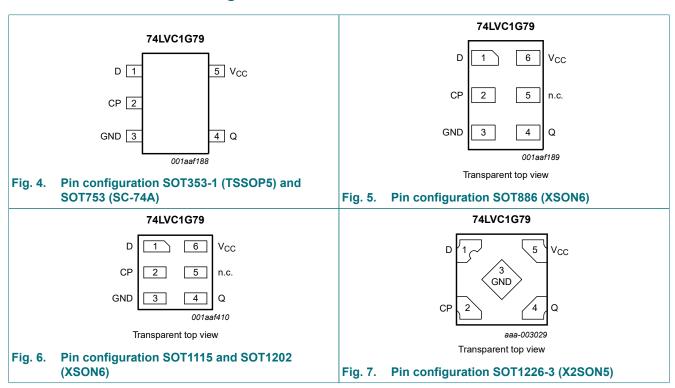


Single D-type flip-flop; positive-edge trigger



6. Pinning information

6.1. Pinning



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74LVC1G79

Single D-type flip-flop; positive-edge trigger

6.2. Pin description

Table 3. Pin description

Symbol	Pin	Pin	
	TSSOP5, SC-74A and X2SON5	XSON6	
D	1	1	data input
CP	2	2	clock pulse input
GND	3	3	ground (0 V)
Q	4	4	data output
n.c.	-	5	not connected
V _{CC}	5	6	supply voltage

7. Functional description

Table 4. Function table

 $H = HIGH \ voltage \ level; \ L = LOW \ voltage \ level; \ \uparrow = LOW-to-HIGH \ CP \ transition; \ X = don't \ care; \ q = lower \ case \ letter \ indicates \ the \ state \ of \ referenced \ input, \ one \ set-up \ time \ prior \ to \ the \ LOW-to-HIGH \ CP \ transition.$

Input D		Output
СР	D	Q
↑	L	L
↑	Н	Н
L	X	q

Single D-type flip-flop; positive-edge trigger

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
VI	input voltage		[1]	-0.5	+6.5	V
I _{OK}	output clamping current	$V_O > V_{CC}$ or $V_O < 0$ V		-	±50	mA
Vo	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	$V_O = 0 \text{ V to } V_{CC}$		-	±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.

For SOT753 (SC-74A) package: P_{tot} derates linearly with 3.8 mW/K above 85 °C.

For SOT886 (XSON6) package: Ptot derates linearly with 3.3 mW/K above 74 °C.

For SOT1115 (XSON6) package: Ptot derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package: Ptot derates linearly with 3.0 mW/K above 67 °C.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{CC}	supply voltage		1.65	-	5.5	V
VI	input voltage		0	-	5.5	V
Vo	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
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

^[2] For SOT353-1 (TSSOP5) package: Ptot derates linearly with 3.3 mW/K above 74 °C.

Single D-type flip-flop; positive-edge trigger

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
l _l	input leakage current	$V_{I} = 5.5 \text{ V or GND}; V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	±0.1	±1	μΑ
I _{OFF}	power-off leakage current	$V_{CC} = 0 \text{ V}; V_{I} \text{ or } V_{O} = 5.5 \text{ V}$	-	±0.1	±2	μΑ
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
Δl _{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	μΑ
Cı	input capacitance	V_{CC} = 3.3 V; V_I = GND to V_{CC}	-	5	-	pF

Symbol	Parameter	Conditions	Min	Typ[1]	Max	Unit
T _{amb} = -4	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 μ A; 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
l _l	input leakage current	V _I = 5.5 V or GND; V _{CC} = 0 V to 5.5 V	-	-	±1	μA
I _{OFF}	power-off leakage current	$V_{CC} = 0 \text{ V}; V_{I} \text{ or } V_{O} = 5.5 \text{ V}$	-	-	±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	μΑ
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	μΑ

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

Single D-type flip-flop; positive-edge trigger

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11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 10.

Symbol	Parameter	Conditions	-40	°C to +85	°C	-40 °C to	+125 °C	Unit
			Min	Typ[1]	Max	Min	Max	1
t _{pd}	propagation delay	CP to Q; see Fig. 8 [2]						
		V _{CC} = 1.65 V to 1.95 V	1.0	3.6	9.9	1.0	12.5	ns
		V _{CC} = 2.3 V to 2.7 V	0.5	2.3	7.0	0.5	9.0	ns
		V _{CC} = 2.7 V	0.5	2.6	6.0	0.5	8.0	ns
		V _{CC} = 3.0 V to 3.6 V	0.5	2.2	5.0	0.5	6.5	ns
		V _{CC} = 4.5 V to 5.5 V	0.5	1.7	3.8	0.5	5.0	ns
t _{su}	set-up time	D to CP; see Fig. 9						
		V _{CC} = 1.65 V to 1.95 V	2.5	1.4	-	2.5	-	ns
		V _{CC} = 2.3 V to 2.7 V	1.7	0.9	-	1.7	-	ns
		V _{CC} = 2.7 V	1.7	0.9	-	1.7	-	ns
		V _{CC} = 3.0 V to 3.6 V	1.3	0.6	-	1.2	-	ns
		V _{CC} = 4.5 V to 5.5 V	1.2	0.6	-	1.2	-	ns
t _h	hold time	D to CP; see Fig. 9						
		V _{CC} = 1.65 V to 1.95 V	0	-0.7	-	0	-	ns
		V _{CC} = 2.3 V to 2.7 V	0	-0.4	-	0	-	ns
		V _{CC} = 2.7 V	+0.5	-0.3	-	0.5	-	ns
		V _{CC} = 3.0 V to 3.6 V	+0.5	-0.3	-	0.5	-	ns
		V _{CC} = 4.5 V to 5.5 V	+0.5	-0.2	-	0.5	-	ns
t _W	pulse width	CP HIGH or LOW; see Fig. 9						
		V _{CC} = 1.65 V to 1.95 V	3.0	1.1	-	3.0	-	ns
		V _{CC} = 2.3 V to 2.7 V	2.5	0.7	-	2.5	-	ns
		V _{CC} = 2.7 V	2.5	0.6	-	2.5	-	ns
		V _{CC} = 3.0 V to 3.6 V	2.5	0.6	-	2.5	-	ns
		V _{CC} = 4.5 V to 5.5 V	2.0	0.5	-	2.0	-	ns
f _{max}	maximum	CP; see Fig. 9						
	frequency	V _{CC} = 1.65 V to 1.95 V	160	250	-	160	-	MHz
		V _{CC} = 2.3 V to 2.7 V	160	300	-	160	-	MHz
		V _{CC} = 2.7 V	160	350	-	160	-	MHz
		V _{CC} = 3.0 V to 3.6 V	160	450	-	160	-	MHz
		V _{CC} = 4.5 V to 5.5 V	200	500	-	200	-	MHz
C _{PD}	power dissipation capacitance	$V_{I} = GND \text{ to } V_{CC}; V_{CC} = 3.3 \text{ V}$ [3]	-	17	-	-	-	pF

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.

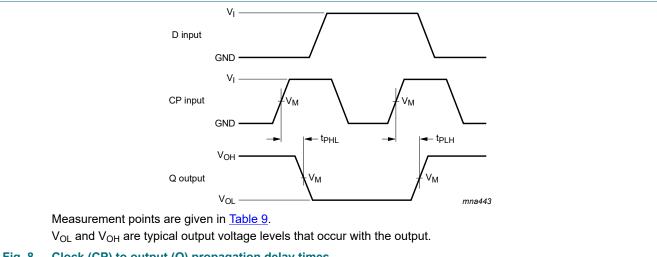
 t_{pd} is the same as t_{PLH} and t_{PHL} . C_{PD} is used to determine the dynamic power dissipation (P_D in μ W). $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum (C_L \times V_{CC}^2 \times f_o)$ where:

 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.

Single D-type flip-flop; positive-edge trigger

11.1. Waveforms and test circuit



Clock (CP) to output (Q) propagation delay times Fig. 8.

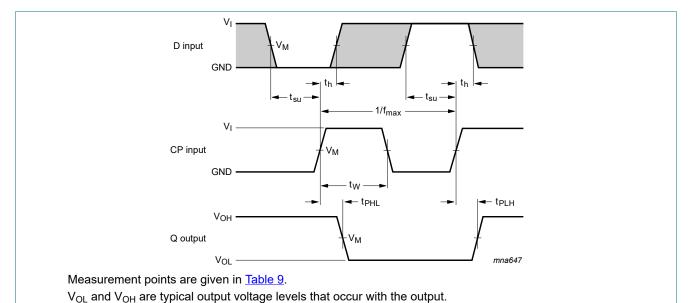
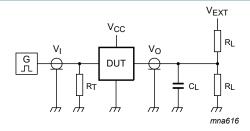


Fig. 9. Clock (CP) to output (Q) propagation delay times, clock pulse width, D to CP set-up times, the CP to D hold times and maximum clock pulse frequency

Table 9. Measurement points

Supply voltage	Input	Output
V _{CC}	V _M	V _M
1.65 V to 1.95 V	0.5 × V _{CC}	0.5 × V _{CC}
2.3 V to 2.7 V	0.5 × V _{CC}	0.5 × 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 × V _{CC}	0.5 × V _{CC}

Single D-type flip-flop; positive-edge trigger



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. 10. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Input		Load		V _{EXT}
V _{CC}	VI	$t_r = t_f$	CL	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

Single D-type flip-flop; positive-edge trigger

12. Package outline

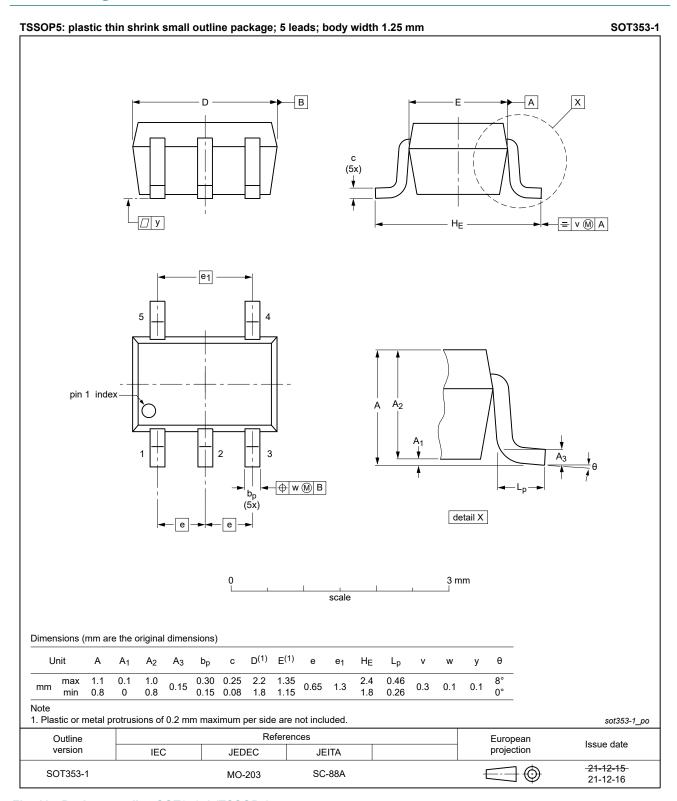


Fig. 11. Package outline SOT353-1 (TSSOP5)

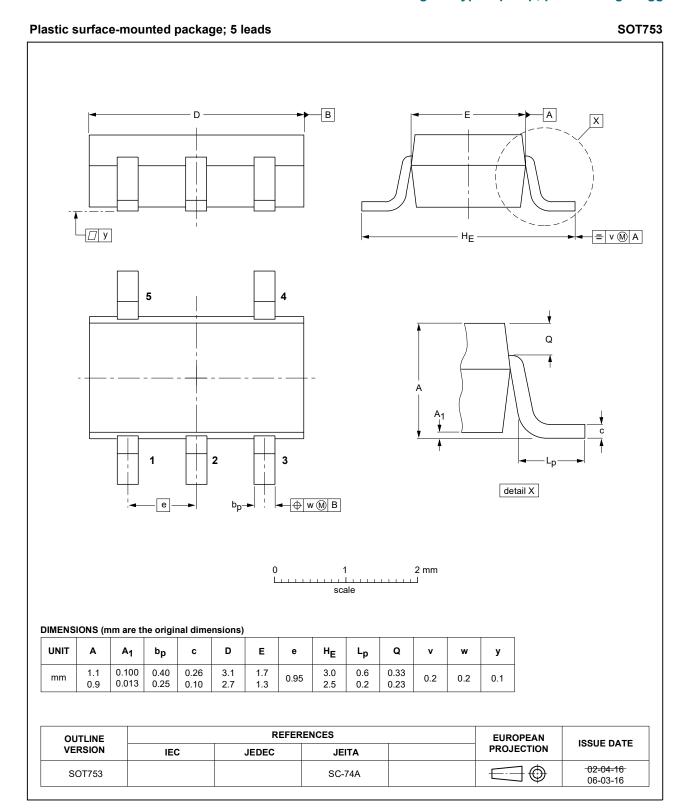


Fig. 12. Package outline SOT753 (SC-74A)

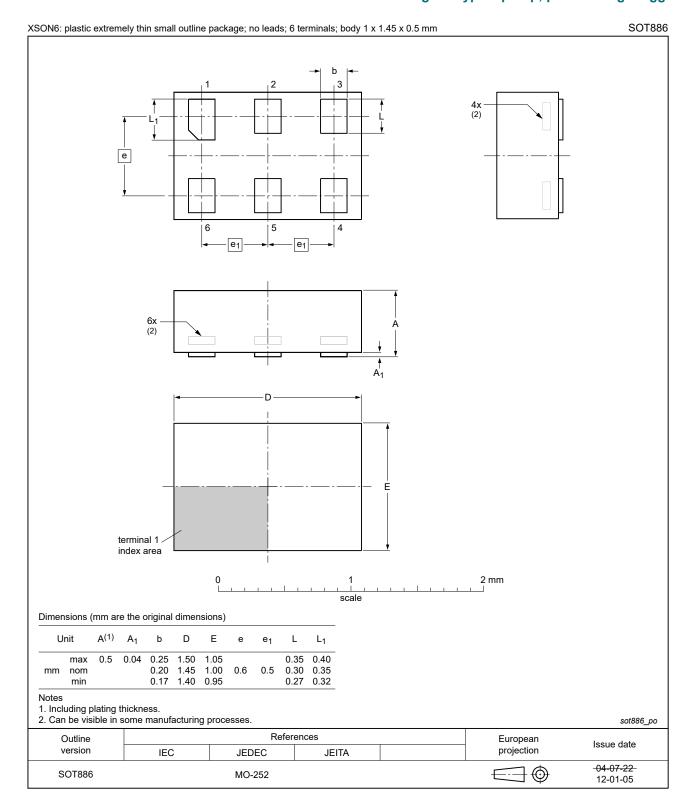


Fig. 13. Package outline SOT886 (XSON6)

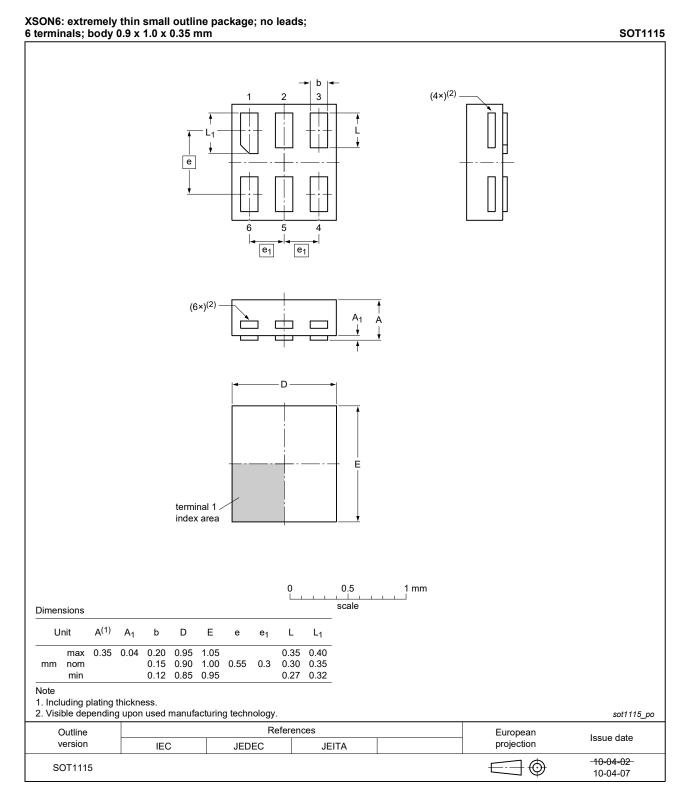


Fig. 14. Package outline SOT1115 (XSON6)

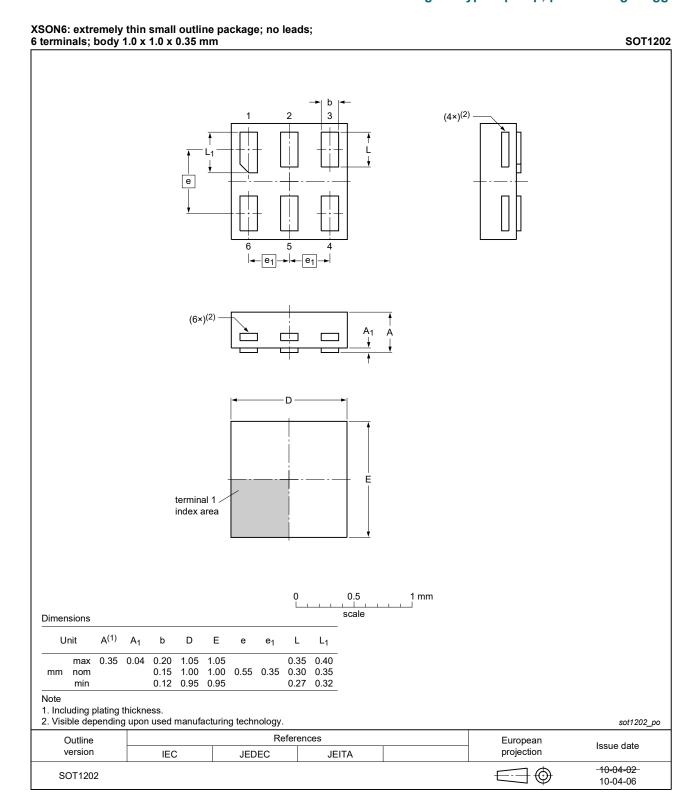


Fig. 15. Package outline SOT1202 (XSON6)

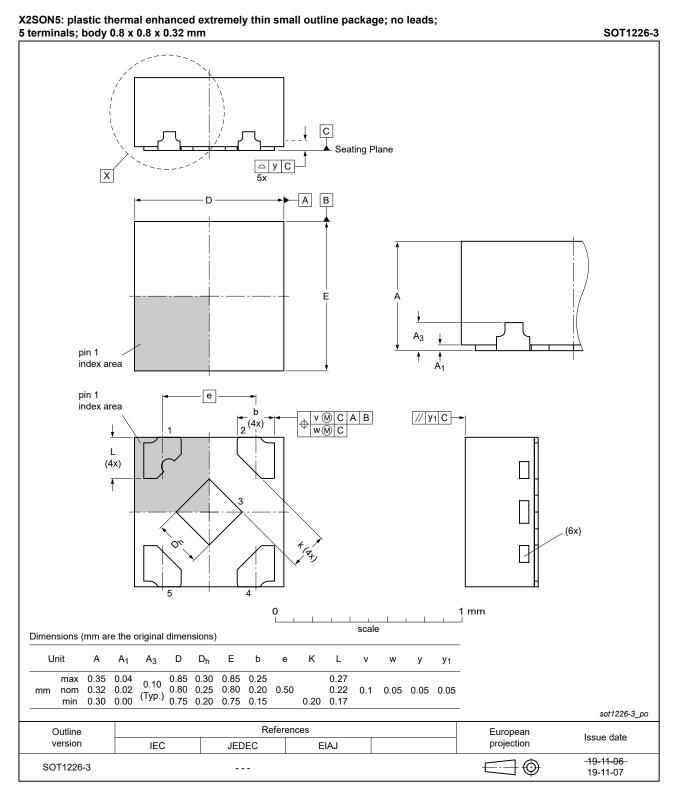


Fig. 16. Package outline SOT1226-3 (X2SON5)

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Single D-type flip-flop; positive-edge trigger

13. Abbreviations

Table 11. Abbreviations

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

14. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes	
74LVC1G79 v.15	20230818	Product data sheet	-	74LVC1G79 v.14	
Modifications:	<u>Section 2</u> : ESD specification updated according to the latest JEDEC standard.				
74LVC1G79 v.14	20220329	Product data sheet	-	74LVC1G79 v.13	
Modifications:	 Package SOT1226 (X2SON5) changed to SOT1226-3 (X2SON5). 				
74LVC1G79 v.13	20220201	Product data sheet	-	74LVC1G79 v.12	
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. Type number 74LVC1G79GF (SOT891/XSON6) removed. Section 1 and Section 2 updated. Table 5: Derating values for P_{tot} total power dissipation updated. Fig. 11: Package outline drawing SOT353-1 (TSSOP5) has changed. 				
74LVC1G79 v.12	20161205	Product data sheet	-	74LVC1G79 v.11	
Modifications:	<u>Table 7</u> : The maximum limits for leakage current and supply current have changed.				
74LVC1G79 v.11	20120702	Product data sheet	-	74LVC1G79 v.10	
Modifications:	Added type number 74LVC1G79GX (SOT1226)				
74LVC1G79 v.10	20120402	Product data sheet	-	74LVC1G79 v.9	
Modifications:	Errata in <u>Table 3</u> corrected (description CP input).				
74LVC1G79 v.9	20111202	Product data sheet	-	74LVC1G79 v.8	
Modifications:	 Legal pages 	updated.			
74LVC1G79 v.8	20100930	Product data sheet	-	74LVC1G79 v.7	
74LVC1G79 v.7	20070829	Product data sheet	-	74LVC1G79 v.6	
74LVC1G79 v.6	20061009	Product data sheet	-	74LVC1G79 v.5	
74LVC1G79 v.5	20040910	Product specification	-	74LVC1G79 v.4	
74LVC1G79 v.4	20040317	Product specification	-	74LVC1G79 v.3	
74LVC1G79 v.3	20030516	Product specification	-	74LVC1G79 v.2	
74LVC1G79 v.2	20030130	Product specification	-	74LVC1G79 v.1	
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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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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74LVC1G79

Single D-type flip-flop; positive-edge trigger

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For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 18 August 2023

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