SN74LVC1G175(LX)
Single D-type Flip-flop with Reset; Positive-edge Trigger

Product Specification

Specification Revision History:

Version	Date	Description
2023-06-A1	2023-06	New

Contents

1、General Description

The SN74LVC1G175 is a low-power, low-voltage single positive edge triggered D-type flip-flop with individual data (D) input, clock (CP) input, master reset ($\overline{MR}$) input, and Q output.

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

Features:

- Wide supply voltage range from 1.65V to 5.5V
- Inputs accept voltages to 5.5 V
- ±24mA output drive at 3.0V
- High-impedance when V_{CC}=0V
- Temperature range:-40℃ to +125℃
- Packaging information: SOT23-6/SOT363

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
SN74LVC1G175DB(LX)	SOT23-6	ENXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
SN74LVC1G175DC(LX)	SOT363	ENXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm

Note 1: “XX” refers to variable content, meaning year and package batch serial number.

Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

2、Block Diagram And Pin Description

2.1、Block Diagram

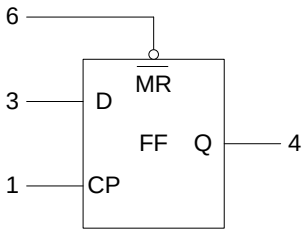


Figure 1. Logic symbol

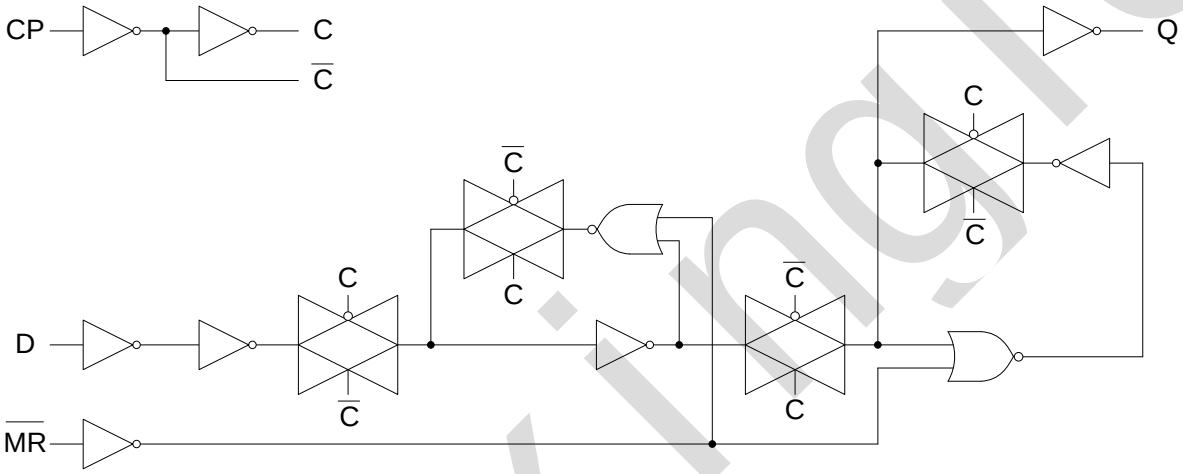
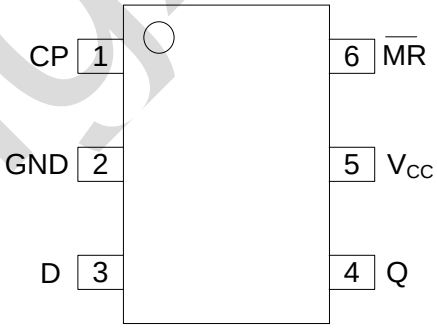


Figure 2. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	CP	clock input (LOW-to-HIGH, edge-triggered)
2	GND	ground (0V)
3	D	data input
4	Q	data output
5	V_{CC}	supply voltage
6	$\overline{MR}$	master reset input (active LOW)

2.4、Function Table

Operating mode	Input			Output
	$\overline{MR}$	CP	D	Q
Reset(clear)	L	X	X	L
Load '1'	H	↑	h	H
Load '0'	H	↑	l	L

Note:

H=HIGH voltage level; L=LOW voltage level.

h = HIGH voltage level one set-up time prior to the LOW-to-HIGH CP transition;

l = LOW voltage level one set-up time prior to the LOW-to-HIGH CP transition;

↑ = LOW-to-HIGH CP transition

X = don't care

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground = 0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+6.5	V
input voltage	V_I	-	-0.5	+6.5	V
output voltage	V_O	Active mode	-0.5	V_{CC}+0.5	V
		Power-down mode; V_{CC}=0V	-0.5	+6.5	V
supply current	I_{CC}	-	-	100	mA
ground current	I_{GND}	-	-100	-	mA
input clamping current	I_{IK}	V_I < 0V	-50	-	mA
output current	I_O	V_O=0V to V_{CC}	-	±50	mA
output clamping current	I_{OK}	V_O > V_{CC} or V_O < 0V	-	±50	mA
storage temperature	T_{stg}	-	-65	+150	℃
soldering temperature	T_L	10s	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	1.65	-	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	Active mode	0	-	V_{CC}	V
		Power-down mode; V_{CC}=0V	0	-	5.5	V
ambient temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
		V_{CC}=4.5V to 5.5V		0.7× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
		V_{CC}=4.5V to 5.5V		-	-	0.3× V_{CC}	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 5.5V	V_{CC} - 0.1	-	-	V
			I_O=-4mA; V_{CC}=1.65V	1.2	1.54	-	V
			I_O=-8mA; V_{CC}=2.3V	1.9	2.15	-	V
			I_O=-12mA; V_{CC}=2.7V	2.2	2.50	-	V
			I_O=-24mA; V_{CC}=3.0V	2.3	2.62	-	V
			I_O=-32mA; V_{CC}=4.5V	3.8	4.11	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 5.5V	-	-	0.10	V
			I_O=4mA; V_{CC}=1.65V	-	0.07	0.45	V
			I_O=8mA; V_{CC}=2.3V	-	0.12	0.30	V
			I_O=12mA; V_{CC}=2.7V	-	0.17	0.40	V
			I_O=24mA; V_{CC}=3.0V	-	0.33	0.55	V
			I_O=32mA; V_{CC}=4.5V	-	0.39	0.55	V
input leakage current	I_I	V_I=5.5V or GND; V_{CC}=0V to 5.5V		-	-	±1	uA
power-off leakage current	I_{OFF}	V_I or V_O=5.5V; V_{CC}=0V		-	-	±2	uA
supply current	I_{CC}	V_I=5.5V or GND; I_O=0A; V_{CC}=1.65V to 5.5V		-	-	4	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	500	uA

Note: Typical values are measured at T_{amb}=25℃.

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V		0.65× V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=2.7V to 3.6V		2.0	-	-	V
		V_{CC}=4.5V to 5.5V		0.7× V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=1.65V to 1.95V		-	-	0.35× V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=2.7V to 3.6V		-	-	0.8	V
		V_{CC}=4.5V to 5.5V		-	-	0.3× V_{CC}	V
HIGH-level output voltage	V_{OH}	V_I = V_{IH} or V_{IL}	I_O=-100uA; V_{CC}=1.65V to 5.5V	V_{CC} - 0.1	-	-	V
			I_O=-4mA; V_{CC}=1.65V	0.95	-	-	V
			I_O=-8mA; V_{CC}=2.3V	1.7	-	-	V
			I_O=-12mA; V_{CC}=2.7V	1.9	-	-	V
			I_O=-24mA; V_{CC}=3.0V	2.0	-	-	V
			I_O=-32mA; V_{CC}=4.5V	3.4	-	-	V
LOW-level output voltage	V_{OL}	V_I = V_{IH} or V_{IL}	I_O=100uA; V_{CC}=1.65V to 5.5V	-	-	0.10	V
			I_O=4mA; V_{CC}=1.65V	-	-	0.70	V
			I_O=8mA; V_{CC}=2.3V	-	-	0.45	V
			I_O=12mA; V_{CC}=2.7V	-	-	0.60	V
			I_O=24mA; V_{CC}=3.0V	-	-	0.80	V
			I_O=32mA; V_{CC}=4.5V	-	-	0.80	V
input leakage current	I_I	V_I=5.5V or GND; V_{CC}=0V to 5.5V		-	-	±1	uA
power-off leakage current	I_{OFF}	V_I or V_O=5.5V; V_{CC}=0V		-	-	±2	uA
supply current	I_{CC}	V_I=5.5V or GND; I_O=0A; V_{CC}=1.65V to 5.5V		-	-	4	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	500	uA

3.3.3、AC Characteristics 1

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.[1]	Max.	Unit
A to Y propagation delay	t_{PLH}, t_{PHL}	see Figure 4	V_{CC}=1.65V to 1.95V	-	4.9	13.4	ns
			V_{CC}=2.3V to 2.7V	-	3.1	7.1	ns
			V_{CC}=2.7V	-	3.2	7.1	ns
			V_{CC}=3.0V to 3.6V	-	3.1	5.7	ns
			V_{CC}=4.5V to 5.5V	-	2.2	4.0	ns
$\overline{MR}$ to Q High to Low propagation delay	t_{PHL}	see Figure 5	V_{CC}=1.65V to 1.95V	-	4.3	12.9	ns
			V_{CC}=2.3V to 2.7V	-	2.8	7.0	ns
			V_{CC}=2.7V	-	3.0	7.0	ns
			V_{CC}=3.0V to 3.6V	-	2.5	5.8	ns
			V_{CC}=4.5V to 5.5V	-	2.0	4.1	ns
CP HIGH or LOW pulse width	t_W	see Figure 4	V_{CC}=1.65V to 1.95V	6.2	-	-	ns
			V_{CC}=2.3V to 2.7V	2.7	-	-	ns
			V_{CC}=2.7V	2.7	-	-	ns
			V_{CC}=3.0V to 3.6V	2.7	1.3	-	ns
			V_{CC}=4.5V to 5.5V	2.0	-	-	ns
$\overline{MR}$ LOW pulse width		see Figure 5	V_{CC}=1.65V to 1.95V	6.2	-	-	ns
			V_{CC}=2.3V to 2.7V	2.7	-	-	ns
			V_{CC}=2.7V	2.7	-	-	ns
			V_{CC}=3.0V to 3.6V	2.7	1.6	-	ns
			V_{CC}=4.5V to 5.5V	2.0	-	-	ns
$\overline{MR}$ to CP recovery time	t_{rec}	see Figure 5	V_{CC}=1.65V to 1.95V	1.9	-	-	ns
			V_{CC}=2.3V to 2.7V	1.4	-	-	ns
			V_{CC}=2.7V	1.3		-	ns
			V_{CC}=3.0V to 3.6V	1.2	0.4	-	ns
			V_{CC}=4.5V to 5.5V	1.0	-	-	ns
D to CP Set-up time	t_{su}	see Figure 4	V_{CC}=1.65V to 1.95V	2.9	-	-	ns
			V_{CC}=2.3V to 2.7V	1.7	-	-	ns
			V_{CC}=2.7V	1.7	-	-	ns
			V_{CC}=3.0V to 3.6V	1.3	0.5	-	ns
			V_{CC}=4.5V to 5.5V	1.1	-	-	ns
D to CP hold time	t_h	see Figure 4	V_{CC}=1.65V to 1.95V	0.0	-	-	ns
			V_{CC}=2.3V to 2.7V	0.3	-	-	ns
			V_{CC}=2.7V	0.5	-	-	ns
			V_{CC}=3.0V to 3.6V	1.2	0.2	-	ns
			V_{CC}=4.5V to 5.5V	0.5	-	-	ns
maximum frequency	f_{max}	see Figure 4	V_{CC}=1.65V to 1.95V	80	-	-	MHZ
			V_{CC}=2.3V to 2.7V	175	-	-	MHZ
			V_{CC}=2.7V	175	-	-	MHZ
			V_{CC}=3.0V to 3.6V	175	-	-	MHZ
			V_{CC}=4.5V to 5.5V	200	-	-	MHZ

Note: Typical values are measured at T_{amb}=25℃ and V_{CC}=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.

3.3.4、AC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.[1]	Max.	Unit
A to Y propagation delay	t_{PLH}, t_{PHL}	see Figure 4	V_{CC}=1.65V to 1.95V	-	-	17	ns
			V_{CC}=2.3V to 2.7V	-	-	9.0	ns
			V_{CC}=2.7V	-	-	9.0	ns
			V_{CC}=3.0V to 3.6V	-	-	7.5	ns
			V_{CC}=4.5V to 5.5V	-	-	5.5	ns
$\overline{MR}$ to Q propagation delay	t_{PHL}	see Figure 5	V_{CC}=1.65V to 1.95V	-	-	17	ns
			V_{CC}=2.3V to 2.7V	-	-	9.0	ns
			V_{CC}=2.7V	-	-	9.0	ns
			V_{CC}=3.0V to 3.6V	-	-	7.5	ns
			V_{CC}=4.5V to 5.5V	-	-	5.5	ns
CP HIGH or LOW pulse width	t_W	see Figure 4	V_{CC}=1.65V to 1.95V	6.8	-	-	ns
			V_{CC}=2.3V to 2.7V	2.9	-	-	ns
			V_{CC}=2.7V	2.9	-	-	ns
			V_{CC}=3.0V to 3.6V	2.9	-	-	ns
			V_{CC}=4.5V to 5.5V	2.2	-	-	ns
$\overline{MR}$ LOW pulse width		see Figure 5	V_{CC}=1.65V to 1.95V	6.8	-	-	ns
			V_{CC}=2.3V to 2.7V	2.9	-	-	ns
			V_{CC}=2.7V	2.9	-	-	ns
			V_{CC}=3.0V to 3.6V	2.9	-	-	ns
			V_{CC}=4.5V to 5.5V	2.2	-	-	ns
$\overline{MR}$ to CP recovery time	t_{rec}	see Figure 5	V_{CC}=1.65V to 1.95V	2.1	-	-	ns
			V_{CC}=2.3V to 2.7V	1.5	-	-	ns
			V_{CC}=2.7V	1.4	-	-	ns
			V_{CC}=3.0V to 3.6V	1.3	-	-	ns
			V_{CC}=4.5V to 5.5V	1.1	-	-	ns
D to CP Set-up time	t_{su}	see Figure 4	V_{CC}=1.65V to 1.95V	3.2	-	-	ns
			V_{CC}=2.3V to 2.7V	1.8	-	-	ns
			V_{CC}=2.7V	1.8	-	-	ns
			V_{CC}=3.0V to 3.6V	1.4	-	-	ns
			V_{CC}=4.5V to 5.5V	1.2	-	-	ns
D to CP hold time	t_h	see Figure 4	V_{CC}=1.65V to 1.95V	0.0	-	-	ns
			V_{CC}=2.3V to 2.7V	0.3	-	-	ns
			V_{CC}=2.7V	0.6	-	-	ns
			V_{CC}=3.0V to 3.6V	1.3	-	-	ns
			V_{CC}=4.5V to 5.5V	0.6	-	-	ns
maximum frequency	f_{max}	see Figure 4	V_{CC}=1.65V to 1.95V	72	-	-	MHZ
			V_{CC}=2.3V to 2.7V	159	-	-	MHZ
			V_{CC}=2.7V	159	-	-	MHZ
			V_{CC}=3.0V to 3.6V	159	-	-	MHZ
			V_{CC}=4.5V to 5.5V	182	-	-	MHZ

4、Testing Circuit

4.1、AC Testing Circuit

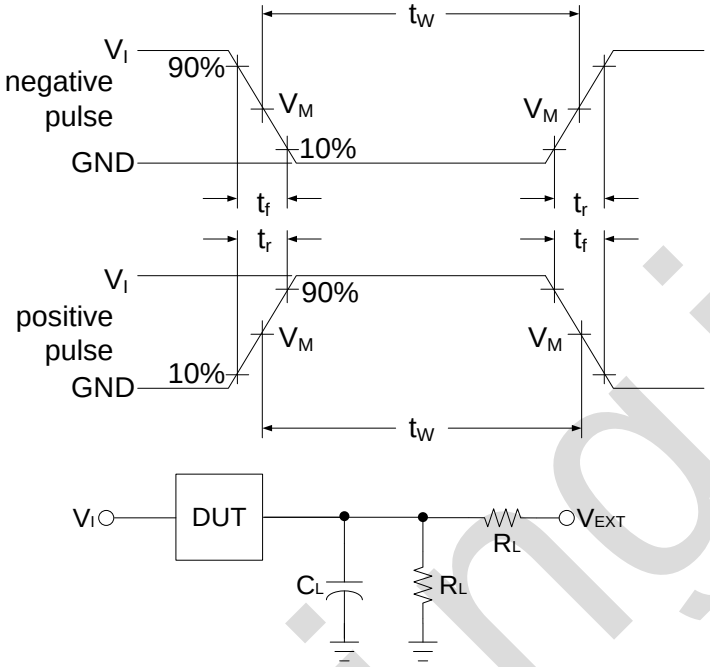


Figure 3. Load circuit

C_L includes probe and jig capacitance.

R_L=Load resistance.

4.2、Test Data

Supply voltage	Input		Load		V_{EXT}		
V_{CC}	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
1.65V to 1.95V	V_{CC}	≤ 3ns	30pF	1kΩ	Open	2×V_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 3ns	30pF	500Ω	Open	2×V_{CC}	GND
2.7V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND
3.0V to 3.6V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND
4.5V to 5.5V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2×V_{CC}	GND

4.3、AC Testing Waveforms

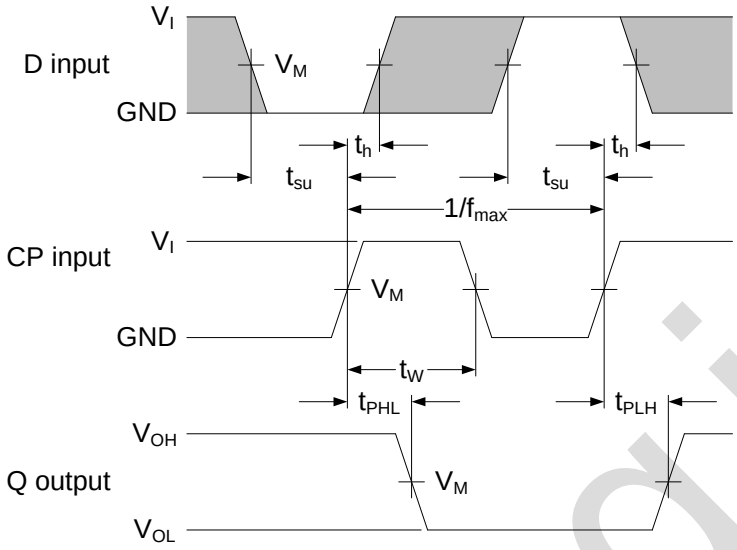


Figure 4. The clock input (CP) to output (Q) propagation delays, the clock pulse width, the D to CP set-up, the CP to D hold times, and the maximum clock pulse frequency

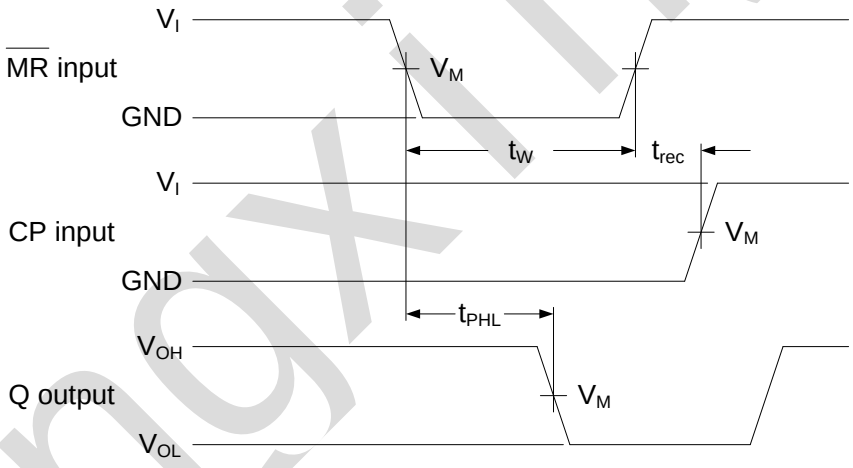


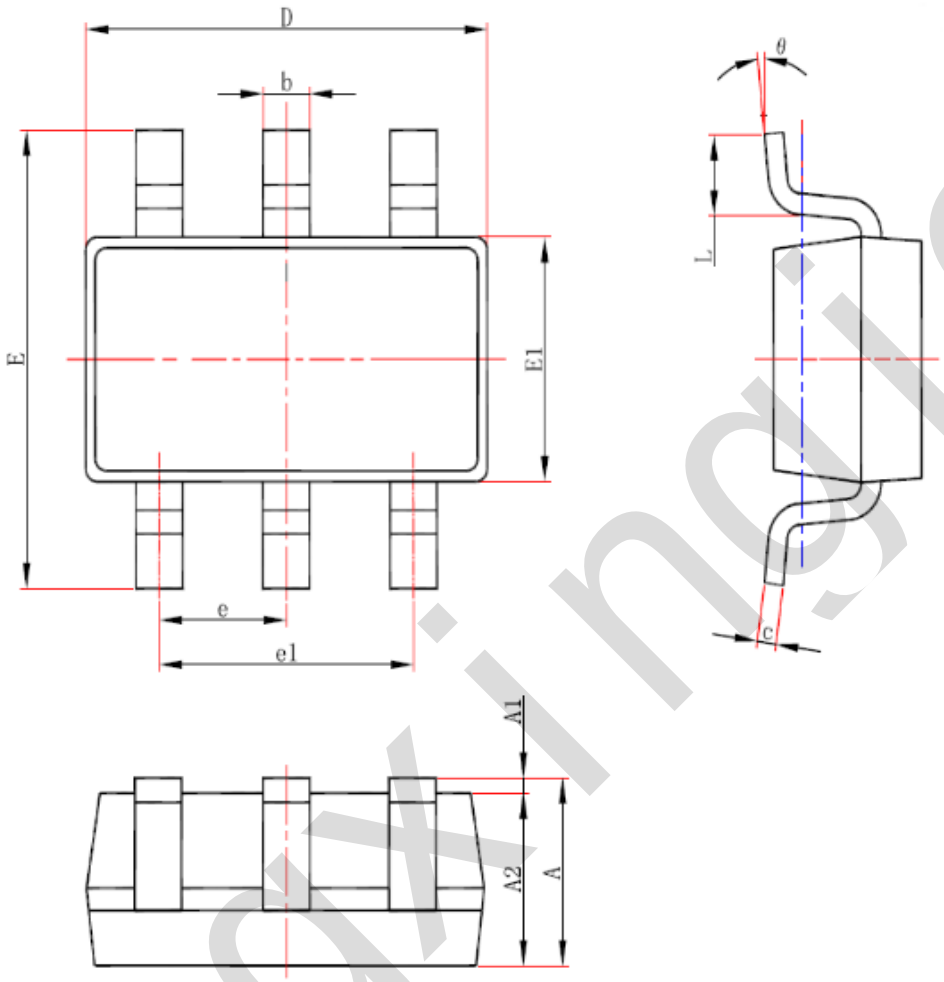
Figure 5. The master reset ($\overline{MR}$) input to output (Q) propagation delays, the master reset pulse width, and the $\overline{MR}$ to CP recovery time

4.4、Measurement Points

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

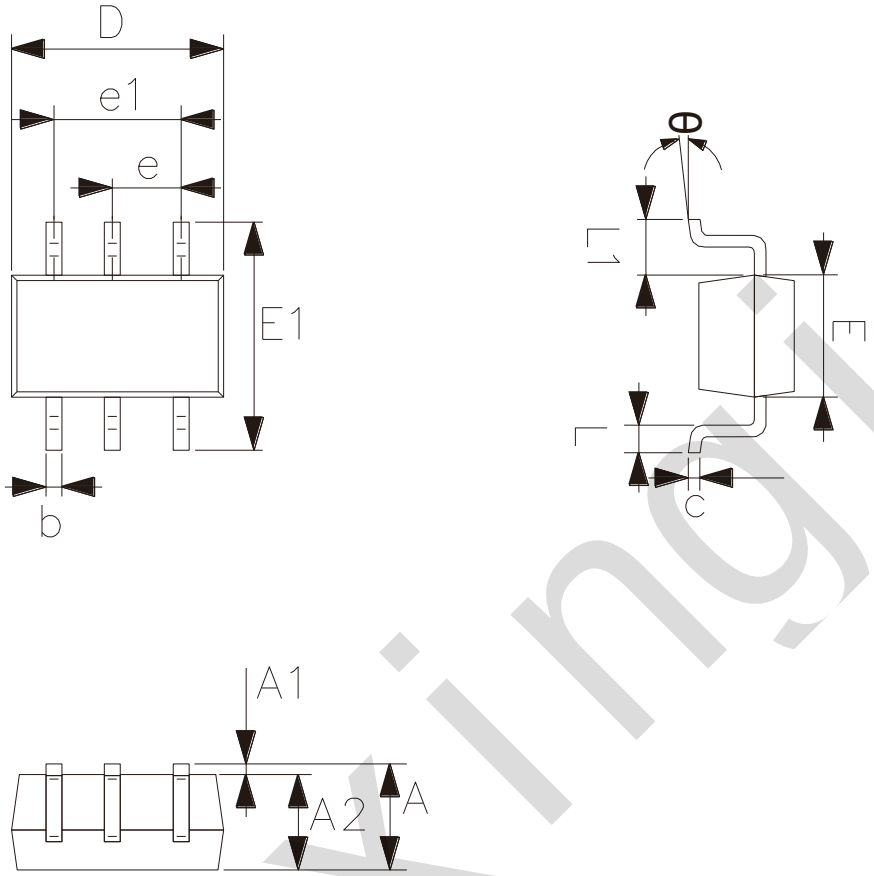
5、Package Information

5.1、SOT23-6



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.25
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2、SOT363



Symbol	Dimensions (mm)	
	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E1	2.15	2.45
E	1.15	1.35
e	0.65	
e1	1.20	1.40
L	0.26	0.46
L1	0.525	
θ	0°	8°

6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○：Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×：Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

We recommend you to read this chapter carefully before using this product.

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