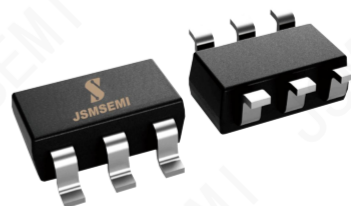


1、General Description

The 74LVC1G175 is a low-power, low-voltage single positive edge triggered D-type flip-flop with individual data (D) input, clock (CP) input, master reset (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
- $\pm 24\text{mA}$ output drive at 3.0V
- High-impedance when $V_{CC}=0\text{V}$
- Temperature range: -40°C to $+125^{\circ}\text{C}$
- Packaging information: SOT23-6/SOT363 (TSSOP-6)

2、Block Diagram And Pin Description

2.1、Block Diagram

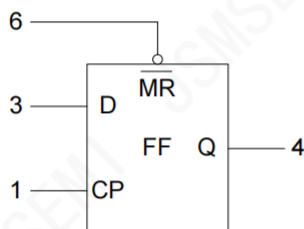


Figure 1. Logic symbol

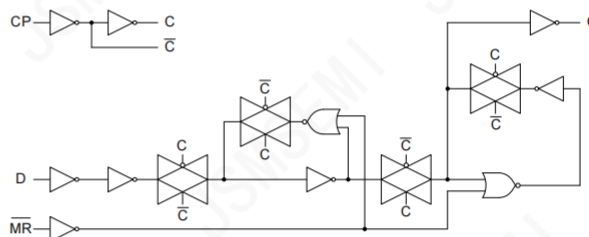
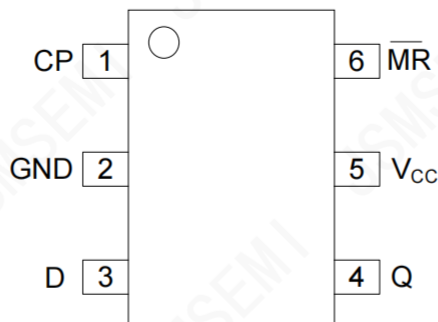


Figure 2. Logic diagram

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
74LVC1G175GV,125-JSM	SOT-23-6	ENXX	-40 to 125°C	3	T&R,3000	Rohs
74LVC1G175GW-JSM	TSSOP-6	ENXX	-40 to 125°C	3	T&R,3000	Rohs
74LVC1G175GW,125-JSM	TSSOP-6	ENXX	-40 to 125°C	3	T&R,3000	Rohs

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	$\overline{\text{MR}}$	master reset input (active LOW)

2.4、Function Table

Operating mode	Input			Output
	$\overline{\text{MR}}$	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	°C
soldering temperature	T_L	10s	260		°C

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	°C

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

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

Note: Typical values are measured at $T_{amb} = 25^{\circ}\text{C}$.

3.3.2、DC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground = 0V), unless otherwise specified.)

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

3.3.3、AC Characteristics 1

($T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, 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 $T_{amb}=25^{\circ}\text{C}$ and $V_{CC}=1.8\text{V}, 2.5\text{V}, 2.7\text{V}, 3.3\text{V}$ and 5.0V respectively.

3.3.4、AC Characteristics 2

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, 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

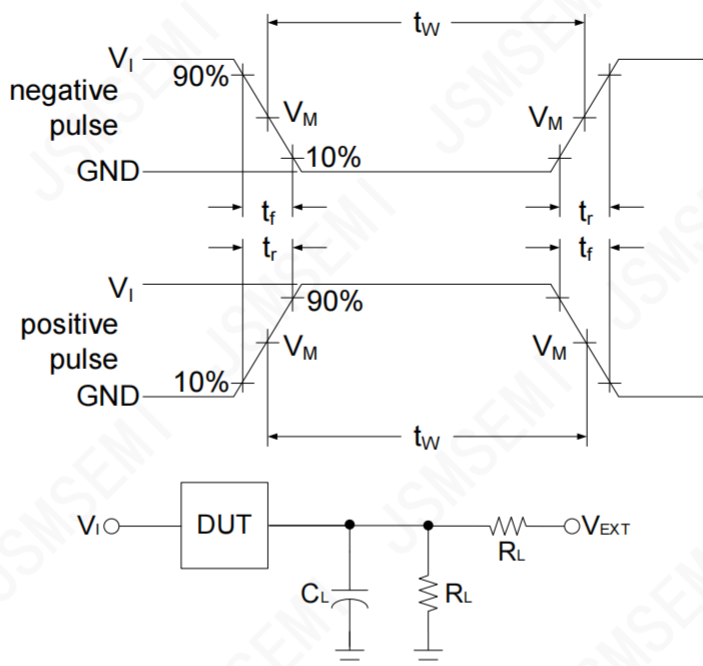


Figure 3. Load circuit

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}	$\leq 3ns$	30pF	1k Ω	Open	$2 \times V_{CC}$	GND
2.3V to 2.7V	V_{CC}	$\leq 3ns$	30pF	500 Ω	Open	$2 \times V_{CC}$	GND
2.7V	V_{CC}	$\leq 3ns$	50pF	500 Ω	Open	$2 \times V_{CC}$	GND
3.0V to 3.6V	V_{CC}	$\leq 3ns$	50pF	500 Ω	Open	$2 \times V_{CC}$	GND
4.5V to 5.5V	V_{CC}	$\leq 3ns$	50pF	500 Ω	Open	$2 \times V_{CC}$	GND

4.3、AC Testing Waveforms

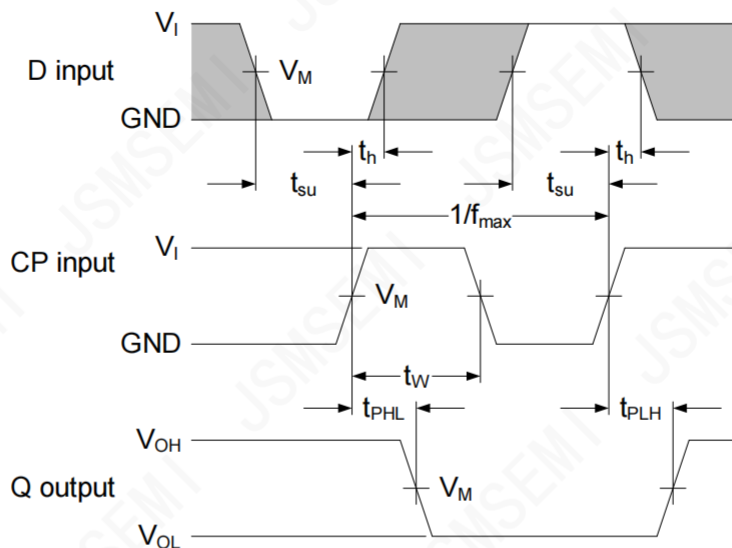


Figure 4. The clock input (CP) to output (Q) propagation delays, the clock pulse width, the D to CP set-up, the CP to D hold times, and the maximum clock pulse frequency

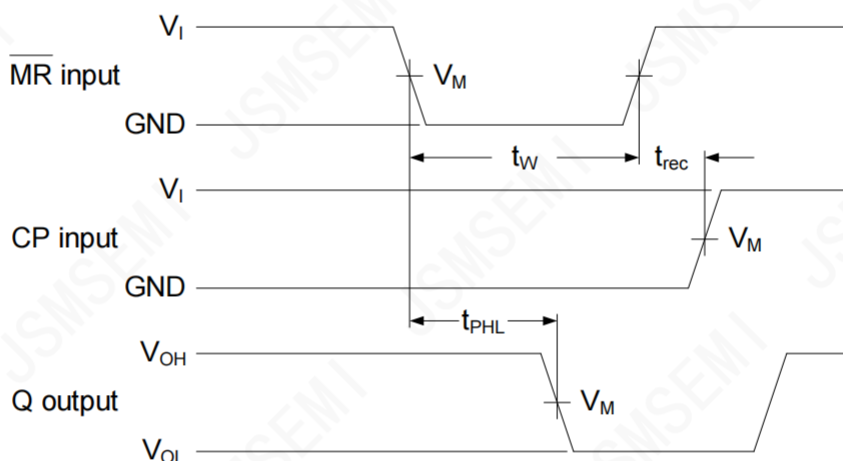


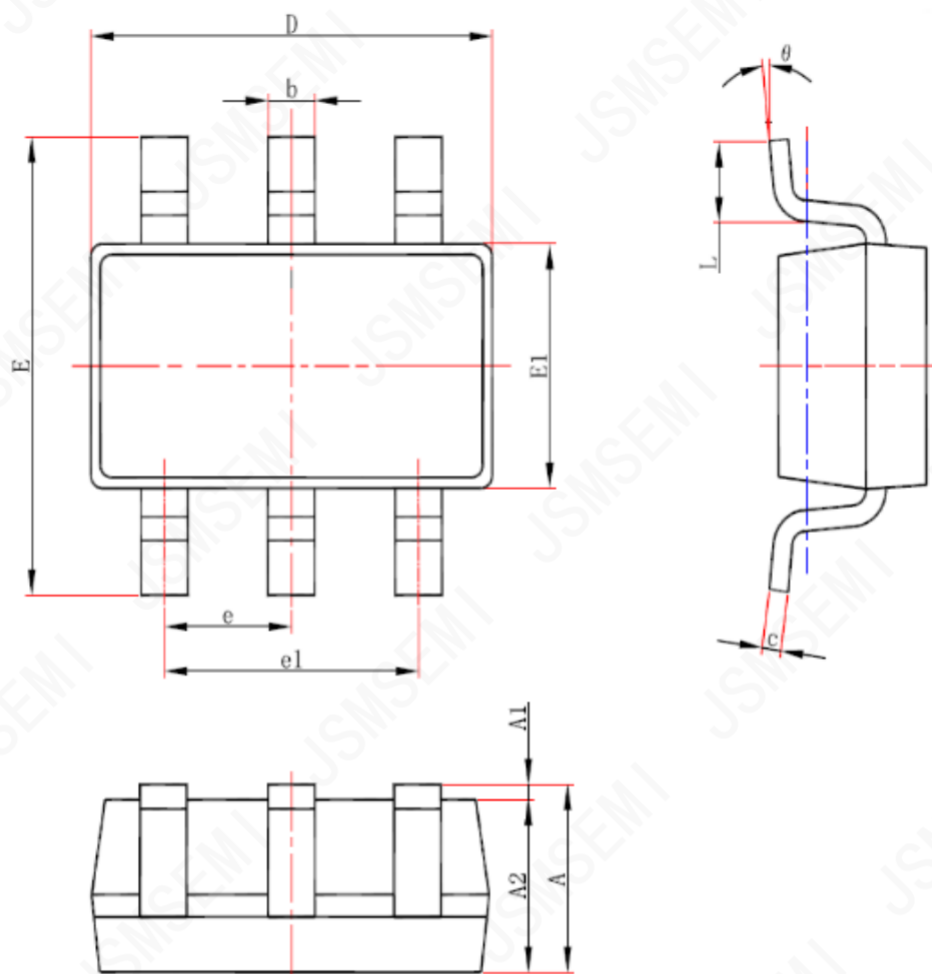
Figure 5. The master reset ($\overline{MR}$) input to output (Q) propagation delays, the master reset pulse width, and the $\overline{MR}$ to CP recovery time

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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

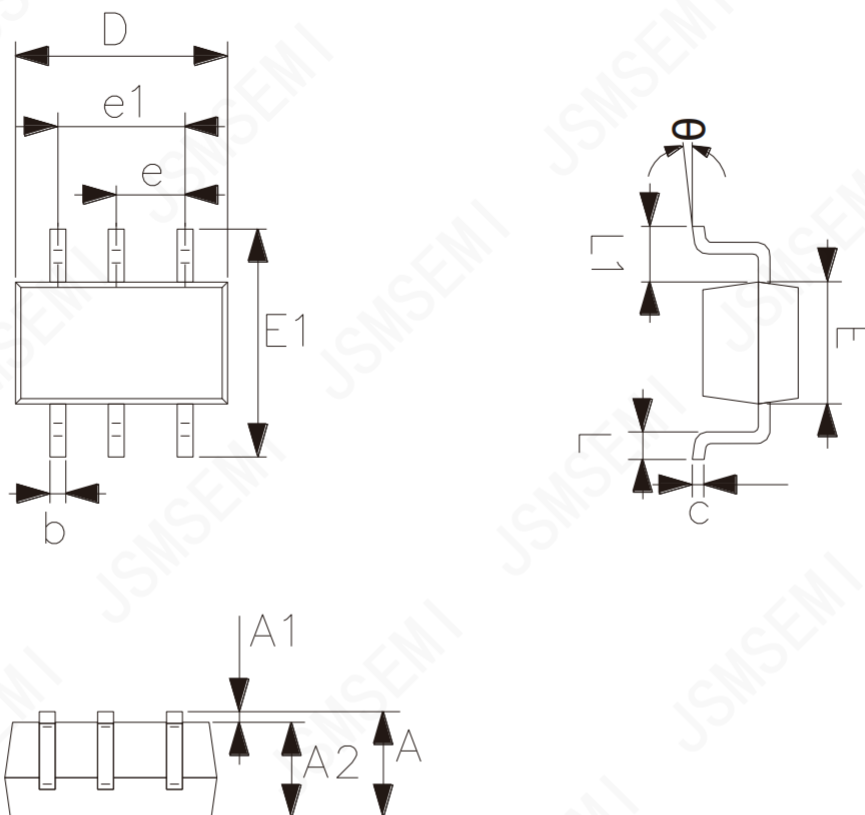
5、Package Information

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.									

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