AiP74AUP1G74
Low Power Single D-type flip-flop with set and reset; positive edge trigger

Product Specification

Specification Revision History：

Version	Date	Description
2019-04-A1	2019-04	New
2023-04-B1	2023-04	Update the template

Contents

1、General Description

The AiP74AUP1G74 provides a low-power, low-voltage single positive-edge triggered D-type flip-flop with individual data (D), clock (CP), set ($\overline{SD}$) and reset ($\overline{RD}$) inputs and complementary Q and $\overline{Q}$ outputs. The $\overline{SD}$ and $\overline{RD}$ are asynchronous active LOW inputs and operate independently of the clock input. Information on the data input is transferred to the Q output on the LOW-to-HIGH transition of the clock pulse. The D input must be stable one set-up time prior to the LOW-to-HIGH clock transition for predictable operation.

Schmitt trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8V to 3.6V.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8V to 3.6V.

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.

Features:

- Wide supply voltage range from 0.8V to 3.6V
- Low static power consumption; I_{CC}=1uA (maximum)
- Inputs accept voltages up to 3.6V
- Low noise overshoot and undershoot<10% of V_{CC}
- I_{OFF} circuitry provides partial power-down mode operation
- Multiple package options
- Specified from -40℃ to +125℃
- Packaging information: TSSOP8/VSSOP8

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74AUP1G74TA8.TB	TSSOP8	CHXX	100 PCS/tube	200 tube/box	20000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AUP1G74TA8.TR	TSSOP8	CHXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing: 0.65mm
AiP74AUP1G74YA8.TR	VSSOP8	CHXX	3000 PCS/reel	3000 PCS/box	Dimensions of plastic enclosure: 2.0mm×2.3mm Pin spacing: 0.50mm

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

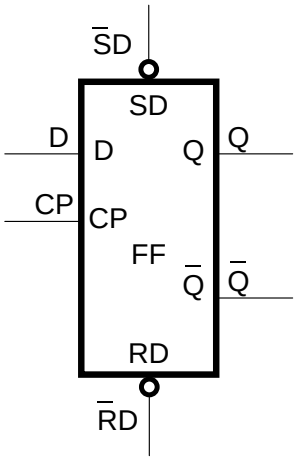


Figure 1. Logic symbol

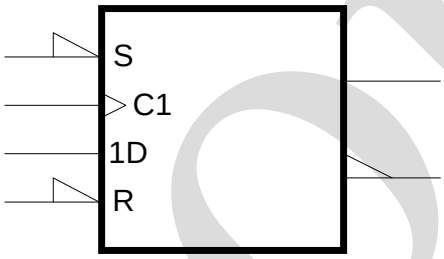


Figure 2. IEC Logic symbol

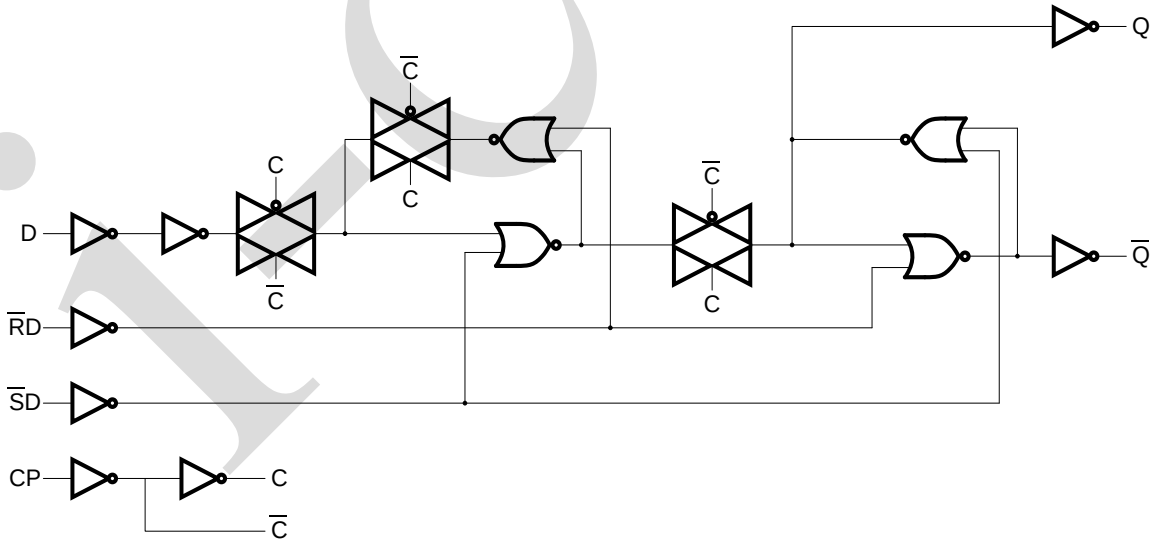
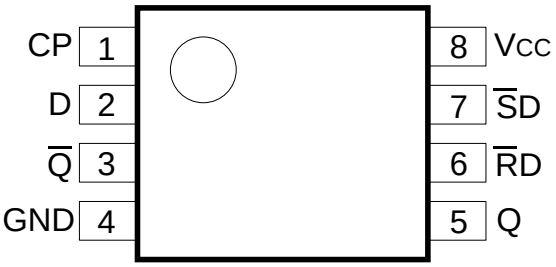


Figure 3. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	CP	clock input
2	D	data input
3	$\overline{Q}$	complement output
4	GND	ground (0 V)
5	Q	true output
6	$\overline{RD}$	asynchronous reset input (active LOW)
7	$\overline{SD}$	asynchronous set input (active LOW)
8	V_{CC}	supply voltage

2.4、Function Table For Asynchronous Operation

Input				Output	
$\overline{SD}$	$\overline{RD}$	CP	D	Q	$\overline{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H

Note:

H = HIGH voltage level;

L = LOW voltage level;

X = don't care.

2.5、Function Table For Synchronous Operation

Input				Output	
$\overline{SD}$	$\overline{RD}$	CP	D	Q_{n+1}	$\overline{Q}_{n+1}$
H	H	↑	L	L	H
H	H	↑	H	H	L

Note:

H = HIGH voltage level;

L = LOW voltage level;

X = don't care;

↑ = LOW-to-HIGH CP transition;

Q_{n+1} = state after the next LOW-to-HIGH CP transition.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

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

Characteristic	Symbol	Conditions		Min.	Max.	Unit
supply voltage	V_{CC}	-		-0.5	+4.6	V
input voltage	V_I	-[1]		-0.5	+4.6	V
output voltage	V_O	Active mode and Power-down mode [1]		-0.5	+4.6	V
input clamping current	I_{IK}	V_I<0V		-50	-	mA
output clamping current	I_{OK}	V_O<0V		-50	-	mA
output current	I_O	V_O=0V to V_{CC}		-	±20	mA
supply current	I_{CC}	-		-	+50	mA
ground current	I_{GND}	-		-50	-	mA
storage temperature	T_{stg}	-		-65	+150	℃
total power dissipation	P_{tot}	-		-	250	mW
soldering temperature	T_L	10s	VSSOP	260		℃

Note:

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	0.8	-	3.6	V
input voltage	V_I	-	0	-	3.6	V
output voltage	V_O	Active mode	0	-	V_{CC}	V
		Power-down mode; V_{CC}=0V	0	-	3.6	V
ambient temperature	T_{amb}	-	-40	-	+125	℃
input transition rise and fall rate	Δt/ΔV	V_{CCI}=0.8V to 3.6V	-	-	200	ns/V

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

(T_{amb}=25℃, 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}=0.8V		0.70×V_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V		0.65×V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.6	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=0.8V		-	-	0.30×V_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.35×V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	I_O=-20uA; V_{CC}=0.8V to 3.6V	V_{CC}-0.1	-	-	V
			I_O=-1.1mA; V_{CC}=1.1V	0.75×V_{CC}	-	-	V
			I_O=-1.7mA; V_{CC}=1.4V	1.11	-	-	V
			I_O=-1.9mA; V_{CC}=1.65V	1.32	-	-	V
			I_O=-2.3mA; V_{CC}=2.3V	2.05	-	-	V
			I_O=-3.1mA; V_{CC}=2.3V	1.9	-	-	V
			I_O=-2.7mA; V_{CC}=3.0V	2.72	-	-	V
			I_O=-4.0mA; V_{CC}=3.0V	2.6	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.1	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.30×V_{CC}	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.31	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.31	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.31	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.44	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.31	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.44	V
input leakage current	I_I	V_I=GND to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
power-off current leakage	I_{OFF}	V_I or V_O=0V to 3.6V; V_{CC}=0V		-	-	±1.0	uA
additional power-off leakage current	ΔI_{OFF}	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
supply current	I_{CC}	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.0	uA
additional supply current	ΔI_{CC}	V_I =V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V; per pin[1]		-	-	40	uA
input capacitance	C_I	V_{CC}=0V to 3.6V; V_I=GND or V_{CC}		-	0.6	-	pF
output capacitance	C_O	V_O=GND; V_{CC}=0V		-	1.3	-	pF

Note:

[1] One input at V_{CC}-0.6V, other input at V_{CC} or GND.

3.3.2、DC Characteristics 2

(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}=0.8V		0.70×V_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V		0.65×V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.6	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=0.8V		-	-	0.30×V_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.35×V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	I_O=-20uA; V_{CC}=0.8V to 3.6V	V_{CC}-0.1	-	-	V
			I_O=-1.1mA; V_{CC}=1.1V	0.70×V_{CC}	-	-	V
			I_O=-1.7mA; V_{CC}=1.4V	1.03	-	-	V
			I_O=-1.9mA; V_{CC}=1.65V	1.30	-	-	V
			I_O=-2.3mA; V_{CC}=2.3V	1.97	-	-	V
			I_O=-3.1mA; V_{CC}=2.3V	1.85	-	-	V
			I_O=-2.7mA; V_{CC}=3.0V	2.67	-	-	V
			I_O=-4.0mA; V_{CC}=3.0V	2.55	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.1	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.30×V_{CC}	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.37	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.35	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.33	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.45	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.33	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.45	V
input leakage current	I_I	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V		-	-	±1.0	uA
power-off current leakage	I_{OFF}	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V		-	-	±1.0	uA
additional power-off leakage current	ΔI_{OFF}	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
supply current	I_{CC}	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.0	uA
additional supply current	ΔI_{CC}	V_I =V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V; per pin[1]		-	-	50	uA

Note:

[1] One input at V_{CC}-0.6V, other input at V_{CC} or GND.

3.3.3、DC Characteristics 3

(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}=0.8V		0.75×V_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V		0.70×V_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.6	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
LOW-level input voltage	V_{IL}	V_{CC}=0.8V		-	-	0.25×V_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.30×V_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
HIGH-level output voltage	V_{OH}	V_I=V_{IH} or V_{IL}	I_O=-20uA; V_{CC}=0.8V to 3.6V	V_{CC}-0.11	-	-	V
			I_O=-1.1mA; V_{CC}=1.1V	0.60×V_{CC}	-	-	V
			I_O=-1.7mA; V_{CC}=1.4V	0.93	-	-	V
			I_O=-1.9mA; V_{CC}=1.65V	1.17	-	-	V
			I_O=-2.3mA; V_{CC}=2.3V	1.77	-	-	V
			I_O=-3.1mA; V_{CC}=2.3V	1.67	-	-	V
			I_O=-2.7mA; V_{CC}=3.0V	2.40	-	-	V
			I_O=-4.0mA; V_{CC}=3.0V	2.30	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.11	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.33×V_{CC}	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.41	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.39	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.36	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.50	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.36	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.50	V
input leakage current	I_I	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V		-	-	±1.0	uA
power-off current leakage	I_{OFF}	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V		-	-	±1.0	uA
additional power-off leakage current	ΔI_{OFF}	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
supply current	I_{CC}	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.4	uA
additional supply current	ΔI_{CC}	V_I =V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V; per pin[1]		-	-	75	uA

Note:

[1] One input at V_{CC}-0.6V, other input at V_{CC} or GND.

3.3.4、AC Characteristics 1

(T_{amb}=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified)[1][2]

Parameter	Symbol	Conditions		Min.	Typ.[1]	Max.	Unit
C_L=5pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=0.8V	-	25.4	-	ns
			V_{CC}=1.1V to 1.3V	2.9	6.7	14.0	ns
			V_{CC}=1.4V to 1.6V	2.4	4.5	7.6	ns
			V_{CC}=1.65V to 1.95V	1.9	3.5	5.7	ns
			V_{CC}=2.3V to 2.7V	1.7	2.6	3.8	ns
			V_{CC}=3.0V to 3.6V	1.5	2.2	3.1	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	19.6	-	ns
			V_{CC}=1.1V to 1.3V	2.7	5.6	11.0	ns
			V_{CC}=1.4V to 1.6V	2.4	4.0	6.3	ns
			V_{CC}=1.65V to 1.95V	2.0	3.3	4.9	ns
			V_{CC}=2.3V to 2.7V	1.9	2.7	3.7	ns
			V_{CC}=3.0V to 3.6V	1.8	2.5	3.2	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	19.2	-	ns
			V_{CC}=1.1V to 1.3V	2.6	5.5	11.0	ns
			V_{CC}=1.4V to 1.6V	2.3	3.9	6.3	ns
			V_{CC}=1.65V to 1.95V	1.9	3.2	5.0	ns
			V_{CC}=2.3V to 2.7V	1.9	2.6	3.6	ns
			V_{CC}=3.0V to 3.6V	1.8	2.4	3.3	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=0.8V	-	53	-	MHz
			V_{CC}=1.1V to 1.3V	-	203	-	MHz
			V_{CC}=1.4V to 1.6V	-	347	-	MHz
			V_{CC}=1.65V to 1.95V	-	435	-	MHz
			V_{CC}=2.3V to 2.7V	-	550	-	MHz
			V_{CC}=3.0V to 3.6V	-	619	-	MHz
C_L=10pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=0.8V	-	28.9	-	ns
			V_{CC}=1.1V to 1.3V	3.1	7.5	15.8	ns
			V_{CC}=1.4V to 1.6V	2.7	5.1	8.7	ns
			V_{CC}=1.65V to 1.95V	2.5	4.1	6.5	ns
			V_{CC}=2.3V to 2.7V	2.0	3.2	4.6	ns
			V_{CC}=3.0V to 3.6V	1.8	2.8	3.8	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	23.2	-	ns
			V_{CC}=1.1V to 1.3V	2.9	6.5	12.9	ns
			V_{CC}=1.4V to 1.6V	2.7	4.6	7.5	ns
			V_{CC}=1.65V to 1.95V	2.6	3.9	5.6	ns
			V_{CC}=2.3V to 2.7V	2.3	3.2	4.4	ns
			V_{CC}=3.0V to 3.6V	2.2	3.0	3.9	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	22.7	-	ns
			V_{CC}=1.1V to 1.3V	2.8	6.4	12.8	ns
			V_{CC}=1.4V to 1.6V	2.6	4.5	7.5	ns
			V_{CC}=1.65V to 1.95V	2.5	3.3	5.8	ns
			V_{CC}=2.3V to 2.7V	2.2	3.2	4.4	ns

			V_{CC}=3.0V to 3.6V	2.0	2.9	4.0	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=0.8V	-	52	-	MHz
			V_{CC}=1.1V to 1.3V	-	192	-	MHz
			V_{CC}=1.4V to 1.6V	-	324	-	MHz
			V_{CC}=1.65V to 1.95V	-	421	-	MHz
			V_{CC}=2.3V to 2.7V	-	486	-	MHz
			V_{CC}=3.0V to 3.6V	-	550	-	MHz
C_L=15pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=0.8V	-	32.4	-	ns
			V_{CC}=1.1V to 1.3V	3.5	8.3	17.6	ns
			V_{CC}=1.4V to 1.6V	3.2	5.6	9.5	ns
			V_{CC}=1.65V to 1.95V	2.7	4.6	7.2	ns
			V_{CC}=2.3V to 2.7V	2.4	3.6	5.2	ns
			V_{CC}=3.0V to 3.6V	2.2	3.2	4.4	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	26.7	-	ns
			V_{CC}=1.1V to 1.3V	3.3	7.3	14.7	ns
			V_{CC}=1.4V to 1.6V	3.2	5.2	8.3	ns
			V_{CC}=1.65V to 1.95V	2.8	4.3	6.4	ns
			V_{CC}=2.3V to 2.7V	2.8	3.7	5.1	ns
			V_{CC}=3.0V to 3.6V	2.5	3.5	4.6	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	26.1	-	ns
			V_{CC}=1.1V to 1.3V	3.2	7.2	14.5	ns
			V_{CC}=1.4V to 1.6V	3.1	5.1	8.4	ns
			V_{CC}=1.65V to 1.95V	2.7	4.3	6.5	ns
			V_{CC}=2.3V to 2.7V	2.6	3.6	5.0	ns
			V_{CC}=3.0V to 3.6V	2.4	3.4	4.6	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=0.8V	-	50	-	MHz
			V_{CC}=1.1V to 1.3V	-	181	-	MHz
			V_{CC}=1.4V to 1.6V	-	301	-	MHz
			V_{CC}=1.65V to 1.95V	-	407	-	MHz
			V_{CC}=2.3V to 2.7V	-	422	-	MHz
			V_{CC}=3.0V to 3.6V	-	481	-	MHz
C_L=30pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=0.8V	-	42.7	-	ns
			V_{CC}=1.1V to 1.3V	4.2	10.6	22.5	ns
			V_{CC}=1.4V to 1.6V	3.7	7.2	12.0	ns
			V_{CC}=1.65V to 1.95V	3.5	5.8	9.2	ns
			V_{CC}=2.3V to 2.7V	3.3	4.7	6.6	ns
			V_{CC}=3.0V to 3.6V	3.0	4.3	5.8	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=0.8V	-	37.0	-	ns
			V_{CC}=1.1V to 1.3V	4.0	9.5	19.8	ns
			V_{CC}=1.4V to 1.6V	3.8	6.7	10.9	ns
			V_{CC}=1.65V to 1.95V	3.7	5.6	8.4	ns
			V_{CC}=2.3V to 2.7V	3.7	4.8	6.6	ns
			V_{CC}=3.0V to 3.6V	3.4	4.6	6.0	ns
		$\overline{RD}$ to Q, $\overline{Q}$;	V_{CC}=0.8V	-	36.4	-	ns
			V_{CC}=1.1V to 1.3V	3.9	9.4	19.5	ns

		see Figure 6[2]	V_{CC}=1.4V to 1.6V	3.6	6.6	10.9	ns
			V_{CC}=1.65V to 1.95V	3.5	5.5	8.5	ns
			V_{CC}=2.3V to 2.7V	3.5	4.7	6.5	ns
			V_{CC}=3.0V to 3.6V	3.3	4.4	6.1	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=0.8V	-	28	-	MHz
			V_{CC}=1.1V to 1.3V	-	145	-	MHz
			V_{CC}=1.4V to 1.6V	-	185	-	MHz
			V_{CC}=1.65V to 1.95V	-	270	-	MHz
			V_{CC}=2.3V to 2.7V	-	290	-	MHz
			V_{CC}=3.0V to 3.6V	-	315	-	MHz
C_L=5pF, 10pF, 15pF and 30pF							
set-up time	t_{su}	D to CP HIGH; see Figure 5	V_{CC}=0.8V	-	3.4	-	ns
			V_{CC}=1.1V to 1.3V	-	0.6	-	ns
			V_{CC}=1.4V to 1.6V	-	0.3	-	ns
			V_{CC}=1.65V to 1.95V	-	0.4	-	ns
			V_{CC}=2.3V to 2.7V	-	0.2	-	ns
			V_{CC}=3.0V to 3.6V	-	0.3	-	ns
		D to CP LOW; see Figure 5	V_{CC}=0.8V	-	3.0	-	ns
			V_{CC}=1.1V to 1.3V	-	0.5	-	ns
			V_{CC}=1.4V to 1.6V	-	0.3	-	ns
			V_{CC}=1.65V to 1.95V	-	0.4	-	ns
			V_{CC}=2.3V to 2.7V	-	0.5	-	ns
			V_{CC}=3.0V to 3.6V	-	0.6	-	ns
hold time	t_h	D to CP; see Figure 5	V_{CC}=0.8V	-	-1.9	-	ns
			V_{CC}=1.1V to 1.3V	-	-0.3	-	ns
			V_{CC}=1.4V to 1.6V	-	-0.2	-	ns
			V_{CC}=1.65V to 1.95V	-	-0.2	-	ns
			V_{CC}=2.3V to 2.7V	-	-0.2	-	ns
			V_{CC}=3.0V to 3.6V	-	-0.2	-	ns
recovery time	t_{rec}	$\overline{RD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-	-0.5	-	ns
			V_{CC}=1.4V to 1.6V	-	-0.2	-	ns
			V_{CC}=1.65V to 1.95V	-	-0.2	-	ns
			V_{CC}=2.3V to 2.7V	-	-0.1	-	ns
			V_{CC}=3.0V to 3.6V	-	-0.1	-	ns
		$\overline{SD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-	-0.5	-	ns
			V_{CC}=1.4V to 1.6V	-	-0.4	-	ns
			V_{CC}=1.65V to 1.95V	-	-0.3	-	ns
			V_{CC}=2.3V to 2.7V	-	-0.2	-	ns
			V_{CC}=3.0V to 3.6V	-	-0.1	-	ns
pulse width	t_W	CP HIGH or LOW; see Figure 5	V_{CC}=1.1V to 1.3V	-	2.1	-	ns
			V_{CC}=1.4V to 1.6V	-	1.1	-	ns
			V_{CC}=1.65V to 1.95V	-	0.9	-	ns
			V_{CC}=2.3V to 2.7V	-	0.6	-	ns
			V_{CC}=3.0V to 3.6V	-	0.6	-	ns
		SD or RD LOW; see Figure 6	V_{CC}=1.1V to 1.3V	-	4.2	-	ns
			V_{CC}=1.4V to 1.6V	-	2.3	-	ns
			V_{CC}=1.65V to 1.95V	-	1.8	-	ns

			V_{CC}=2.3V to 2.7V	-	1.2	-	ns
			V_{CC}=3.0V to 3.6V	-	1.1	-	ns
Power dissipation capacitance	C_{PD}	f_i=1MHz; V_I=GND to V_{CC}[3]	V_{CC}=0.8V	-	2.8	-	pF
			V_{CC}=1.1V to 1.3V	-	2.9	-	pF
			V_{CC}=1.4V to 1.6V	-	3.0	-	pF
			V_{CC}=1.65V to 1.95V	-	3.0	-	pF
			V_{CC}=2.3V to 2.7V	-	3.5	-	pF
			V_{CC}=3.0V to 3.6V	-	3.9	-	pF

Note:

[1] All typical values are measured at nominal V_{CC}.

[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 uW).

$P_D=C_{PD}\times V_{CC}^2\times f_i\times N+\Sigma(C_L\times V_{CC}^2\times f_o)$ 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 V;

N=number of inputs switching;

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

3.3.5、AC Characteristics 2

(T_{amb}=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified)[1][2]

Parameter	Symbol	Conditions		Min.	Typ.[1]	Max.	Unit
C_L=5pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	2.6	-	14.2	ns
			V_{CC}=1.4V to 1.6V	2.3	-	8.3	ns
			V_{CC}=1.65V to 1.95V	1.7	-	6.5	ns
			V_{CC}=2.3V to 2.7V	1.4	-	4.4	ns
			V_{CC}=3.0V to 3.6V	1.2	-	3.4	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.5	-	11.4	ns
			V_{CC}=1.4V to 1.6V	2.2	-	6.9	ns
			V_{CC}=1.65V to 1.95V	1.7	-	5.6	ns
			V_{CC}=2.3V to 2.7V	1.7	-	4.0	ns
			V_{CC}=3.0V to 3.6V	1.5	-	3.6	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.5	-	11.3	ns
			V_{CC}=1.4V to 1.6V	2.2	-	6.8	ns
			V_{CC}=1.65V to 1.95V	1.8	-	5.6	ns
			V_{CC}=2.3V to 2.7V	1.7	-	4.1	ns
			V_{CC}=3.0V to 3.6V	1.5	-	3.6	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	170	-	-	MHz
			V_{CC}=1.4V to 1.6V	310	-	-	MHz
			V_{CC}=1.65V to 1.95V	400	-	-	MHz
			V_{CC}=2.3V to 2.7V	490	-	-	MHz
			V_{CC}=3.0V to 3.6V	550	-	-	MHz
C_L=10pF							
propagation	t_{pd}	CP to Q, $\overline{Q}$;	V_{CC}=1.1V to 1.3V	2.9	-	16.1	ns

delay		see Figure 5[2]	V_{CC}=1.4V to 1.6V	2.4	-	9.4	ns
			V_{CC}=1.65V to 1.95V	2.2	-	7.2	ns
			V_{CC}=2.3V to 2.7V	1.8	-	5.3	ns
			V_{CC}=3.0V to 3.6V	1.6	-	4.1	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.8	-	13.3	ns
			V_{CC}=1.4V to 1.6V	2.3	-	7.9	ns
			V_{CC}=1.65V to 1.95V	2.3	-	6.3	ns
			V_{CC}=2.3V to 2.7V	2.0	-	4.8	ns
			V_{CC}=3.0V to 3.6V	1.9	-	4.2	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.7	-	13.2	ns
			V_{CC}=1.4V to 1.6V	2.3	-	8.1	ns
			V_{CC}=1.65V to 1.95V	2.3	-	6.3	ns
			V_{CC}=2.3V to 2.7V	2.0	-	4.9	ns
			V_{CC}=3.0V to 3.6V	1.9	-	4.3	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	150	-	-	MHz
			V_{CC}=1.4V to 1.6V	280	-	-	MHz
			V_{CC}=1.65V to 1.95V	310	-	-	MHz
			V_{CC}=2.3V to 2.7V	370	-	-	MHz
			V_{CC}=3.0V to 3.6V	410	-	-	MHz
C_L=15pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	3.3	-	17.8	ns
			V_{CC}=1.4V to 1.6V	2.8	-	10.5	ns
			V_{CC}=1.65V to 1.95V	2.5	-	8.1	ns
			V_{CC}=2.3V to 2.7V	2.2	-	5.8	ns
			V_{CC}=3.0V to 3.6V	2.0	-	4.9	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.1	-	15.2	ns
			V_{CC}=1.4V to 1.6V	2.9	-	9.0	ns
			V_{CC}=1.65V to 1.95V	2.5	-	7.1	ns
			V_{CC}=2.3V to 2.7V	2.2	-	5.5	ns
			V_{CC}=3.0V to 3.6V	2.4	-	5.0	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.1	-	15.0	ns
			V_{CC}=1.4V to 1.6V	2.7	-	9.2	ns
			V_{CC}=1.65V to 1.95V	2.6	-	7.3	ns
			V_{CC}=2.3V to 2.7V	2.4	-	5.5	ns
			V_{CC}=3.0V to 3.6V	2.3	-	5.0	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	120	-	-	MHz
			V_{CC}=1.4V to 1.6V	190	-	-	MHz
			V_{CC}=1.65V to 1.95V	240	-	-	MHz
			V_{CC}=2.3V to 2.7V	300	-	-	MHz
			V_{CC}=3.0V to 3.6V	320	-	-	MHz
C_L=30pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	4.0	-	23.0	ns
			V_{CC}=1.4V to 1.6V	3.7	-	13.3	ns
			V_{CC}=1.65V to 1.95V	3.4	-	10.4	ns
			V_{CC}=2.3V to 2.7V	3.0	-	7.3	ns
			V_{CC}=3.0V to 3.6V	2.8	-	6.8	ns
		$\overline{SD}$ to Q, $\overline{Q}$;	V_{CC}=1.1V to 1.3V	3.8	-	20.8	ns

		see Figure 6[2]	V_{CC}=1.4V to 1.6V	3.7	-	12.0	ns
			V_{CC}=1.65V to 1.95V	3.5	-	9.3	ns
			V_{CC}=2.3V to 2.7V	3.2	-	7.2	ns
			V_{CC}=3.0V to 3.6V	3.1	-	6.8	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.8	-	20.2	ns
			V_{CC}=1.4V to 1.6V	3.7	-	12.0	ns
			V_{CC}=1.65V to 1.95V	3.5	-	9.5	ns
			V_{CC}=2.3V to 2.7V	3.2	-	7.1	ns
			V_{CC}=3.0V to 3.6V	3.1	-	7.1	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	70	-	-	MHz
			V_{CC}=1.4V to 1.6V	120	-	-	MHz
			V_{CC}=1.65V to 1.95V	150	-	-	MHz
			V_{CC}=2.3V to 2.7V	190	-	-	MHz
			V_{CC}=3.0V to 3.6V	200	-	-	MHz
C_L=5pF, 10pF, 15pF and 30pF							
set-up time	t_{su}	D to CP HIGH; see Figure 5	V_{CC}=1.1V to 1.3V	1.2	-	-	ns
			V_{CC}=1.4V to 1.6V	0.6	-	-	ns
			V_{CC}=1.65V to 1.95V	0.5	-	-	ns
			V_{CC}=2.3V to 2.7V	0.4	-	-	ns
			V_{CC}=3.0V to 3.6V	0.4	-	-	ns
		D to CP LOW; see Figure 5	V_{CC}=1.1V to 1.3V	1.2	-	-	ns
			V_{CC}=1.4V to 1.6V	0.7	-	-	ns
			V_{CC}=1.65V to 1.95V	0.7	-	-	ns
			V_{CC}=2.3V to 2.7V	0.7	-	-	ns
			V_{CC}=3.0V to 3.6V	0.8	-	-	ns
hold time	t_h	D to CP; see Figure 5	V_{CC}=1.1V to 1.3V	0.5	-	-	ns
			V_{CC}=1.4V to 1.6V	0.2	-	-	ns
			V_{CC}=1.65V to 1.95V	0.1	-	-	ns
			V_{CC}=2.3V to 2.7V	0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	0.1	-	-	ns
recovery time	t_{rec}	$\overline{RD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-0.9	-	-	ns
			V_{CC}=1.4V to 1.6V	-0.6	-	-	ns
			V_{CC}=1.65V to 1.95V	-0.4	-	-	ns
			V_{CC}=2.3V to 2.7V	-0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	-0.1	-	-	ns
		$\overline{SD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-0.3	-	-	ns
			V_{CC}=1.4V to 1.6V	-0.1	-	-	ns
			V_{CC}=1.65V to 1.95V	0	-	-	ns
			V_{CC}=2.3V to 2.7V	0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	0.1	-	-	ns
pulse width	t_W	CP HIGH or LOW; see Figure 5	V_{CC}=1.1V to 1.3V	2.7	-	-	ns
			V_{CC}=1.4V to 1.6V	1.5	-	-	ns
			V_{CC}=1.65V to 1.95V	1.6	-	-	ns
			V_{CC}=2.3V to 2.7V	1.7	-	-	ns
			V_{CC}=3.0V to 3.6V	1.9	-	-	ns
		$\overline{SD}$ or $\overline{RD}$ LOW; see Figure 6	V_{CC}=1.1V to 1.3V	11.3	-	-	ns
			V_{CC}=1.4V to 1.6V	6.2	-	-	ns

			V_{CC}=1.65V to 1.95V	4.8	-	-	ns
			V_{CC}=2.3V to 2.7V	3.3	-	-	ns
			V_{CC}=3.0V to 3.6V	2.6	-	-	ns

Note:

[1] All typical values are measured at nominal V_{CC}.

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

3.3.6、AC Characteristics 3

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified)[1][2]

Parameter	Symbol	Conditions		Min.	Typ.[1]	Max.	Unit
C_L=5pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	2.6	-	14.2	ns
			V_{CC}=1.4V to 1.6V	2.3	-	8.6	ns
			V_{CC}=1.65V to 1.95V	1.7	-	6.8	ns
			V_{CC}=2.3V to 2.7V	1.4	-	4.7	ns
			V_{CC}=3.0V to 3.6V	1.2	-	3.7	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.5	-	11.5	ns
			V_{CC}=1.4V to 1.6V	2.2	-	7.3	ns
			V_{CC}=1.65V to 1.95V	1.7	-	5.9	ns
			V_{CC}=2.3V to 2.7V	1.7	-	4.2	ns
			V_{CC}=3.0V to 3.6V	1.5	-	3.8	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.5	-	11.5	ns
			V_{CC}=1.4V to 1.6V	2.2	-	7.3	ns
			V_{CC}=1.65V to 1.95V	1.8	-	5.9	ns
			V_{CC}=2.3V to 2.7V	1.7	-	4.2	ns
			V_{CC}=3.0V to 3.6V	1.5	-	3.8	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	170	-	-	MHz
			V_{CC}=1.4V to 1.6V	300	-	-	MHz
			V_{CC}=1.65V to 1.95V	390	-	-	MHz
			V_{CC}=2.3V to 2.7V	480	-	-	MHz
			V_{CC}=3.0V to 3.6V	510	-	-	MHz
C_L=10pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	2.9	-	16.1	ns
			V_{CC}=1.4V to 1.6V	2.4	-	9.8	ns
			V_{CC}=1.65V to 1.95V	2.2	-	7.6	ns
			V_{CC}=2.3V to 2.7V	1.8	-	5.6	ns
			V_{CC}=3.0V to 3.6V	1.6	-	4.4	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.8	-	13.5	ns
			V_{CC}=1.4V to 1.6V	2.3	-	8.3	ns
			V_{CC}=1.65V to 1.95V	2.3	-	6.6	ns
			V_{CC}=2.3V to 2.7V	2.0	-	5.2	ns
			V_{CC}=3.0V to 3.6V	1.9	-	4.4	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	2.7	-	13.4	ns
			V_{CC}=1.4V to 1.6V	2.3	-	8.4	ns
			V_{CC}=1.65V to 1.95V	2.3	-	6.7	ns
			V_{CC}=2.3V to 2.7V	2.0	-	5.2	ns

			V_{CC}=3.0V to 3.6V	1.9	-	4.5	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	150	-	-	MHz
			V_{CC}=1.4V to 1.6V	230	-	-	MHz
			V_{CC}=1.65V to 1.95V	250	-	-	MHz
			V_{CC}=2.3V to 2.7V	360	-	-	MHz
			V_{CC}=3.0V to 3.6V	360	-	-	MHz
C_L=15pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	3.3	-	18.0	ns
			V_{CC}=1.4V to 1.6V	2.8	-	11.1	ns
			V_{CC}=1.65V to 1.95V	2.5	-	8.6	ns
			V_{CC}=2.3V to 2.7V	2.2	-	6.2	ns
			V_{CC}=3.0V to 3.6V	2.0	-	5.2	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.1	-	15.4	ns
			V_{CC}=1.4V to 1.6V	2.9	-	9.5	ns
			V_{CC}=1.65V to 1.95V	2.5	-	7.5	ns
			V_{CC}=2.3V to 2.7V	2.2	-	5.8	ns
			V_{CC}=3.0V to 3.6V	2.4	-	5.2	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.1	-	15.2	ns
			V_{CC}=1.4V to 1.6V	2.7	-	9.7	ns
			V_{CC}=1.65V to 1.95V	2.6	-	7.7	ns
			V_{CC}=2.3V to 2.7V	2.4	-	5.8	ns
			V_{CC}=3.0V to 3.6V	2.3	-	5.2	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	120	-	-	MHz
			V_{CC}=1.4V to 1.6V	160	-	-	MHz
			V_{CC}=1.65V to 1.95V	190	-	-	MHz
			V_{CC}=2.3V to 2.7V	270	-	-	MHz
			V_{CC}=3.0V to 3.6V	300	-	-	MHz
C_L=30pF							
propagation delay	t_{pd}	CP to Q, $\overline{Q}$; see Figure 5[2]	V_{CC}=1.1V to 1.3V	4.0	-	23.3	ns
			V_{CC}=1.4V to 1.6V	3.7	-	14.0	ns
			V_{CC}=1.65V to 1.95V	3.4	-	11.0	ns
			V_{CC}=2.3V to 2.7V	3.0	-	7.8	ns
			V_{CC}=3.0V to 3.6V	2.8	-	7.3	ns
		$\overline{SD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.8	-	21.1	ns
			V_{CC}=1.4V to 1.6V	3.7	-	12.7	ns
			V_{CC}=1.65V to 1.95V	3.5	-	9.9	ns
			V_{CC}=2.3V to 2.7V	3.2	-	7.6	ns
			V_{CC}=3.0V to 3.6V	3.1	-	7.1	ns
		$\overline{RD}$ to Q, $\overline{Q}$; see Figure 6[2]	V_{CC}=1.1V to 1.3V	3.8	-	20.5	ns
			V_{CC}=1.4V to 1.6V	3.7	-	12.6	ns
			V_{CC}=1.65V to 1.95V	3.5	-	10.1	ns
			V_{CC}=2.3V to 2.7V	3.2	-	7.6	ns
			V_{CC}=3.0V to 3.6V	3.1	-	7.5	ns
maximum frequency	f_{max}	CP; see Figure 5	V_{CC}=1.1V to 1.3V	70	-	-	MHz
			V_{CC}=1.4V to 1.6V	110	-	-	MHz
			V_{CC}=1.65V to 1.95V	120	-	-	MHz
			V_{CC}=2.3V to 2.7V	170	-	-	MHz

			V_{CC}=3.0V to 3.6V	190	-	-	MHz
C_L=5pF, 10pF, 15pF and 30pF							
set-up time	t_{su}	D to CP HIGH; see Figure 5	V_{CC}=1.1V to 1.3V	1.2	-	-	ns
			V_{CC}=1.4V to 1.6V	0.6	-	-	ns
			V_{CC}=1.65V to 1.95V	0.5	-	-	ns
			V_{CC}=2.3V to 2.7V	0.4	-	-	ns
			V_{CC}=3.0V to 3.6V	0.4	-	-	ns
		D to CP LOW; see Figure 5	V_{CC}=1.1V to 1.3V	1.2	-	-	ns
			V_{CC}=1.4V to 1.6V	0.7	-	-	ns
			V_{CC}=1.65V to 1.95V	0.7	-	-	ns
			V_{CC}=2.3V to 2.7V	0.7	-	-	ns
			V_{CC}=3.0V to 3.6V	0.8	-	-	ns
hold time	t_h	D to CP; see Figure 5	V_{CC}=1.1V to 1.3V	0.5	-	-	ns
			V_{CC}=1.4V to 1.6V	0.2	-	-	ns
			V_{CC}=1.65V to 1.95V	0.1	-	-	ns
			V_{CC}=2.3V to 2.7V	0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	0.1	-	-	ns
recovery time	t_{rec}	$\overline{RD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-0.9	-	-	ns
			V_{CC}=1.4V to 1.6V	-0.6	-	-	ns
			V_{CC}=1.65V to 1.95V	-0.4	-	-	ns
			V_{CC}=2.3V to 2.7V	-0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	-0.1	-	-	ns
		$\overline{SD}$; see Figure 6	V_{CC}=1.1V to 1.3V	-0.3	-	-	ns
			V_{CC}=1.4V to 1.6V	-0.1	-	-	ns
			V_{CC}=1.65V to 1.95V	0	-	-	ns
			V_{CC}=2.3V to 2.7V	0.1	-	-	ns
			V_{CC}=3.0V to 3.6V	0.1	-	-	ns
pulse width	t_W	CP HIGH or LOW; see Figure 5	V_{CC}=1.1V to 1.3V	2.7	-	-	ns
			V_{CC}=1.4V to 1.6V	1.5	-	-	ns
			V_{CC}=1.65V to 1.95V	1.6	-	-	ns
			V_{CC}=2.3V to 2.7V	1.7	-	-	ns
			V_{CC}=3.0V to 3.6V	1.9	-	-	ns
		$\overline{SD}$ or $\overline{RD}$ LOW; see Figure 6	V_{CC}=1.1V to 1.3V	11.5	-	-	ns
			V_{CC}=1.4V to 1.6V	6.4	-	-	ns
			V_{CC}=1.65V to 1.95V	5.0	-	-	ns
			V_{CC}=2.3V to 2.7V	3.5	-	-	ns
			V_{CC}=3.0V to 3.6V	2.8	-	-	ns

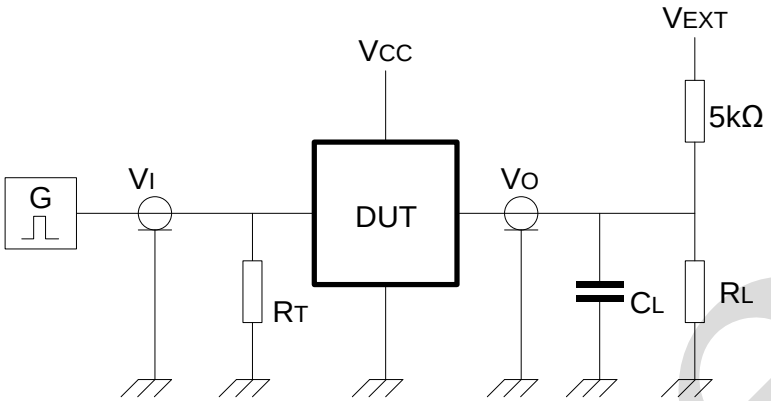
Note:

[1] All typical values are measured at nominal V_{CC}.

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

4、Testing Circuit

4.1、AC Testing Circuit



Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

R_T=Termination resistance.

V_{EXT}=External voltage for measuring switching times.

Figure 4. Test circuit for measuring switching times

4.2、Test Data

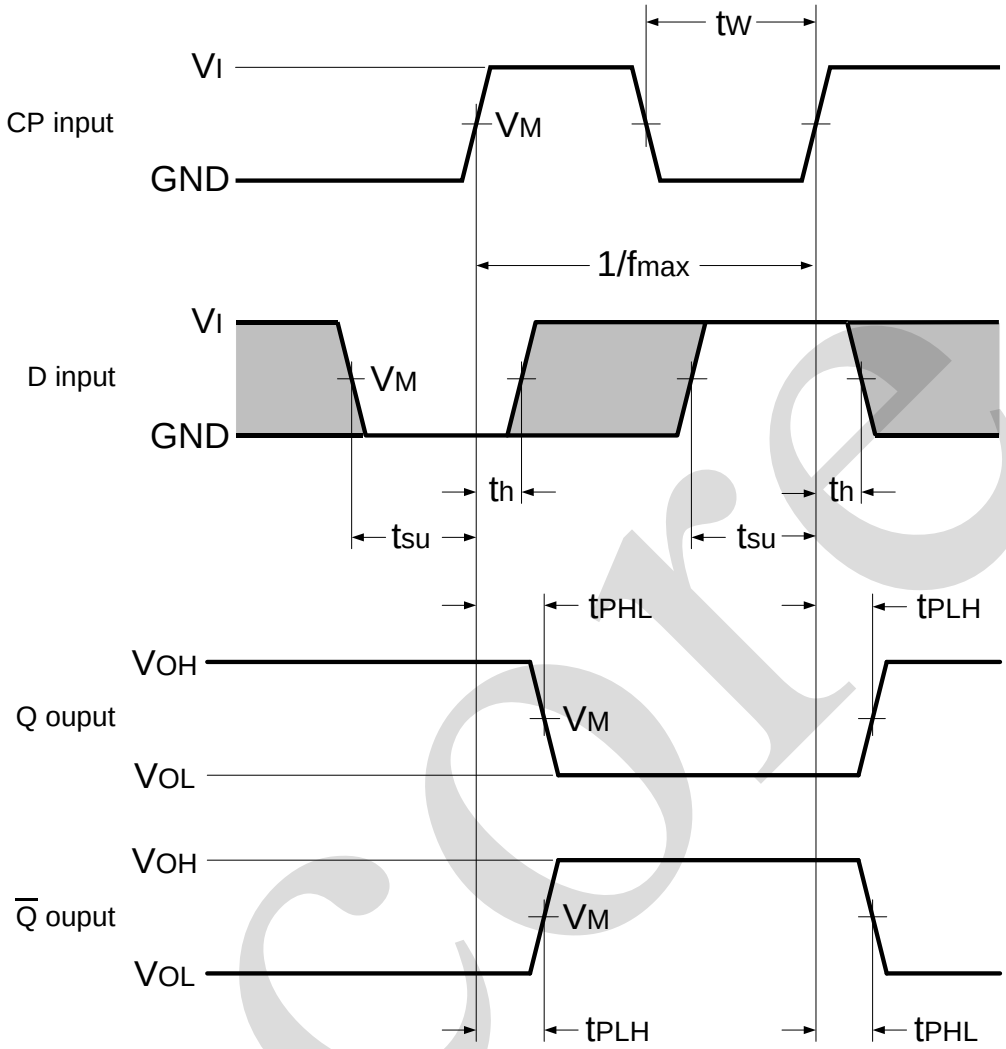
Supply voltage	**Load**		**V_{EXT}**		
V_{CC}	**C_L**	**R_L[1]**	**t_{PLH}, t_{PHL}**	**t_{PZH}, t_{PHZ}**	**t_{PZL}, t_{PLZ}**
0.8V to 3.6V	5pF, 10pF, 15pF and 30pF	5kΩ or 1MΩ	open	GND	2×V_{CC}

Note:

[1] For measuring enable and disable times R_L=5kΩ

For measuring propagation delays, setup and hold times and pulse width R_L=1MΩ.

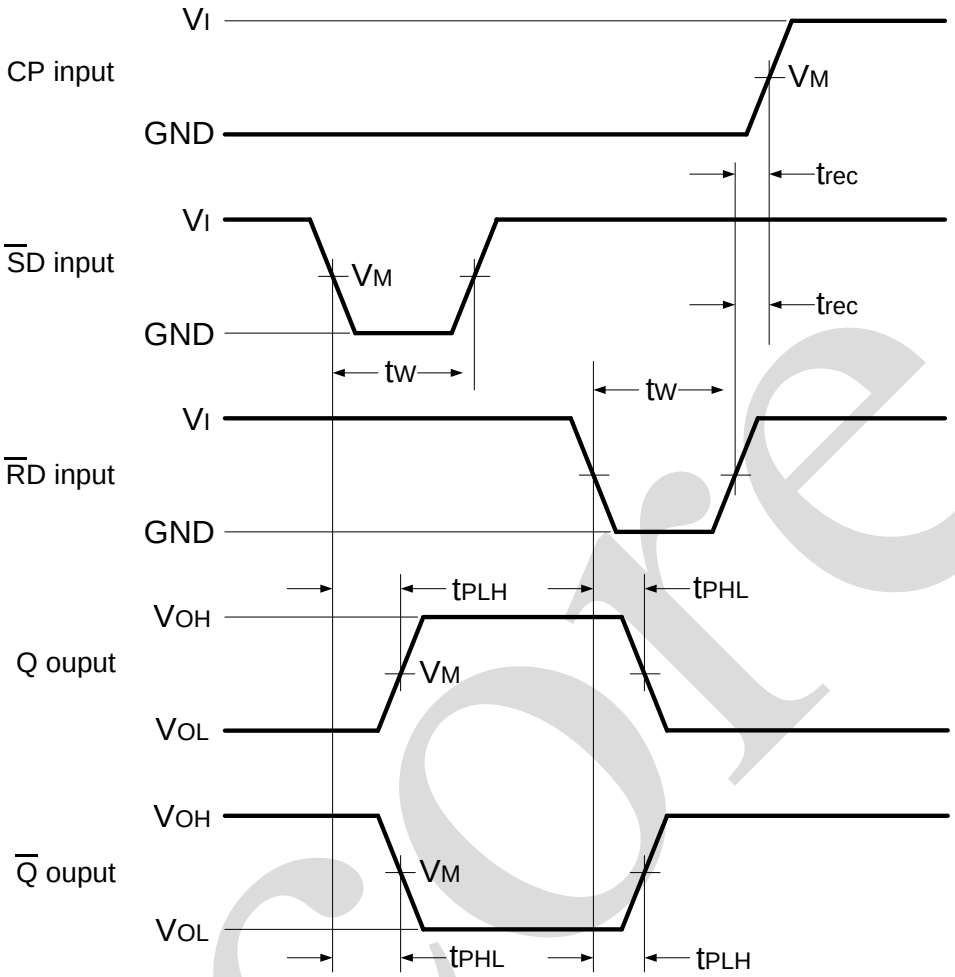
4.3、AC Testing Waveforms



The shaded areas indicate when the input is permitted to change for predictable output performance.

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

Figure 5. The clock input (CP) to output (Q, $\overline{Q}$) propagation delays, the data input (D) to clock input (CP) set-up and hold times and the clock input (CP) pulse width and maximum frequency



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

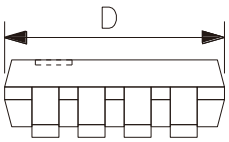
Figure 6. The set input ($\overline{SD}$) and reset input ($\overline{RD}$) to output (Q, $\overline{Q}$) propagation delays, the set input ($\overline{SD}$) and reset input ($\overline{RD}$) pulse widths and the reset input ($\overline{RD}$) to clock input (CP) recovery time

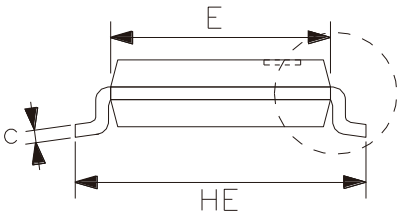
4.4、Measurement points

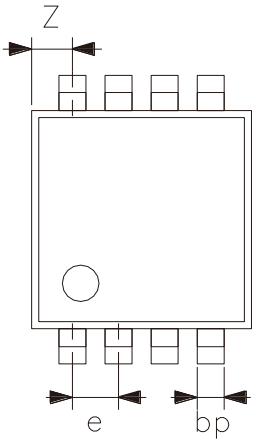
Supply voltage	**Output**	**Input**		
V_{CC}	**V_M**	**V_M**	**V_I**	**t_r=t_f**
0.8V to 3.6V	0.5×V_{CC}	0.5×V_{CC}	V_{CC}	≤3.0ns

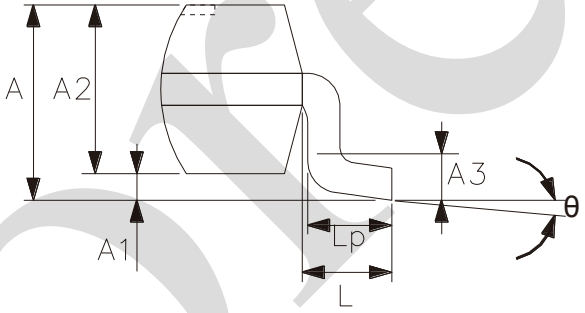
5、Package Information

5.1、TSSOP8



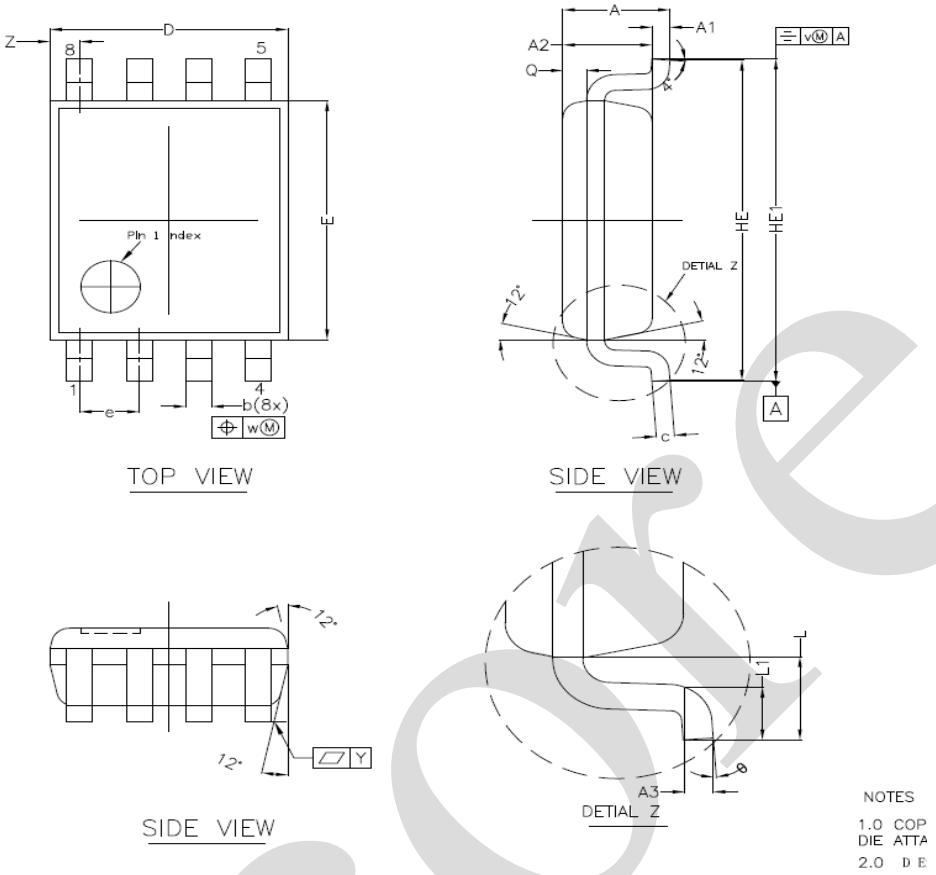






Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.10
A1	0	0.15
A2	0.75	0.95
A3	0.25	
bp	0.22	0.38
c	0.08	0.18
D	2.90	3.10
E	2.90	3.10
HE	3.90	4.10
L	0.50	
Lp	0.33	0.47
e	0.65	
Z	0.35	0.70
θ	0 °	8 °

5.2、VSSOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.00
A1	0.00	0.15
A2	0.60	0.85
A3	0.12	
Q	0.19	0.21
b	0.17	0.27
c	0.08	0.23
D	1.90	2.10
E	2.20	2.40
HE	3.00	3.20
HE1	3.00	3.40
e	0.50	
L	0.40	
L1	0.15	0.40
Y	0.10	
Z	0.10	0.40
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

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