



# AiP74HC/HCT563

## Octal D-type transparent latch; 3-state; inverting

### Product Specification

**Specification Revision History:**

Version	Date	Description
2012-06-A1	2012-06	New
2021-12-A2	2021-12	Modify ordering information
2022-01-A3	2022-01	Modify ambient temperature to $-40^{\circ}\text{C}\sim+105^{\circ}\text{C}$ and add electrical characteristics of $-40^{\circ}\text{C}\sim+105^{\circ}\text{C}$



## 1、 General Description

The AiP74HC/HCT563 is an 8-bit D-type transparent latch with 3-state inverting outputs. The device features latch enable (LE) and output enable ( $\overline{OE}$ ) inputs. When LE is HIGH, data at the inputs enter the latches. In this condition the latches are transparent, a latch output will change each time its corresponding D-input changes. When LE is LOW the latches store the information that was present at the inputs a set-up time preceding the HIGH-to-LOW transition of LE. A HIGH on  $\overline{OE}$  causes the outputs to assume a high-impedance OFF-state. Operation of the  $\overline{OE}$  input does not affect the state of the latches. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

### Features:

- Input levels:
  - For AiP74HC563: CMOS level
  - For AiP74HCT563: TTL level
- 3-state inverting outputs for bus-oriented applications
- Common 3-state output enable input
- Functionally identical to the AiP74HC/HCT373 and AiP74HC/HCT573
- Specified from -40°C to +105°C
- Packaging information: DIP20/SOP20/TSSOP20

**Ordering Information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74HC563DA20.TB	DIP20	74HC563	18 PCS/tube	40 tube/box	720 PCS/box	Dimensions of plastic enclosure: 26.3mm×6.4mm Pin spacing: 2.54mm
AiP74HCT563DA20.TB	DIP20	74HCT563	18 PCS/tube	40 tube/box	720 PCS/box	Dimensions of plastic enclosure: 26.3mm×6.4mm Pin spacing: 2.54mm
AiP74HC563SA20.TB	SOP20	74HC563	35 PCS/tube	80 tube/box	2800 PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74HCT563SA20.TB	SOP20	74HCT563	35 PCS/tube	80 tube/box	2800 PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74HC563TA20.TB	TSSOP20	74HC563	70 PCS/tube	200 tube/box	14000 PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing: 0.65mm
AiP74HCT563TA20.TB	TSSOP20	74HCT563	70 PCS/tube	200 tube/box	14000 PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing: 0.65mm

**Reel packing specifications:**

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74HC563SA20.TR	SOP20	74HC563	2000PCS/reel	4000PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing:1.27mm
AiP74HCT563SA20.TR	SOP20	74HCT563	2000PCS/reel	4000PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing:1.27mm
AiP74HC563TA20.TR	TSSOP20	74HC563	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing:0.65mm
AiP74HCT563TA20.TR	TSSOP20	74HCT563	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing:0.65mm

Note: 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

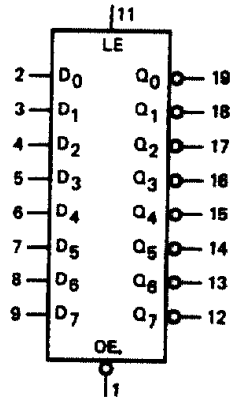


Figure 1. Logic symbol

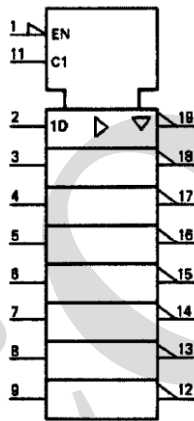


Figure 2. IEC logic symbol

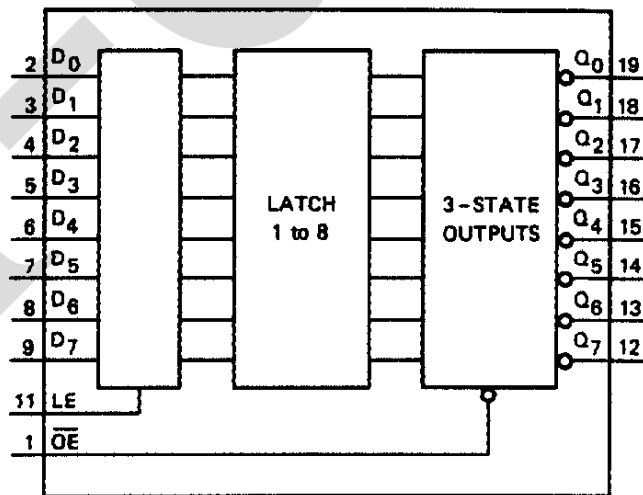


Figure 3. Functional diagram

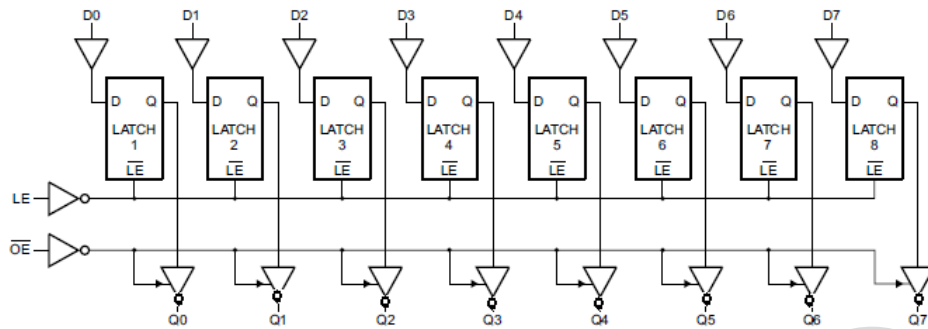
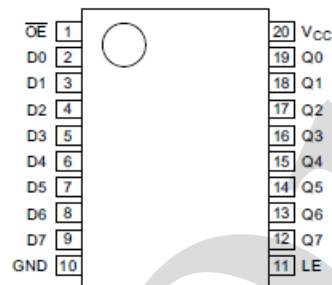


Figure 4. Logic diagram

## 2.2、Pin Configurations



## 2.3、Pin Description

Pin No.	Pin Name	Description
1	OE	3-state output enable input (active LOW)
2	D0	data input
3	D1	data input
4	D2	data input
5	D3	data input
6	D4	data input
7	D5	data input
8	D6	data input
9	D7	data input
10	GND	ground (0V)
11	LE	latch enable input (active HIGH)
12	Q7	3-state latch output
13	Q6	3-state latch output
14	Q5	3-state latch output
15	Q4	3-state latch output
16	Q3	3-state latch output
17	Q2	3-state latch output
18	Q1	3-state latch output
19	Q0	3-state latch output
20	V <sub>CC</sub>	supply voltage



## 2.4、Function Table

Operating mode	Control		Input	Internal latches	Output
	$\overline{\text{OE}}$	LE	Dn		Qn
Enable and read register (transparent mode)	L	H	L	L	H
			H	H	L
Latch and read register	L	L	l	L	H
			h	H	L
Latch register and disable outputs	H	L	l	L	Z
			h	H	Z

Note: H=HIGH voltage level; L=LOW voltage level; Z=high-impedance OFF-state;

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

l = LOW voltage level one set-up time prior to the HIGH-to-LOW LE transition.

## 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	+7.0	V
input clamping current	$I_{IK}$	$V_I < -0.5V$ or $V_I > V_{CC}+0.5V$	-	$\pm 20$	mA
output clamping current	$I_{OK}$	$V_O < -0.5V$ or $V_O > V_{CC}+0.5V$	-	$\pm 20$	mA
output current	$I_O$	$V_O = -0.5V$ to $(V_{CC}+0.5V)$	-	$\pm 35$	mA
supply current	$I_{CC}$	-	-	+70	mA
ground current	$I_{GND}$	-	-70	-	mA
storage temperature	$T_{stg}$	-	-65	+150	°C
total power dissipation	$P_{tot}$	-	-	500	mW
Soldering temperature	$T_L$	10s	DIP	245	°C
			SOP	250	

Note:

[1] For DIP20 packages: above 70°C the value of  $P_{tot}$  derates linearly with 12mW/K.

[2] For SOP20 packages: above 70°C the value of  $P_{tot}$  derates linearly with 8mW/K.

[3] For (T)SSOP20 packages: above 60°C the value of  $P_{tot}$  derates linearly with 5.5mW/K.



### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>AiP74HC563</b>						
supply voltage	$V_{CC}$	-	2.0	5.0	6.0	V
input voltage	$V_I$	-	0	-	$V_{CC}$	V
output voltage	$V_O$	-	0	-	$V_{CC}$	V
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=2.0V$	-	-	625	ns/V
		$V_{CC}=4.5V$	-	1.67	139	ns/V
		$V_{CC}=6.0V$	-	-	83	ns/V
ambient temperature	$T_{amb}$	-	-40	-	+105	°C
<b>AiP74HCT563</b>						
supply voltage	$V_{CC}$	-	4.5	5.0	5.5	V
input voltage	$V_I$	-	0	-	$V_{CC}$	V
output voltage	$V_O$	-	0	-	$V_{CC}$	V
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=4.5V$	-	1.67	139	ns/V
ambient temperature	$T_{amb}$	-	-40	-	+105	°C

### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

( $T_{amb}=25^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5	1.2	-	V	
		$V_{CC}=4.5V$	3.15	2.4	-	V	
		$V_{CC}=6.0V$	4.2	3.2	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0V$	-	0.8	0.5	V	
		$V_{CC}=4.5V$	-	2.1	1.35	V	
		$V_{CC}=6.0V$	-	2.8	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O=-20\mu A; V_{CC}=2.0V$	1.9	2.0	-	V
			$I_O=-20\mu A; V_{CC}=4.5V$	4.4	4.5	-	V
			$I_O=-20\mu A; V_{CC}=6.0V$	5.9	6.0	-	V
			$I_O=-6.0mA; V_{CC}=4.5V$	3.98	4.32	-	V
			$I_O=-7.8mA; V_{CC}=6.0V$	5.48	5.81	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O=20\mu A; V_{CC}=2.0V$	-	0	0.1	V
			$I_O=20\mu A; V_{CC}=4.5V$	-	0	0.1	V
			$I_O=20\mu A; V_{CC}=6.0V$	-	0	0.1	V
			$I_O=6.0mA; V_{CC}=4.5V$	-	0.15	0.26	V
			$I_O=7.8mA; V_{CC}=6.0V$	-	0.16	0.26	V
input leakage current	$I_I$	$V_I=V_{CC} \text{ or } GND;$ $V_{CC}=6.0V$	-	-	$\pm 0.1$	$\mu A$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH} \text{ or } V_{IL}; V_{CC}=6.0V;$ $V_O=V_{CC} \text{ or } GND$	-	-	$\pm 0.5$	$\mu A$	
supply current	$I_{CC}$	$V_I=V_{CC} \text{ or } GND; I_O=0A; V_{CC}=6.0V$	-	-	8.0	$\mu A$	





input capacitance	$C_I$	-	-	3.5	-	pF	
<b>AiP74HCT563</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=4.5V$ to $5.5V$	2.0	1.6	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=4.5V$ to $5.5V$	-	1.2	0.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=-20\mu A$	4.4	4.5	-	V
			$I_O=-6.0mA$	3.98	4.32	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=20\mu A$	-	0	0.1	V
			$I_O=6.0mA$	-	0.16	0.26	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5V$	-	-	$\pm 0.1$	$\mu A$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=5.5V$ ; $V_O=V_{CC}$ or GND	-	-	$\pm 0.5$	$\mu A$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$	-	-	8.0	$\mu A$	
additional supply current	$\Delta I_{CC}$	per input pin; $V_I=V_{CC}-2.1V$ ; other inputs at $V_{CC}$ or GND; $V_{CC}=4.5V$ to $5.5V$ ; $I_O=0A$	per input pin; Dn inputs	-	35	126	$\mu A$
			per input pin; LE input	-	65	234	$\mu A$
			per input pin; OE input	-	125	450	$\mu A$
input capacitance	$C_I$	-	-	3.5	-	pF	

### 3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5	-	-	V	
		$V_{CC}=4.5V$	3.15	-	-	V	
		$V_{CC}=6.0V$	4.2	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0V$	-	-	0.5	V	
		$V_{CC}=4.5V$	-	-	1.35	V	
		$V_{CC}=6.0V$	-	-	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=-20\mu A$ ; $V_{CC}=2.0V$	1.9	-	-	V
			$I_O=-20\mu A$ ; $V_{CC}=4.5V$	4.4	-	-	V
			$I_O=-20\mu A$ ; $V_{CC}=6.0V$	5.9	-	-	V
			$I_O=-6.0mA$ ; $V_{CC}=4.5V$	3.84	-	-	V
			$I_O=-7.8mA$ ; $V_{CC}=6.0V$	5.34	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=20\mu A$ ; $V_{CC}=2.0V$	-	-	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=4.5V$	-	-	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=6.0V$	-	-	0.1	V
			$I_O=6.0mA$ ; $V_{CC}=4.5V$	-	-	0.33	V
			$I_O=7.8mA$ ; $V_{CC}=6.0V$	-	-	0.33	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0V$	-	-	$\pm 1.0$	$\mu A$	
OFF-state	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=6.0V$ ;	-	-	$\pm 5.0$	$\mu A$	



output current		$V_O=V_{CC}$ or GND						
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=6.0V$			-	-	80	$\mu A$
<b>AiP74HCT563</b>								
HIGH-level input voltage	$V_{IH}$	$V_{CC}=4.5V$ to $5.5V$			2.0	-	-	V
LOW-level input voltage	$V_{IL}$	$V_{CC}=4.5V$ to $5.5V$			-	-	0.8	V
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=-20\mu A$	4.4	-	-	V	
			$I_O=-6.0mA$	3.84	-	-	V	
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=20\mu A$	-	-	0.1	V	
			$I_O=6.0mA$	-	-	0.33	V	
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5V$			-	-	$\pm 1.0$	$\mu A$
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=5.5V$ ; $V_O=V_{CC}$ or GND			-	-	$\pm 5.0$	$\mu A$
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$			-	-	80	$\mu A$
additional supply current	$\Delta I_{CC}$	per input pin; $V_I=V_{CC}-2.1V$ ; other inputs at $V_{CC}$ or GND; $V_{CC}=4.5V$ to $5.5V$ ; $I_O=0A$	per input pin; Dn inputs	-	-	158	$\mu A$	
			per input pin; LE input	-	-	293	$\mu A$	
			per input pin; OE input	-	-	563	$\mu A$	

### 3.3.3、DC Characteristics 3

( $T_{amb}=-40^{\circ}C$  to  $+105^{\circ}C$ , voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0V$	1.5	-	-	V	
		$V_{CC}=4.5V$	3.15	-	-	V	
		$V_{CC}=6.0V$	4.2	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0V$	-	-	0.5	V	
		$V_{CC}=4.5V$	-	-	1.35	V	
		$V_{CC}=6.0V$	-	-	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=-20\mu A$ ; $V_{CC}=2.0V$	1.9	-	-	V
			$I_O=-20\mu A$ ; $V_{CC}=4.5V$	4.4	-	-	V
			$I_O=-20\mu A$ ; $V_{CC}=6.0V$	5.9	-	-	V
			$I_O=-6.0mA$ ; $V_{CC}=4.5V$	3.7	-	-	V
			$I_O=-7.8mA$ ; $V_{CC}=6.0V$	5.2	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=20\mu A$ ; $V_{CC}=2.0V$	-	-	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=4.5V$	-	-	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=6.0V$	-	-	0.1	V
			$I_O=6.0mA$ ; $V_{CC}=4.5V$	-	-	0.4	V
			$I_O=7.8mA$ ; $V_{CC}=6.0V$	-	-	0.4	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0V$	-	-	$\pm 1.0$	$\mu A$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=6.0V$ ; $V_O=V_{CC}$ or GND	-	-	$\pm 10$	$\mu A$	



supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=6.0V$		-	-	160	uA
<b>AiP74HC563</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=4.5V$ to 5.5V		2.0	-	-	V
LOW-level input voltage	$V_{IL}$	$V_{CC}=4.5V$ to 5.5V		-	-	0.8	V
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=-20uA$	4.4	-	-	V
			$I_O=-6.0mA$	3.7	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=20uA$	-	-	0.1	V
			$I_O=6.0mA$	-	-	0.4	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5V$		-	-	$\pm 1.0$	uA
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_{CC}=5.5V$ ; $V_O=V_{CC}$ or GND		-	-	$\pm 10$	uA
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$		-	-	160	uA
additional supply current	$\Delta I_{CC}$	per input pin; $V_I=V_{CC}-2.1V$ ; other inputs at $V_{CC}$ or GND; $V_{CC}=4.5V$ to 5.5V; $I_O=0A$	per input pin; Dn inputs	-	-	172	uA
			per input pin; LE input	-	-	319	uA
			per input pin; OE input	-	-	613	uA

### 3.3.4、AC Characteristics 1

( $T_{amb}=25^{\circ}C$ , GND =0V;  $t_r=t_f=6ns$ ;  $C_L=50pF$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
propagation delay	$t_{pd}$	Dn to Qn; see Figure 6	$V_{CC}=2.0V$	-	47	145	ns
			$V_{CC}=4.5V$	-	17	29	ns
			$V_{CC}=5.0V$ ; $C_L=15pF$	-	14	-	ns
		LE to Qn; see Figure 7	$V_{CC}=6.0V$	-	14	25	ns
			$V_{CC}=2.0V$	-	47	145	ns
			$V_{CC}=4.5V$	-	17	29	ns
OE to Qn enable time	$t_{en}$	see Figure 8	$V_{CC}=5.0V$ ; $C_L=15pF$	-	14	-	ns
			$V_{CC}=6.0V$	-	14	25	ns
			$V_{CC}=2.0V$	-	47	150	ns
OE to Qn disable time	$t_{dis}$	see Figure 8	$V_{CC}=4.5V$	-	17	30	ns
			$V_{CC}=6.0V$	-	14	26	ns
			$V_{CC}=2.0V$	-	50	150	ns
transition time	$t_t$	Qn; see Figure 6	$V_{CC}=4.5V$	-	18	30	ns
			$V_{CC}=6.0V$	-	14	26	ns
			$V_{CC}=2.0V$	-	14	60	ns
pulse width	$t_w$	LE HIGH; see Figure 7	$V_{CC}=6.0V$	80	14	-	ns
			$V_{CC}=4.5V$	16	5	-	ns
			$V_{CC}=2.0V$	14	4	-	ns
set-up time	$t_{su}$	Dn to LE;	$V_{CC}=2.0V$	50	11	-	ns



		see Figure 9	V <sub>CC</sub> =4.5V	10	4	-	ns
			V <sub>CC</sub> =6.0V	9	3	-	ns
hold time	t <sub>h</sub>	Dn to LE; see Figure 9	V <sub>CC</sub> =2.0V	4	-6	-	ns
			V <sub>CC</sub> =4.5V	4	-2	-	ns
			V <sub>CC</sub> =6.0V	4	-2	-	ns
power dissipation capacitance	C <sub>PD</sub>	-	-	19	-	-	pF
<b>AiP74HCT563</b>							
propagation delay	t <sub>pd</sub>	Dn to Qn; see Figure 6	V <sub>CC</sub> =4.5V	-	18	30	ns
			V <sub>CC</sub> =5.0V; C <sub>L</sub> =15pF	-	16	-	ns
		LE to Qn; see Figure 7	V <sub>CC</sub> =4.5V	-	19	35	ns
			V <sub>CC</sub> =5.0V; C <sub>L</sub> =15pF	-	16	-	ns
OE to Qn enable time	t <sub>en</sub>	V <sub>CC</sub> =4.5V; see Figure 8		-	20	35	ns
OE to Qn disable time	t <sub>dis</sub>	V <sub>CC</sub> =4.5V; see Figure 8		-	22	35	ns
transition time	t <sub>t</sub>	Qn; V <sub>CC</sub> =4.5V; see Figure 6		-	5	12	ns
pulse width	t <sub>w</sub>	LE HIGH; V <sub>CC</sub> =4.5V; see Figure 7		16	5	-	ns
Dn to LE set-up time	t <sub>su</sub>	V <sub>CC</sub> =4.5V; see Figure 9		10	3	-	ns
Dn to LE hold time	t <sub>h</sub>	V <sub>CC</sub> =4.5V; see Figure 9		5	-1	-	ns
power dissipation capacitance	C <sub>PD</sub>	-		-	19	-	pF

Note:

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[2] t<sub>en</sub> is the same as t<sub>PZL</sub> and t<sub>PZH</sub>.

[3] t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.

[4] t<sub>t</sub> is the same as t<sub>THL</sub> and t<sub>TLH</sub>.

[5] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in uW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum(C_L \times V_{CC}^2 \times f_o)$  where:

f<sub>i</sub>=input frequency in MHz;

f<sub>o</sub>=output frequency in MHz;

C<sub>L</sub>=output load capacitance in pF;

V<sub>CC</sub>=supply voltage in V;

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



### 3.3.5、AC Characteristics 2

( $T_{amb} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $GND = 0\text{V}$ ;  $t_r = t_f = 6\text{ns}$ ;  $C_L = 50\text{pF}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
propagation delay	$t_{pd}$	Dn to Qn; see Figure 6	$V_{CC} = 2.0\text{V}$	-	-	180	ns
			$V_{CC} = 4.5\text{V}$	-	-	36	ns
			$V_{CC} = 6.0\text{V}$	-	-	31	ns
		LE to Qn; see Figure 7	$V_{CC} = 2.0\text{V}$	-	-	180	ns
			$V_{CC} = 4.5\text{V}$	-	-	36	ns
			$V_{CC} = 6.0\text{V}$	-	-	31	ns
$\overline{\text{OE}}$ to Qn enable time	$t_{en}$	see Figure 8	$V_{CC} = 2.0\text{V}$	-	-	190	ns
			$V_{CC} = 4.5\text{V}$	-	-	38	ns
			$V_{CC} = 6.0\text{V}$	-	-	33	ns
$\overline{\text{OE}}$ to Qn disable time	$t_{dis}$	see Figure 8	$V_{CC} = 2.0\text{V}$	-	-	190	ns
			$V_{CC} = 4.5\text{V}$	-	-	38	ns
			$V_{CC} = 6.0\text{V}$	-	-	33	ns
transition time	$t_t$	Qn; see Figure 6	$V_{CC} = 2.0\text{V}$	-	-	75	ns
			$V_{CC} = 4.5\text{V}$	-	-	15	ns
			$V_{CC} = 6.0\text{V}$	-	-	13	ns
pulse width	$t_w$	LE HIGH; see Figure 7	$V_{CC} = 2.0\text{V}$	100	-	-	ns
			$V_{CC} = 4.5\text{V}$	20	-	-	ns
			$V_{CC} = 6.0\text{V}$	17	-	-	ns
set-up time	$t_{su}$	Dn to LE; see Figure 9	$V_{CC} = 2.0\text{V}$	65	-	-	ns
			$V_{CC} = 4.5\text{V}$	13	-	-	ns
			$V_{CC} = 6.0\text{V}$	11	-	-	ns
hold time	$t_h$	Dn to LE; see Figure 9	$V_{CC} = 2.0\text{V}$	4	-	-	ns
			$V_{CC} = 4.5\text{V}$	4	-	-	ns
			$V_{CC} = 6.0\text{V}$	4	-	-	ns
<b>AiP74HCT563</b>							
propagation delay	$t_{pd}$	Dn to Qn; see Figure 6	$V_{CC} = 4.5\text{V}$	-	-	38	ns
		LE to Qn; see Figure 7	$V_{CC} = 4.5\text{V}$	-	-	44	ns
$\overline{\text{OE}}$ to Qn enable time	$t_{en}$	$V_{CC} = 4.5\text{V}$ ; see Figure 8		-	-	44	ns
$\overline{\text{OE}}$ to Qn disable time	$t_{dis}$	$V_{CC} = 4.5\text{V}$ ; see Figure 8		-	-	44	ns
transition time	$t_t$	Qn; $V_{CC} = 4.5\text{V}$ ; see Figure 6		-	-	15	ns
pulse width	$t_w$	LE HIGH; $V_{CC} = 4.5\text{V}$ ; see Figure 7		20	-	-	ns
Dn to LE set-up time	$t_{su}$	$V_{CC} = 4.5\text{V}$ ; see Figure 9		13	-	-	ns
Dn to LE hold time	$t_h$	$V_{CC} = 4.5\text{V}$ ; see Figure 9		5	-	-	ns

Note:

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .
- [2]  $t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ .
- [3]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .
- [4]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .



### 3.3.6、 AC Characteristics 3

( $T_{amb} = -40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ ,  $GND = 0\text{V}$ ;  $t_r = t_f = 6\text{ns}$ ;  $C_L = 50\text{pF}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>AiP74HC563</b>							
propagation delay	$t_{pd}$	Dn to Qn; see Figure 6	$V_{CC} = 2.0\text{V}$	-	-	180	ns
			$V_{CC} = 4.5\text{V}$	-	-	36	ns
			$V_{CC} = 6.0\text{V}$	-	-	31	ns
		LE to Qn; see Figure 7	$V_{CC} = 2.0\text{V}$	-	-	180	ns
			$V_{CC} = 4.5\text{V}$	-	-	36	ns
			$V_{CC} = 6.0\text{V}$	-	-	31	ns
$\overline{\text{OE}}$ to Qn enable time	$t_{en}$	see Figure 8	$V_{CC} = 2.0\text{V}$	-	-	190	ns
			$V_{CC} = 4.5\text{V}$	-	-	38	ns
			$V_{CC} = 6.0\text{V}$	-	-	33	ns
$\overline{\text{OE}}$ to Qn disable time	$t_{dis}$	see Figure 8	$V_{CC} = 2.0\text{V}$	-	-	190	ns
			$V_{CC} = 4.5\text{V}$	-	-	38	ns
			$V_{CC} = 6.0\text{V}$	-	-	33	ns
transition time	$t_t$	Qn; see Figure 6	$V_{CC} = 2.0\text{V}$	-	-	75	ns
			$V_{CC} = 4.5\text{V}$	-	-	15	ns
			$V_{CC} = 6.0\text{V}$	-	-	13	ns
pulse width	$t_w$	LE HIGH; see Figure 7	$V_{CC} = 2.0\text{V}$	100	-	-	ns
			$V_{CC} = 4.5\text{V}$	20	-	-	ns
			$V_{CC} = 6.0\text{V}$	17	-	-	ns
set-up time	$t_{su}$	Dn to LE; see Figure 9	$V_{CC} = 2.0\text{V}$	65	-	-	ns
			$V_{CC} = 4.5\text{V}$	13	-	-	ns
			$V_{CC} = 6.0\text{V}$	11	-	-	ns
hold time	$t_h$	Dn to LE; see Figure 9	$V_{CC} = 2.0\text{V}$	4	-	-	ns
			$V_{CC} = 4.5\text{V}$	4	-	-	ns
			$V_{CC} = 6.0\text{V}$	4	-	-	ns
<b>AiP74HCT563</b>							
propagation delay	$t_{pd}$	Dn to Qn; see Figure 6	$V_{CC} = 4.5\text{V}$	-	-	38	ns
		LE to Qn; see Figure 7	$V_{CC} = 4.5\text{V}$	-	-	44	ns
$\overline{\text{OE}}$ to Qn enable time	$t_{en}$	$V_{CC} = 4.5\text{V}$ ; see Figure 8		-	-	44	ns
$\overline{\text{OE}}$ to Qn disable time	$t_{dis}$	$V_{CC} = 4.5\text{V}$ ; see Figure 8		-	-	44	ns
transition time	$t_t$	Qn; $V_{CC} = 4.5\text{V}$ ; see Figure 6		-	-	15	ns
pulse width	$t_w$	LE HIGH; $V_{CC} = 4.5\text{V}$ ; see Figure 7		20	-	-	ns
Dn to LE set-up time	$t_{su}$	$V_{CC} = 4.5\text{V}$ ; see Figure 9		13	-	-	ns
Dn to LE hold time	$t_h$	$V_{CC} = 4.5\text{V}$ ; see Figure 9		5	-	-	ns

Note:

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .
- [2]  $t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ .
- [3]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .
- [4]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .



### 4、 Testing Circuit

#### 4.1、 AC Testing Circuit

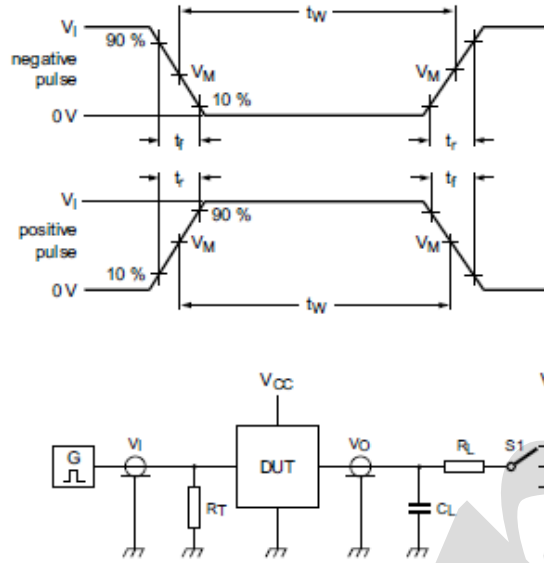


Figure 5. Test circuit for measuring switching times

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.

S1=Test selection switch.

#### 4.2、 AC Testing Waveforms

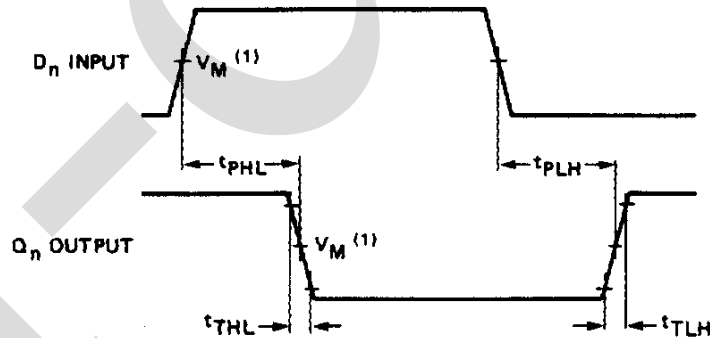


Figure 6. Propagation delay data input (Dn) to output (Qn) and output transition time

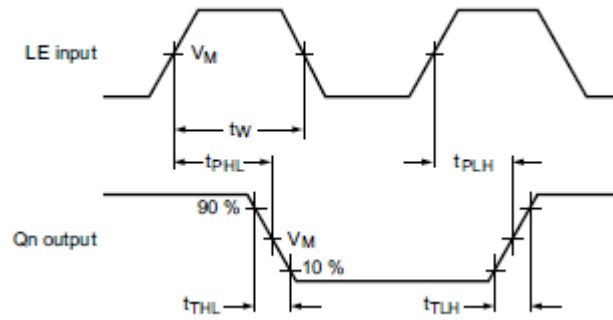


Figure 7. Pulse width latch enable input (LE), propagation delay latch enable input (LE) to output (Qn) and output transition time

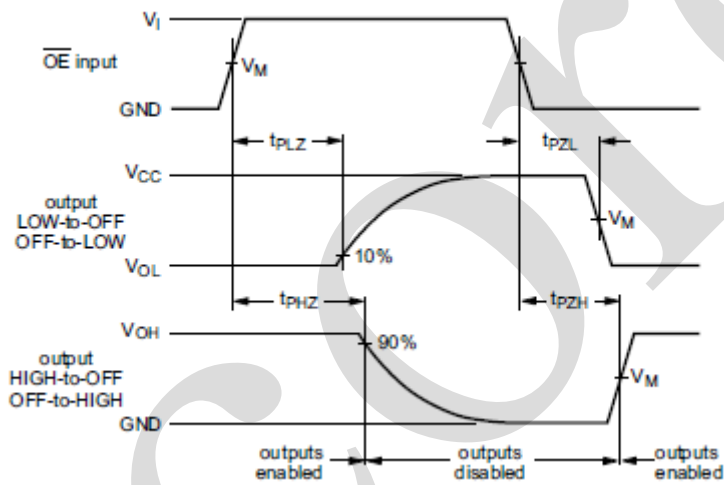


Figure 8. Enable and disable times

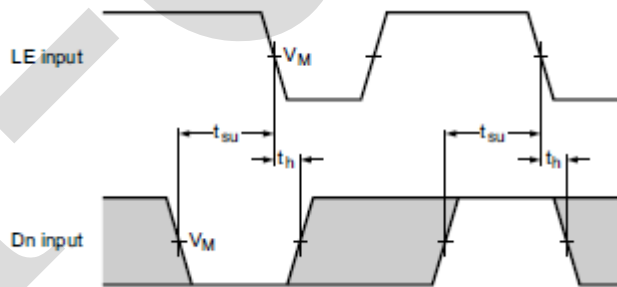


Figure 9. Set-up and hold times for data input (Dn) to latch input (LE)





## 4.3、 Measurement Points

Type	Input	Output
	$V_M$	$V_M$
AiP74HC563	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
AiP74HCT563	1.3V	1.3V

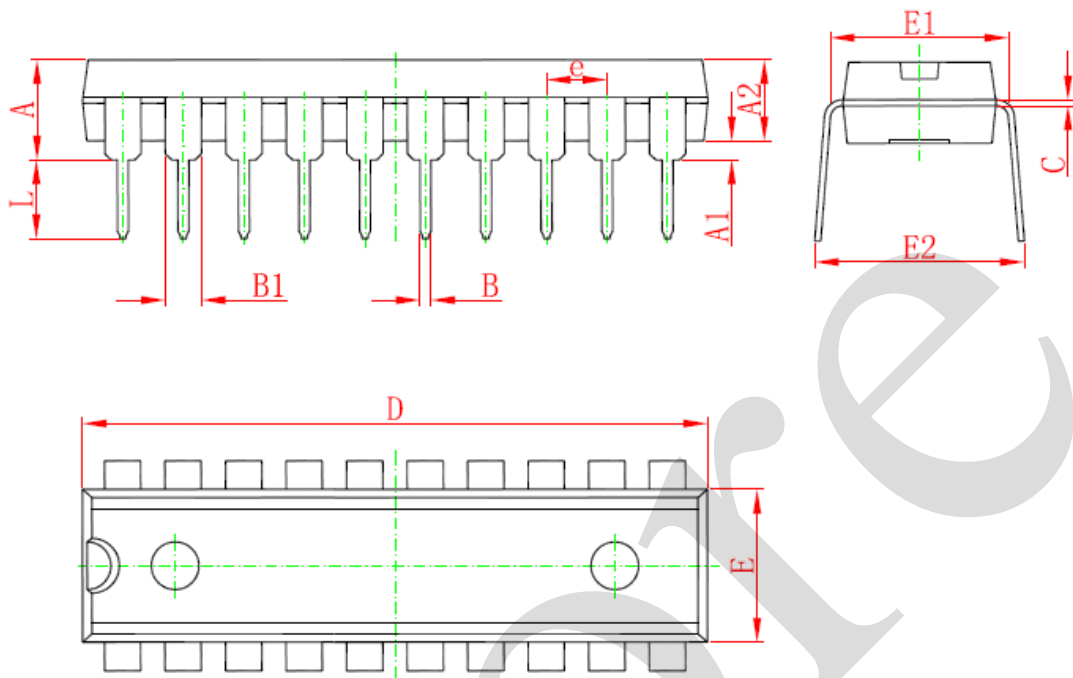
## 4.4、 Test Data

Type	Input		Load		S1 position		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHL},$ $t_{PLH}$	$t_{PZH},$ $t_{PHZ}$	$t_{PZL},$ $t_{PLZ}$
AiP74HC563	$V_{CC}$	6ns	15pF, 50pF	1k $\Omega$	open	GND	$V_{CC}$
AiP74HCT563	3V	6ns	15pF, 50pF	1k $\Omega$	open	GND	$V_{CC}$



## 5、Package Information

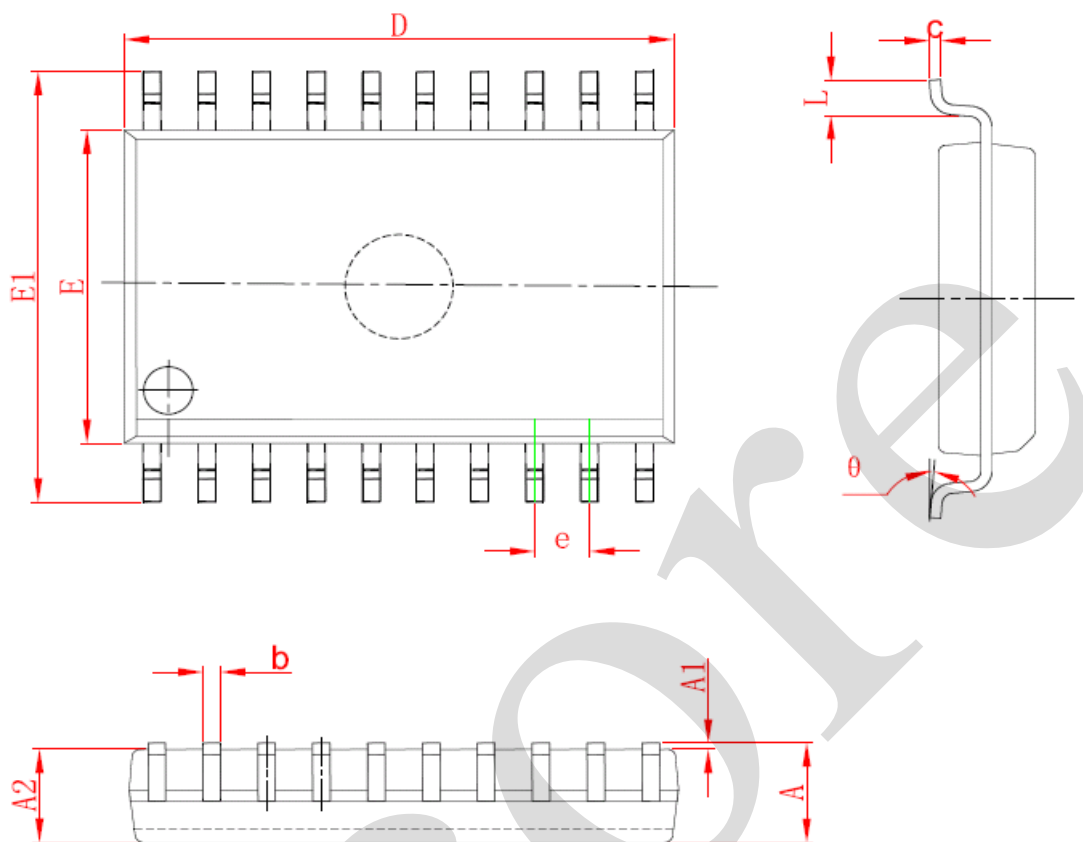
### 5.1、DIP20



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	25.950	26.550	1.022	1.045
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354



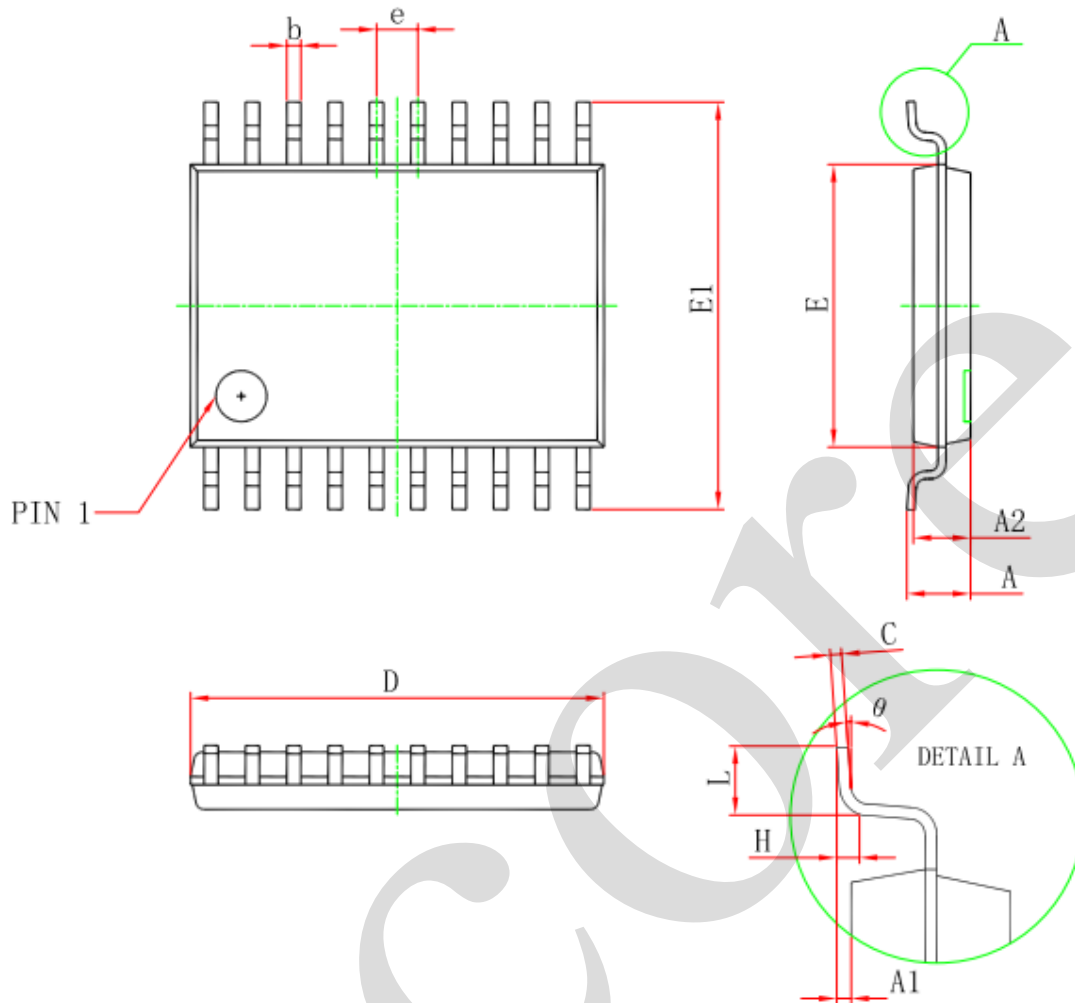
## 5.2、SOP20



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.350	2.650	0.093	0.104
A1	0.100	0.300	0.004	0.012
A2	2.100	2.500	0.083	0.098
b	0.330	0.510	0.013	0.020
c	0.204	0.330	0.008	0.013
D	12.520	13.000	0.493	0.512
E	7.400	7.600	0.291	0.299
E1	10.210	10.610	0.402	0.418
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



## 5.3. TSSOP20



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	6.400	6.600	0.252	0.259
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
e	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65 (BSC)		0.026 (BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
$\theta$	1°	7°	1°	7°



## 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、 Notion

Recommended carefully reading this information before the use of this product;

The information in this document are subject to change without notice;

This information is using to the reference only, the company is not responsible for any loss;

The company is not responsible for the any infringement of the third party patents or other rights of the responsibility.