AiP74AHC377/AHCT377
Octal D Type Flip-Flop with Data Enable; Positive-Edge Trigger

Product Specification

Specification Revision History：

Version	Date	Description
2025-09-A0	2025-09	New
2025-12-A1	2025-12	Modify the parameters

Contents

1、General Description

The AiP74AHC/AHCT377 is an octal D-type flip-flop with data enable; positive-edge trigger.

Features:

- Supply voltage range:
  AiP74AHC377: 2.0V to 5.5V
  AiP74AHCT377: 4.5V to 5.5V
- Input levels:
  AiP74AHC377: CMOS level
  AiP74AHCT377: TTL level
- Temperature range:-40℃ to +125℃
- Packaging information: DIP20/SOP20/TSSOP20

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74AHC377DA20.TB	DIP20	74AHC377	18 PCS/tube	40 tube/box	720 PCS/box	Dimensions of plastic enclosure: 26.3mm×6.4mm Pin spacing: 2.54mm
AiP74AHCT377DA20.TB	DIP20	74AHCT377	18 PCS/tube	40 tube/box	720 PCS/box	Dimensions of plastic enclosure: 26.3mm×6.4mm Pin spacing: 2.54mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AHC377SA20.TR	SOP20	74AHC377	2000PCS/reel	2000PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74AHCT377SA20.TR	SOP20	74AHCT377	2000PCS/reel	2000PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74AHC377TA20.TR	TSSOP20	74AHC377	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing: 0.65mm
AiP74AHCT377TA20.TR	TSSOP20	74AHCT377	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

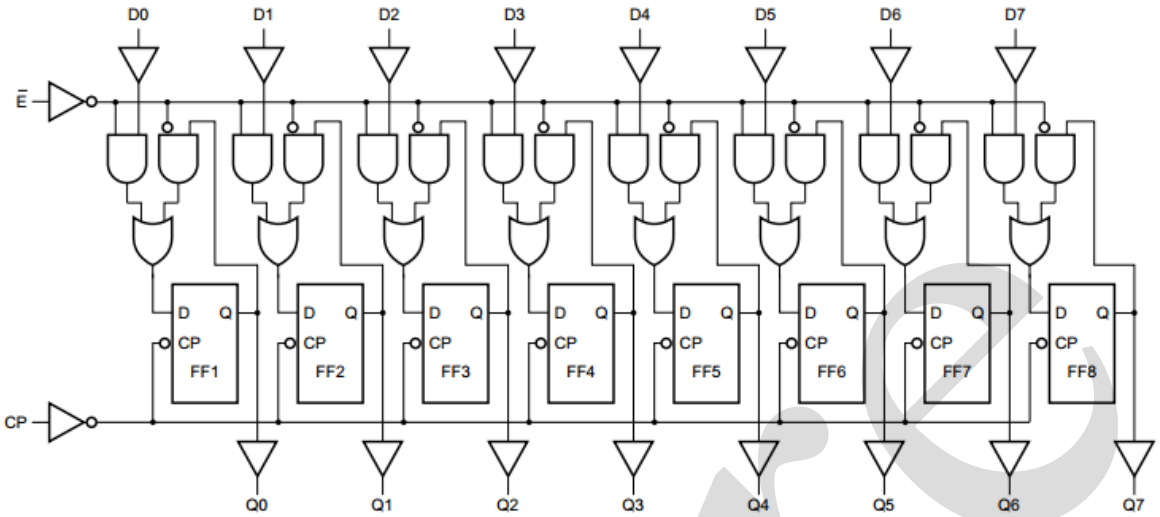
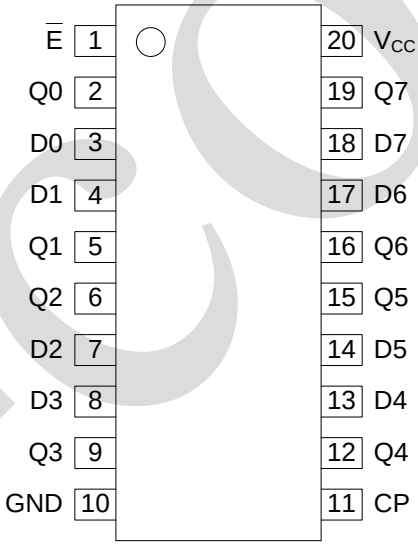


Figure 1. Logic symbol

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	$\overline{E}$	data enable input (active LOW)
2	Q0	data output
3	D0	data input
4	D1	data input
5	Q1	data output
6	Q2	data output
7	D2	data input
8	D3	data input
9	Q3	data output
10	GND	ground (0V)
11	CP	clock input (LOW-to-HIGH, edge triggered)
12	Q4	data output
13	D4	data input
14	D5	data input
15	Q5	data output
16	Q6	data output
17	D6	data input
18	D7	data input
19	Q7	data output
20	V_{CC}	supply voltage

2.4、Function Table

Operating mode	Control		Input	Output
	$\overline{E}$	CP	Dn	Q0 to Q7
Load 0	l	↑	h	H
Load 1			l	L
Hold(do nothing)	h	↑	X	No change
	H	X	X	No change

Note:

H = HIGH voltage level;

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

L = LOW voltage level;

l = LOW voltage level one set-up time prior to the 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	+7	V
supply current	I_{CC}	-		-	50	mA
ground current	I_{GND}	-		-50	-	mA
input clamping current	I_{IK}	V_I < -0.5V		-	±20	mA
output clamping current	I_{OK}	V_O < -0.5V or V_O > V_{CC}+0.5V		-	±20	mA
output current	I_O	-0.5V < V_O < V_{CC}+0.5V		-	±25	mA
storage temperature	T_{stg}	-		-65	+150	℃
soldering temperature	T_L	10s	DIP	245		℃
			SOPTSSOP	260		

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AiP74AHCT377						
supply voltage	V_{CC}	-	2.0	5.0	5.5	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-40	+25	+125	℃
AiP74AHCT377						
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
ambient temperature	T_{amb}	-	-40	+25	+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	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC377							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	2.0	-	V
		3.0V	I_O=-50uA	2.9	3.5	-	V
		4.5V	I_O=-50uA	4.4	4.5	-	V
		3.0V	I_O=-4.0mA	2.48	-	-	V
		4.5V	I_O=-8.0mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=50uA	-	0	0.1	V
		4.5V	I_O=50uA	-	0	0.1	V
		3.0V	I_O=4.0mA	-	-	0.44	V
		4.5V	I_O=8.0mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	1	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	40	uA
AiP74AHCT377							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	-	-	V
			I_O=-8.0mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	-	0.1	V
			I_O=8.0mA	-	-	0.44	V
input leakage current	I_I	0V to 5.5V	V_I=V_{CC} or GND	-	-	1	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	40	uA
additional supply current	ΔI_{CC}	4.5V to 5.5V	per input pin; V_I=V_{CC} -2.1V; Other inputs at V_{CC} or GND; I_O=0A	-	-	1.5	mA

3.3.2、DC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
AiP74AHC377							
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	-	-	V
		3.0V	-	2.1	-	-	V
		5.5V	-	3.85	-	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	-	0.5	V
		3.0V	-	-	-	0.9	V
		5.5V	-	-	-	1.65	V
HIGH-level output voltage	V_{OH}	2.0V	I_O=-50uA	1.9	-	-	V
		3.0V	I_O=-50uA	2.9	-	-	V
		4.5V	I_O=-50uA	4.4	-	-	V
		3.0V	I_O=-4.0mA	2.4	-	-	V
		4.5V	I_O=-8.0mA	3.7	-	-	V
LOW-level output voltage	V_{OL}	2.0V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=50uA	-	-	0.1	V
		4.5V	I_O=50uA	-	-	0.1	V
		3.0V	I_O=4.0mA	-	-	0.55	V
		4.5V	I_O=8.0mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	2	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	80	uA
AiP74AHCT377							
HIGH-level input voltage	V_{IH}	4.5V to 5.5V	-	2.0	-	-	V
LOW-level input voltage	V_{IL}	4.5V to 5.5V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	4.5V	I_O=-50uA	4.4	-	-	V
			I_O=-8.0mA	3.7	-	-	V
LOW-level output voltage	V_{OL}	4.5V	I_O=50uA	-	-	0.1	V
			I_O=8.0mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=V_{CC} or GND	-	-	2	uA
supply current	I_{CC}	5.5V	V_I=V_{CC} or GND;I_O=0A	-	-	80	uA
additional supply current	ΔI_{CC}	4.5V to 5.5V	per input pin; V_I=V_{CC} -2.1V; Other inputs at V_{CC} or GND; I_O=0A	-	-	1.5	mA

3.3.3、AC Characteristics 1

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

Parameter	Symbol	V_{CC}	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC377								
CP to Qn propagation delay	t_{pd}	3.0V to 3.6V	C_L=15pF	see Figure 3	1.0	-	15.0	ns
			C_L=50pF		1.0	-	18.0	ns
		4.5V to 5.5V	C_L=15pF		1.0	-	10.5	ns
			C_L=50pF		1.0	-	12.0	ns
maximum frequence	fmax	3.0V to 3.6V	C_L=15pF	see Figure 3	70	125	-	MHz
			C_L=50pF		45	75	-	MHz
		4.5V to 5.5V	C_L=15pF		110	175	-	MHz
			C_L=50pF		75	120	-	MHz
CP high or low	tw	3.0V to 3.6V	-	see Figure 3	5.0	-	-	ns
		4.5V to 5.5V	-		5.0	-	-	ns
Dn, $\overline{E}$ to CP set-up time	tsu	3.0V to 3.6V	-	see Figure 4	5.0	-	-	ns
		4.5V to 5.5V	-		4.5	-	-	ns
Dn, $\overline{E}$ to CP hold time	th	3.0V to 3.6V	-		1.5	-	-	ns
		4.5V to 5.5V	-		2.0	-	-	ns
AiP74AHCT377								
CP to Qn propagation delay	t_{pd}	4.5V to 5.5V	C_L=15pF	see Figure 3	1.0	4.0	10.5	ns
			C_L=50pF		1.0	5.7	12.0	ns
maximum frequence	fmax	4.5V to 5.5V	C_L=15pF	see Figure 3	80	140	-	MHz
			C_L=50pF		75	130	-	MHz
CP high or low	tw	4.5V to 5.5V	-	see Figure 3	5.0	-	-	ns
Dn, $\overline{E}$ to CP set-up time	tsu	4.5V to 5.5V	-	see Figure 4	4.5	-	-	ns
Dn, $\overline{E}$ to CP hold time	th	4.5V to 5.5V	-		2.0	-	-	ns

3.3.4、AC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions		Min.	Typ.	Max.	Unit
AiP74AHC377								
CP to Qn propagation delay	t_{pd}	3.0V to 3.6V	C_L=15pF	see Figure 3	1.0	-	16.0	ns
			C_L=50pF		1.0	-	20.0	ns
		4.5V to 5.5V	C_L=15pF		1.0	-	11.5	ns
			C_L=50pF		1.0	-	13.5	ns
maximum frequence	fmax	3.0V to 3.6V	C_L=15pF	see Figure 3	70	-	-	MHz
			C_L=50pF		45	-	-	MHz
		4.5V to 5.5V	C_L=15pF		110	-	-	MHz
			C_L=50pF		75	-	-	MHz
CP high or low	tw	3.0V to 3.6V	-	see Figure 3	5.0	-	-	ns
		4.5V to 5.5V	-		5.0	-	-	ns
Dn, $\overline{E}$ to CP set-up time	tsu	3.0V to 3.6V	-	see Figure 4	5.0	-	-	ns
		4.5V to 5.5V	-		4.5	-	-	ns
Dn, $\overline{E}$ to CP hold time	th	3.0V to 3.6V	-		1.5	-	-	ns
		4.5V to 5.5V	-		2.0	-	-	ns
AiP74AHCT377								
CP to Qn propagation delay	t_{pd}	4.5V to 5.5V	C_L=15pF	see Figure 3	1.0	-	11.5	ns
			C_L=50pF		1.0	-	13.5	ns
maximum frequence	fmax	4.5V to 5.5V	C_L=15pF	see Figure 3	80	-	-	MHz
			C_L=50pF		75	-	-	MHz
CP high or low	tw	4.5V to 5.5V	-	see Figure 3	5.0	-	-	ns
Dn, $\overline{E}$ to CP set-up time	tsu	4.5V to 5.5V	-	see Figure 4	4.5	-	-	ns
Dn, $\overline{E}$ to CP hold time	th	4.5V to 5.5V	-		2.0	-	-	ns

4、Testing Circuit

4.1、AC Testing Circuit

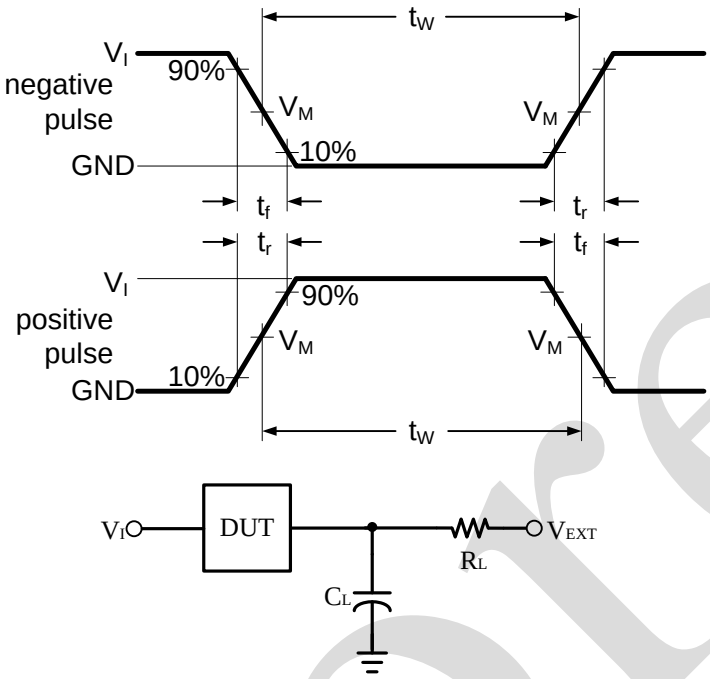


Figure 2. Test circuit for measuring switching times

C_L includes probe and jig capacitance.

4.2、Test Data

Type	Input		Load	V_{EXT}
	V_I	$t_r = t_f$	C_L	t_{PLH}/t_{PHL}
AiP74AHC377	V_{CC}	3.0ns	15pF, 50pF	Open
AiP74AHCT377	3.0V	3.0ns	15pF, 50pF	Open

4.3、AC Testing Waveforms

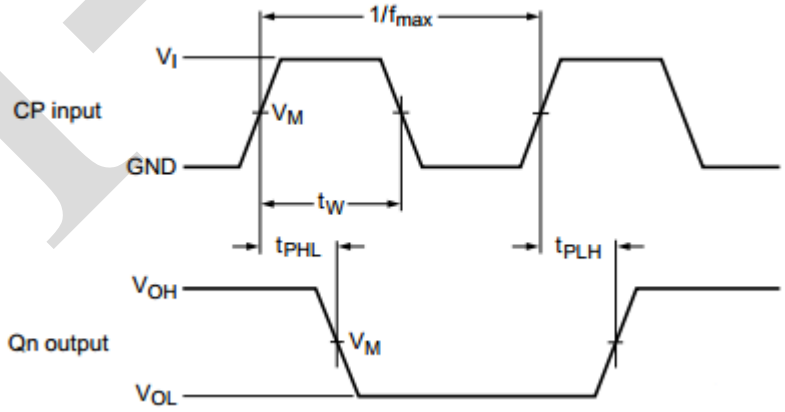


Figure 3. Clock pulse width, maximum frequency and input to output propagation delays

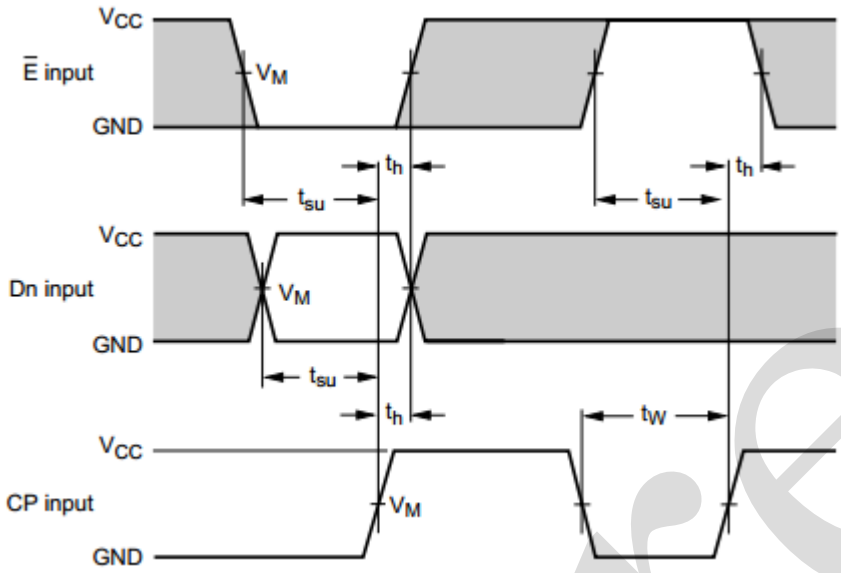


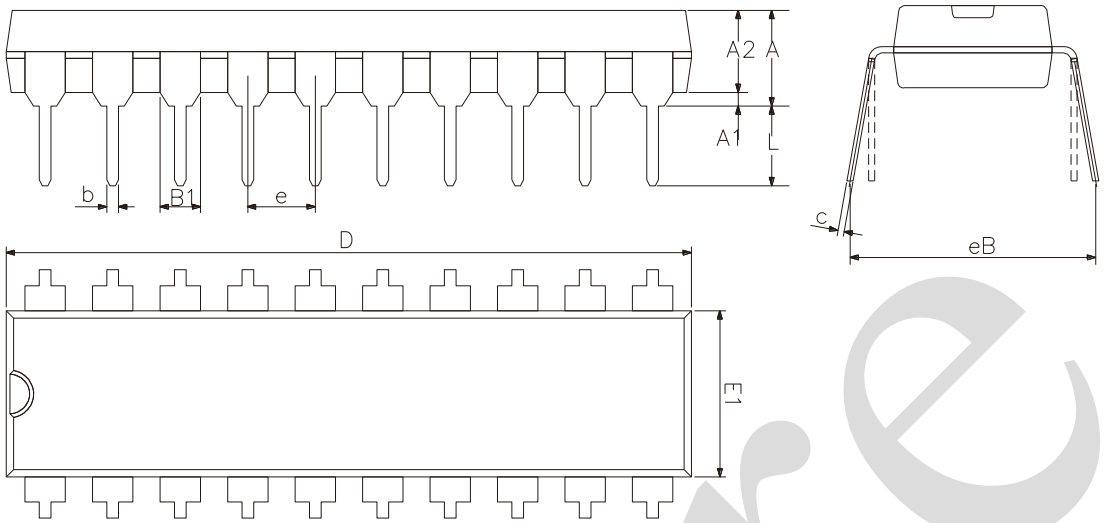
Figure 4. Data set-up and hold times

4.4、Measurement Points

Type	Input	Output
	V_M	V_M
AiP74AHC377	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
AiP74AHCT377	1.5V	$0.5 \times V_{CC}$

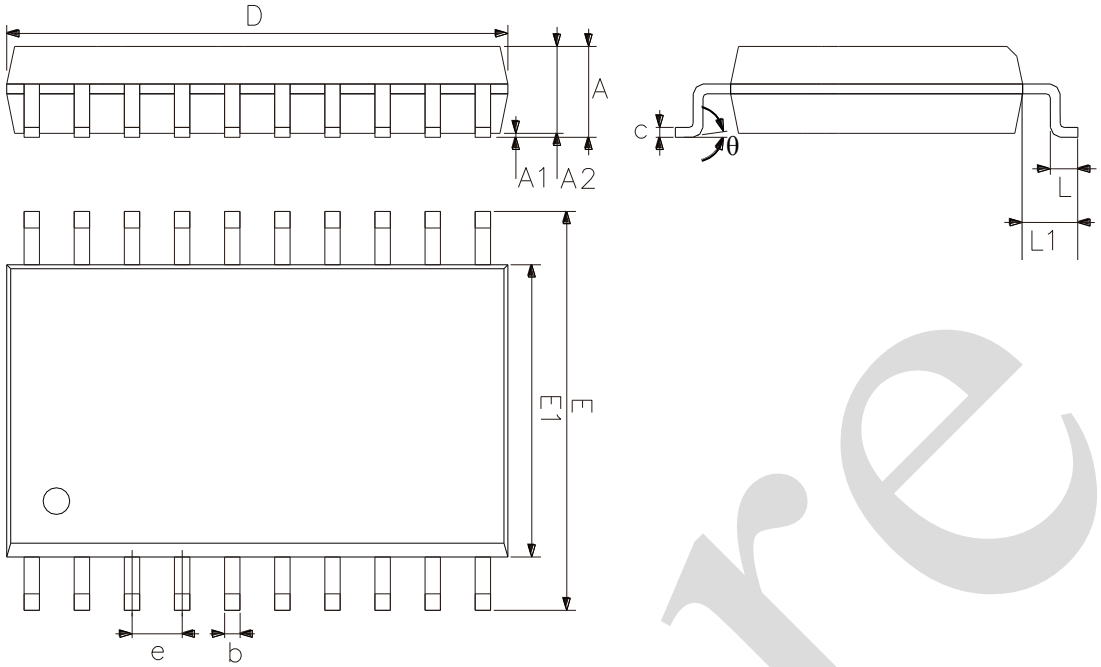
5、Package Information

5.1、DIP20



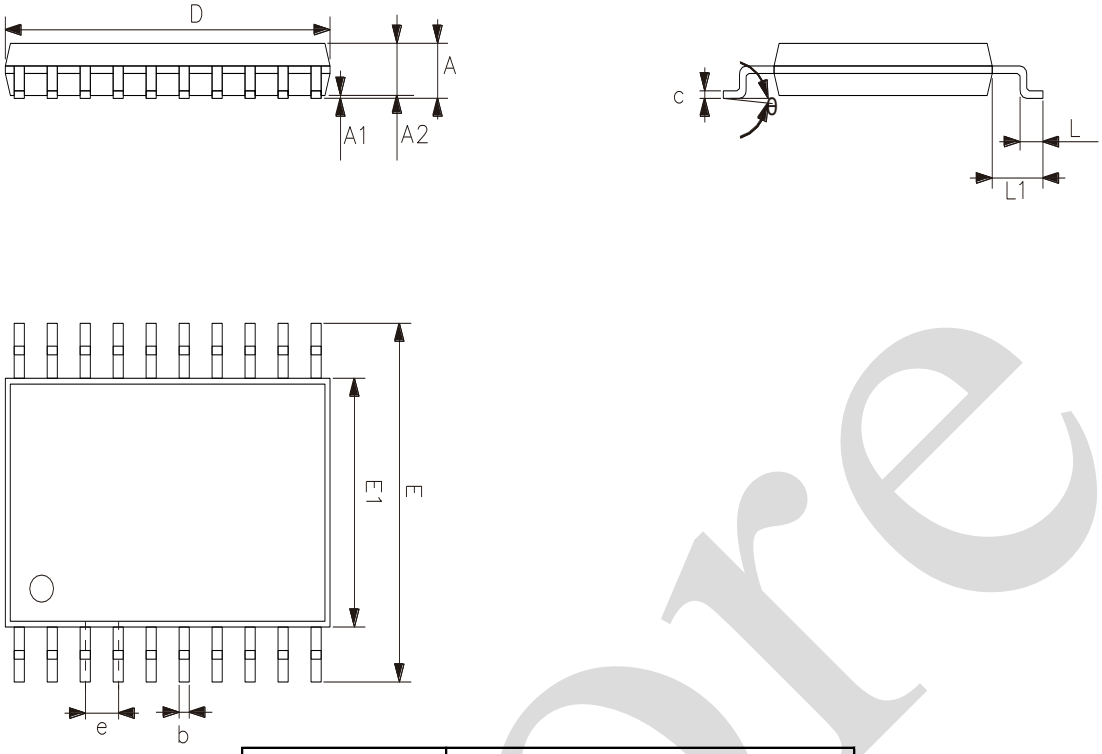
2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	3.60	5.33
A1	0.51	—
A2	3.20	3.60
b	0.36	0.53
B1	1.52	
c	0.204	0.36
D	25.70	26.54
E1	6.20	6.75
e	2.54	
eB	7.62	9.30
L	3.00	3.60

5.2、SOP20



2023/12/A	Dimensions In Millimeters	
Symbol	**Min.**	**Max.**
A	2.47	2.65
A1	0.05	0.30
A2	2.20	2.44
b	0.35	0.50
c	0.15	0.30
D	12.54	12.94
E	10.00	10.60
E1	7.30	7.70
e	1.27	
L	0.40	1.05
L1	1.30	1.50
θ	0°	8°

5.3、TSSOP20



2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	—	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	6.40	6.60
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
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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