AiP74AVC16245
16-Bit Transceiver with Direction Pin; 3-State

Product Specification

Specification Revision History：

Version	Date	Description
2024-04-A0	2024-04	New
2024-09-A1	2024-09	Modify the parameters

Contents

1、General Description

The AiP74AVC16245 is a 16-bit transceiver featuring non-inverting 3-state bus compatible outputs in both send and receive directions.

Features:

- Supply voltage range: 1.2V to 3.6V
- CMOS low power consumption
- Input/output tolerant up to 3.6 V
- Temperature range:-40℃ to +125℃
- Packaging information: TSSOP48

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74AVC16245TA48.TR	TSSOP48	74AVC16245	2000 PCS/reel	2000 PCS/box	Dimensions of plastic enclosure: 12.5mm×6.1mm Pin spacing: 0.5mm

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

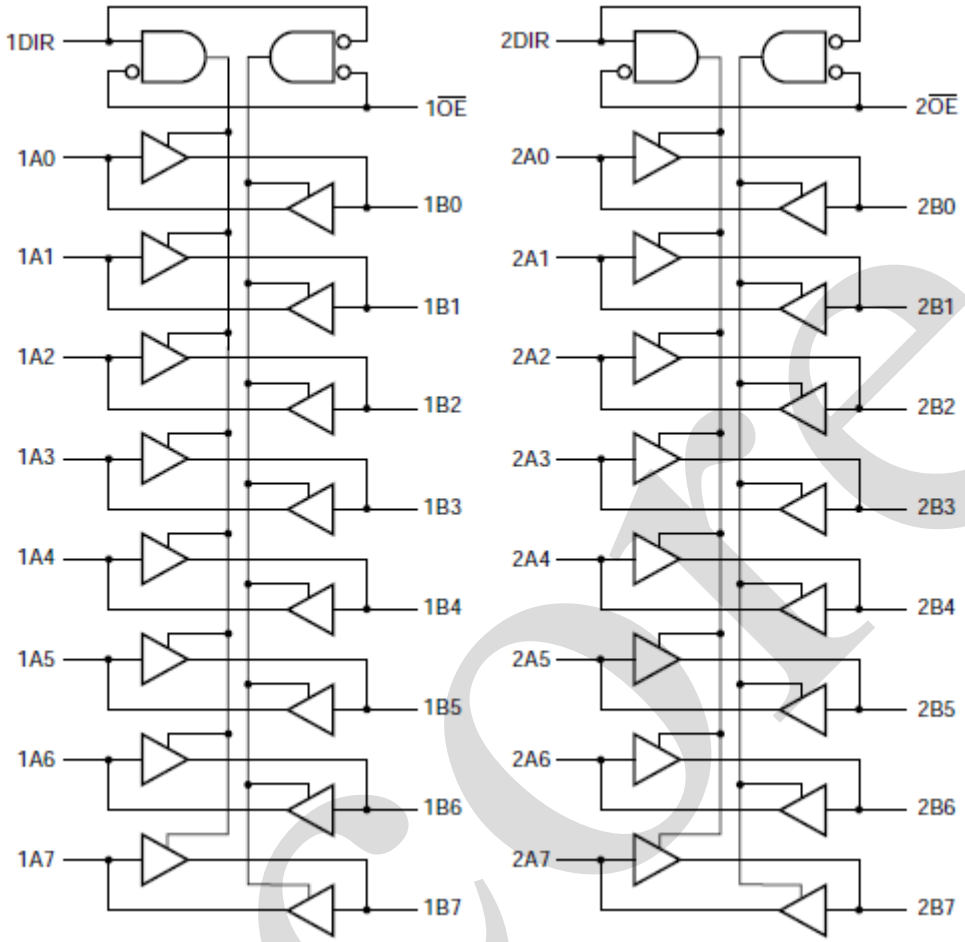
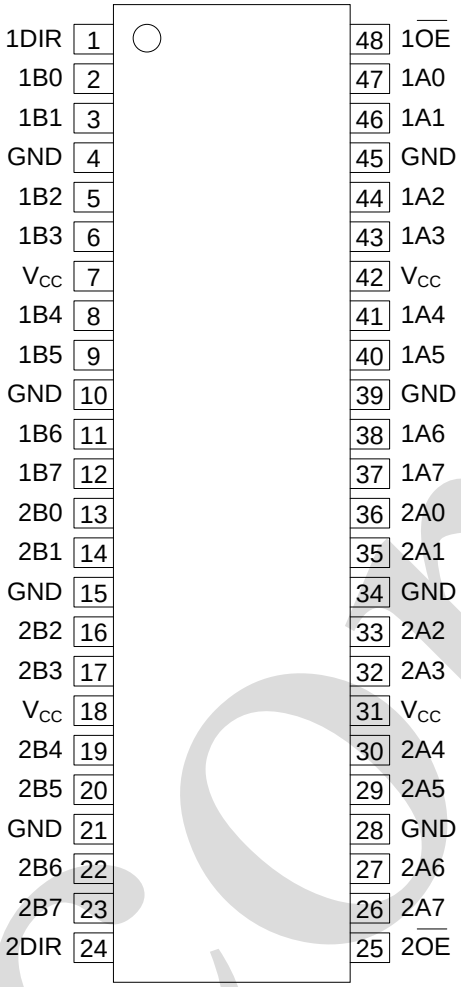


Figure 1. Block diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1DIR, 2DIR	1, 24	direction control input
1B0 to 1B7	2, 3, 5, 6, 8, 9, 11, 12	data input/output
2B0 to 2B7	13, 14, 16, 17, 19, 20, 22, 23	data input/output
GND	4, 10, 15, 21, 28, 34, 39, 45	ground (0 V)
VCC	7, 18, 31, 42	supply voltage
$1\overline{OE}$,$2\overline{OE}$,	48, 25	output enable input (active LOW)
1A0 to 1A7	47, 46, 44, 43, 41, 40, 38, 37	data input/output
2A0 to 2A7	36, 35, 33, 32, 30, 29, 27, 26	data input/output

2.4、Function Table

INPUTS		OUTPUS	
$\overline{nOE}$	nDIR	nAn	nBn
L	L	A=B	inputs
L	H	inputs	B=A
H	X	Z	Z

Note: H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(T_{amb}=25℃, All voltage referenced to GND, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+4.6	V
input voltage	V_I	-	-0.5	+4.6	V
output voltage	V_O	output HIGH or LOW	-0.5	V_{CC}+0.5	V
		output 3-state	-0.5	+4.6	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}	-	1.2	-	3.6	V
input voltage	V_I	-	0	-	3.6	V
output voltage	V_O	output HIGH or LOW	0	-	V_{CC}	V
		output 3-state	0	-	3.6	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	Vcc	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	1.2V	-	Vcc	-	-	V
		1.4V to 1.6V	-	0.65×V_{CC}	0.9	-	V
		1.65V to 1.95V	-	0.65×V_{CC}	0.9	-	V
		2.3V to 2.7V	-	1.7	1.2	-	V
		3.0V to 3.6V		2.0	1.5		V
LOW-level input voltage	V_{IL}	1.2V	-	-	-	GND	V
		1.4V to 1.6V	-	-	0.9	0.35×V_{CC}	V
		1.65V to 1.95V	-	-	0.9	0.35×V_{CC}	V
		2.3V to 2.7V	-	-	1.2	0.7	V
		3.0V to 3.6V	-	-	1.5	0.8	V
HIGH-level output voltage	V_{OH}	1.65V to 3.6V	I_O=-100uA	V_{CC}-0.2	V_{CC}	-	V
		1.4V	I_O=-3mA	Vcc-0.35	Vcc-0.21	-	V
		1.65V	I_O=-4mA	Vcc-0.45	Vcc-0.25	-	V
		2.3V	I_O=-8mA	Vcc-0.55	Vcc-0.37	-	V
		3.0V	I_O=-12mA	Vcc-0.70	Vcc-0.47	-	V
LOW-level output voltage	V_{OL}	1.65V to 3.6V	I_O=100uA	-	GND	0.2	V
		1.4V	I_O=3mA	-	0.22	0.35	V
		1.65V	I_O=4mA	-	0.24	0.45	V
		2.3V	I_O=8mA	-	0.38	0.55	V
		3.0V	I_O=12mA	-	0.53	0.7	V
input leakage current	I_I	1.4V to 3.6V	V_I=VCC or GND	-	-	2.5	uA
OFF-state output current	I_{OZ}	1.4V to 2.7V	V_O=VCC or GND	-	-	5	uA
		3.0V to 3.6V	V_O=VCC or GND	-	-	10	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=3.6V	-	-	±10	uA
supply current	I_{CC}	1.4V to 2.7V	V_I=V_{CC} or GND; I_O=0A	-	-	20	uA
		3.0V to 3.6V	V_I=V_{CC} or GND; I_O=0A	-	-	40	uA

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

3.3.2、DC Characteristics 2

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

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	1.2V	-	1.08	-	-	V
		1.4V to 1.6V	-	0.65×V_{CC}	-	-	V
		1.65V to 1.95V	-	0.65×V_{CC}	-	-	V
		2.3V to 2.7V	-	1.7	-	-	V
		3.0V to 3.6V		2.0	-		V
LOW-level input voltage	V_{IL}	1.2V	-	-	-	GND	V
		1.4V to 1.6V	-	-	-	0.35×V_{CC}	V
		1.65V to 1.95V	-	-	-	0.35×V_{CC}	V
		2.3V to 2.7V	-	-	-	0.7	V
		3.0V to 3.6V	-	-	-	0.8	V
HIGH-level output voltage	V_{OH}	1.65V to 3.6V	I_O=-100uA	V_{CC}-0.2	-	-	V
		1.4V	I_O=-3mA	Vcc-0.45	-	-	V
		1.65V	I_O=-4mA	Vcc-0.55	-	-	V
		2.3V	I_O=-8mA	Vcc-0.65	-	-	V
		3.0V	I_O=-12mA	Vcc-0.80	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 3.6V	I_O=100uA	-	-	0.2	V
		1.4V	I_O=3mA	-	-	0.45	V
		1.65V	I_O=4mA	-	-	0.55	V
		2.3V	I_O=8mA	-	-	0.65	V
		3.0V	I_O=12mA	-	-	0.8	V
input leakage current	I_I	1.4V to 3.6V	V_I=VCC or GND	-	-	2.5	uA
OFF-state output current	I_{OZ}	1.4V to 2.7V	V_O=VCC or GND	-	-	5	uA
		3.0V to 3.6V	V_O=VCC or GND	-	-	10	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=3.6V	-	-	±10	uA
supply current	I_{CC}	1.4V to 2.7V	V_I=V_{CC} or GND; I_O=0A	-	-	20	uA
		3.0V to 3.6V	V_I=V_{CC} or GND; I_O=0A	-	-	40	uA

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

3.3.3、AC Characteristics 1

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

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
nAn to nBn; nBn to nAn; propagation delay	t_{PLH}, t_{PHL}	1.2V	see Figure 3	-	2.8	-	ns
		1.4V to 1.6V		-	1.8	-	ns
		1.65V to 1.95V		0.7	1.8	3.0	ns
		2.3V to 2.7V		0.6	1.3	1.9	ns
		3.0V to 3.6V		0.5	1.1	1.7	ns
$\overline{nOE}$ to nAn/nBn enable time	t_{PZH}, t_{PZL}	1.2V	see Figure 4	-	5.9	-	ns
		1.4V to 1.6V		-	3.9	-	ns
		1.65V to 1.95V		1.4	3.3	3.0	ns
		2.3V to 2.7V		1.0	2.4	1.9	ns
		3.0V to 3.6V		0.7	2.0	1.7	ns
$\overline{nOE}$ to nAn/nBn disable time	t_{PLZ}, t_{PHZ}	1.2V	see Figure 4	-	6.9	-	ns
		1.4V to 1.6V		-	4.8	-	ns
		1.65V to 1.95V		2.2	3.7	6.0	ns
		2.3V to 2.7V		1.1	2.0	4.2	ns
		3.0V to 3.6V		1.2	2.2	3.7	ns

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

3.3.4、AC Characteristics 2

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

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
nAn to nBn; nBn to nAn; propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 3	-	-	3.6	ns
		2.3V to 2.7V		-	-	2.3	ns
		3.0V to 3.6V		-	-	2.0	ns
$\overline{nOE}$ to nYn enable time	t_{PZH}, t_{PZL}	1.65V to 1.95V	see Figure 4	-	-	3.6	ns
		2.3V to 2.7V		-	-	2.3	ns
		3.0V to 3.6V		-	-	2.0	ns
$\overline{nOE}$ to nYn disable time	t_{PLZ}, t_{PHZ}	1.65V to 1.95V	see Figure 4	-	-	7.2	ns
		2.3V to 2.7V		-	-	5.0	ns
		3.0V to 3.6V		-	-	4.4	ns

4、Testing Circuit

4.1、AC Testing Circuit

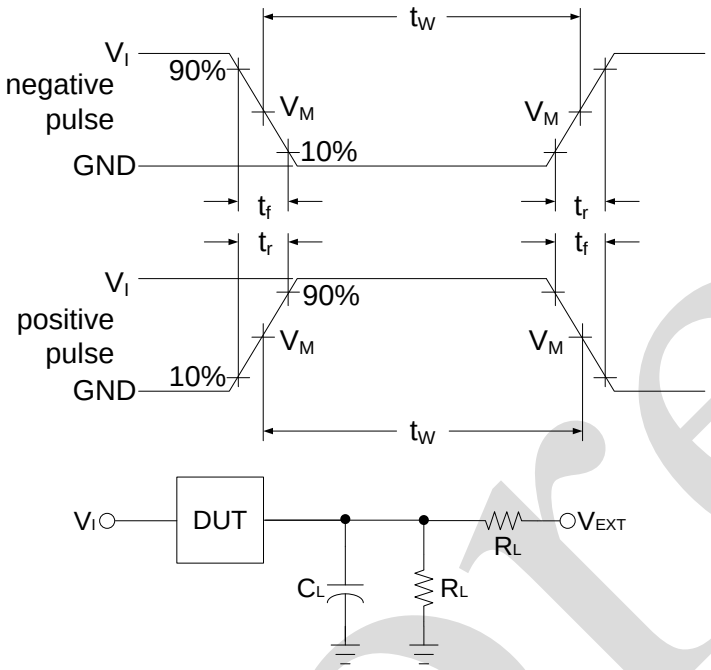


Figure 2. Load circuit

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}
1.2V	V_{CC}	≤ 2ns	15pF	2kΩ	Open	2×V_{CC}	GND
1.4V to 1.6V	V_{CC}	≤ 2ns	15pF	2kΩ	Open	2×V_{CC}	GND
1.65V to 1.95V	V_{CC}	≤ 2ns	30pF	1kΩ	Open	2×V_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 2ns	30pF	500Ω	Open	2×V_{CC}	GND
3.0V to 3.6V	V_{CC}	≤ 2ns	50pF	500Ω	Open	2×V_{CC}	GND

4.3、AC Testing Waveforms

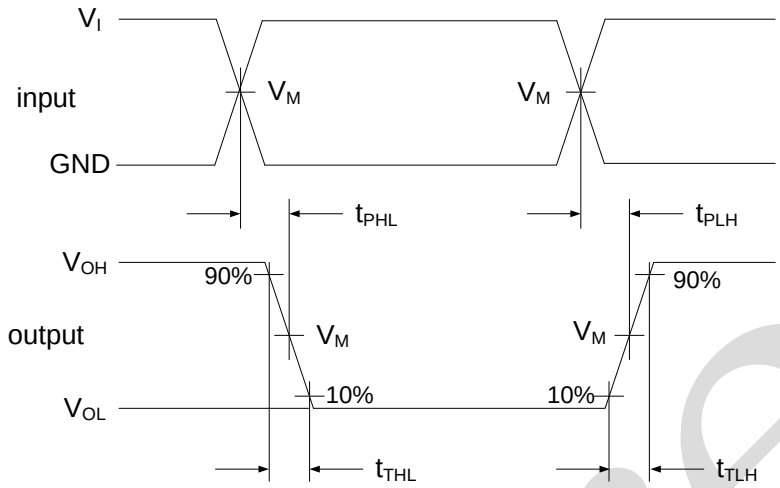


Figure 3. The data input (nAn) to output (nYn) propagation delays

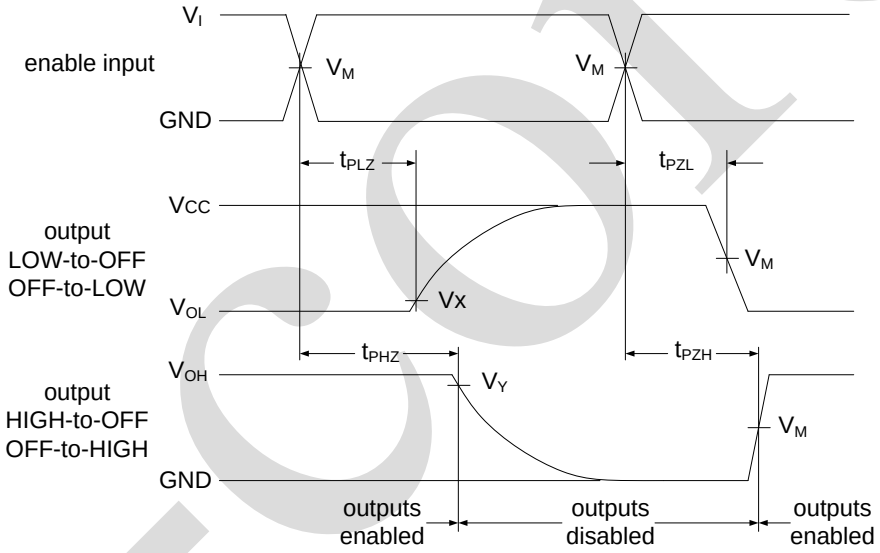


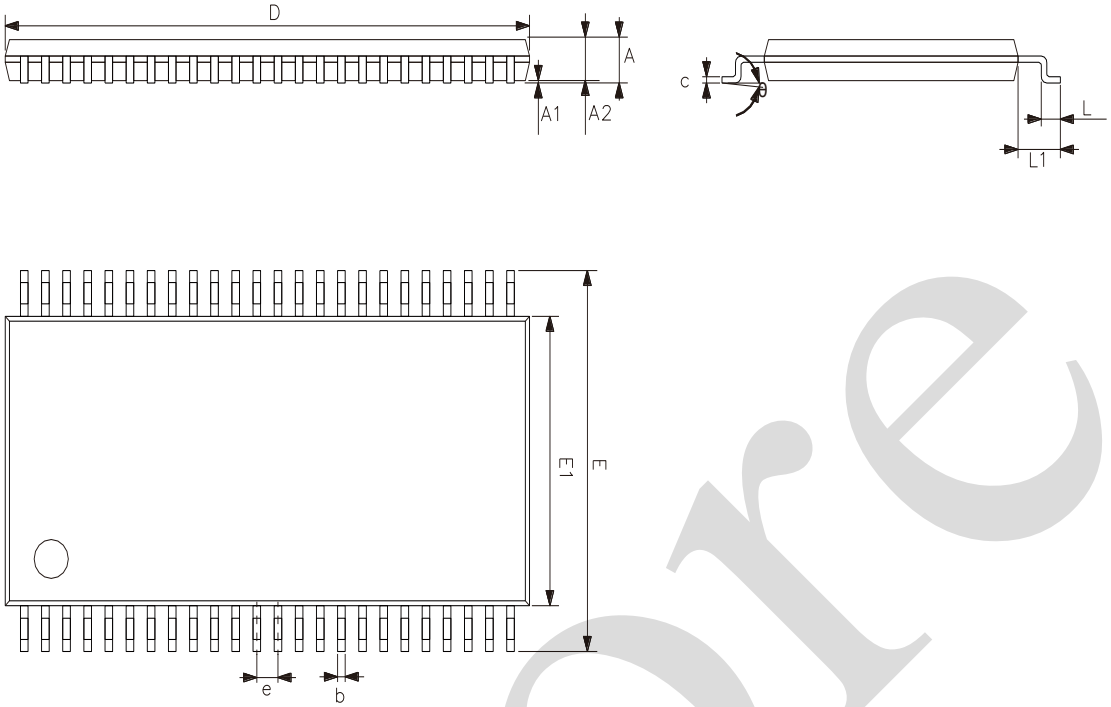
Figure 4. 3-state enable and disable times

4.4、Measurement Points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.2V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
1.4V to 1.6V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
1.65V to 1.95V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.3V to 2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.15V	V_{OH}-0.15V
2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.3V	V_{OH}-0.3V
3.0V to 3.6V	$0.5\times V_{CC}$	$0.5\times V_{CC}$	V_{OL}+0.3V	V_{OH}-0.3V

5、Package Information

5.1、TSSOP48



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	—	1.20
A1	0.03	0.15
A2	0.82	1.05
b	0.17	0.27
c	0.12	0.22
D	12.40	12.60
E	7.90	8.30
E1	6.00	6.20
e	0.50	
L	0.35	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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