AOS SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS74HC240D

WEB | www.aossemi.cn

AOS74HC240D

Data Sheet

Logic Gates

■ General Description

The AOS74HC240 is an 8-bit inverting buffer/line driver with 3-state outputs. The device can be used as two 4-bit buffers or one 8-bit buffer. The device features two output enables (1¬ OE and 2 ¬ OE), each controlling four of the 3-state outputs. A HIGH on n¬ OE causes the outputs to assume a high-impedance OFF-state. Inputs include clamp diodes that enable the use of current limiting resistors to interface inputs to voltages in excess of V_{CC}.

■ Features:

- Input levels:For AOS74HC240: CMOS level
- Inverting 3-state outputs
- Specified from -40℃ to +125℃
- Packaging information: DIP20/SOP20/TSSOP20

■ Ordering Information:

Tube packing specifications:

Type number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Packgingq uantity	Notes
AOS74HC240D	SOP20	74HC240	35 PCS/tube	80 tube/box	2800 PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm

Note:If the physical information is inconsistent with the ordering information,please refer to the actual product.

AOS74HC240D

Data Sheet

Block Diagram And Pin Description

Block Diagram

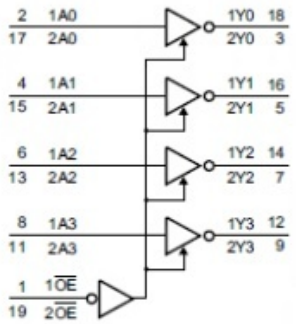


Figure 1. Logic symbol

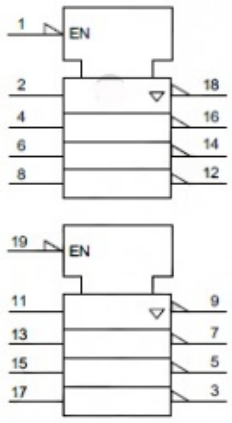


Figure 2. IEC logic symbol

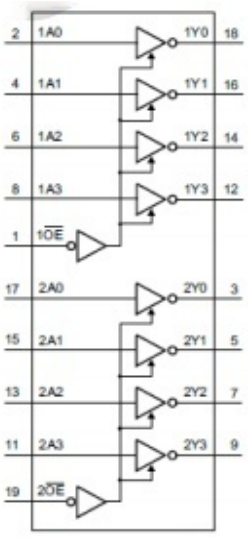
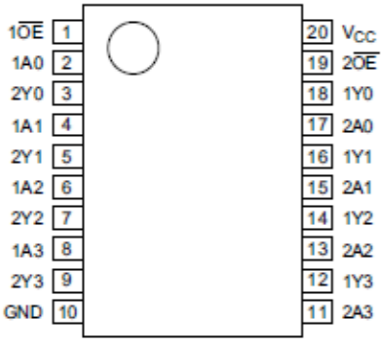


Figure 3. Functional diagram

AOS74HC240D

Data Sheet

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	1 ¬ OE	output enable input (active LOW)
2	1A0	data input
3	2Y0	busoutput
4	1A1	data input
5	2Y1	bus output
6	1A2	data input
7	2Y2	bus output
8	1A3	data input
9	2Y3	bus output
10	GND	ground (0V)
11	2A3	data input
12	1Y3	bus output
13	2A2	data input
14	1Y2	bus output
15	2A1	data input
16	1Y1	bus output
17	2A0	data input
18	1Y0	bus output
19	2 ¬ OE	output enable input (active LOW)
20	V_{CC}	supply voltage

AOS74HC240D

Data Sheet

Function Table

Input		Output
n ¬ OE	nAn	nYn
L	L	H
L	H	L
H	X	Z

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

AOS74HC240D

Data Sheet

Electrical Parameter

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
input clamping current	I_{IK}	V_I< -0.5V or V_I>V_{CC}+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		-	±35	mA
supply current	I_{CC}	-		-	70	mA
ground current	I_{GND}	-		-70	-	mA
total power dissipation	P_{tot}	-		-	500	mW
storage temperature	T_{stg}	-		-65	+150	℃
soldering temperature	T_L	10s	DIP	245		℃
			SO/TSSOP	260		℃

AOS74HC240D

Data Sheet

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AOS74HC240						
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	-	+125	℃

AOS74HC240D

Data Sheet

Electrical Characteristics

DC Characteristics 1

(Tamb=25℃,voltages are referenced to GND(ground=0V),unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
HIGH-level inputvoltage	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 inputvoltage	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} or V_{IL}	I_O=-20uA;V_{CC}=2.0V	1.9	2.0	-	V
			I_O=-20uA;V_{CC}=4.5V	4.4	4.5	-	V
			I_O=-20uA;V_{CC}=6.0V	5.9	6.0	-	V
			I_O=-4.0mA;V_{CC}=4.5V	3.98	4.32	-	V
			I_O=-5.2mA;V_{CC}=6.0V	5.48	5.81	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	I_O=20uA;V_{CC}=2.0V	-	0	0.1	V
			I_O=20uA;V_{CC}=4.5V	-	0	0.1	V
			I_O=20uA;V_{CC}=6.0V	-	0	0.1	V
			I_O=4.0mA;V_{CC}=4.5V	-	0.15	0.26	V
			I_O=5.2mA;V_{CC}=6.0V	-	0.16	0.26	V
input leakage current	I_I	V_I=V_{CC} or GND;V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL};V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±1.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND;I_O=0A;V_{CC}=6.0V		-	-	8.0	uA
input capacitance	C_I	-		-	3.5	-	pF

AOS74HC240D

Data Sheet

DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
HIGH-level inputvoltage	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=-20uA;V_{CC}=2.0V	1.9	-	-	V
			I_O=-20uA;V_{CC}=4.5V	4.4	-	-	V
			I_O=-20uA;V_{CC}=6.0V	5.9	-	-	V
			I_O=-4.0mA;V_{CC}=4.5V	3.84	-	-	V
			I_O=-5.2mA;V_{CC}=6.0V	5.34	-	-	V
LOW-level output voltage	V_{OL}	V_I=V_{IH} or V_{IL}	I_O=20uA;V_{CC}=2.0V	-	-	0.1	V
			I_O=20uA;V_{CC}=4.5V	-	-	0.1	V
			I_O=20uA;V_{CC}=6.0V	-	-	0.1	V
			I_O=4.0mA;V_{CC}=4.5V	-	-	0.33	V
			I_O=5.2mA;V_{CC}=6.0V	-	-	0.33	V
input leakage current	I_I	V_I=V_{CC} or GND; V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL};V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±5.0	uA
supply current	I_{CC}	V_I=V_{CC} or GND;I_O=0A; V_{CC}=6.0V		-	-	80	uA

AOS74HC240D

Data Sheet

DC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
HIGH-level input voltage	V_{IH}	V_{CC}=2.0V		1.5	-	-	V
		V_{CC}=4.5V		3.15	-	-	
		V_{CC}=6.0V		4.2	-	-	
LOW-level input voltage	V_{IL}	V_{CC}=2.0V		-	-	0.5	
		V_{CC}=4.5V		-	-	1.35	
		V_{CC}=6.0V		-	-	1.8	
HIGH-level output voltage	V_{OH}	V_I=V_{IH}或V_{IL}	I_O=-20μA;V_{CC}=2.0V	1.9	-	-	
			I_O=-20μA;V_{CC}=4.5V	4.4	-	-	
			I_O=-20μA;V_{CC}=6.0V	5.9	-	-	
			I_O=-4.0mA;V_{CC}=4.5V	3.7	-	-	
			I_O=-5.2mA;V_{CC}=6.0V	5.2	-	-	
LOW-level output voltage	V_{OL}	V_I=V_{IH}或V_{IL}	I_O=20μA;V_{CC}=2.0V	-	-	0.1	
			I_O=20μA;V_{CC}=4.5V	-	-	0.1	
			I_O=20μA;V_{CC}=6.0V	-	-	0.1	
			I_O=4.0mA;V_{CC}=4.5V	-	-	0.4	
			I_O=5.2mA;V_{CC}=6.0V	-	-	0.4	
input leakage current	I_I	V_I=V_{CC}或GND;V_{CC}=6.0V		-	-	±1.0	uA
OFF-state output current	I_{OZ}	V_I=V_{IH} or V_{IL};V_{CC}=6.0V; V_O=V_{CC} or GND		-	-	±10	uA
supply current	I_{CC}	V_I=V_{CC}或GND;I_O=0A,V_{CC}=6.0V		-	-	160	uA

AOS74HC240D

Data Sheet

AC Characteristics 1

(Tamb=25℃,GND=0V,C_L=50pF,unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
nAn to nYnpropagation delay	t_{pd}	see Figure 5	V_{CC}=2.0V	-	30	100	ns
			V_{CC}=4.5V	-	11	20	ns
			V_{CC}=5.0V C_L=15pF	-	9	-	ns
			V_{CC}=6.0V	-	9	17	ns
n ¬ OE to nYn enable time	t_{en}	see Figure 6	V_{CC}=2.0V	-	39	150	ns
			V_{CC}=4.5V	-	14	30	ns
			V_{CC}=6.0V	-	11	26	ns
n ¬ OE to nYn disable time	t_{dis}	see Figure 6	V_{CC}=2.0V	-	41	150	ns
			V_{CC}=4.5V	-	15	30	ns
			V_{CC}=6.0V	-	12	26	ns
transition time	t_t	see Figure 5	V_{CC}=2.0V	-	14	60	ns
			V_{CC}=4.5V	-	5	12	ns
			V_{CC}=6.0V	-	4	10	ns
power dissipation capacitance	C_{PD}	per package;V_I=GND to V_{CC}		-	30	-	pF

Note:

[1]t_{pd} is the sameas t_{PLH} and t_{PHL}.

[2]t_t is the same as t_{THL} and t_{TLH}.

[3]C_{PD} is used to determine the dynamic power dissipation (P_D in uW).

$P_D=C_{PD}\times V_{CC2}\times f_i\times N+(C_L\times V_{CC2}\times f_o)$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;

$(C_L\times V_{CC2}\times f_o)$=sum of outputs.

AOS74HC240D

Data Sheet

AC Characteristics 2

(T_{amb}=-40℃ to +85℃,GND=0V,C_L=50pF,unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
nAn to nYn propagation delay	t_{pd}	see Figure 5	V_{CC}=2.0V	-	-	125	ns
			V_{CC}=4.5V	-	-	25	ns
			V_{CC}=6.0V	-	-	21	ns
n ¬ OEto nYn enable time	t_{en}	see Figure 6	V_{CC}=2.0V	-	-	190	ns
			V_{CC}=4.5V	-	-	38	ns
			V_{CC}=6.0V	-	-	33	ns
n ¬ OEto nYn disable time	t_{dis}	see Figure 6	V_{CC}=2.0V	-	-	190	ns
			V_{CC}=4.5V	-	-	38	ns
			V_{CC}=6.0V	-	-	33	ns
transition time	t_t	see Figure 5	V_{CC}=2.0V	-	-	75	ns
			V_{CC}=4.5V	-	-	15	ns
			V_{CC}=6.0V	-	-	13	ns

Note:

[1] t_{pd} is the sameas t_{PLH} and t_{PHL}.

[2] t_t is the same as t_{THL} and t_{TLH}.

[3] t_{dis} is the same as t_{PLZ} and t_{PHZ}.

[4] t_t is the same as t_{THL} and t_{TLH}.

AOS74HC240D

Data Sheet

AC Characteristics 3

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
AOS74HC240							
nAn to nYnpropagation delay	t_{pd}	see Figure 5	V_{CC}=2.0V	-	-	150	ns
			V_{CC}=4.5V	-	-	30	ns
			V_{CC}=6.0V	-	-	26	ns
nO—Eto nYn enable time	t_{en}	see Figure 6	V_{CC}=2.0V	-	-	225	ns
			V_{CC}=4.5V	-	-	45	ns
			V_{CC}=6.0V	-	-	38	ns
nO—Eto nYn disable time	t_{dis}	see Figure 6	V_{CC}=2.0V	-	-	225	ns
			V_{CC}=4.5V	-	-	45	ns
			V_{CC}=6.0V	-	-	38	ns
transition time	t_t	see Figure 5	V_{CC}=2.0V	-	-	90	ns
			V_{CC}=4.5V	-	-	18	ns
			V_{CC}=6.0V	-	-	15	ns

Note:

[1] t_{pd} is the sameas t_{PLH} and t_{PHL}.

[2] t_t is the same as t_{THL} and t_{TLH}.

[3] t_{dis} is the same as t_{PLZ} and t_{PHZ}.

[4] t_t is the same as t_{THL} and t_{TLH}.

AOS74HC240D

Data Sheet

Testing Circuit
AC Testing Circuit

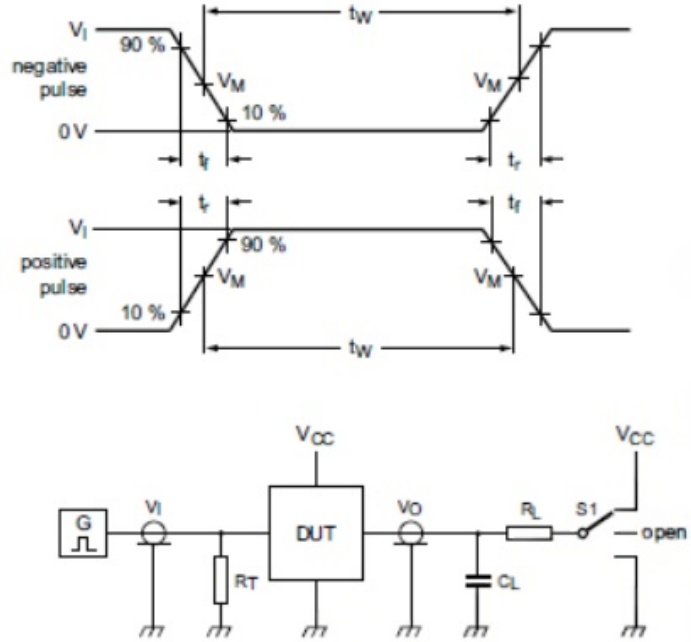


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:
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.
R_L=Load resistance.
S_1=Test selection switch.

AOS74HC240D

Data Sheet

AC Testing Waveforms

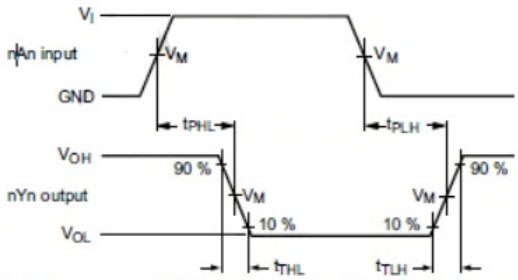


Figure 5. Input (nAn) to output (nYn) propagation delays and output transition times

Measurement Points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
AOS74HC240	0.5xV_{CC}	0.5xV_{CC}	0.1xV_{CC}	0.9xV_{CC}

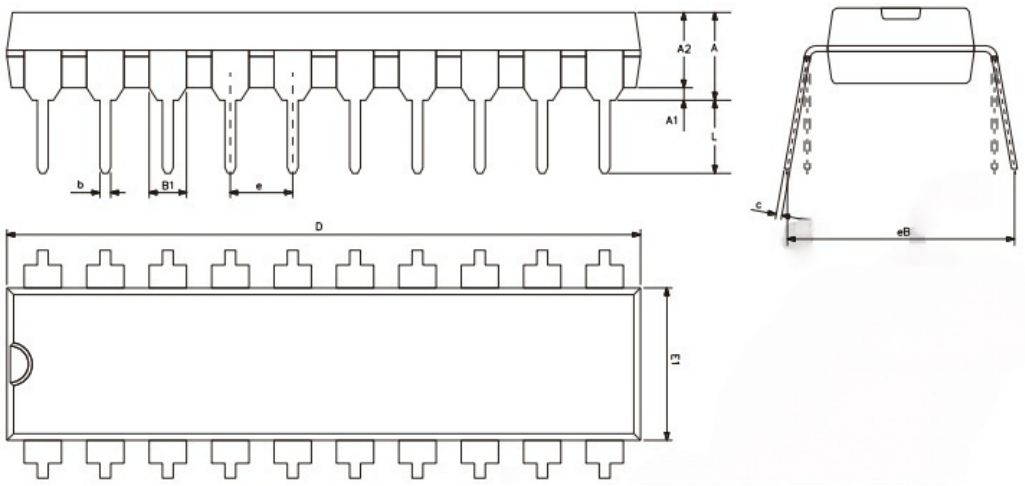
Test Data

Type	Input		Load		S1 position		
	V_M	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
AOS74HC240	V_{CC}	6ns	15pF, 50pF	1kΩ	open	GND	V_{CC}

AOS74HC240D

Data Sheet

Package Information
DIP20



Symbol	Dimensions (mm)	
	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

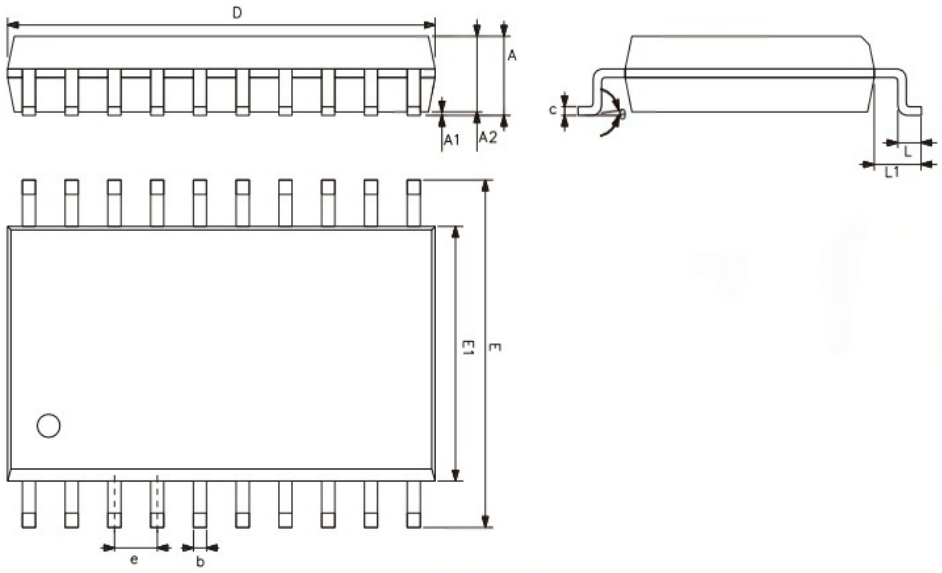
Product Specification

Logic Gates

AOS74HC240D

Data Sheet

SOP20



Symbol	Dimensions (mm)	
	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 °