



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS74HC139D

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电源管理IC



通信接口芯片



二三极管



LDO稳压器



逻辑器件



MOSFETs



运算放大器



显示驱动



MCU单片机



光电器件

AOS74HC139D

Data Sheet

Logic Gates

■ General Description

The 74HC139 decodes two binary weighted address inputs (nA_0 , nA_1) to four mutually exclusive outputs (nY_0 to nY_3). Each decoder features an enable input (nE). When nE is HIGH all outputs are forced HIGH. The enable input can be used as the data input for a 1-to-4 demultiplexer application. 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 AOS74HC139: CMOS level
- Demultiplexing capability
- 2 independent 2-to-4 decoderson
- Multifunction capability
- Suitable for memory decoding, data routing or code conversion
- Active LOW mutually exclusive outputs
- Specified from -40°C to $+125^{\circ}\text{C}$
- Packaging information: DIP16/SOP16/TSSOP16

■ Ordering Information:

Tube packing specifications:

Type number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Packaging quantity	Notes
AOS74HC139D	SOP16	74HC139	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm

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



AOS74HC139D

Data Sheet

Block Diagram And Pin Description Block Diagram

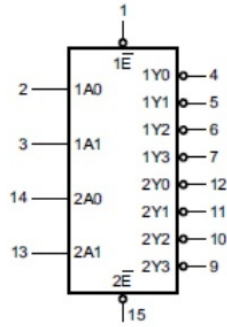


Figure 1. Logic symbol

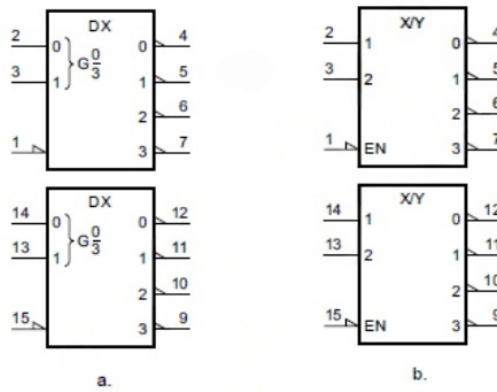


Figure 2. IEC logic symbol

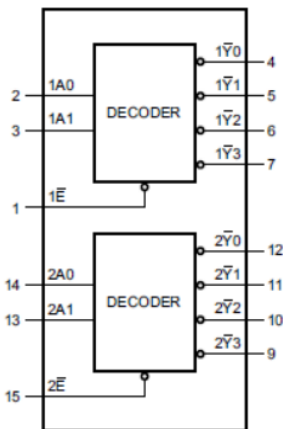


Figure 3. Functional diagram

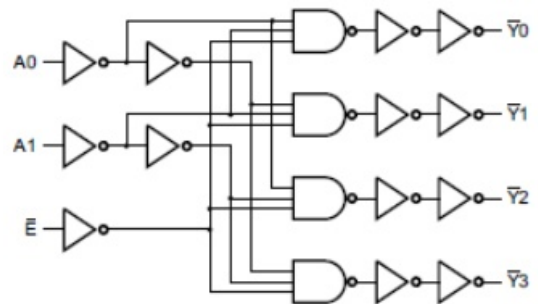


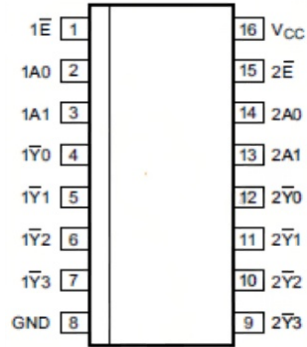
Figure 4. Logic diagram (one decoder/demultiplexer)



AOS74HC139D

Data Sheet

■ Pin Configurations



■ Pin Description

Pin No.	Pin Name	Description
1	1 \bar{E}	enable input (active LOW)
2	1A0	address input
3	1A1	address input
4	1 \bar{Y} 0	output (active LOW)
5	1 \bar{Y} 1	output (active LOW)
6	1 \bar{Y} 2	output (active LOW)
7	1 \bar{Y} 3	output (active LOW)
8	GND	ground (0V)
9	2 \bar{Y} 3	output (active LOW)
10	2 \bar{Y} 2	output (active LOW)
11	2 \bar{Y} 1	output (active LOW)
12	2 \bar{Y} 0	output (active LOW)
13	2A1	address input
14	2A0	address input
15	2 \bar{E}	enable input (active LOW)
16	V _{CC}	supply voltage



AOS74HC139D

Data Sheet

■ Function Table

Control	Input		Output			
$\bar{n}E$	nA1	nA0	$\bar{n}Y3$	$\bar{n}Y2$	$\bar{n}Y1$	$\bar{n}Y0$
H	X	X	H	H	H	H
L	L	L	H	H	H	L
L	L	H	H	H	L	H
L	H	L	H	L	H	H
L	H	H	L	H	H	H

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care



AOS74HC139D

Data Sheet

Electrical Parameter Absolute Maximum Ratings

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

Parameter	Symbol	Conditions	Min.	Max.	Unit	
AOS74HC139						
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	t/ 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	



AOS74HC139D

Data Sheet

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Max.	Unit	
AOS74HC139						
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	t/ 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	



AOS74HC139D

Data Sheet

Electrical Characteristics

DC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
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} 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 _O =V _{CC} or GND; V _{CC} =6.0V	-	-	±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	



AOS74HC139D

Data Sheet

DC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
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 =-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	uA	
OFF-state output current	I _{OZ}	V _I =V _{IH} or V _{IL} ; V _O =V _{CC} or GND; V _{CC} =6.0V	-	-	± 5.0	uA	
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V	-	-	80	uA	



AOS74HC139D

Data Sheet

DC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
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}	$I_{O} = -20\mu\text{A}; V_{CC} = 2.0V$	1.9	-	-	V
			$I_{O} = -20\mu\text{A}; V_{CC} = 4.5V$	4.4	-	-	V
			$I_{O} = -20\mu\text{A}; V_{CC} = 6.0V$	5.9	-	-	V
			$I_{O} = -4.0\text{mA}; V_{CC} = 4.5V$	3.7	-	-	V
			$I_{O} = -5.2\text{mA}; V_{CC} = 6.0V$	5.2	-	-	V
LOW-level output voltage	V_{OL}	$V_I = V_{IH}$ or V_{IL}	$I_{O} = 20\mu\text{A}; V_{CC} = 2.0V$	-	-	0.1	V
			$I_{O} = 20\mu\text{A}; V_{CC} = 4.5V$	-	-	0.1	V
			$I_{O} = 20\mu\text{A}; V_{CC} = 6.0V$	-	-	0.1	V
			$I_{O} = 4.0\text{mA}; V_{CC} = 4.5V$	-	-	0.4	V
			$I_{O} = 5.2\text{mA}; V_{CC} = 6.0V$	-	-	0.4	V
input leakage current	I_I	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0V$	-	-	± 1.0	μA	
OFF-state output current	I_{OZ}	$V_I = V_{IH}$ or $V_{IL}; V_O = V_{CC}$ or GND; $V_{CC} = 6.0V$	-	-	± 10	μA	
supply current	I_{CC}	$V_I = V_{CC}$ or GND; $I_O = 0\text{A};$ $V_{CC} = 6.0V$	-	-	160	μA	



AOS74HC139D

Data Sheet

AC Characteristics 1

(Tamb=25°C, GND=0V, CL=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
propagation delay	t _{pd}	nAn to nYn; see Figure 6 ^[1]	V _{CC} =2.0V	-	39	145	ns
			V _{CC} =4.5V	-	14	29	ns
			V _{CC} =5.0V C _L =15pF	-	11	-	ns
			V _{CC} =6.0V	-	11	25	ns
		n \bar{r} E to n \bar{r} Yn; see Figure 7 ^[2]	V _{CC} =2.0V	-	33	135	ns
			V _{CC} =4.5V	-	12	27	ns
			V _{CC} =5.0V C _L =15pF	-	10	-	ns
			V _{CC} =6.0V	-	10	23	ns
transition time	t _t	n \bar{r} Yn; see Figure 6 and Figure 7 ^[2]	V _{CC} =2.0V	-	19	75	ns
			V _{CC} =4.5V	-	7	15	ns
			V _{CC} =6.0V	-	6	13	ns
power dissipation capacitance	C _{PD}	C _L =50pF; f=1MHz; V _i =GND to V _{CC} ^[3]	-	42	-	pF	

Note:

[1]t_{pd} is the same as 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} × V_{CC2} × f_i × N + (C_L × V_{CC2} × 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;

Σ(C_L × V_{CC2} × f_o)=sum of outputs.

AOS74HC139D

Data Sheet

AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
propagation delay	t_{pd}	nAn to nYn; see Figure 6 ^[1]	$V_{CC}=2.0V$	-	-	180	ns
			$V_{CC}=4.5V$	-	-	36	ns
			$V_{CC}=6.0V$	-	-	31	ns
		n \bar{r} E to n \bar{r} Yn; see Figure 7 ^[1]	$V_{CC}=2.0V$	-	-	170	ns
			$V_{CC}=4.5V$	-	-	34	ns
			$V_{CC}=6.0V$	-	-	29	ns
transition time	t_t	n \bar{r} Yn; see Figure 6 and Figure 7 ^[2]	$V_{CC}=2.0V$	-	-	95	ns
			$V_{CC}=4.5V$	-	-	19	ns
			$V_{CC}=6.0V$	-	-	16	ns

Note:

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

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



AOS74HC139D

Data Sheet

AC Characteristics 3

($T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND(GND=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC139							
propagation delay	t_{pd}	nAn to nYn; see Figure 6 ^[1]	$V_{CC}=2.0\text{V}$	-	-	220	ns
			$V_{CC}=4.5\text{V}$	-	-	44	ns
			$V_{CC}=6.0\text{V}$	-	-	38	ns
		n \bar{A} E to n \bar{A} Yn; see Figure 7 ^[1]	$V_{CC}=2.0\text{V}$	-	-	205	ns
			$V_{CC}=4.5\text{V}$	-	-	41	ns
			$V_{CC}=6.0\text{V}$	-	-	35	ns
transition time	t_t	n \bar{A} Yn; see Figure 6 and Figure 7 ^[2]	$V_{CC}=2.0\text{V}$	-	-	110	ns
			$V_{CC}=4.5\text{V}$	-	-	22	ns
			$V_{CC}=6.0\text{V}$	-	-	19	ns

Note:

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

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



AOS74HC139D

Data Sheet

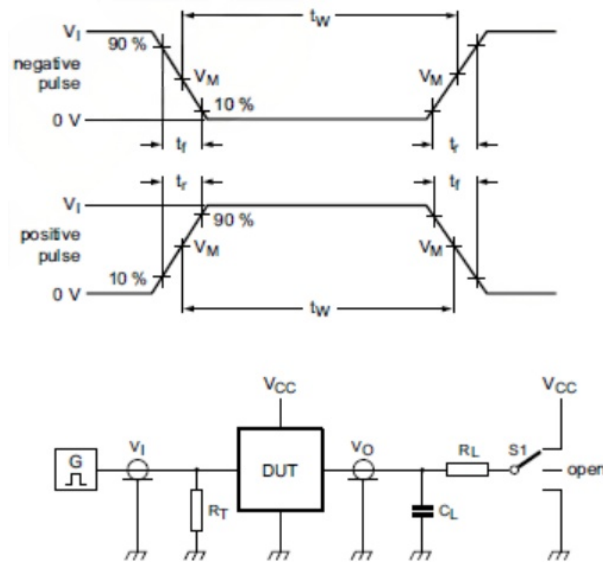
Testing Circuit
AC Testing Circuit

Figure 5. 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_0 of the pulse generator.

R_L =Load resistance.

$S1$ =Test selection switch.



AOS74HC139D

Data Sheet

AC Testing Waveforms

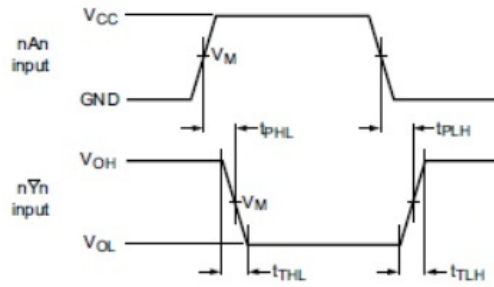


Figure 6. Propagation delay input (nA_n) to output ($n\bar{Y}_n$) and transition time output ($n\bar{Y}_n$)

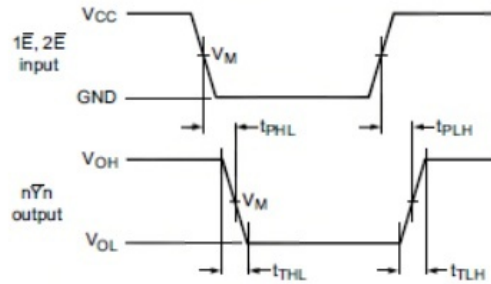


Figure 7. Propagation delay enable input ($n\bar{E}$) to output ($n\bar{Y}_n$) and transition time output ($n\bar{Y}_n$)

Measurement Points

Type	Input	Output
	V_M	V_M
AOS74HC139	$0.5V_{CC}$	$0.5V_{CC}$

Test Data

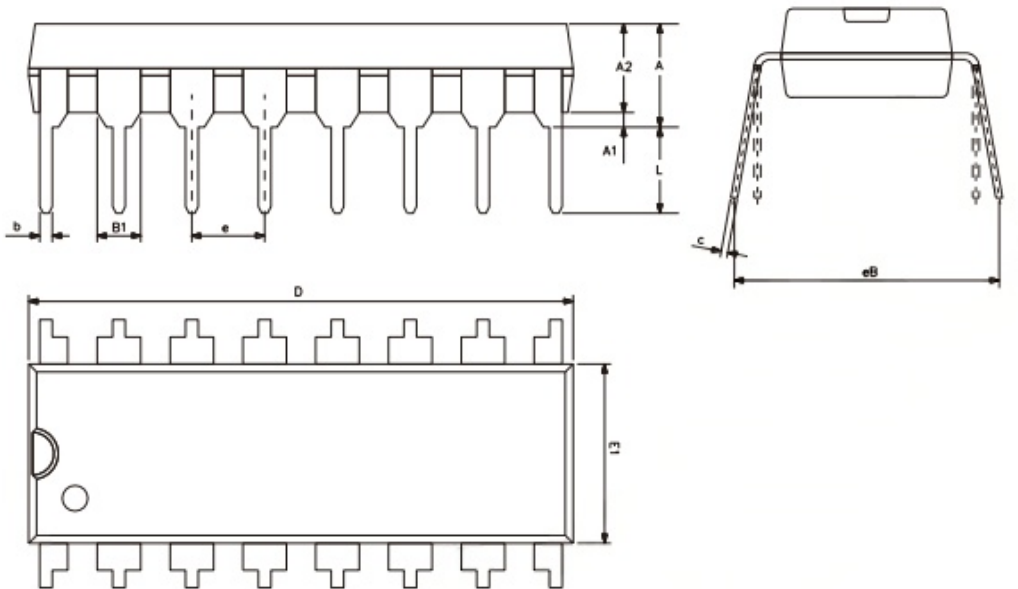
Type	Input		Load		S1 position		
	V_M	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
AOS74HC139	V_{CC}	6ns	15pF, 50pF	1k	open	GND	V_{CC}



AOS74HC139D

Data Sheet

Package Information DIP16



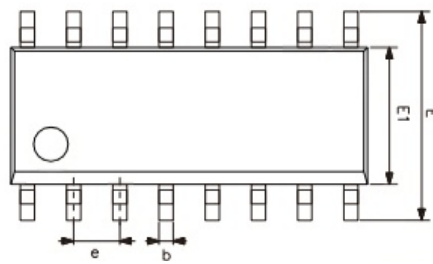
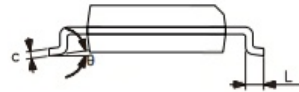
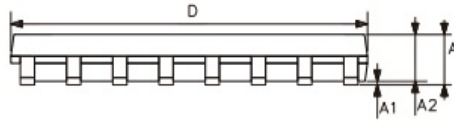
Symbol	Dimensions (mm)	
	Min.	Max.
A2	3.20	3.60
A1	0.51	-
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
c	0.20	0.36
eB	7.62	9.30



AOS74HC139D

Data Sheet

SOP16



Symbol	Dimensions (mm)	
	Min.	Max.
A	1.35	1.80
A1	0.10	0.25
A2	1.25	1.55
b	0.33	0.51
c	0.19	0.25
D	9.50	10.10
E	5.80	6.30
E1	3.70	4.10
e	1.27	
L	0.35	0.89
	0°	8°

