



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS74HC151D

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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

AOS74HC151D

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Logic Gates

3-8 译码器 / 信号分离器 (反相)

■ General Description

The AOS74HC151 are 8-bit multiplexer with eight binary inputs (I0 to I7), three select inputs (S0 to S2) and an enable input (\bar{E}). One of the eight binary inputs is selected by the select inputs and routed to the complementary outputs (Y and \bar{Y}). A HIGH on \bar{E} forces the output \bar{Y} LOW and output Y HIGH. Inputs also 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 AOS74HC151: CMOS level
- Low-power dissipation
- Non-inverting data path
- Specified from -40 to +125
- Packaging information: DIP16/SOP16/TSSOP16

■ Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AOS74HC151DR	SOP16	HC151	2500 PCS/reel	5000 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.



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Block Diagram And Pin Description

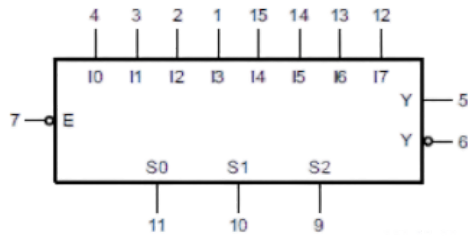


Figure 1. Logic symbol

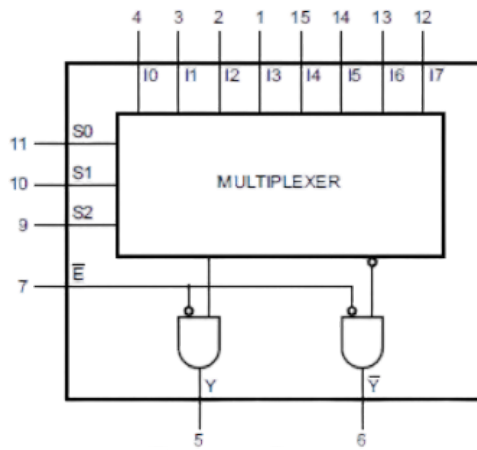


Figure 2. Functional diagram

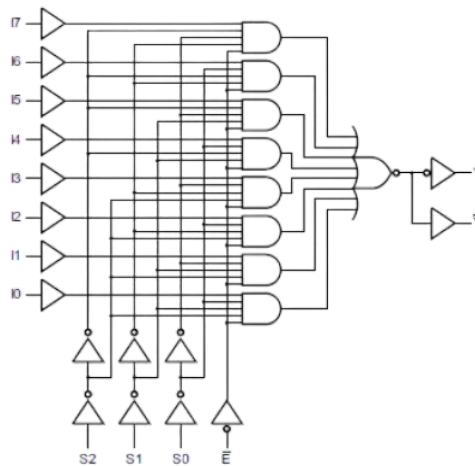


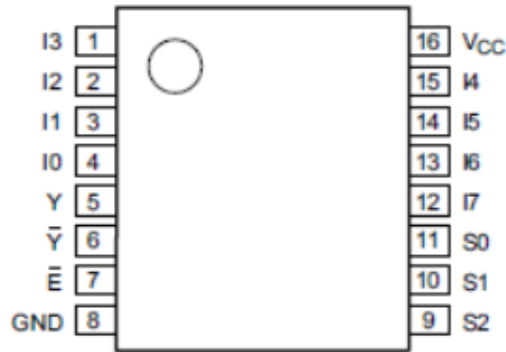
Figure 3. Logic diagram



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■ Pin Configurations



■ Pin Description

Pin No.	Pin Name	Description
1	I3	data input
2	I2	data input
3	I1	data input
4	I0	data input
5	Y	multiplier output
6	\bar{Y}	complementary multiplier output
7	\bar{E}	enable input(active LOW)
8	GND	ground (0V)
9	S2	common data select input
10	S1	common data select input
11	S0	common data select input
12	I7	data input
13	I6	data input
14	I5	data input
15	I4	data input
16	V _{cc}	supply voltage



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■ Function Table

Input												Output	
\bar{E}	S2	S1	S0	I0	I1	I2	I3	I4	I5	I6	I7	Y	\bar{Y}
H	X	X	X	X	X	X	X	X	X	X	X	H	L
L	L	L	L	L	X	X	X	X	X	X	X	H	L
L	L	L	L	H	X	X	X	X	X	X	X	L	H
L	L	L	H	X	L	X	X	X	X	X	X	H	L
L	L	L	H	X	H	X	X	X	X	X	X	L	H
L	L	H	L	X	X	L	X	X	X	X	X	H	L
L	L	H	L	X	X	H	X	X	X	X	X	L	H
L	L	H	H	X	X	X	L	X	X	X	X	H	L
L	L	H	H	X	X	X	H	X	X	X	X	L	H
L	H	L	L	X	X	X	X	L	X	X	X	H	L
L	H	L	L	X	X	X	X	H	X	X	X	L	H
L	H	L	H	X	X	X	X	X	L	X	X	H	L
L	H	L	H	X	X	X	X	X	H	X	X	L	H
L	H	H	L	X	X	X	X	X	X	L	X	H	L
L	H	H	L	X	X	X	X	X	X	H	X	L	H
L	H	H	H	X	X	X	X	X	X	X	L	H	L
L	H	H	H	X	X	X	X	X	X	X	H	L	H

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



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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 $V_O > V_{CC} + 0.5V$	-	± 20	mA
output clamping current	I_{OK}	$V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$	-	± 20	
output current	I_O	$V_O \leq -0.5V$ to $(V_{CC} + 0.5V)$	-	± 25	
supply current	I_{CC}	-	-	50	
ground current	I_{GND}	-	-50	-	
total power dissipation	P_{tot}	-	-	500	mW
storage temperature	T_{stg}	-	-65	+150	
soldering temperature	T_L	10秒	DIP	245	
			SOP	260	

Note:

- [1] For DIP16 packages: above 70°C the value of P_{tot} derates linearly with 12mW/K.
- [2] For SOP16 packages: above 70°C the value of P_{tot} derates linearly with 8mW/K.
- [3] For (T)SSOP16 packages: above 60°C the value of P_{tot} derates linearly with 5.5mW/K.



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Recommended Operating Conditions

Parameter	Symbol	Condi ti ons	Mi n.	Typ.	Max.	Uni t
AOS74HC151						
supply vol tage	V_{CC}	-	2.0	5.0	6.0	V
i nput vol tage	V_I	-	0	-	V_{CC}	
output vol tage	V_O	-	0	-	V_{CC}	
i nput transition rise and fall rate	$\Delta t / \Delta V$	$V_{CC}=2.0V$	-	-	625	ns/V
		$V_{CC}=4.5V$	-	1.67	139	
		$V_{CC}=6.0V$	-	-	83	
ambient temperature	T_{amb}	-	-40	-	+105	



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Electrical Characteristics

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
AOS74HC151						
HIGH-level input voltage	V_{IH}	$V_{CC}=2.0V$	1.5	1.2	-	V
		$V_{CC}=4.5V$	3.15	2.4	-	
		$V_{CC}=6.0V$	4.2	3.2	-	
LOW-level input voltage	V_{IL}	$V_{CC}=2.0V$	-	0.8	0.5	
		$V_{CC}=4.5V$	-	2.1	1.35	
		$V_{CC}=6.0V$	-	2.8	1.8	
HIGH-level output voltage	V_{OH}	$V_I=V_{IH}$ 或 V_{IL}	$I_{O}=-20\mu A; V_{CC}=2.0V$	1.9	2.0	
			$I_{O}=-20\mu A; V_{CC}=4.5V$	4.4	4.5	-
			$I_{O}=-20\mu A; V_{CC}=6.0V$	5.9	6.0	-
			$I_{O}=-4.0mA; V_{CC}=4.5V$	3.98	4.32	-
			$I_{O}=-5.2mA; V_{CC}=6.0V$	5.48	5.81	-
LOW-level output voltage	V_{OL}	$V_I=V_{IH}$ 或 V_{IL}	$I_{O}=20\mu A; V_{CC}=2.0V$	-	0	0.1
			$I_{O}=20\mu A; V_{CC}=4.5V$	-	0	0.1
			$I_{O}=20\mu A; V_{CC}=6.0V$	-	0	0.1
			$I_{O}=4.0mA; V_{CC}=4.5V$	-	0.15	0.26
			$I_{O}=5.2mA; V_{CC}=6.0V$	-	0.16	0.26
input leakage current	I_I	$V_I=V_{CC}$ 或GND; $V_{CC}=6.0V$	-	-	± 0.1	μA
supply current	I_{CC}	$V_I=V_{CC}$ 或GND; $I_O=0A, V_{CC}=6.0V$	-	-	8.0	
input capacitance	C_i	-	-	3.5	-	mA



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DC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AOS74HC151						
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}	$I_O = -20\mu A; V_{CC}=2.0V$	1.9	-	
			$I_O = -20\mu A; V_{CC}=4.5V$	4.4	-	-
			$I_O = -20\mu A; V_{CC}=6.0V$	5.9	-	-
			$I_O = -4.0mA; V_{CC}=4.5V$	3.84	-	-
			$I_O = -5.2mA; V_{CC}=6.0V$	5.34	-	-
LOW-level output voltage	V_{OL}	$V_I = V_{IH}$ 或 V_{IL}	$I_O = 20\mu A; V_{CC}=2.0V$	-	-	0.1
			$I_O = 20\mu A; V_{CC}=4.5V$	-	-	0.1
			$I_O = 20\mu A; V_{CC}=6.0V$	-	-	0.1
			$I_O = 4.0mA; V_{CC}=4.5V$	-	-	0.33
			$I_O = 5.2mA; V_{CC}=6.0V$	-	-	0.33
input leakage current	I_I	$V_I = V_{CC}$ 或 $GND; V_{CC}=6.0V$	-	-	± 1.0	μA
supply current	I_{CC}	$V_I = V_{CC}$ 或 $GND; I_O = 0A, V_{CC}=6.0V$	-	-	80	



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DC Characteristics 3

(Tamb=-40°C to +105°C, voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AOS74HC151						
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	μA
supply current	I _{CC}	V _I =V _{CC} 或GND; I _O =0A, V _{CC} =6.0V	-	-	160	



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AC Characteristics 1

(T_{amb}=25°C, GND=0V, C_L=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC151							
propagation delay	t _{pd}	In to Y; see Figure 5 ^[1]	V _{CC} =2.0V	-	52	170	ns
			V _{CC} =4.5V	-	19	34	
			V _{CC} =5.0V, C _L =15pF	-	17	-	
			V _{CC} =6.0V	-	15	29	
		In to -Y; see Figure 5 ^[1]	V _{CC} =2.0V	-	58	185	
			V _{CC} =4.5V	-	21	37	
			V _{CC} =5.0V, C _L =15pF	-	17	-	
			V _{CC} =6.0V	-	17	31	
		Sn to Y; see Figure 6 ^[1]	V _{CC} =2.0V	-	61	185	
			V _{CC} =4.5V	-	22	37	
			V _{CC} =5.0V, C _L =15pF	-	19	-	
			V _{CC} =6.0V	-	18	31	
		Sn to -Y; see Figure 6 ^[1]	V _{CC} =2.0V	-	61	205	
			V _{CC} =4.5V	-	22	41	
			V _{CC} =5.0V, C _L =15pF	-	19	-	
			V _{CC} =6.0V	-	18	35	
		-E to Y; see Figure 6	V _{CC} =2.0V	-	41	125	
			V _{CC} =4.5V	-	15	25	
			V _{CC} =5.0V, C _L =15pF	-	12	-	
			V _{CC} =6.0V	-	12	21	
		-E to -Y; see Figure 6	V _{CC} =2.0V	-	47	145	
			V _{CC} =4.5V	-	17	29	
			V _{CC} =5.0V, C _L =15pF	-	14	-	
			V _{CC} =6.0V	-	14	25	
transition time	t _t	Y, -Y; see Figure 5 ^[2]	V _{CC} =2.0V	-	19	75	
			V _{CC} =4.5V	-	7	15	
			V _{CC} =6.0V	-	6	13	
power dissipation capacitance	C _{PD}	C _L =50pF; f=1MHz; V _I =GND to V _{CC} ^[3]	-	40	-	pF	



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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_b in μW).

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

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



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AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
AOS74HC151							
propagation delay	t_{pd}	In to Y; see Figure 5 ^[1]	$V_{CC} = 2.0V$	-	-	215	ns
			$V_{CC} = 4.5V$	-	-	43	
			$V_{CC} = 6.0V$	-	-	37	
		In to $\neg Y$; see Figure 5 ^[1]	$V_{CC} = 2.0V$	-	-	230	
			$V_{CC} = 4.5V$	-	-	46	
			$V_{CC} = 6.0V$	-	-	39	
		Sn to Y; see Figure 6 ^[1]	$V_{CC} = 2.0V$	-	-	230	
			$V_{CC} = 4.5V$	-	-	46	
			$V_{CC} = 6.0V$	-	-	39	
		Sn to $\neg Y$; see Figure 6 ^[1]	$V_{CC} = 2.0V$	-	-	255	
			$V_{CC} = 4.5V$	-	-	51	
			$V_{CC} = 6.0V$	-	-	43	
		$\neg E$ to Y; see Figure 6	$V_{CC} = 2.0V$	-	-	155	
			$V_{CC} = 4.5V$	-	-	36	
			$V_{CC} = 6.0V$	-	-	31	
		$\neg E$ to $\neg Y$; see Figure 6	$V_{CC} = 2.0V$	-	-	180	
			$V_{CC} = 4.5V$	-	-	36	
			$V_{CC} = 6.0V$	-	-	31	
transition time	t_t	Y, $\neg Y$; see Figure 5 ^[2]	$V_{CC} = 2.0V$	-	-	95	
			$V_{CC} = 4.5V$	-	-	19	
			$V_{CC} = 6.0V$	-	-	16	

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} .



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AC Characteristics 3

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit			
AOS74HC151									
propagation delay	t_{pd}	In to Y; see Figure 5 ^[1]	$V_{CC} = 2.0V$	-	-	255	ns		
			$V_{CC} = 4.5V$	-	-	51			
			$V_{CC} = 6.0V$	-	-	43			
		In to -Y; see Figure 5 ^[1]	$V_{CC} = 2.0V$	-	-	280			
			$V_{CC} = 4.5V$	-	-	56			
			$V_{CC} = 6.0V$	-	-	46			
		Sn to Y; see Figure 6 ^[1]	$V_{CC} = 2.0V$	-	-	280			
			$V_{CC} = 4.5V$	-	-	56			
			$V_{CC} = 6.0V$	-	-	48			
		Sn to -Y; see Figure 6 ^[1]	$V_{CC} = 2.0V$	-	-	310			
			$V_{CC} = 4.5V$	-	-	62			
			$V_{CC} = 6.0V$	-	-	53			
		-E to Y; see Figure 6	$V_{CC} = 2.0V$	-	-	190			
			$V_{CC} = 4.5V$	-	-	38			
			$V_{CC} = 6.0V$	-	-	32			
		-E to -Y; see Figure 6	$V_{CC} = 2.0V$	-	-	220			
			$V_{CC} = 4.5V$	-	-	44			
			$V_{CC} = 6.0V$	-	-	38			
		transition time	t_t	Y, -Y; see Figure 5 ^[2]	$V_{CC} = 2.0V$	-		-	110
					$V_{CC} = 4.5V$	-		-	22
					$V_{CC} = 6.0V$	-		-	19

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} .



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Testing Circuit AC Testing Circuit

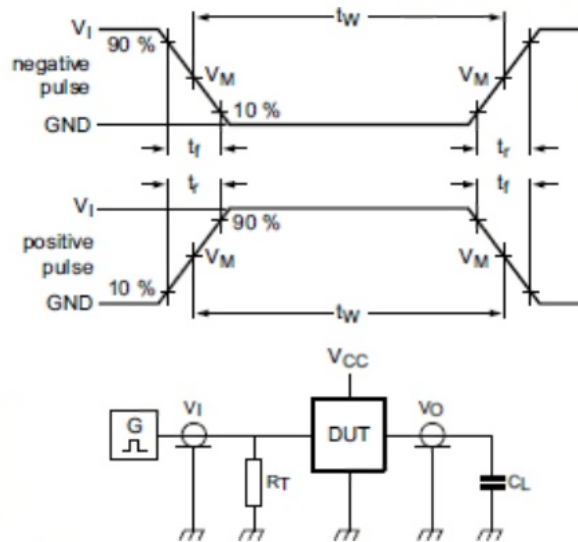


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:

CL=Load capacitance including jig and probe capacitance.

RT=Termination resistance should be equal to the output impedance Z_o of the pulse generator.



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AC Testing Waveforms

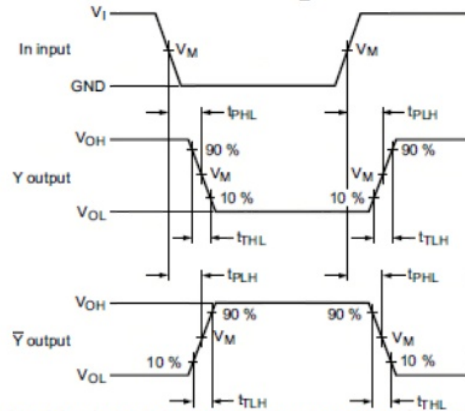


Figure 5. Propagation delay input (In) to output (Y, \bar{Y}) and the output (Y, \bar{Y}) transition time

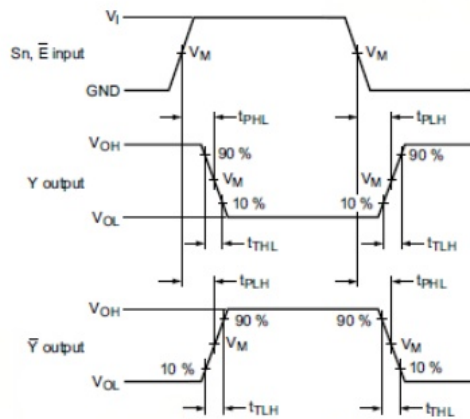


Figure 6. Propagation delay input (S_n, \bar{E}) to output (Y, \bar{Y}) and output (Y, \bar{Y}) transitions time

Measurement Points

Type	Input	Output
	V_M	V_M
AOS74HC151	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

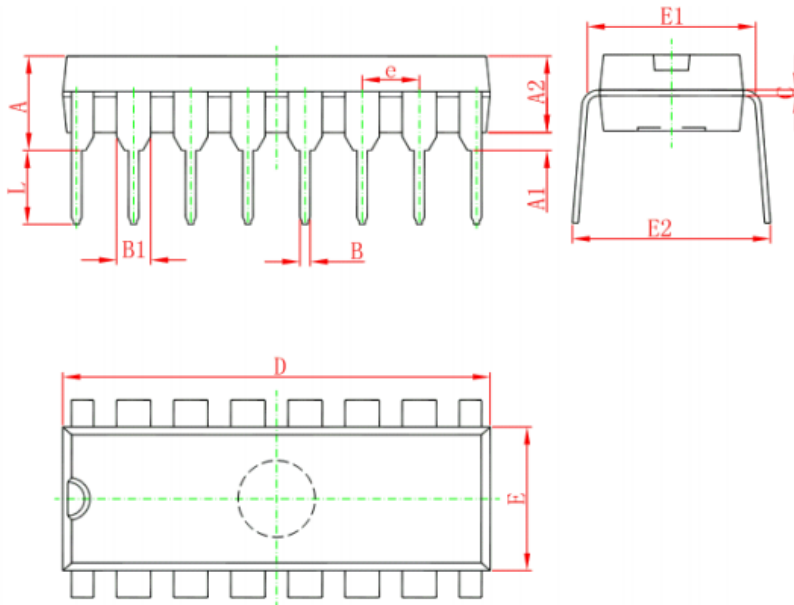
Test Data

Type	Input		Output	TEST
	V_M	t_r, t_f	C_L	
AOS74HC151	V_{CC}	6ns	15pF, 50pF	t_{PHL}, t_{PLH}



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Package Information
DIP16

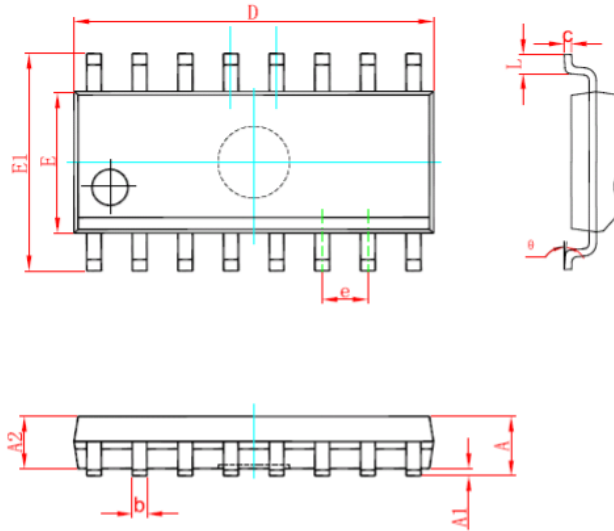
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.240	0.360	0.008	0.014
D	18.800	19.200	0.740	0.756
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
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



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SOP16



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	9.800	10.200	0.386	0.402
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
	0°	8°	0°	8°

