

74AC/ACT11470

Octal Transceiver/Register with Dual Enable; 3-State

Objective Specification

ACL Products

FEATURES

- Combines '245 and '374 type functions in one chip
- 8-bit octal transceiver with D-type flip-flops
- 3-State buffers
- Output capability: ± 24 mA
- CMOS (AC) and TTL (ACT) voltage level inputs
- 50 Ω incident wave switching
- Center-pin V_{CC} and ground configuration to minimize high-speed switching noise
- I_{CC} category: MSI

DESCRIPTION

The 74AC/ACT11470 high-performance CMOS devices combine very high speed and high output drive comparable to the most advanced TTL families.

The 74AC/ACT11470 Octal Transceiver/Register contains two sets of D-type flip-flops for temporary storage of data flowing in either direction. Dual Enable (\overline{E}_{AB} , \overline{E}_{BA}) and Output Enable (\overline{OE}_{AB} , \overline{OE}_{BA}) inputs are provided for each register to permit independent control of inputting and outputting in either direction of data flow.

GENERAL INFORMATION

SYMBOL	PARAMETER	CONDITIONS $T_A = 25^\circ\text{C}; \text{GND} = 0\text{V};$ $V_{CC} = 5.0\text{V}$	TYPICAL		UNIT	
			AC	ACT		
t_{PLH}/t_{PHL}	Propagation delay CP_{XX} to A_n or B_n	$C_L = 50\text{pF}$	5.2	6.7	ns	
C_{PD}	Power dissipation capacitance per register ¹	$f = 1\text{MHz};$ $C_L = 50\text{pF}$	Enabled	155	160	pF
			Disabled	35	40	
C_{IN}	Input capacitance	$V_I = 0\text{V}$ or V_{CC}	4.5	4.5	pF	
$C_{I/O}$	I/O capacitance	$V_{I/O} = 0\text{V}$ or V_{CC} ; Disabled	12.0	12.0	pF	
I_{LATCH}	Latch-up current	Per Jeduc JC40.2 Standard 17	500	500	mA	
f_{MAX}	Maximum clock frequency	$C_L = 50\text{pF}$	125	125	MHz	

Note:

1. C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

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

f_i = input frequency in MHz, C_L = output load capacitance in pF,

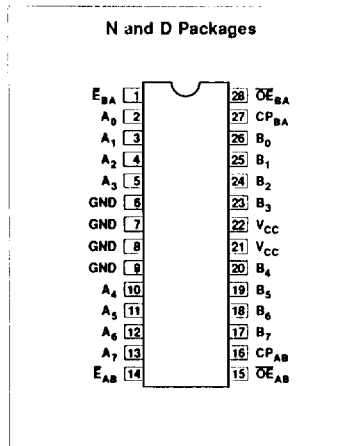
f_o = output frequency in MHz, V_{CC} = supply voltage in V,

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

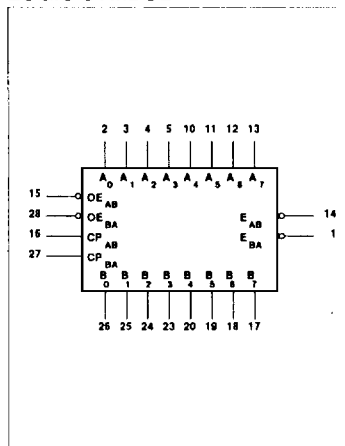
ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE
28-pin plastic DIP (300mil-wide)	-40°C to +85°C	74AC11470N 74ACT11470N
28-pin plastic SO (300mil-wide)	-40°C to +85°C	74AC11470D 74ACT11470D

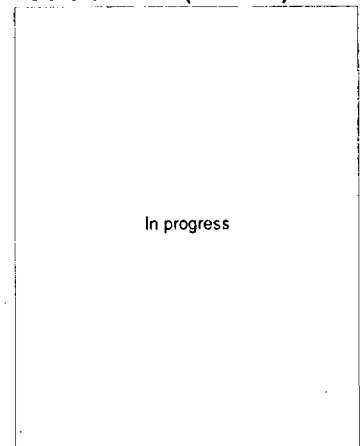
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
16	CP_{AB}	A-to-B clock input (active Low)
27	CP_{BA}	B-to-A clock input (active Low)
15	\overline{OE}_{AB}	A-to-B output enable input (active Low)
28	\overline{OE}_{BA}	B-to-A output enable input (active Low)
14	\overline{E}_{AB}	A-to-B enable input (active Low)
1	\overline{E}_{BA}	B-to-A enable input (active Low)
2, 3, 4, 5, 10, 11, 12, 13	$A_0 - A_7$	Data inputs/outputs (A side)
26, 25, 24, 23, 20, 19, 18, 17	$B_0 - B_7$	Data inputs/outputs (B side)
6, 7, 8, 9	GND	Ground (0V)
21, 22	V_{CC}	Positive supply voltage

FUNCTION TABLE

INPUTS				OUTPUTS	STATUS
\overline{OE}_{xx}	\overline{E}_{xx}	CP_{xx}	Data		
H	X	X	X	Z	Outputs disabled
X	H	X	X	Z	Outputs and clock disabled
L	L	↑	$\begin{matrix} l \\ h \end{matrix}$	$\begin{matrix} L \\ H \end{matrix}$	Load register
X	↑	L	$\begin{matrix} l \\ h \end{matrix}$	Z	Load register and disable outputs

H = High voltage level

h = High state present one setup time before the Low-to-High transition

L = Low voltage level

l = Low state present one setup time before the Low-to-High transition

↑ = Low-to-High transition

X = Don't care

Z = High-impedance state

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RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	74AC11470			74ACT11470			UNIT
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	DC supply voltage	3.0 ¹	5.0	5.5	4.5	5.0	5.5	V
V_I	Input voltage	0		V_{CC}	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	0		V_{CC}	V
$\Delta V/\Delta v$	Input transition rise or fall rate	0		10	0		10	ns/V
T_A	Operating free-air temperature	-40		+85	-40		+85	°C

NOTE:

- No electrical or switching characteristics are specified at $V_{CC} < 3V$. Operation between 2V and 3V is not recommended, but within that range, a device output will maintain a previously established logic state.

ABSOLUTE MAXIMUM RATINGS¹

SYMBOL	PARAMETER	TEST CONDITIONS	RATING	UNIT
V_{CC}	DC supply voltage		-0.5 to +7.0	V
I_{IK} or V_I	DC input diode current ²	$V_I < 0$	-20	mA
		$V_I > V_{CC}$	20	
	DC input voltage		-0.5 to $V_{CC} + 0.5$	V
I_{OK} or V_O	DC output diode current ²	$V_O < 0$	-50	mA
		$V_O > V_{CC}$	50	
	DC output voltage		-0.5 to $V_{CC} + 0.5$	V
I_O	DC output source or sink current per output pin	$V_O = 0$ to V_{CC}	±50	mA
I_{CC} or I_{GND}	DC V_{CC} current		±200	mA
	DC ground current		±200	
T_{STG}	Storage temperature		-65 to 150	°C
P_{TOT}	Power dissipation per package Plastic DIP	Above 70°C: derate linearly by 8mW/K	500	mW
	Power dissipation per package Plastic surface mount (SO)	Above 70°C: derate linearly by 6mW/K	400	mW

NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	V _{CC} V	74AC11470				74ACT11470				UNIT	
				T _A = +25°C		T _A = -40°C to +85°C		T _A = +25°C		T _A = -40°C to +85°C			
				Min	Max	Min	Max	Min	Max	Min	Max		
V _{IH}	High-level input voltage		3.0	2.10		2.10						V	
			4.5	3.15		3.15		2.0		2.0			
			5.5	3.85		3.85		2.0		2.0			
V _{IL}	Low-level input voltage		3.0		0.90		0.90					V	
			4.5		1.35		1.35	0.8		0.8			
			5.5		1.65		1.65	0.8		0.8			
V _{OH}	High-level output voltage	V _I = V _{IL} or V _{IH}	I _{OH} = -50μA	3.0	2.9		2.9					V	
				4.5	4.4		4.4		4.4		4.4		
			I _{OH} = -4mA	3.0	2.58		2.48						
				4.5	3.94		3.8		3.94		3.8		
			I _{OH} = -24mA	3.0									
				4.5	3.94		4.8		4.94		4.8		
I _{OH} = -75mA ¹	5.5			3.85				3.85					
V _{OL}	Low-level output voltage	V _I = V _{IL} or V _{IH}	I _{OL} = 50μA	3.0		0.1		0.1				V	
				4.5		0.1		0.1		0.1			0.1
				5.5		0.1		0.1		0.1			0.1
			I _{OL} = 12mA	3.0		0.36		0.44					
				4.5		0.36		0.44		0.36			0.44
			I _{OL} = 24mA	3.0		0.36		0.44		0.36			0.44
				4.5		0.36		0.44		0.36			0.44
I _{OL} = 75mA ¹	5.5				1.65				1.65				
I _I	Input leakage current	V _I = V _{CC} or GND	5.5		±0.1		±1.0		±0.1		±1.0	μA	
I _{OZ}	3-State output off-state current	V _I = V _{IL} or V _{IH} ; V _O = V _{CC} or GND	5.5		±0.5		±5.0		±0.5		±5.0	μA	
I _{CC}	Quiescent supply current	V _I = V _{CC} or GND, I _O = 0	5.5		8.0		80		8.0		80	μA	
ΔI _{CC}	Supply current, TTL inputs High ²	One input at 3.4V, other inputs at V _{CC} or GND	5.5						0.9		1.0	mA	

NOTES:

- Not more than one output should be tested at a time, and the duration of the test should not exceed 10ms.
- This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0V or V_{CC}.