

MC74AC573, MC74ACT573

Octal Buffer/Line Driver with 3-State Outputs

The MC74AC573/74ACT573 is a high-speed octal latch with buffered common Latch Enable (LE) and buffered common Output Enable (\overline{OE}) inputs.

The MC74AC573/74ACT573 is functionally identical to the MC74AC373/74ACT373 but has inputs and outputs on opposite sides.

- Inputs and Outputs on Opposite Sides of Package Allowing Easy Interface with Microprocessors
- Useful as Input or Output Port for Microprocessors
- Functionally Identical to MC74AC373/74ACT373
- 3-State Outputs for Bus Interfacing
- Outputs Source/Sink 24 mA
- 'ACT573 Has TTL Compatible Inputs

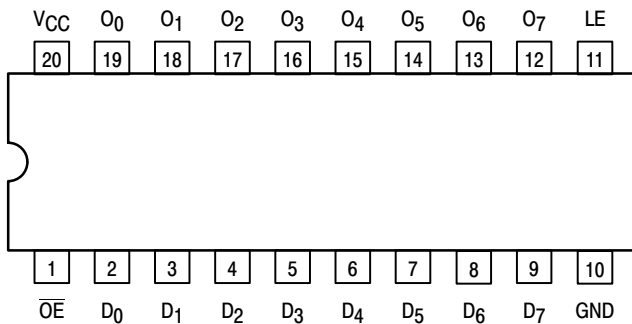


Figure 1. Pinout 20-Lead Packages Conductors (Top View)

PIN ASSIGNMENT

PIN	FUNCTION
D ₀ -D ₇	Data Inputs
LE	Latch Enable Input
\overline{OE}	3-State Output Enable Input
O ₀ -O ₇	3-State Latch Outputs

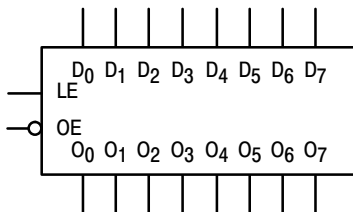
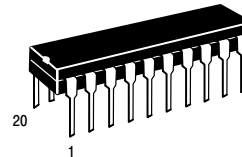


Figure 2. Logic Symbol

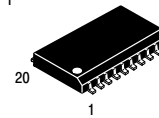


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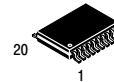
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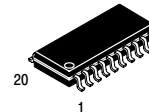
PDIP-20
N SUFFIX
CASE 738



SO-20
DW SUFFIX
CASE 751



TSSOP-20
DT SUFFIX
CASE 948E



EIAJ-20
M SUFFIX
CASE 967

ORDERING INFORMATION

Device	Package	Shipping
MC74AC573N	PDIP-20	18 Units/Rail
MC74ACT573N	PDIP-20	18 Units/Rail
MC74AC573DW	SOIC-20	38 Units/Rail
MC74AC573DWR2	SOIC-20	1000 Tape & Reel
MC74ACT573DW	SOIC-20	38 Units/Rail
MC74ACT573DWR2	SOIC-20	1000 Tape & Reel
MC74AC573DT	TSSOP-20	75 Units/Rail
MC74AC573DTR2	TSSOP-20	2500 Tape & Reel
MC74ACT573DT	TSSOP-20	75 Units/Rail
MC74ACT573DTR2	TSSOP-20	2500 Tape & Reel
MC74AC573M	EIAJ-20	40 Units/Rail
MC74AC573MEL	EIAJ-20	2000 Tape & Reel
MC74ACT573M	EIAJ-20	40 Units/Rail
MC74ACT573MEL	EIAJ-20	2000 Tape & Reel

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 270 of this data sheet.

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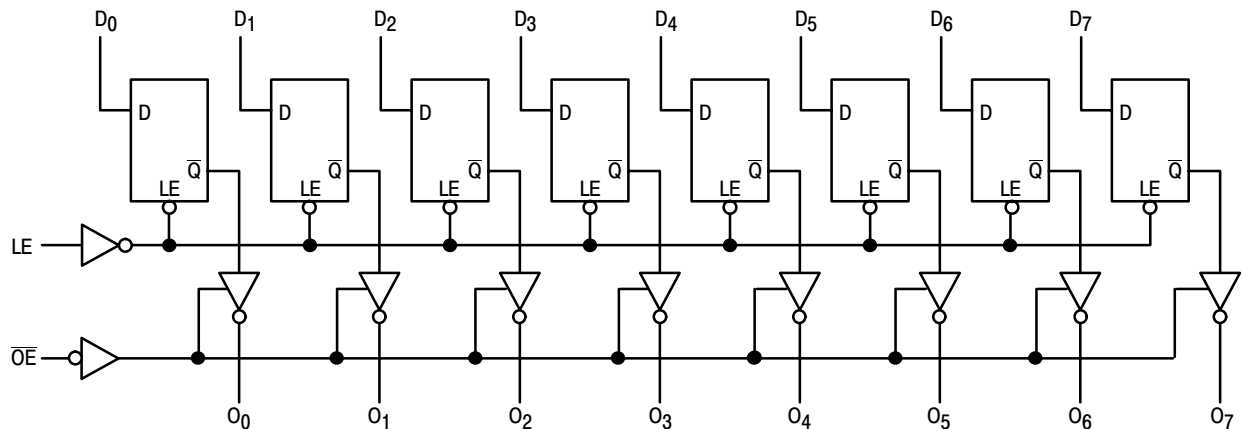
TRUTH TABLE

Inputs			Outputs
\overline{OE}	LE	D_n	O_n
L	H	H	H
L	H	L	L
L	L	X	O_0
H	X	X	Z

H = HIGH Voltage Level
 L = LOW Voltage Level
 Z = High Impedance
 X = Immaterial
 O_0 = Previous O_0 before LOW-to-HIGH Transition of Clock

FUNCTIONAL DESCRIPTION

The MC74AC573/74ACT574 contains eight D-type latches with 3-state output buffers. When the Latch Enable (LE) input is HIGH, data on the D_n inputs enters the latches. In this condition the latches are transparent, i.e., a latch output will change state each time its D input changes. When LE is LOW the latches store the information that was present on the D inputs a setup time preceding the HIGH-to-LOW transition of LE. The 3-state buffers are controlled by the Output Enable (\overline{OE}) input. When \overline{OE} is LOW, the buffers are enabled. When \overline{OE} is HIGH the buffers are in the high impedance mode but this does not interfere with entering new data into the latches.



NOTE: That this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Figure 3. Logic Diagram

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
V_{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{IN}	DC Input Current, per Pin	± 20	mA
I_{OUT}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	$^{\circ}C$

*Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

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RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V _{CC}	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage (Ref. to GND)	0	–	V _{CC}	V	
t _r , t _f	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V _{CC} @ 3.0 V	–	150	–	ns/V
		V _{CC} @ 4.5 V	–	40	–	
		V _{CC} @ 5.5 V	–	25	–	
t _r , t _f	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V _{CC} @ 4.5 V	–	10	–	ns/V
		V _{CC} @ 5.5 V	–	8.0	–	
T _J	Junction Temperature (PDIP)	–	–	140	°C	
T _A	Operating Ambient Temperature Range	–40	25	85	°C	
I _{OH}	Output Current – High	–	–	–24	mA	
I _{OL}	Output Current – Low	–	–	24	mA	

1. V_{IN} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. V_{IN} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

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DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74AC		74AC	Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C		
			Typ	Guaranteed Limits			
V _{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V _{IL}	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V _{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I _{OUT} = -50 μA
		4.5	4.49	4.4	4.4		
		5.5	5.49	5.4	5.4		
		3.0	-	2.56	2.46	V	*V _{IN} = V _{IL} or V _{IH} -12 mA I _{OH} -24 mA -24 mA
		4.5	-	3.86	3.76		
		5.5	-	4.86	4.76		
V _{OL}	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I _{OUT} = 50 μA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
		3.0	-	0.36	0.44	V	*V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA
		4.5	-	0.36	0.44		
		5.5	-	0.36	0.44		
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μA	V _I = V _{CC} , GND
I _{OZ}	Maximum 3-State Current	5.5	-	±0.5	±5.0	μA	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND
I _{OLD}	†Minimum Dynamic Output Current	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max
I _{OHD}		5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min
I _{CC}	Maximum Quiescent Supply Current	5.5	-	8.0	80	μA	V _{IN} = V _{CC} or GND

*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one output loaded at a time.

NOTE: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

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AC CHARACTERISTICS (For Figures and Waveforms – See Section 3)

Symbol	Parameter	V _{CC} * (V)	74AC			74AC		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay D _n to O _n	3.3	2.5	–	13.0	2.0	15.0	ns	3–5
		5.0	2.5	–	10.0	2.0	11.5		
t _{PHL}	Propagation Delay D _n to O _n	3.3	2.5	–	12.0	2.0	14.0	ns	3–5
		5.0	2.5	–	9.5	2.0	11.0		
t _{PLH}	Propagation Delay LE to O _n	3.3	2.5	–	13.0	2.0	15.0	ns	3–6
		5.0	2.5	–	9.5	2.0	11.0		
t _{PHL}	Propagation Delay LE to O _n	3.3	2.5	–	12.0	2.0	14.0	ns	3–6
		5.0	2.5	–	8.5	2.0	10.0		
t _{PZH}	Output Enable Time	3.3	2.5	–	11.0	2.0	12.0	ns	3–7
		5.0	2.5	–	9.0	2.0	10.0		
t _{PZL}	Output Enable Time	3.3	2.5	–	11.0	2.0	12.5	ns	3–8
		5.0	2.5	–	8.5	2.0	9.5		
t _{PHZ}	Output Disable Time	3.3	2.5	–	12.5	2.0	13.5	ns	3–7
		5.0	2.5	–	11.0	2.0	12.0		
t _{PLZ}	Output Disable Time	3.3	2.5	–	9.5	2.0	10.5	ns	3–8
		5.0	2.5	–	8.0	2.0	9.0		

*Voltage Range 3.3 V is 3.3 V ±0.3 V.
Voltage Range 5.0 V is 5.0 V ±0.5 V.

AC OPERATING REQUIREMENTS

Symbol	Parameter	V _{CC} * (V)	74AC		74AC		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF		T _A = -40°C to +85°C C _L = 50 pF			
			Typ	Guaranteed Minimum				
t _s	Setup Time, HIGH or LOW D _n to LE	3.3	–	3.5	4.0	ns	3–9	
		5.0	–	3.0	3.5			
t _h	Hold Time, HIGH or LOW D _n to LE	3.3	–	2.0	2.0	ns	3–9	
		5.0	–	2.0	2.0			
t _w	LE Pulse Width, HIGH	3.3	–	6.0	7.0	ns	3–6	
		5.0	–	4.0	5.0			

*Voltage Range 3.3 V is 3.3 V ±0.3 V.
Voltage Range 5.0 V is 5.0 V ±0.5 V.

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DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74ACT		74ACT		Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	4.5	1.5	2.0	2.0	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
		5.5	1.5	2.0	2.0			
V _{IL}	Maximum Low Level Input Voltage	4.5	1.5	0.8	0.8	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
		5.5	1.5	0.8	0.8			
V _{OH}	Minimum High Level Output Voltage	4.5	4.49	4.4	4.4	V	I _{OUT} = -50 μA	
		5.5	5.49	5.4	5.4			
		4.5	-	3.86	3.76	V	*V _{IN} = V _{IL} or V _{IH} I _{OH} = -24 mA	
		5.5	-	4.86	4.76			
V _{OL}	Maximum Low Level Output Voltage	4.5	0.001	0.1	0.1	V	I _{OUT} = 50 μA	
		5.5	0.001	0.1	0.1			
		4.5	-	0.36	0.44	V	*V _{IN} = V _{IL} or V _{IH} I _{OL} = 24 mA	
		5.5	-	0.36	0.44			
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μA	V _I = V _{CC} , GND	
ΔI _{CCT}	Additional Max. I _{CC} /Input	5.5	0.6	-	1.5	mA	V _I = V _{CC} - 2.1 V	
I _{OZ}	Maximum 3-State Current	5.5	-	±0.5	±5.0	μA	V _I (OE) = V _{IL} , V _{IH} V _I = V _{CC} , GND V _O = V _{CC} , GND	
I _{OLD}	†Minimum Dynamic Output Current	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}		5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5	-	8.0	80	μA	V _{IN} = V _{CC} or GND	

*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one output loaded at a time.

AC CHARACTERISTICS (For Figures and Waveforms – See Section 3)

Symbol	Parameter	V _{CC} * (V)	74ACT			74ACT		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay D _n to O _n	5.0	2.5	-	10.5	2.0	12	ns	3-5
t _{PHL}	Propagation Delay D _n to O _n	5.0	2.5	-	10.5	2.0	12	ns	3-5
t _{PLH}	Propagation Delay LE to O _n	5.0	3.0	-	10.5	2.5	12	ns	3-6
t _{PHL}	Propagation Delay LE to O _n	5.0	2.5	-	9.5	2.0	10.5	ns	3-6
t _{PZH}	Output Enable Time	5.0	2.0	-	10	1.5	11	ns	3-7
t _{PZL}	Output Enable Time	5.0	1.5	-	9.5	1.5	10.5	ns	3-8
t _{PHZ}	Output Disable Time	5.0	2.5	-	11	1.5	12.5	ns	3-7
t _{PLZ}	Output Disable Time	5.0	1.5	-	8.5	1.0	9.5	ns	3-8

*Voltage Range 5.0 V is 5.0 V ±0.5 V.

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AC OPERATING REQUIREMENTS

Symbol	Parameter	V _{CC} * (V)	74ACT		74ACT	Unit	Fig. No.
			T _A = +25°C C _L = 50 pF		T _A = -40°C to +85°C C _L = 50 pF		
			Typ	Guaranteed Minimum			
t _s	Setup Time, HIGH or LOW D _n to LE	5.0	–	3.0	3.5	ns	3–9
t _h	Hold Time, HIGH or LOW D _n to LE	5.0	–	0	0	ns	3–9
t _w	LE Pulse Width, HIGH	5.0	–	3.5	4.0	ns	3–6

*Voltage Range 5.0 V is 5.0 V ±0.5 V.

CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	5.0	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	25	pF	V _{CC} = 5.0 V

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MARKING DIAGRAMS

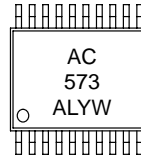
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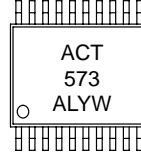
SO-20



TSSOP-20



EIAJ-20



A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week