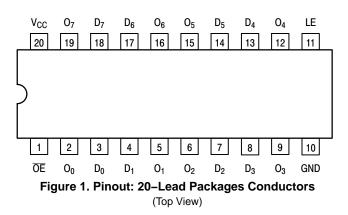
Octal Transparent Latch with 3-State Outputs

The MC74AC373/74ACT373 consists of eight latches with 3-state outputs for bus organized system applications. The flip-flops appear transparent to the data when Latch Enable (LE) is HIGH. When LE is LOW, the data that meets the setup time is latched. Data appears on the bus when the Output Enable (\overline{OE}) is LOW. When \overline{OE} is HIGH, the bus output is in the high impedance state.

Features

- Eight Latches in a Single Package
- 3-State Outputs for Bus Interfacing
- Outputs Source/Sink 24 mA
- 'ACT373 Has TTL Compatible Inputs
- These are Pb–Free Devices



PIN ASSIGNMENT

PIN	FUNCTION
D ₀ -D ₇	Data Inputs
LE	Latch Enable Input
ŌĒ	Output Enable Input
0 ₀ –0 ₇	3-State Latch Outputs

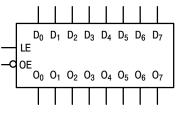


Figure 2. Logic Symbol



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CASE 948E

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 9 of this data sheet.

TRUTH TABLE

	Inputs					
ŌĒ	LE	D _n	On			
Н	Х	Х	Z			
L	Н	L	L			
L	н	Н	Н			
L	L	Х	O ₀			

H = HIGH Voltage Level

L = LOW Voltage Level

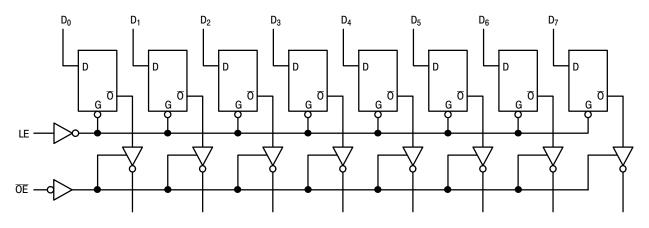
Z = High Impedance

X = Immaterial

 O_0 = Previous O_0 before LOW-to-HIGH Transition of Clock

FUNCTIONAL DESCRIPTION

The MC74AC373/74ACT373 contains eight D-type latches with 3-state standard outputs. 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 standard outputs are controlled by the Output Enable (\overline{OE}) input. When \overline{OE} is LOW, the standard outputs are in the 2-state mode. When \overline{OE} is HIGH, the standard outputs are in the high impedance mode but this does not interfere with entering new data into the latches.



NOTE: 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 C	GND)	-0.5 to +7.0	V
V _{IN}	DC Input Voltage (Referenced to GN	–0.5 to V _{CC} +0.5	V	
V _{OUT}	DC Output Voltage (Referenced to C	GND) (Note 1)	–0.5 to V _{CC} +0.5	V
I _{IK}	DC Input Diode Current		±20	mA
I _{OK}	DC Output Diode Current		±50	mA
I _{OUT}	DC Output Sink/Source Current		±50	mA
I _{CC}	DC Supply Current, per Output Pin		±50	mA
I _{GND}	DC Ground Current, per Output Pin	±100	mA	
T _{STG}	Storage Temperature Range	-65 to +150	°C	
ΤL	Lead temperature, 1 mm from Case	for 10 Seconds	260	°C
Τ _J	Junction Temperature Under Bias		140	°C
θ_{JA}	Thermal Resistance (Note 2)	SOIC TSSOP	65.8 110.7	°C/W
MSL	Moisture Sensitivity	SOIC TSSOP	Level 3 Level 1	
F _R	Flammability Rating	Oxygen Index: 30% – 35%	UL 94 V–0 @ 0.125 in	
V _{ESD}	ESD Withstand Voltage	Human Body Model (Note 3) Machine Model (Note 4) Charged Device Model (Note 5)	> 2000 > 200 > 1000	V
I _{Latchup}	Latchup Performance	Above V_{CC} and Below GND at 85°C (Note 6)	±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. I_{OUT} absolute maximum rating must be observed.

The package thermal impedance is calculated in accordance with JESD 51–7.
 Tested to EIA/JESD22–A114–A.

Tested to EIA/JESD22-A115-A. 4.

5. Tested to JESD22-C101-A.

6. Tested to EIA/JESD78.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Тур	Max	Unit
M			2.0	5.0	6.0	N
V _{CC}	Supply Voltage	Ϋ́ACT	4.5	5.0	5.5	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage (Ref. to GND)		0	-	V _{CC}	V
			-	150	-	
t _r , t _f	Input Rise and Fall Time (Note 7) 'AC Devices except Schmitt Inputs	V _{CC} @ 4.5 V	-	40	-	ns/V
		V _{CC} @ 5.5 V	-	25	-	
	Input Rise and Fall Time (Note 8)	V _{CC} @ 4.5 V	-	10	-	n o//
t _r , t _f	'ACT Devices except Schmitt Inputs	V _{CC} @ 5.5 V	_	8.0	_	ns/V
T _A	Operating Ambient Temperature Range	-40	25	85	°C	
I _{OH}	Output Current – High			_	-24	mA
I _{OL}	Output Current – Low	-	-	24	mA	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

7. V_{IN} from 30% to 70% V_{CC} ; see individual Data Sheets for devices that differ from the typical input rise and fall times. 8. 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.

DC CHARACTERISTICS

			74	AC	74AC		
Symbol	Parameter	V _{CC} (V)	T _A = +25°C		T _A = –40°C to +85°C	Unit	Conditions
			Тур	Gua	ranteed Limits		
V _{IH}	Minimum High Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	v	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{IL}	Maximum Low Level Input Voltage	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	v	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{OH}	Minimum High Level Output Voltage	3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	v	I _{OUT} = -50 μA
		3.0 4.5 5.5		2.56 3.86 4.86	2.46 3.76 4.76	v	$V_{IN} = V_{IL} \text{ or } V_{IH}$ -12 mA $I_{OH} -24 \text{ mA}$ -24 mA
V _{OL}	Maximum Low Level Output Voltage	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V	I _{OUT} = 50 μA
		3.0 4.5 5.5	- - -	0.36 0.36 0.36	0.44 0.44 0.44	V	$V_{IN} = V_{IL} \text{ or } V_{IH}$ 12 mA I_{OL} 24 mA 24 mA
I _{IN}	Maximum Input Leakage Current	5.5	-	±0.1	±1.0	μΑ	$V_I = V_{CC}, GND$
I _{OZ}	Maximum 3–State Current	5.5	-	±0.5	±5.0	μΑ	$V_{I} (OE) = V_{IL}, V_{IH}$ $V_{I} = V_{CC}, GND$ $V_{O} = V_{CC}, GND$
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 Mi
ICC	Maximum Quiescent Supply Current	5.5	_	8.0	80	μΑ	$V_{IN} = V_{CC}$ or GND

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions. *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}.

				74AC		74	AC		
Symbol	mbol Parameter		T _A = +25°C C _L = 50 pF			T _A = −40°C to +85°C C _L = 50 pF		Unit	Fig. No.
			Min	Тур	Max	Min	Max		
t _{PLH}	Propagation Delay D_n to O_n	3.3 5.0	1.5 1.5	10 7.0	13.5 9.5	1.5 1.5	15 10.5	ns	3–5
t _{PHL}	Propagation Delay D_n to O_n	3.3 5.0	1.5 1.5	9.5 7.0	13 9.5	1.5 1.5	14.5 10.5	ns	3–5
t _{PLH}	Propagation Delay LE to O _n	3.3 5.0	1.5 1.5	10 7.5	13.5 9.5	1.5 1.5	15 10.5	ns	3–6
t _{PHL}	Propagation Delay LE to O _n	3.3 5.0	1.5 1.5	9.5 7.0	12.5 9.5	1.5 1.5	14 10.5	ns	3–6
t _{PZH}	Output Enable Time	3.3 5.0	1.5 1.5	9.0 7.0	11.5 8.5	1.0 1.0	13 9.5	ns	3–7
t _{PZL}	Output Enable Time	3.3 5.0	1.5 1.5	8.5 6.5	11.5 8.5	1.0 1.0	13 9.5	ns	3–8
t _{PHZ}	Output Disable Time	3.3 5.0	1.5 1.5	10 8.0	12.5 11	1.0 1.0	14.5 12.5	ns	3–7
t _{PLZ}	Output Disable Time	3.3 5.0	1.5 1.5	8.0 6.5	11.5 8.5	1.0 1.0	12.5 10	ns	3–8

AC CHARACTERISTICS (For Figures and Waveforms - See AND8277/D at www.onsemi.com)

*Voltage Range 3.3 V is 3.3 V \pm 0.3 V. Voltage Range 5.0 V is 5.0 V \pm 0.5 V.

AC OPERATING REQUIREMENTS

			74	AC	74AC				
Symbol	Parameter	V _{CC} * (V)	T _A = +25°C C _L = 50 pF		$I_A = +25^{\circ}C$ to +85°C		T _A = −40°C to +85°C C _L = 50 pF	Unit	Fig. No.
			Тур	Guaran	teed Minimum				
ts	Setup Time, HIGH or LOW D _n to LE	3.3 5.0	3.5 2.0	5.5 4.0	6.0 4.5	ns	3–9		
t _h	Hold Time, HIGH or LOW D _n to LE	3.3 5.0	-3.0 -1.5	1.0 1.0	1.0 1.0	ns	3–9		
t _w	LE Pulse Width, HIGH	3.3 5.0	4.0 2.0	5.5 4.0	6.0 4.5	ns	3–6		

*Voltage Range 3.3 V is 3.3 V \pm 0.3 V. Voltage Range 5.0 V is 5.0 V \pm 0.5 V.

DC CHARACTERISTICS

			74 <i>A</i>	СТ	74ACT		
Symbol	Parameter	V _{CC} (V)			T _A = –40°C to +85°C	Unit	Conditions
			Тур	Gua	aranteed Limits		
V _{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	$V_{OUT} = 0.1 V$ or $V_{CC} - 0.1 V$
V _{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I _{OUT} = -50 μA
		4.5 5.5		3.86 4.86	3.76 4.76	V	$*V_{IN} = V_{IL} \text{ or } V_{IH}$ $I_{OH} -24 \text{ mA}$ -24 mA
V _{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I _{OUT} = 50 μA
		4.5 5.5	-	0.36 0.36	0.44 0.44	V	$V_{IN} = V_{IL} \text{ or } V_{IH}$ 24 mA V_{OL} 24 mA
I _{IN}	Maximum Input Leakage Current	5.5	_	±0.1	±1.0	μΑ	$V_{I} = V_{CC}, GND$
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	μΑ	$V_{I} (OE) = V_{IL}, V_{IH}$ $V_{I} = V_{CC}, GND$ $V_{O} = V_{CC}, GND$
I _{OLD}	†Minimum Dynamic	5.5	-	-	75	mA	V _{OLD} = 1.65 V Max
I _{OHD}	Output Current	5.5	-	-	-75	mA	V _{OHD} = 3.85 V Min
Icc	Maximum Quiescent Supply Current	5.5	-	8.0	80	μΑ	$V_{IN} = V_{CC}$ 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.

				74ACT		744	СТ		
Symbol	Parameter	V_{CC}^{*} $T_{A} = +25^{\circ}C$ (V) $C_{L} = 50 \text{ pF}$			to +	-40°C 85°C 50 pF	Unit	Fig. No.	
			Min	Тур	Max	Min	Max		
t _{PLH}	Propagation Delay D _n to O _n	5.0	2.5	8.5	10	1.5	11.5	ns	3–5
t _{PHL}	Propagation Delay D _n to O _n	5.0	2.0	8.0	10	1.5	11.5	ns	3–5
t _{PLH}	Propagation Delay LE to O _n	5.0	2.5	8.5	11	2.0	11.5	ns	3–6
t _{PHL}	Propagation Delay LE to O _n	5.0	2.0	8.0	10	1.5	11.5	ns	3–6
t _{PZH}	Output Enable Time	5.0	2.0	8.0	9.5	1.5	10.5	ns	3–7
t _{PZL}	Output Enable Time	5.0	2.0	7.5	9.0	1.5	10.5	ns	3–8
t _{PHZ}	Output Disable Time	5.0	2.5	9.0	11	2.5	12.5	ns	3–7
t _{PLZ}	Output Disable Time	5.0	1.5	7.5	8.5	1.0	10	ns	3–8

AC CHARACTERISTICS (For Figures and Waveforms - See AND8277/D at www.onsemi.com)

*Voltage Range 5.0 V is 5.0 V \pm 0.5 V.

AC OPERATING REQUIREMENTS (For Figures and Waveforms – See AND8277/D at www.onsemi.com)

				74ACT	74ACT				
Symbol	Parameter	V _{CC} * (V)	$T_{A} = +25^{\circ}C$ $C_{L} = 50 \text{ pF}$ Typ Guaranteed		$I_A = +25 C$ to +85°		T _A = −40°C to +85°C C _L = 50 pF	Unit	Fig. No.
					d Minimum				
t _s	Setup Time, HIGH or LOW D _n to LE	5.0	3.0	7.0	8.0	ns	3–9		
t _h	Hold Time, HIGH or LOW D _n to LE	5.0	0	0	1.0	ns	3–9		
tw	LE Pulse Width, HIGH	5.0	2.0	7.0	8.0	ns	3–6		

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

CAPACITANCE

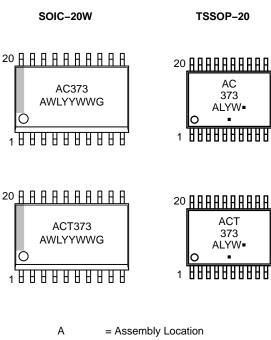
Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	40	pF	V _{CC} = 5.0 V

ORDERING INFORMATION

Device	Package	Shipping [†]		
MC74AC373DWG	SOIC-20 (Pb-Free)	38 Units / Rail		
MC74AC373DWR2G	SOIC-20 (Pb-Free)	1000 / Tape & Reel		
MC74ACT373DWG	SOIC-20 (Pb-Free)	38 Units / Rail		
MC74ACT373DWR2G	SOIC-20 (Pb-Free)	1000 / Tape & Reel		
MC74AC373DTG	TSSOP-20 (Pb-Free)	75 Units / Rail		
MC74AC373DTR2G	TSSOP-20 (Pb-Free)	2500 / Tape & Reel		
MC74ACT373DTG	TSSOP-20 (Pb-Free)	75 Units / Rail		
MC74ACT373DTR2G	TSSOP-20 (Pb-Free)	2500 / Tape & Reel		

+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MARKING DIAGRAMS



- WL, L = Wafer Lot
- YY, Y = Year
- WW, W = Work Week
- G or = Pb–Free Package
- (Note: Microdot may be in either location)

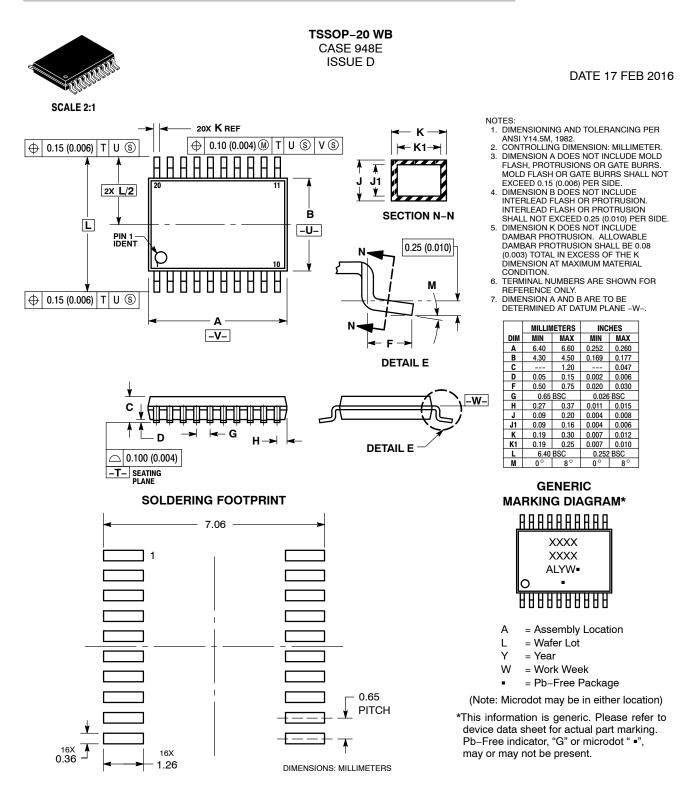
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