

Octal D Flip-Flop

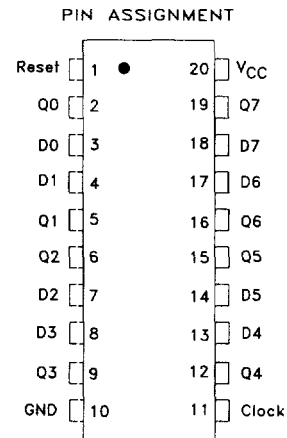
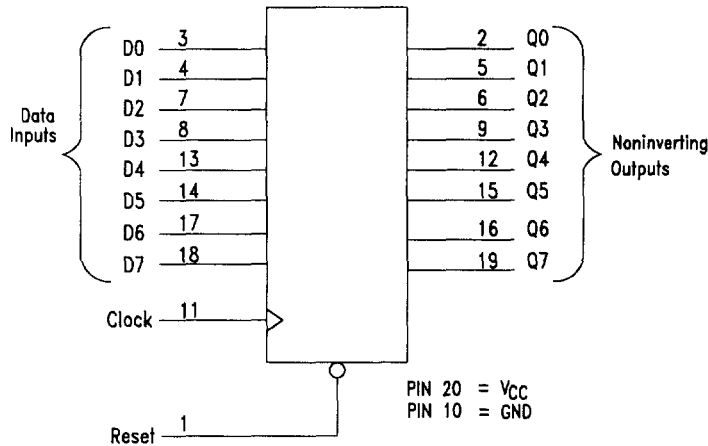
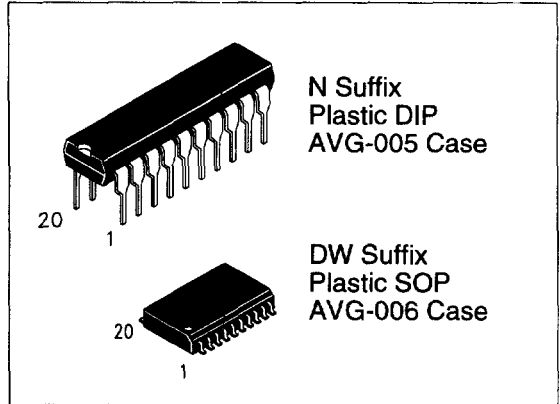
The DV74AC273/ACT273 has eight edge-triggered D-type flip-flops with individual D inputs and Q outputs. The common buffered Clock and Master Reset inputs load and reset (clear) all flip-flops simultaneously.

The register is fully edge-triggered. The state of each D input, one setup time before the LOW-to-HIGH clock transition, is transferred to the corresponding flip-flop's Q output.

All outputs will be forced LOW independently of Clock or Data inputs by a LOW voltage level on the Reset input. The device is useful for applications where only the true output is required and the Clock and Master Reset are common to all storage elements.

- Advanced very high speed CMOS
- Outputs source/sink 24 mA
- Transmission line driving 50 ohms
- ACT has TTL compatible inputs
- Operation from 2 to 6 volts guaranteed
- DC & AC Parameters guaranteed over -40 to +85°C

DV74AC273 DV74ACT273



TRUTH TABLE				
Operating Mode	Inputs			Output
	Reset	Clock	D _n	Q _n
Reset (Clear)	L	X	X	L
Load "1"	H	↑	H	H
Load "0"	H	↑	L	L
	H	L	X	Q _o

H=High Level Logic
X=Don't Care
Q_o=Previous state of Q

L=Low Level Logic
↑=Transition from low to high

PIN NAMES:
D₀-D₇ Data Inputs
MR Master Reset
CP Clock Pulse Input
Q₀-Q₇ Data Outputs

ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	AC273, ACT273	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

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GUARANTEED 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
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	V _{CC} @ 3.0 V			150	ns/V
		V _{CC} @ 4.5 V			40	ns/V
		V _{CC} @ 5.5 V			25	ns/V
t _r , t _f	Input Rise and Fall Time (Note 2) 'ACT Devices	V _{CC} @ 4.5 V			10	ns/V
		V _{CC} @ 5.5 V			8.0	ns/V
T _J	Junction Temperature (PDIP)			140	°C	
T _A	Operating Ambient Temperature Range	-40	25	85	°C	
C _{IN}	Input Capacitance		4.5		pF	
D _{PD}	Power Dissipation Capacitance		5.0		pF	

1. V_{IN} from 30% to 70% V_{CC}

2. V_{IN} from 0.8 to 2.0 V

AC —273

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC273			Unit	
				T _A = +25°C		T _A = -40 to +85°C		
				Typ	Guaranteed Limits			
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	3.0	1.5	2.1	2.1	V	
			4.5	2.25	3.15	3.15		
			5.5	2.75	3.85	3.85		
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	3.0	1.5	0.9	0.9	V	
			4.5	2.25	1.35	1.35		
			5.5	2.75	1.65	1.65		
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	3.0	2.99	2.9	2.9	V	
			4.5	4.49	4.4	4.4		
			5.5	5.49	5.4	5.4		
		V _{IN} = V _{IL} or V _{IH}	-12mA	3.0		2.56	2.46	V
			I _{OH} -24mA	4.5		3.86	3.76	
		-24 mA	5.5		4.86	4.76		
V _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	3.0	0.002	0.1	0.1	V	
			4.5	0.001	0.1	0.1		
			5.5	0.001	0.1	0.1		
		V _{IN} = V _{IL} or V _{IH}	12mA	3.0		0.36	0.44	V
			I _{OL} 24mA	4.5		0.36	0.44	
		24 mA	5.5		0.36	0.44		
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} , GND	5.5		±0.1	±1.0	μA	
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	μA	

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AC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V) ±10%	AC273					Unit
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF		
			Min	Typ	Max	Min	Max	
f _{MAX}	Maximum Clock Frequency	3.3 5.0	90 140	125 175		75 125		MHz

Symbol	Parameter	V _{CC} (V) ±10%	AC273					Unit
			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 Clock to Output	3.3 5.0	4.0 3.0	7.0 5.5	15.5 9.0	3.0 2.5	14.0 10.0	ns
t _{PHL}	Propagation Delay Clock to Output	3.3 5.0	4.0 3.0	7.0 5.0	13.0 10.0	3.5 2.5	14.5 11.0	ns
t _{PLH}	Propagation Delay MR to Output	3.3 5.0	4.0 3.0	7.0 5.0	13.0 10.0	3.5 2.5	14.0 10.5	ns

AC OPERATING REQUIREMENTS

Symbol	Parameter	V _{CC} (V) ±10%	AC273			Unit
			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 Data to CP	3.3 5.0	3.5 2.5	5.5 4.0	6.0 4.5	ns
t _h	Hold Time, HIGH or LOW Data to CP	3.3 5.0	-2.0 -1.0	0 1.0	0 1.0	ns
t _w	Clock Pulse Width HIGH or LOW	3.3 5.0	3.5 2.5	5.5 4.0	6.0 4.5	ns
t _w	MR Pulse Width HIGH or LOW	3.3 5.0	2.0 1.5	5.5 4.0	6.0 4.5	ns
t _{rec}	Recover Time MR to CP	3.3 5.0	1.5 1.0	3.5 2.0	4.5 3.0	ns

ACT — 273

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	ACT273			Unit
				T _A = +25°C		T _A = -40 to +85°C	
				Typ	Guaranteed Limits		
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5	1.5	2.0	2.0	V
			5.5	1.5	2.0	2.0	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5	1.5	0.8	0.8	V
			5.5	1.5	0.8	0.8	
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	4.5	4.49	4.4	4.4	V
			5.5	5.49	5.4	5.4	
		V _{IN} = V _{IL} or V _{IH} I _{OH} = -24mA -24 mA	4.5		3.86	3.76	V
			5.5		4.86	4.76	
V _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	4.5	0.001	0.1	0.1	V
			5.5	0.001	0.1	0.1	
		V _{IN} = V _{IL} or V _{IH} I _{OL} = 24mA 24 mA	4.5		0.36	0.44	V
			5.5		0.36	0.44	
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} , GND	5.5		±0.1	±1.0	μA
ΔI _{CC}	Additional Max I _{CC} /Input	V _{IN} = V _{CC} - 2.1 V	5.5	0.6		1.5	mA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	mA

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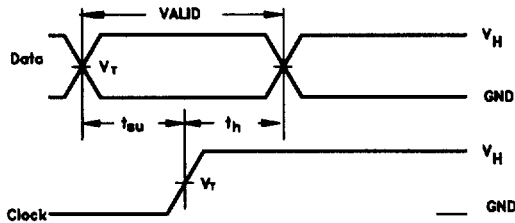
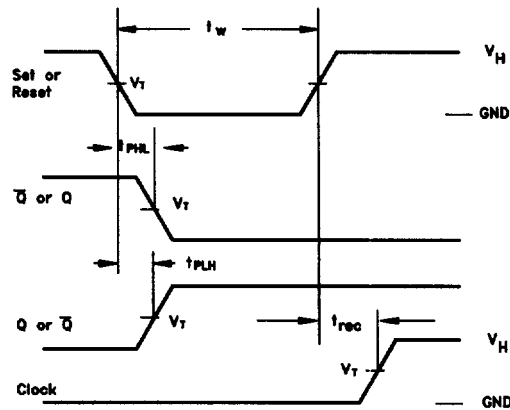
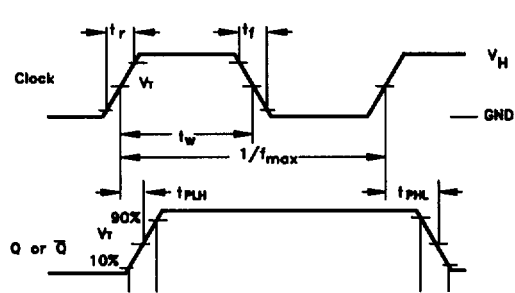
AC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V) ±10%	ACT273					Unit
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF		
			Min	Typ	Max	Min	Max	
f _{MAX}	Maximum Clock Frequency	5.0	125	200		125		MHz
t _{PLH}	Propagation Delay—Clock to Output	5.0	3.0	6.0	10.0	2.5	11.0	ns
t _{PHL}	Propagation Delay—Clock to Output	5.0	3.0	6.5	11.0	2.5	12.0	ns
t _{PLH}	Propagation Delay—MR to Output	5.0	3.0	7.0	11.0	2.5	11.5	ns

AC OPERATING REQUIREMENTS

Symbol	Parameter	V _{CC} (V) ±10%	ACT273			Unit
			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—Data to CP	5.0	3.0	4.5	5.0	ns
t _h	Hold Time, HIGH or LOW—Data to CP	5.0	-2.5	2.0	2.0	ns
t _w	Clock Pulse Width—HIGH or LOW	5.0	2.5	4.0	4.5	ns
t _w	MR Pulse Width—HIGH or LOW	5.0	2.5	4.0	4.5	ns
t _{rec}	Recover Time—MR to CP	5.0	-1.0	2.0	3.0	ns

SWITCHING WAVEFORMS



Input and output threshold voltage:
 $V_T = 50\% V_{CC}$ for AC; 1.5V for ACT
 $V_H = V_{CC}$ for AC, 3V for ACT