

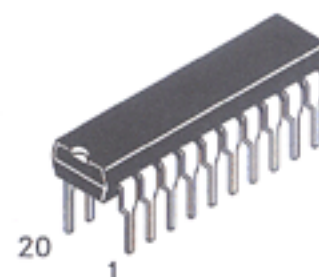
DV74AC374 Available Q2, 1995

Octal Non-inverting D-Type Flip-Flop with 3-State outputs

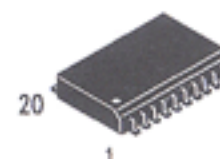
The DV74AC374 and DV74ACT374 is an Octal Flip-Flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus-oriented applications. A buffered Clock (CP) and Output Enable (OE) is common to all flip-flops

- 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 $+85^{\circ}\text{C}$

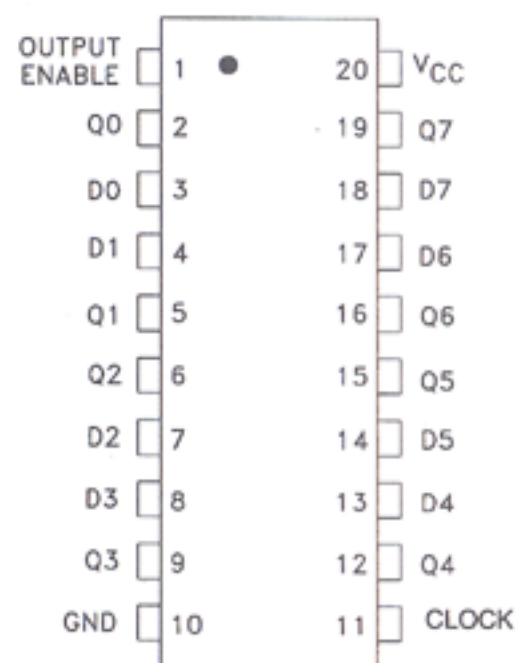
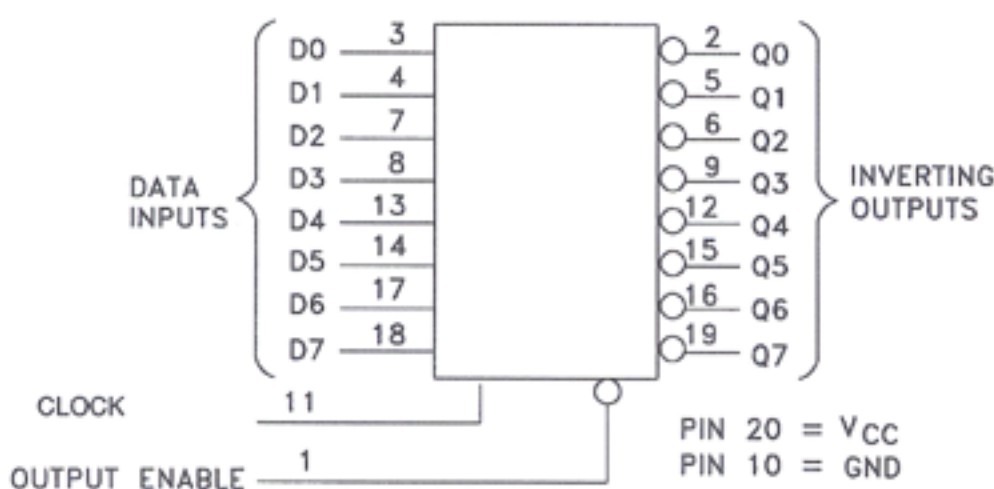
DV74AC374
DV74ACT374



N Suffix
Plastic DIP
AVG-005 Case



D Suffix
Plastic SOP
AVG-006 Case



TRUTH TABLE

Inputs			Outputs
D_n	Clock	OE	Q_n
H	\uparrow	L	H
L	\uparrow	L	L
X	X	H	Z

H=HIGH Voltage Level
Z=High Impedance
 \uparrow = Low to High Transition

L=LOW Voltage Level
X=Immaterial

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ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC374, ACT374	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	°C

GUARANTEED 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	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 _A	Operating Ambient Temperature Range		−40		85	°C
C _{IN}	Input Capacitance V _{CC} = 5.0 V	V _{CC} = 5.0 V		4.5		pF
C _{PD}	Power Dissipation Capacitance	V _{CC} = 5.0 V		30		pF

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

2. V_{IN} from 0.8 to 2.0 V

AC – 374

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC374			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	
		−24 mA	5.5		4.86	4.76	

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Symbol	Parameter	Conditions	V _{CC} (V)	AC374			Unit
				T _A = +25°C		T _A = -40 to +85°C	
				Typ	Guaranteed Limits		
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 I _{OL} 24mA 24 mA	3.0		0.36	0.44	V
			4.5		0.36	0.44	
			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 _{OZ}	Maximum 3-State Current	V _{IN} (OE)=V _{IL} , V _{IH} V _{IN} =V _{CC} , GND V _{OUT} =V _{CC} , GND	5.5		±0.5	±5.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	μA

AC CHARACTERISTICS

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V) ±10%	AC374				Unit
			T _A = +25°C		T _A = − 40°C to +85°C		
			Min	Max	Min	Max	
f _{max}	Maximum Clock Frequency	3.3 5.0	75 95		60 85		MHz
t _{PLH}	Propagation Delay Clock to Q _n	3.3 5.0	3.5 2.0	13.5 9.5	3.5 2.0	15.0 11.0	ns
t _{PHL}		3.3 5.0	3.5 2.0	12.0 8.5	3.5 2.0	13.5 9.5	
t _{PZH}	Output Enable Time Output Enable to Q _n	3.3 5.0	2.5 2.0	11.0 8.5	2.5 2.0	12.0 9.0	ns
t _{PZL}		3.3 5.0	3.0 1.5	10.5 8.0	3.5 2.0	11.5 9.0	
t _{PHZ}	Output Enable Time Output Enable to Q _n	3.3 5.0	4.0 2.0	12.0 9.5	4.5 2.0	13.0 10.5	ns
t _{PLZ}		3.3 5.0	2.0 1.5	9.0 7.5	2.5 1.5	10.0 8.5	

AC OPERATING REQUIREMENTS

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V) ±10%	AC374		Unit
			T _A = +25°C	T _A = − 40°C to +85°C	
			Minimum		
t _s	Setup Time, HIGH or LOW, Dn to Clock	3.3 5.0	2.5 1.5	3.0 2.0	ns
t _h	Hold Time, HIGH or LOW, Dn to Clock	3.3 5.0	1.5 1.5	1.5 1.5	ns
t _w	Clock Pulse Width, HIGH or LOW	3.3 5.0	6.0 4.0	7.0 5.0	ns

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	ACT374			Unit
				TA = +25°C		TA = -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	
			5.5		4.86	4.76	V
V _{OL}	MaximumLow 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	
			5.5		0.36	0.44	V
I _{IN}	Maximum Input Leakage Current	V _{IN} =V _{CC} , GND	5.5		±0.1	±1.0	μA
I _{OZ}	Maximum 3-State Current	V _{IN} (OE)=V _{IL} , V _{IH} V _{IN} =V _{CC} , GND V _{OUT} =V _{CC} , GND	5.5		±0.6	±6.0	μA
ΔI _{CC} T	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

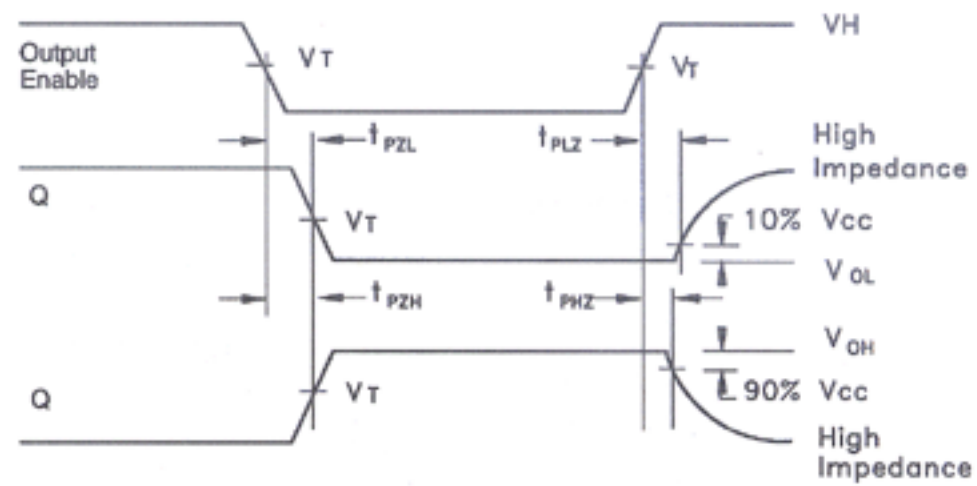
AC CHARACTERISTICS

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V) ±10%	ACT374				Unit
			T _A = +25°C		T _A = − 40°C to +85°C		
			Min	Max	Min	Max	
f _{max}	Maximum Clock Frequency	5.0	100		85		MHz
t _{PLH}	Propagation Delay	5.0	2.5	11.0	2.0	12.0	ns
t _{PHL}	Clock to Q _n	5.0	2.0	10.0	1.5	11.0	
t _{PZH}	Output Enable Time	5.0	2.0	9.5	1.5	10.0	ns
t _{PZL}	Output Enable to Q _n	5.0	2.0	9.0	1.5	10.0	
t _{PHZ}	Output Enable Time	5.0	2.0	10.5	1.5	11.5	ns
t _{PLZ}	Output Enable to Q _n	5.0	2.0	8.5	1.5	9.0	

AC OPERATING REQUIREMENTS

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V) ±10%	ACT374		Unit
			T _A = +25°C	T _A = - 40°C to +85°C	
			Guaranteed Minimum		
t _s	Setup Time, HIGH or LOW, Dn to Clock	5.0	2.5	2.5	ns
t _h	Hold Time, HIGH or LOW, Dn to Clock	5.0	1.0	1.0	ns
t _w	Clock Pulse Width, HIGH or LOW	5.0	3.0	4.0	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