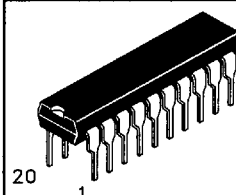


Octal D-Type Flip-Flop with Common Clock and Reset

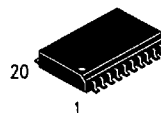
Pinout for the 'HC273A and 'HCT273A is identical to the LS273. The 'HC 273A Inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with TTL FAMILY outputs. The 'HCT273A is particularly suited as a level converter interfacing TTL or NMOS outputs to High-Speed CMOS inputs. This device consists of eight D flip-flops with common Clock and Reset inputs. Each flip-flop is loaded with a low-to-high transition of the Clock input. Reset is asynchronous and active low.

- **Output Drive Capability:** 10 LSTTL Loads
- **Outputs Directly Interface to CMOS, NMOS, and TTL**
- **Operating Voltage Range:** 2 to 6 V for HC devices
- **Low Input Current:** 1 μ A
- **DC, AC parameters guaranteed from -55°C to 125°C**

DV74HC273A DV74HCT273A

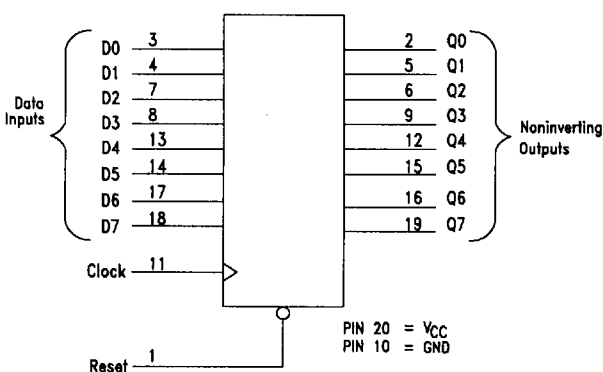


N Suffix
Plastic DIP
AVG-005 Case

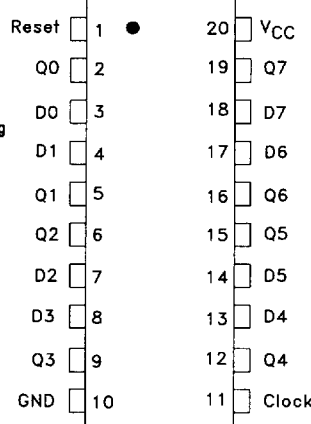


D Suffix
Plastic SOP
AVG-006 Case

273



PIN ASSIGNMENT



TRUTH TABLE (Each Flip-Flop)

Inputs			Output
Reset	Clock	D	Q
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	No Change
H	↓	X	No Change

↑ = Low to High Edge Transition
↓ = High to Low Edge Transition
H = High Logic Level
L = Low Logic Level
X = Don't Care

ABSOLUTE MAXIMUM RATINGS

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

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)	- 1.5 to V _{CC} +1.5	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	± 35	mA
I _{CC}	DC V _{CC} or GND Current Pin	± 75	mA
P _D	Power Dissipation in Still Air Plastic DIP SOP Package	750 500	mW
T _{stg}	Storage Temperature	- 65 to +150	°C
T _L	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage HC(HCT), Referenced to GND	2.0(4.5)	6.0(5.5)	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage, Referenced to GND	0	V _{CC}	V
T _A	Ambient Temperature	-55	+125	°C
t _r , t _f	Input Rise and Fall Time: HC: V _{CC} =2.0V HCT: V _{CC} =5.5V / HC: V _{CC} =4.5V HC: V _{CC} =6.0V	0 0 0	1000 500 400	ns

HC - 273A

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	Guaranteed Limits			Unit
				25°C to -55°C	≤ 85°C	≤ 125°C	
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = V _{CC} - 0.1 V I _{OUT} ≤ 20 μA	2.0	1.50	1.50	1.50	V
			4.5	3.15	3.15	3.15	
			6.0	4.20	4.20	4.20	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V I _{OUT} ≤ 20 μA	2.0	0.50	0.50	0.50	V
			4.5	1.35	1.35	1.35	
			6.0	1.80	1.80	1.8	
V _{OH}	Minimum High Level Output Voltage	V _{IN} = V _{IH} I _{OUT} ≤ 20 μA	2.0	1.90	1.90	1.90	V
			4.5	4.40	4.40	4.40	
			6.0	5.90	5.90	5.90	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IH} I _{OUT} ≤ 4.0 mA I _{OUT} ≤ 5.2 mA	4.5	3.98	3.84	3.70	V
			6.0	5.48	5.34	5.20	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IL} I _{OUT} ≤ 20 μA	2.0	0.10	0.10	0.10	V
			4.5	0.10	0.10	0.10	
			6.0	0.10	0.10	0.10	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IL} I _{OUT} ≤ 4.0 mA I _{OUT} ≤ 5.2 mA	4.5	0.26	0.33	0.40	V
			6.0	0.26	0.33	0.40	
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	6.0	±0.1	±1.00	±1.00	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	6.0	8	80	160	μA

AC CHARACTERISTICS over full operating conditions (CL = 50 pF, Input t_r = t_f = 6 ns)

Symbol	Parameter	V _{CC} (V)	Guaranteed Limits			Unit
			+25°C to -55°C	≤ 85°C	≤ 125°C	
f _{MAX}	Maximum Clock Frequency (50% Duty Cycle)	2.0	6	5	4	MHz
		4.5	30	24	20	
		6.0	35	28	24	
t _{PLH} , t _{PHL}	Maximum Propagation Delay Clock to Q	2.0	145	180	220	ns
		4.5	29	36	44	
		6.0	25	31	38	
t _{PHL}	Maximum Propagation Delay Time, Reset to Q	2.0	145	180	220	ns
		4.5	29	36	44	
		6.0	25	31	38	
t _{TLH} , t _{THL}	Maximum Output Transition Time, any Output	2.0	75	95	110	ns
		4.5	15	19	22	
		6.0	13	16	19	
C _{IN}	Maximum Input Capacitance		10	10	10	pF

CPD	Power Dissipation Capacitance (Per Enabled Output) Used to determine the no-load dynamic power consumption: PD = CPD VCC2f + ICC VCC	Typical @ 25°C, VCC = 5.0 V	pF
		48	

TIMING REQUIREMENTS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6.0 \text{ ns}$)

Symbol	Parameter	Vcc (V)	Guaranteed Limits						Unit
			25°C to -55°C		≤ 85°C		≤ 125°C		
			Min	Max	Min	Max	Min	Max	
t _{su}	Minimum Setup Time, Data to Clock	2.0	60		75		90		ns
		4.5	12		15		18		
		6.0	10		13		15		
t _h	Minimum Hold Time, Clock to Data	2.0	3		3		3		ns
		4.5	3		3		3		
		6.0	3		3		3		
t _{rec}	Minimum Recovery Time, Reset Inactive to Clock	2.0	5		5		5		ms
		4.5	5		5		5		
		6.0	5		5		5		
t _w	Minimum Pulse Width, Clock	2.0	60		75		90		ns
		4.5	12		15		18		
		6.0	10		13		15		
t _w	Minimum Pulse Width, Reset	2.0	60		75		90		ns
		4.5	12		15		18		
		6.0	10		13		15		

HCT - 273A
DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	Guaranteed Limits			Unit
				+25°C to -55°C	< 85°C	≤ 125°C	
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 I _{OUT} = ≤20 μA	4.5 5.5	2.0 2.0	2.0 2.0	2.0 2.0	V
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V I _{OUT} = ≤20 μA	4.5 5.5	0.8 0.8	0.8 0.8	0.8 0.8	V
V _{OH}	Minimum High Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 20 μA	4.5 5.5	4.4 5.4	4.4 5.4	4.4 5.4	V
		V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 4 mA	4.5	3.98	3.84	3.7	V
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 20 μA	4.5 5.5	0.1 0.1	0.1 0.1	0.1 0.1	V
		V _{IN} = V _{IL} or V _{IH} I _{OUT} ≤ 4 mA	4.5	0.26	0.33	0.4	V
I _{IN}	Maximum Input Leakage Current	V _{IN} =V _{CC} or GND	5.5	±0.1	±1.0	±1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	5.5	4.0	40.0	160	μA
ΔI _{CC}	Additional Quiescent Supply Current (per Package)	V _{IN} =2.4 V, Any One Input V _{IN} = V _{CC} or GND, Other Inputs I _{OUT} = 0 μA	5.5	≥ 55°C	25°C to 125°C		mA
				2.9	2.4		

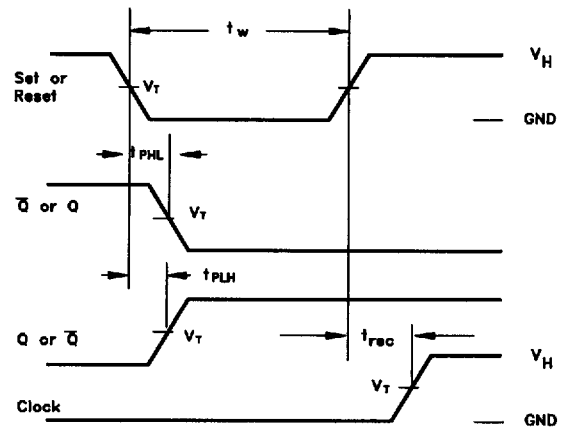
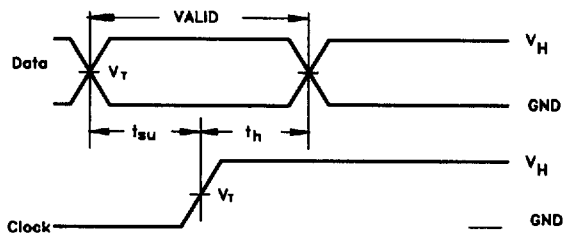
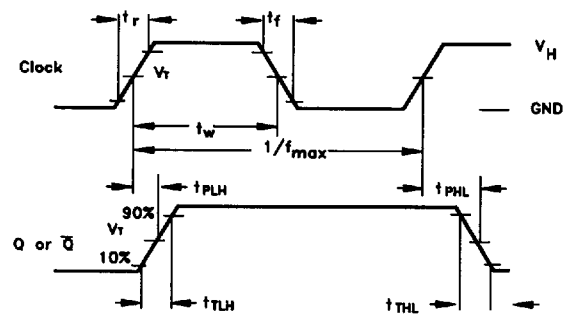
AC CHARACTERISTICS ($V_{CC} = 5.0 \text{ V} \pm 10\%$, Input $t_r = t_f = 6.0 \text{ ns}$)

Symbol	Parameter	Guaranteed Limits			Unit
		25°C to – 55°C	≤ 85°C	≤ 125°C	
f _{MAX}	Maximum Clock Frequency (50% Duty Cycle)	30	24	20	MHz
t _{PLH} , t _{PHL}	Maximum Propagation Delay Clock to Q	25	28	35	ns
t _{PHL}	Maximum Propagation Delay, Reset to Q	25	28	35	ns
t _{TLH} , t _{THL}	Maximum Output Transition Time, any Output	18	20	22	ns

C _{PD}	Power Dissipation Capacitance (Per Gate) Used to determine the no-load dynamic power consumption: P _D = C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} = 5.0 V	pF
		30	

TIMING REQUIREMENTS ($V_{CC} = 5.0 \text{ V} \pm 10\%$, Input $t_r = t_f = 6.0 \text{ ns}$)

Symbol	Parameter	Guaranteed Limits			Unit
		25°C to –55°C	≤ 85°C	≤ 125°C	
t_{SU}	Minimum Setup Time, Data to Clock	10	12.0	15.0	ns
t_H	Minimum Hold Time, Clock to Data	3.0	3.0	3.0	ns
t_{rec}	Minimum Recovery Time, Reset Inactive to Clock	5.0	5.0	5.0	ns
t_w	Minimum Pulse Width, Clock	12.0	15.0	18.0	ns
t_w	Minimum Pulse Width, Reset	12.0	15.0	18.0	ns

SWITCHING WAVEFORMS

Input and Output Threshold Voltage: $V_T = 50\% V_{CC}$ for HC, 1.3V for HCT, $V_H = V_{CC}$ for HC, 3V for HCT