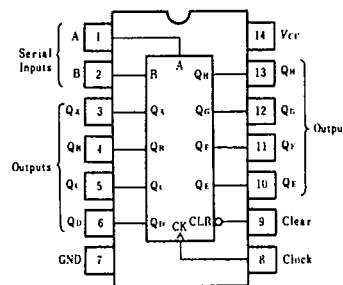


HD74HC164 • 8-bit Parallel-out Shift Register

This 8-bit shift register has gated serial inputs and clear. Each register bit is a D-type master/slave flip-flop. Inputs A & B permit complete control over the incoming data. A low at either or both inputs inhibits entry of new data and resets the first flip-flop to the low level at the next clock pulse. A high level on one input enables the other input which will then determine the state of the first flip-flop. Data at the serial inputs may be changed while the clock is high or low, but only information meeting the setup and hold time requirements will be entered. Data is serially shifted in and out of the 8-bit register during the positive going transition of the clock pulse. Clear is independent of the clock and accomplished by a low level at the clear input.

PIN ARRANGEMENT

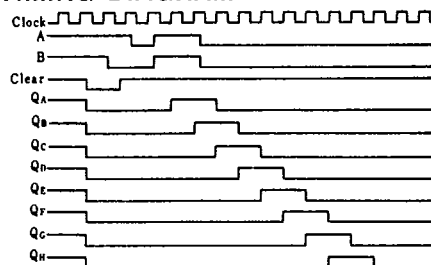


(Top View)

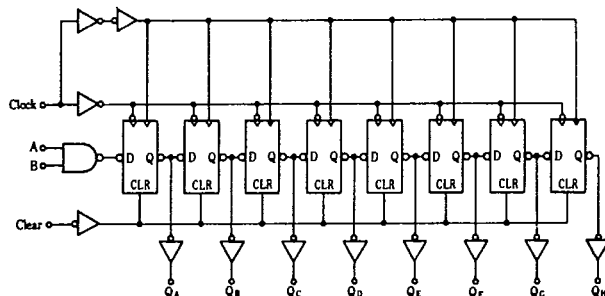
FEATURES

- High Speed Operation: t_{pd} (Clock to Q)=14.5ns typ. ($C_L=50pF$)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{cc}=2\sim 6V$
- Low Input Current: $1\mu A$ max.
- Low Quiescent Supply Current: I_{cc} (static) = $4\mu A$ max.

TIMING DIAGRAM



LOGIC DIAGRAM



FUNCTION TABLE

Inputs				Outputs			
Clear	Clock	A	B	Q _A	Q _B	.....	Q _H
L	X	X	X	L	L	.....	L
H		X	X	Q _{Ao}	Q _{Bo}	.....	Q _{Ho}
H		L	X	L	Q _{An}	.....	Q _{Cn}
H		X	L	L	Q _{An}	.....	Q _{Cn}
H		H	H	H	Q _{An}	.....	Q _{Cn}

Q_{An} to Q_{Hn} - Outputs remain unchanged.
 Q_{An} to Q_{Cn} - Data shifted from the previous stage on a positive edge at the clock input.

■ DC CHARACTERISTICS

Item	Symbol	V _{CC} (V)	Test Conditions	T _a = 25°C			T _a = -40~+85°C		Unit		
				min	typ	max	min	max			
Input Voltage	V _{IH}	2.0	V _{in} = V _{IH} or V _{IL}	1.5	—	—	1.5	—	V		
		4.5		3.15	—	—	3.15	—			
		6.0		4.2	—	—	4.2	—			
	V _{IL}	2.0		—	—	0.5	—	0.5	V		
		4.5		—	—	1.35	—	1.35			
		6.0		—	—	1.8	—	1.8			
Output Voltage	V _{OH}	2.0	V _{in} = V _{IH} or V _{IL}	I _{OH} = -20μA		1.9	2.0	—	1.9	—	V
		4.5		I _{OH} = -4mA		4.4	4.5	—	4.4	—	
		6.0		I _{OH} = -5.2mA		5.9	6.0	—	5.9	—	
		4.5		I _{OH} = -4mA		4.18	—	—	4.13	—	
		6.0		I _{OH} = -5.2mA		5.68	—	—	5.63	—	
		6.0		I _{OH} = -5.2mA		5.68	—	—	5.63	—	
	V _{OL}	2.0	V _{in} = V _{IH} or V _{IL}	I _{OL} = 20μA		—	0.0	0.1	—	0.1	V
		4.5		I _{OL} = 20μA		—	0.0	0.1	—	0.1	
		6.0		I _{OL} = 20μA		—	0.0	0.1	—	0.1	
		4.5		I _{OL} = 4mA		—	—	0.26	—	0.33	
		6.0		I _{OL} = 4mA		—	—	0.26	—	0.33	
		6.0		I _{OL} = 5.2mA		—	—	0.26	—	0.33	
Input Current	I _{in}	6.0	V _{in} = V _{CC} or GND	—	—	±0.1	—	±1.0	μA		
Quiescent Supply Current	I _{CC}	6.0	V _{in} = V _{CC} or GND, I _{in} = 0 μA	—	—	4.0	—	40	μA		

■ AC CHARACTERISTICS (C_L = 50pF, Input t_r = t_f = 6ns)

Item	Symbol	V _{CC} (V)	Test Conditions	T _a = 25°C			T _a = -40~+85°C		Unit	
				min	typ	max	min	max		
Maximum Clock Frequency	f _{max}	2.0		—	—	5	—	4	MHz	
		4.5		—	—	25	—	20		
		6.0		—	—	29	—	24		
Propagation Delay Time	t _{PHL}	2.0	Clock to Q	—	—	160	—	200	ns	
		4.5		—	14	32	—	40		
		6.0		—	—	27	—	34		
		2.0		—	—	160	—	200		
		4.5		—	15	32	—	40		
		6.0		—	—	27	—	34		
	t _{PLH}	2.0	Clear to Q	—	—	175	—	220	ns	
		4.5		—	17	35	—	44		
		6.0		—	—	30	—	37		
	Setup Time	t _{in}	2.0	A, B to Clock	100	—	—	125	—	ns
			4.5		20	1	—	25	—	
			6.0		17	—	—	21	—	
Hold Time	t _h	2.0	Clock to A, B	5	—	—	5	—	ns	
		4.5		5	0	—	5	—		
		6.0		5	—	—	5	—		
Removal Time	t _{rin}	2.0	Clear to Clock	5	—	—	5	—	ns	
		4.5		5	0	—	5	—		
		6.0		5	—	—	5	—		
Pulse Width	t _w	2.0	Clock	80	—	—	100	—	ns	
		4.5		16	8	—	20	—		
		6.0		14	—	—	17	—		
	Clear	2.0	80	—	—	100	—			
		4.5	16	5	—	20	—			
		6.0	14	—	—	17	—			
Output Rise / Fall Time	t _{RLH} t _{RHL}	2.0		—	—	75	—	95	ns	
		4.5		—	5	15	—	19		
		6.0		—	—	13	—	16		
Input Capacitance	C _{in}	—		—	5	10	—	10	pF	



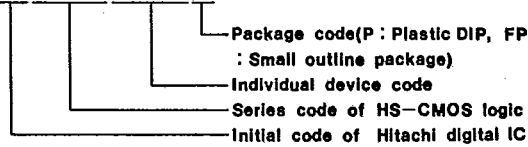
PACKAGE INFORMATION

T-90-20

In the HD74HC series of HS-CMOS logic, either of plastic DIP and small outline packages can be selected.
For your ordering, please refer to the following package code.

● Package code of HS-CMOS Logic

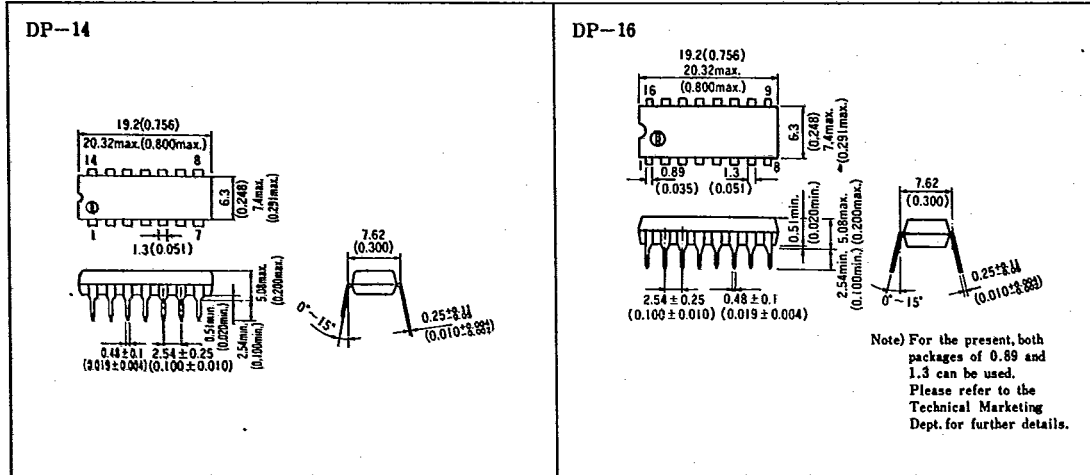
HD74HC XXXXP



■ PLASTIC DIP PACKAGE [Unit: mm (inch), scale: 1/1]

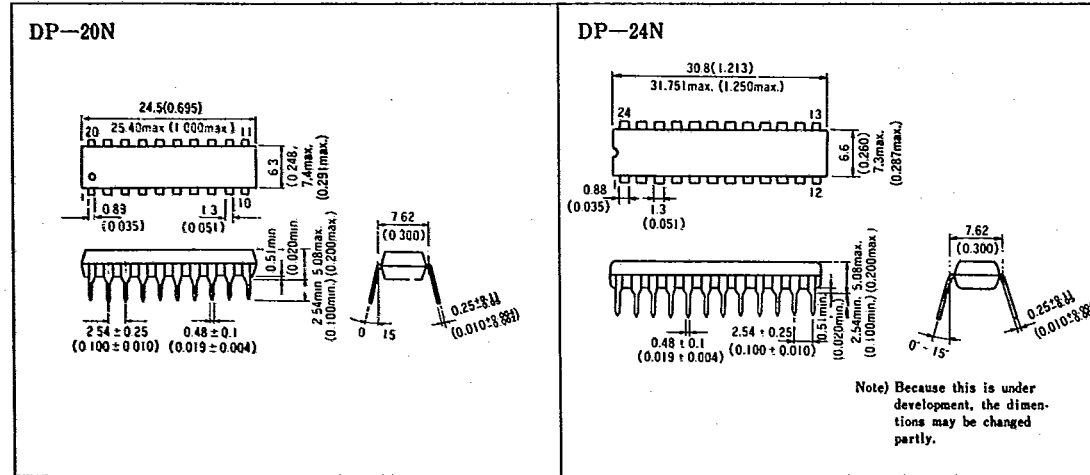
● 14-pin type

● 16-pin type



● 20-pin type

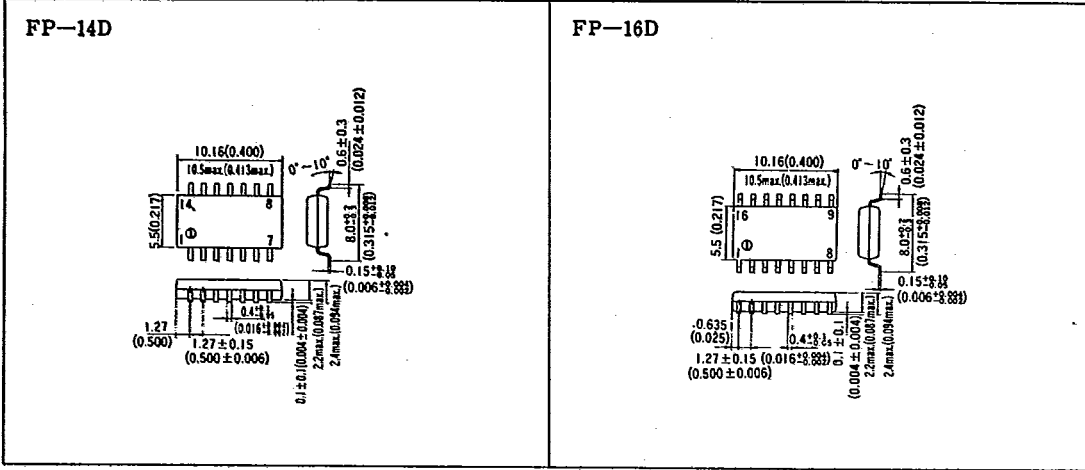
● 24-pin type



SMALL OUTLINE PACKAGE [Unit: mm (inch), scale: 1 1/2]

●14-pin type

●16-pin type



●20-pin type

