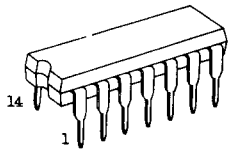
TC4006BP

C²MOS DIGITAL INTEGRATED CIRCUIT
SILICON MONOLITHIC

TC4006BP 18-STAGE STATIC SHIFT REGISTER

TC4006BP is static shift register of 18 bits maximum which consists of two 4 bit shift registers and two 5 bit shift registers, and the clock is supplied from the common $\overline{CLOCK}$ input for all the shift registers, Since 5 bit shift register is provided with 4 bit output D_n+4 in addition to serial data output D_n+5, the shift register with arbitrary number of stages of 4,5,8,9,10,12,13,14,16,17 and 18 can be obtained by the combination of inputs and outputs of 4 bit and 5 bit shift registers.
Each register is shifted by the falling edge of $\overline{CLOCK}$.

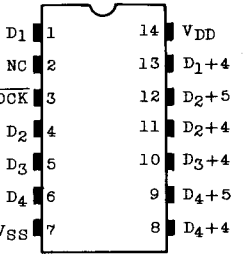


DIP 14(3D14A-P)

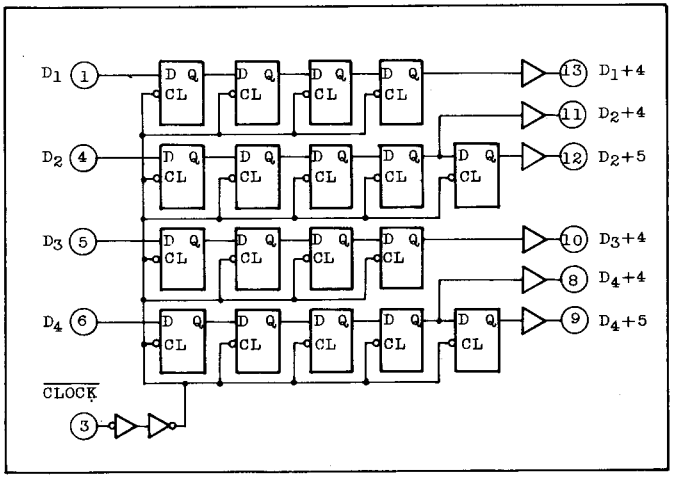
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	V_{SS}-0.5 ~ V_{SS}+20	V
Input Voltage	V_{IN}	V_{SS}-0.5 ~ V_{DD}+0.5	V
Output Voltage	V_{OUT}	V_{SS}-0.5 ~ V_{DD}+0.5	V
DC Input Current	I_{IN}	±10	mA
Power Dissipation	P_D	300	mW
Operating Ambient Temperature Range	T_A	-40 ~ 85	°C
Storage Temperature Range	T_{stg}	-65 ~ 150	°C
Lead Temp./Time	T_{sol}	260°C · 10sec	

PIN ASSIGMENT



LOGIC DIAGRAM



TRUTH TABLE (SINGLE STAGE)

INPUTS		OUTPUT
D_n	$\overline{CLOCK}$	D_n+1
L	↓	L
H	↓	H
*	↑	D_n

* Don't care

RECOMMENDED OPERATING CONDITIONS (V_{SS}=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V_{DD}		3	-	18	V
Input Voltage	V_{IN}		0	-	V_{DD}	V

STATIC ELECTRICAL CHARACTERISTICS (V_{SS}=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD} (V)	-40°C MIN.	-40°C MAX.	25°C MIN.	25°C TYP.	25°C MAX.	85°C MIN.	85°C MAX.	UNIT
High-Level Output Voltage	V_{OH}	$\|I_{OUT}\|<1\mu A$ $V_{IN}=V_{SS},V_{DD}$	5	4.95	-	4.95	5.00	-	4.95	-	V
			10	9.95	-	9.95	10.00	-	9.95	-	
			15	14.95	-	14.95	15.00	-	14.95	-	
Low-Level Output Voltage	V_{OL}	$\|I_{OUT}\|<1\mu A$ $V_{IN}=V_{SS},V_{DD}$	5	-	0.05	-	0.00	0.05	-	0.05	
			10	-	0.05	-	0.00	0.05	-	0.05	
			15	-	0.05	-	0.00	0.05	-	0.05	
Output High Current	I_{OH}	V_{OH}=4.6V $V_{IN}=V_{SS},V_{DD}$	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA
		V_{OH}=2.5V $V_{IN}=V_{SS},V_{DD}$	5	-2.5	-	-2.1	-4.0	-	-1.7	-	
		V_{OH}=9.5V $V_{IN}=V_{SS},V_{DD}$	10	-1.5	-	-1.3	-2.2	-	-1.1	-	
		V_{OH}=13.5V $V_{IN}=V_{SS},V_{DD}$	15	-4.0	-	-3.4	-9.0	-	-2.8	-	
Output Low Current	I_{OL}	V_{OL}=0.4V $V_{IN}=V_{SS},V_{DD}$	5	0.61	-	0.51	1.5	-	0.42	-	
		V_{OL}=0.5V $V_{IN}=V_{SS},V_{DD}$	10	1.5	-	1.3	3.8	-	1.1	-	
		V_{OL}=1.5V $V_{IN}=V_{SS},V_{DD}$	15	4.0	-	3.4	15.0	-	2.8	-	
Input High Voltage	V_{IH}	V_{OUT}=0.5V,4.5V $\|I_{OUT}\|<1\mu A$	5	3.5	-	3.5	2.75	-	3.5	-	V
		V_{OUT}=1.0V,9.0V $\|I_{OUT}\|<1\mu A$	10	7.0	-	7.0	5.5	-	7.0	-	
		V_{OUT}=1.5V,13.5V $\|I_{OUT}\|<1\mu A$	15	11.0	-	11.0	8.25	-	11.0	-	
Input Low Voltage	V_{IL}	V_{OUT}=0.5V,4.5V $\|I_{OUT}\|<1\mu A$	5	-	1.5	-	2.25	1.5	-	1.5	
		V_{OUT}=1.0V,9.0V $\|I_{OUT}\|<1\mu A$	10	-	3.0	-	4.5	3.0	-	3.0	
		V_{OUT}=1.5V,13.5V $\|I_{OUT}\|<1\mu A$	15	-	4.0	-	6.75	4.0	-	4.0	
Input Current "H" Level	I_{IH}	V_{IH}=18V	18	-	0.1	-	10^{-5}	0.1	-	1.0	μA
Input Current "L" Level	I_{IL}	V_{IL}=0V	18	-	-0.1	-	-10^{-5}	-0.1	-	-1.0	
Quiescent Device Current	I_{DD}	$V_{IN}=V_{SS},V_{DD}$ *	5	-	5	-	0.005	5	-	150	μA
			10	-	10	-	0.010	10	-	300	
			15	-	20	-	0.015	20	-	600	

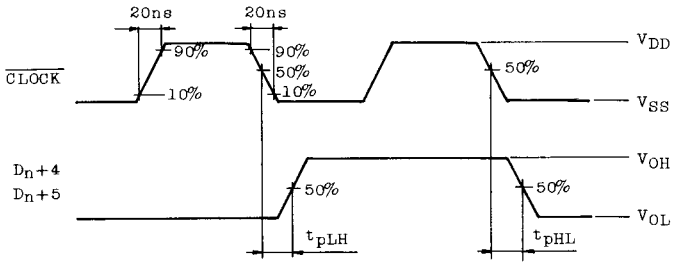
* All valid input combinations.

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, V_{SS}=0V, C_L=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITION V_{DD} (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t_{TLH}	5	-	80	200	ns
		10	-	50	100	
		15	-	40	80	
Output Transition Time (High to Low)	t_{THL}	5	-	80	200	
		10	-	50	100	
		15	-	40	80	
Propagation Delay Time	t_{pLH} t_{pHL}	5	-	170	400	ns
		10	-	75	200	
		15	-	65	160	
Max. Clock Frequency	f_{CL}	5	2.5	8	-	MHz
		10	5	17	-	
		15	7	20	-	
Min. Clock Pulse Width	t_w	5	-	60	180	ns
		10	-	30	80	
		15	-	25	50	
Max. Clock Rise Time Max. Clock Fall Time	t_{rCL} t_{fCL}	5	20	-	-	μs
		10	2.5	-	-	
		15	1.0	-	-	
Min. Set-up Time (DATA - $\overline{\text{CLOCK}}$)	t_{SU}	5	-	20	100	ns
		10	-	8	50	
		15	-	5	40	
Min. Hold Time (DATA - $\overline{\text{CLOCK}}$)	t_H	5	-	-2	60	ns
		10	-	4	40	
		15	-	5	30	
Input Capacitance	C_{IN}		-	5	7.5	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

WAVEFORM 1.



WAVEFORM 2.