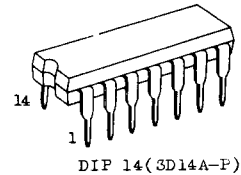


# TC4006BP

C<sup>2</sup>MOS DIGITAL INTEGRATED CIRCUIT  
SILICON MONOLITHIC

## TC4006BP 18-STAGE STATIC SHIFT REGISTER

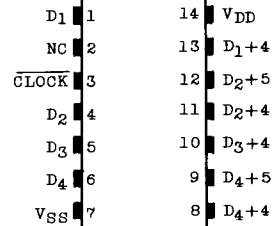
TC4006BP is static shift register of 18 bits maximum which consists of two 4 bit shift registers and two 5 bit shift registers, and the clock is supplied from the common CLOCK input for all the shift registers. Since 5 bit shift register is provided with 4 bit output  $D_{n+4}$  in addition to serial 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 CLOCK.



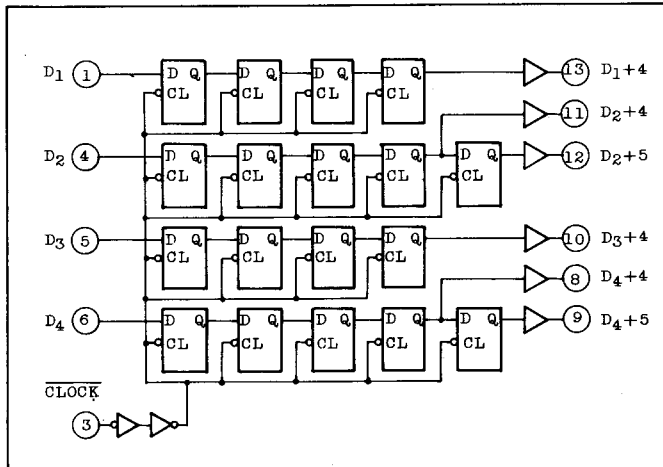
### MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V <sub>DD</sub>	V <sub>SS</sub> -0.5 ~ V <sub>SS</sub> +20	V
Input Voltage	V <sub>IN</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
DC Input Current	I <sub>IN</sub>	±10	mA
Power Dissipation	P <sub>D</sub>	300	mW
Operating Ambient Temperature Range	T <sub>A</sub>	-40 ~ 85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 ~ 150	°C
Lead Temp./Time	T <sub>sol</sub>	260°C · 10sec	

### PIN ASSIGNMENT



### LOGIC DIAGRAM



### TRUTH TABLE (SINGLE STAGE)

INPUTS		OUTPUT
D <sub>n</sub>	CLOCK	D <sub>n+1</sub>
L		L
H		H
*		D <sub>n</sub>

\* Don't care

RECOMMENDED OPERATING CONDITIONS (V<sub>SS</sub>=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V <sub>DD</sub>		3	-	18	V
Input Voltage	V <sub>IN</sub>		0	-	V <sub>DD</sub>	V

STATIC ELECTRICAL CHARACTERISTICS (V<sub>SS</sub>=0V)

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNIT	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> =V <sub>SS</sub> ,V <sub>DD</sub>	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 <sub>OL</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> =V <sub>SS</sub> ,V <sub>DD</sub>	5	-	0.05	-	0.00	0.05	-	0.05	V	
			10	-	0.05	-	0.00	0.05	-	0.05		
			15	-	0.05	-	0.00	0.05	-	0.05		
Output High Current	I <sub>OH</sub>	V <sub>OH</sub> =4.6V V <sub>OH</sub> =2.5V V <sub>OH</sub> =9.5V V <sub>OH</sub> =13.5V V <sub>IN</sub> =V <sub>SS</sub> ,V <sub>DD</sub>	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA	
			5	-2.5	-	-2.1	-4.0	-	-1.7	-		
			10	-1.5	-	-1.3	-2.2	-	-1.1	-		
			15	-4.0	-	-3.4	-9.0	-	-2.8	-		
Output Low Current	I <sub>OL</sub>	V <sub>OL</sub> =0.4V V <sub>OL</sub> =0.5V V <sub>OL</sub> =1.5V V <sub>IN</sub> =V <sub>SS</sub> ,V <sub>DD</sub>	5	0.61	-	0.51	1.5	-	0.42	-	mA	
			10	1.5	-	1.3	3.8	-	1.1	-		
			15	4.0	-	3.4	15.0	-	2.8	-		
Input High Voltage	V <sub>IH</sub>	V <sub>OUT</sub> =0.5V,4.5V V <sub>OUT</sub> =1.0V,9.0V V <sub>OUT</sub> =1.5V,13.5V  I <sub>OUT</sub>   < 1μA	5	3.5	-	3.5	2.75	-	3.5	-	V	
			10	7.0	-	7.0	5.5	-	7.0	-		
			15	11.0	-	11.0	8.25	-	11.0	-		
Input Low Voltage	V <sub>IL</sub>	V <sub>OUT</sub> =0.5V,4.5V V <sub>OUT</sub> =1.0V,9.0V V <sub>OUT</sub> =1.5V,13.5V  I <sub>OUT</sub>   < 1μA	5	-	1.5	-	2.25	1.5	-	1.5	V	
			10	-	3.0	-	4.5	3.0	-	3.0		
			15	-	4.0	-	6.75	4.0	-	4.0		
Input Current	"H" Level	I <sub>IH</sub>	V <sub>IH</sub> =18V	18	-	0.1	-	10 <sup>-5</sup>	0.1	-	1.0	μA
	"L" Level	I <sub>IL</sub>	V <sub>IL</sub> =0V	18	-	-0.1	-	-10 <sup>-5</sup>	-0.1	-	-1.0	
Quiescent Device Current	I <sub>DD</sub>	V <sub>IN</sub> =V <sub>SS</sub> ,V <sub>DD</sub> *	5	-	5	-	0.005	5	-	150	μA	
			10	-	10	-	0.010	10	-	300		
			15	-	20	-	0.015	20	-	600		

\* All valid input combinations.

# TC4006BP

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, VSS=0V, CL=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITION	VDD (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t <sub>TLH</sub>		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Output Transition Time (High to Low)	t <sub>THL</sub>		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Propagation Delay Time	t <sub>pLH</sub> t <sub>pHL</sub>		5	-	170	400	ns
			10	-	75	200	
			15	-	65	160	
Max. Clock Frequency	f <sub>CL</sub>		5	2.5	8	-	MHz
			10	5	17	-	
			15	7	20	-	
Min. Clock Pulse Width	t <sub>w</sub>		5	-	60	180	ns
			10	-	30	80	
			15	-	25	50	
Max. Clock Rise Time Max. Clock Fall Time	t <sub>rCL</sub> t <sub>fCL</sub>		5	20	-	-	μs
			10	2.5	-	-	
			15	1.0	-	-	
Min. Set-up Time (DATA - CLOCK)	t <sub>SU</sub>		5	-	20	100	ns
			10	-	8	50	
			15	-	5	40	
Min. Hold Time (DATA - CLOCK)	t <sub>H</sub>		5	-	-2	60	ns
			10	-	4	40	
			15	-	5	30	
Input Capacitance	C <sub>IN</sub>			-	5	7.5	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

