

# TC4042BP/BF

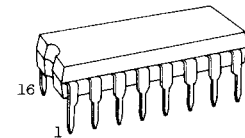
C<sup>2</sup>MOS DIGITAL INTEGRATED CIRCUIT  
SILICON MONOLITHIC

## TC4042BP/TC4042BF QUAD CLOCKED "D" LATCH

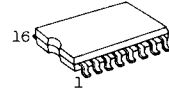
TC4042BP/BF contains four circuits of "D" type latches having common CLOCK input and POLARITY input.

When POLARITY input is placed at "H" level, D input appears as it is at Q output during CLOCK input stays high and D input at the time of falling edge of CLOCK input is retained at Q output. As long as CLOCK input stays low, Q output is not changed even when D input varies.

When POLARITY input is placed "L", D input appears as it is at Q output during CLOCK input stays at "L" level and the latch operation is seen as long as CLOCK input is "H".



DIP16 (3D16A-P)

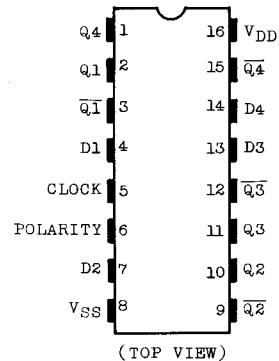


MFP16 (F16GC-P)

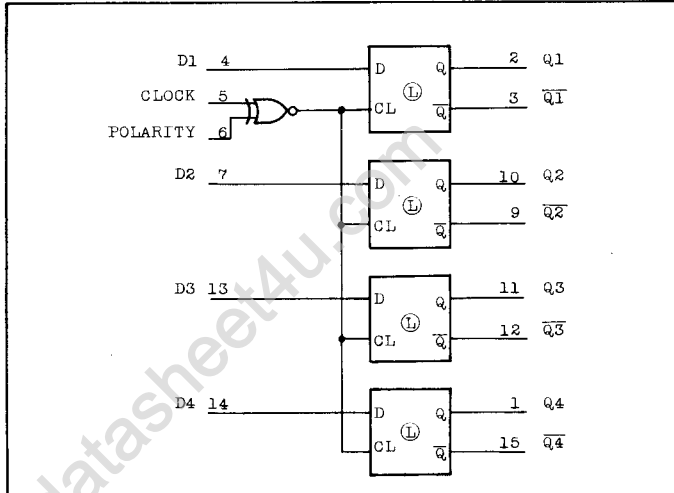
### ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNITS
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(DIP)/180(MFP)	mW
Operating 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 · 10 sec	

### PIN ASSIGNMENT



### BLOCK DIAGRAM



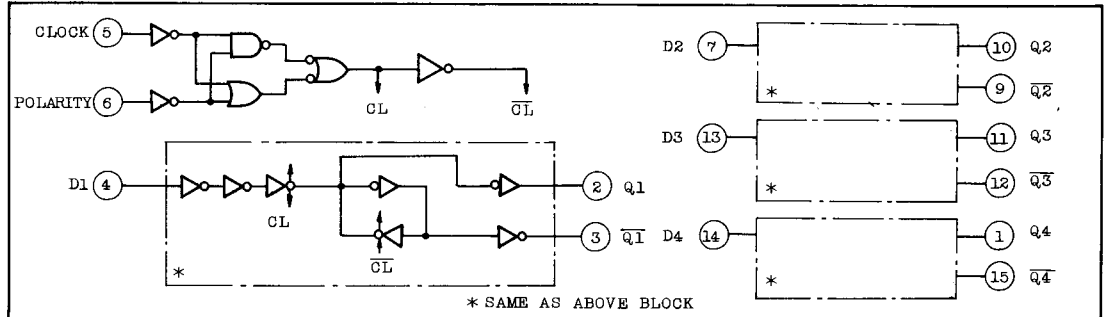
### TRUTH TABLE

INPUTS		OUTPUTS
CLOCK Δ	POLARITY †	Q <sub>n</sub> *
H	H	D <sub>n</sub>
L	L	D <sub>n</sub>
	L	LATCH
	H	LATCH

Δ : Level Change

† : 1 ~ 4

LOGIC DIAGRAM



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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS
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	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNITS
				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	1.2	-	0.42	-	mA
			10	1.5	-	1.3	3.2	-	1.1	-	
			15	4.0	-	3.4	12.0	-	2.8	-	
			5	3.5	-	3.5	2.75	-	3.5	-	
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	-	
			5	-	1.5	-	2.25	1.5	-	1.5	
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	10	-	3.0	-	4.5	3.0	-	3.0	
			15	-	4.0	-	6.75	4.0	-	4.0	

# TC4042BP/BF

## STATIC ELECTRICAL CHARACTERISTICS (Continued)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNITS	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
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	-	1	-	0.002	1	-	30		
			10	-	2	-	0.004	2	-	60		
			15	-	4	-	0.008	4	-	120		

\* All valid input combinations.

## DYNAMIC ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, V<sub>SS</sub>=0V, C<sub>L</sub>=50pF)

CHARACTERISTICS	SYMBOL	TEST CONDITION	V <sub>DD</sub> (V)	MIN.	TYP.	MAX.	UNITS
Output Transition Time (High to Low)	t <sub>THL</sub>		5 10 15	- - -	70 35 30	200 100 80	
Propagation Delay Time (CLOCK - Q, Q̄)	t <sub>pLH</sub> t <sub>pHL</sub>		5	-	150	440	
			10	-	70	180	
			15	-	50	120	
Propagation Delay Time (DATA - Q, Q̄)	t <sub>pLH</sub> t <sub>pHL</sub>		5	-	110	220	
			10	-	55	110	
			15	-	40	80	
Min. Clock Pulse Width	t <sub>w</sub>		5	-	55	200	
			10	-	25	100	
			15	-	20	60	
Min. Hold Time (DATA - CLOCK)	t <sub>H</sub>		5	-	5	50	
			10	-	3	20	
			15	-	2	20	
Min. Set-up Time (DATA - CLOCK)	t <sub>SU</sub>		5	-	20	50	
			10	-	10	30	
			15	-	5	25	
Input Capacitance	C <sub>IN</sub>			-	5	7.5	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

