TC4042BP/BF

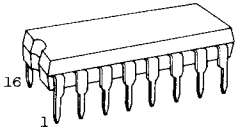
C²MOS DIGITAL INTEGRATED CIRCUIT
SILICON MONOLITHIC

TC4042BP/TC4042BF QUAD CLOCKED "D" LATCH

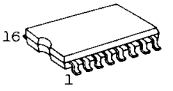
TC4042BP/BF contains four circuits of "D" type latches having common CLOCK input and POLARITY input.

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)

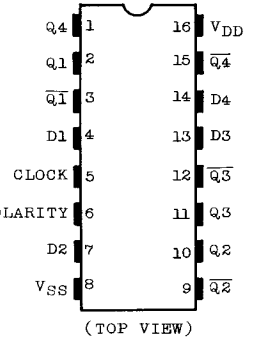


MFP16(F16GC-P)

ABSOLUTE MAXIMUM RATINGS

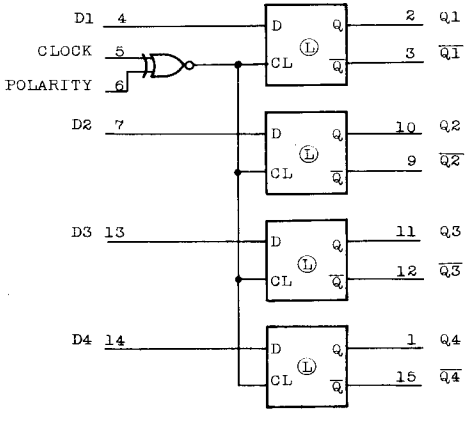
CHARACTERISTIC	SYMBOL	RATING	UNITS
DC Supply Voltage	V_{DD}	V_{SS} -0.5 ∿V_{SS} +20	V
Input Voltage	V_{IN}	V_{SS} -0.5 ∿V_{DD} +0.5	V
Output Voltage	V_{OUT}	V_{SS} -0.5 ∿V_{DD} +0.5	V
DC Input Current	I_{IN}	±10	mA
Power Dissipation	P_D	300(DIP)/180(MFP)	mW
Operating Temperature Range	T_A	-40 ∿85	°C
Storage Temperature Range	T_{stg}	-65 ∿150	°C
Lead Temp./Time	T_{sol}	260°C · 10 sec	

PIN ASSIGNMENT



(TOP VIEW)

BLOCK DIAGRAM

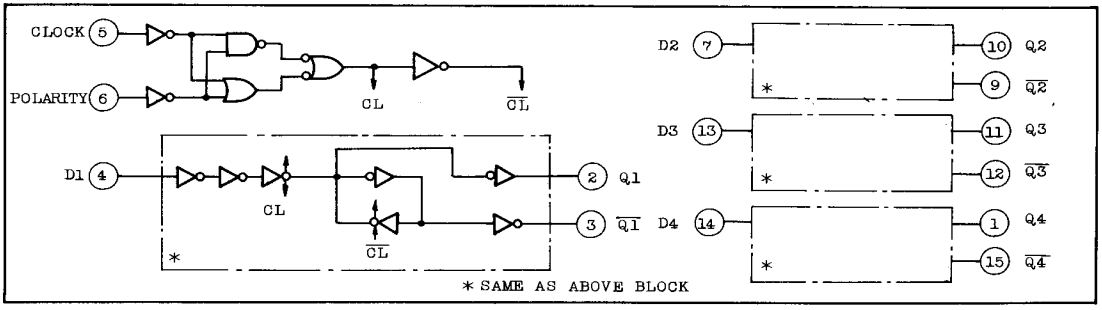


TRUTH TABLE

INPUTS		OUTPUTS
CLOCK △	POLARITY	Qn•
H	H	Dn
L	L	Dn
↓	L	LATCH
↑	H	LATCH

△ : Level Change
• : 1 ~ 4

LOGIC DIAGRAM



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

CHARACTERISTIC	SYMBOL		MIN.	TYP.	MAX.	UNITS
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 CONDITIONS	V_{DD} (V)	-40°C MIN.	-40°C MAX.	25°C MIN.	25°C TYP.	25°C MAX.	85°C MIN.	85°C MAX.	UNITS
High-Level Output Voltage	V_{OH}	$\|I_{OUT}\|$<1μA 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}	$\|I_{OUT}\|$<1μA 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	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA
		V_{OH}=2.5V	5	-2.5	-	-2.1	-4.0	-	-1.7	-	
		V_{OH}=9.5V	10	-1.5	-	-1.3	-2.2	-	-1.1	-	
		V_{OH}=13.5V	15	-4.0	-	-3.4	-9.0	-	-2.8	-	
		V_{IN}=V_{SS}, V_{DD}									
Output Low Current	I_{OL}	V_{OL}-0.4V	5	0.61	-	0.51	1.2	-	0.42	-	
		V_{OL}=0.5V	10	1.5	-	1.3	3.2	-	1.1	-	
		V_{OL}=1.5V	15	4.0	-	3.4	12.0	-	2.8	-	
		V_{IN}=V_{SS}, V_{DD}									
Input High Voltage	V_{IH}	V_{OUT}=0.5V, 4.5V	5	3.5	-	3.5	2.75	-	3.5	-	V
		V_{OUT}=1.0V, 9.0V	10	7.0	-	7.0	5.5	-	7.0	-	
		V_{OUT}=1.5V,13.5V	15	11.0	-	11.0	8.25	-	11.0	-	
		$\|I_{OUT}\|$<1μA									
Input Low Voltage	V_{IL}	V_{OUT}=0.5V, 4.5V	5	-	1.5	-	2.25	1.5	-	1.5	
		V_{OUT}=1.0V, 9.0V	10	-	3.0	-	4.5	3.0	-	3.0	
		V_{OUT}=1.5V,13.5V	15	-	4.0	-	6.75	4.0	-	4.0	
		$\|I_{OUT}\|$<1μA									

STATIC ELECTRICAL CHARACTERISTICS (Continued)

CHARACTERISTIC		SYMBOL	TEST CONDITIONS	V_{DD} (V)	-40°C MIN.	-40°C MAX.	25°C MIN.	25°C TYP.	25°C MAX.	85°C MIN.	85°C MAX.	UNITS
Input Current	"H" Level	I_{IH}	V_{IH}=18V	18	-	0.1	-	10^{-5}	0.1	-	1.0	μA
	"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	-	1	-	0.002	1	-	30	
				10	-	2	-	0.004	2	-	60	
				15	-	4	-	0.008	4	-	120	

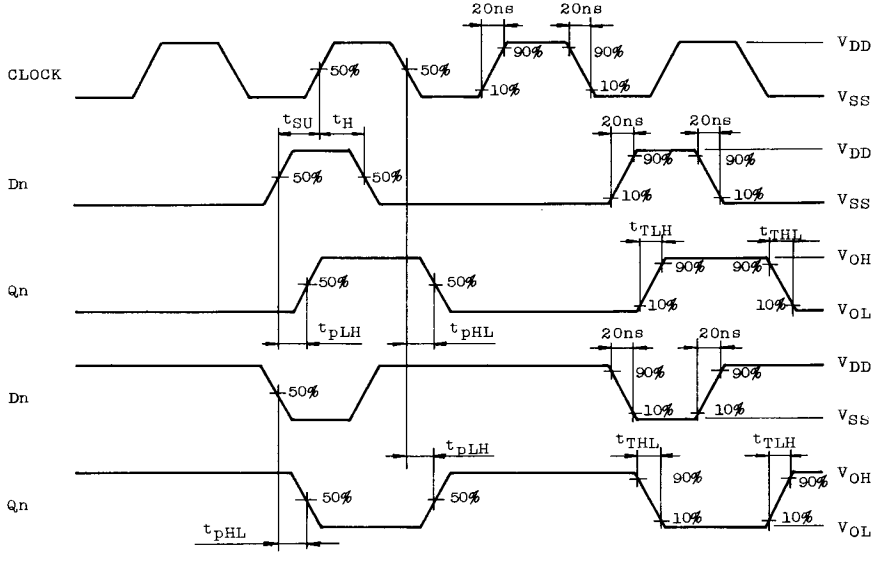
* All valid input combinations.

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

CHARACTERISTICS	SYMBOL	TEST CONDITION	V_{DD}(V)	MIN.	TYP.	MAX.	UNITS
Output Transisition Time (Low to High)	t_{TLH}		5	-	70	200	ns
			10	-	35	100	
			15	-	30	80	
Output Transition Time (High to Low)	t_{THL}		5	-	70	200	
			10	-	35	100	
			15	-	30	80	
Propagation Delay Time (CLOCK - Q, $\overline{Q}$)	t_{pLH} t_{pHL}		5	-	150	440	
			10	-	70	180	
			15	-	50	120	
Propagation Delay Time (DATA - Q, $\overline{Q}$)	t_{pLH} t_{pHL}		5	-	110	220	
			10	-	55	110	
			15	-	40	80	
Min. Clock Pulse Width	t_w		5	-	55	200	
			10	-	25	100	
			15	-	20	60	
Min. Hold Time (DATA - CLOCK)	t_H		5	-	5	50	
			10	-	3	20	
			15	-	2	20	
Min. Set-up Time (DATA - CLOCK)	t_{SU}		5	-	20	50	
			10	-	10	30	
			15	-	5	25	
Input Capacitance	C_{IN}			-	5	7.5	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

WAVEFORM 1 (POLARITY="L")



WAVEFORM 2 (CLOCK=POLARITY="H")