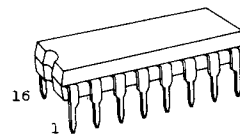


TC4018BP PRESETTABLE DIVIDE-BY-"N" COUNTER

TC4018BP is frequency division counter consisting of 5 bit Johnson counter having capability of frequency division by the factors of $1/2$, $1/4$, $1/6$, $1/8$ and $1/10$ by connecting outputs Q_1 through Q_5 to DATA input. Similarly by connecting the outputs of Q_1 through Q_5 to DATA input through gates, frequency division by the factors of $1/3$, $1/5$, $1/7$ and $1/9$ can be achieved.

RESET and PRESET are asynchronous type and when RESET="H", all of Q_1 through Q_5 are "H". When PRESET ENABLE="H", Q_n is complement of IN_n . The counter advances its state by rising edge of clock input.

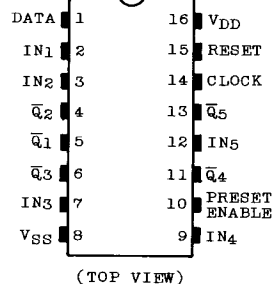


DIP 16 (SD16A-P)

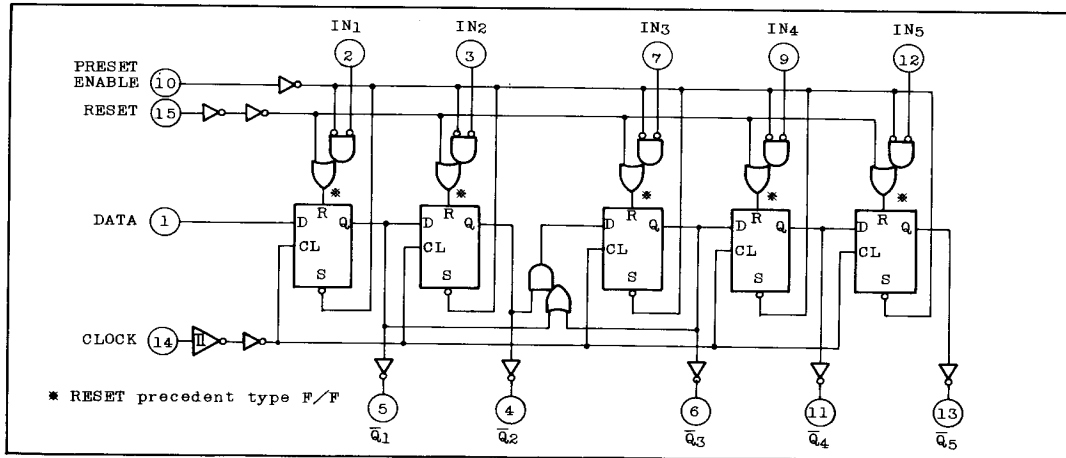
MAXIMUM RATINGS

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.	

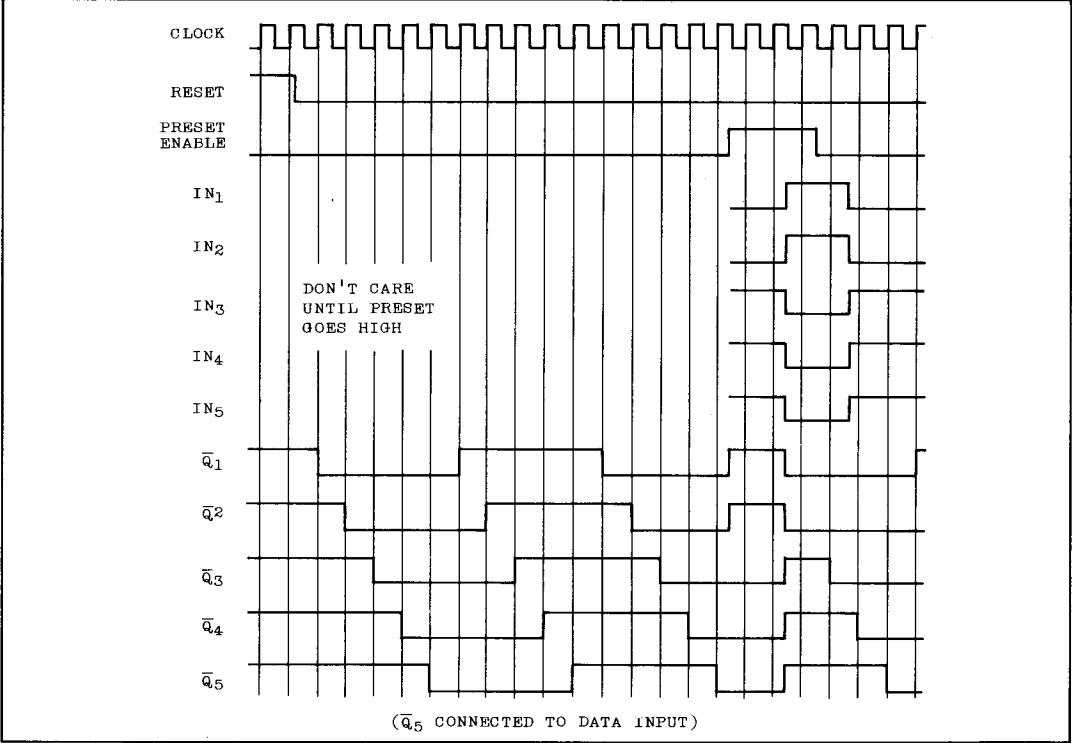
PIN ASSIGNMENT



LOGIC DIAGRAM



TIMING CHART



FUNCTION SELECTION, TRUTH TABLE

FUNCTION SELECTION			TRUTH TABLE				
COUNTER MODE	CONNECT DATA INPUT (Pin 1) to :	COMMENTE	CLOCK	RESET	PE	IN _n	Q _n
10 (Division)	Q ₅	—		L	L	*	Q _n △
8 "	Q ₄			L	L	*	Q _n △
6 "	Q ₃		*	L	H	L	H
4 "	Q ₂		*	L	H	H	L
2 "	Q ₁		*	H	*	*	H
9 "	Q ₅ , Q ₄	USE AND GATE					
7 "	Q ₄ , Q ₃						
5 "	Q ₃ , Q ₂						
3 "	Q ₂ , Q ₁						

* Don't care
△ No Change

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	SYM-BOL	TEST CONDITION	V _{DD} (V)	–40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
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	V
			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	1.5	–	0.42	–	mA
		V _{OL} =0.5V	10	1.5	–	1.3	3.8	–	1.1	–	
		V _{OL} =1.5V	15	4.0	–	3.4	15.0	–	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
		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									
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	–	5	–	0.005	5	–	150	μA
			10	–	10	–	0.010	10	–	300	
			15	–	20	–	0.015	20	–	600	

* All valied input combinations.

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

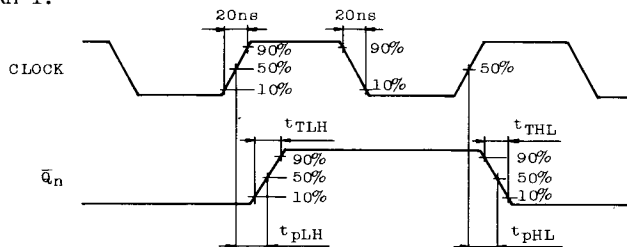
CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{DD} (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t _{TLH}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Output Transition Time (High to Low)	t _{THL}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Propagation Delay Time (CLOCK - $\bar{Q}$)	t _{pLH} t _{pHL}		5	-	280	560	ns
			10	-	110	220	
			15	-	80	160	
Propagation Dealy Time (PRESET - $\bar{Q}$) (ENABLE - $\bar{Q}$)	t _{pLH} t _{pHL}		5	-	300	600	ns
			10	-	110	250	
			15	-	80	180	
Propagation Delay Time (RESET - $\bar{Q}$)	t _{pLH}		5	-	300	600	ns
			10	-	110	250	
			15	-	80	180	
Max. Clock Frequency	f _{CL}		5	2	4	-	MHz
			10	5.5	11	-	
			15	8	16	-	
Min. Clock Pulse Width	t _w		5	-	125	250	ns
			10	-	45	90	
			15	-	30	60	
Max. Clock Rise Time Max. Clock Fall Time	t _{rCL} t _{fCL}		5	No Limit			μs
			10				
			15				
Min. Set-up Time (DATA - CLOCK)	t _{su}		5	-	35	70	ns
			10	-	15	30	
			15	-	10	20	
Min. Hold Time (DATA - CLOCK)	t _h		5	-	-20	140	ns
			10	-	-5	80	
			15	-	-5	60	
Min. Removal Time (PE, RESET - CLOCK)	t _{rem}		5	-	35	80	ns
			10	-	15	30	
			15	-	10	20	

DYNAMIC ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V_{SS}=0\text{V}$, $C_L=50\text{pF}$)

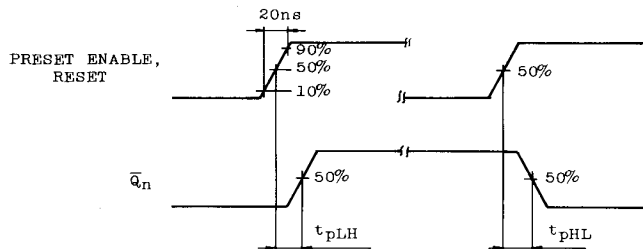
CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD} (V)	MIN.	TYP.	MAX.	UNIT
Min. Pulse Width (PRESET ENABLE, RESET)	t_{WH}		5	-	110	220	ns
			10	-	40	80	
			15	-	30	60	
Input Capacitance	C_{IN}			-	5	7.5	pF

WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

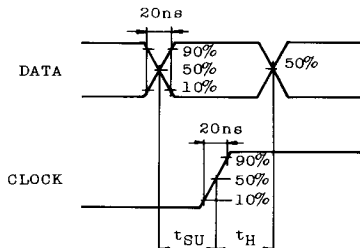
WAVEFORM 1.



WAVEFORM 2.



WAVEFORM 3.



WAVEFORM 4.

