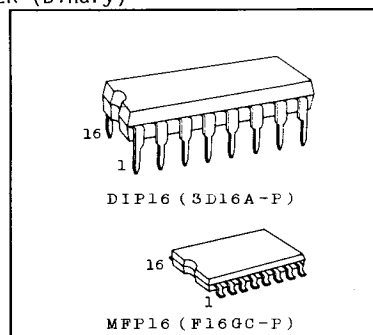


TC4522BP PROGRAMMABLE DIVIDE-BY-N 4-BIT COUNTER (BCD)
TC4526BP/TC4526BF PROGRAMMABLE DIVIDE-BY-N 4-BIT COUNTER (Binary)

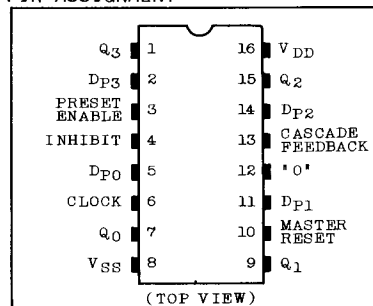
TC4522BP, TC4526BP/BF is a 4-bit, synchronous, down counter having clear, preset and inhibit function. The counting operation of each counter is made at the rising edge of CLOCK. The counter can advance its counting operation at the falling edge of INHIBIT input by setting the CLOCK input to "H" level. The programmable frequency division circuit can be formed by using the PRESET ENABLE input. Also the circuit can be expanded by means of cascade connection by use of the CASCADE FEEDBACK input and "0" output. (Refer to application circuit). This counter is suitable to programmable frequency-dividers, synthesizers, etc.



ABSOLUTE 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(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 · 10sec	

PIN ASSIGNMENT



TRUTH TABLE

(TC4522BP, TC4526BP/BF)

CLOCK	INHIBIT	PRESET ENABLE	MASTER RESET	ACTION
L	*	L	L	NO COUNT
\uparrow	L	L	L	COUNT
*	H	L	L	NO COUNT
H	\downarrow	L	L	COUNT
*	*	H	L	PRESET
*	*	*	H	RESET

* Don't Care

(TC4522BP)

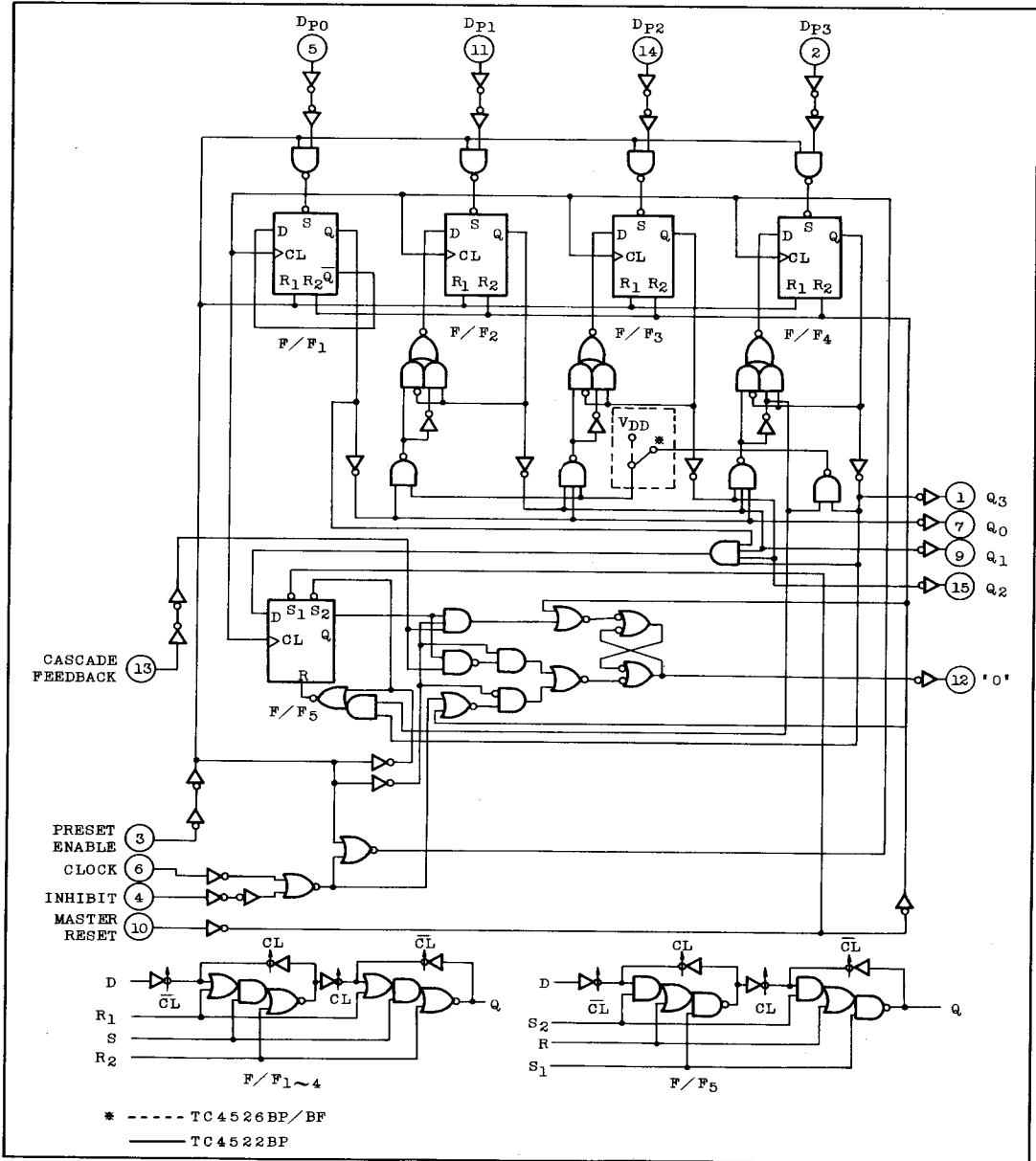
Count	Q ₀	Q ₁	Q ₂	Q ₃
9	H	L	L	H
8	L	L	L	H
7	H	H	H	L
6	L	H	H	L
5	H	L	H	L
4	L	L	H	L
3	H	H	L	L
2	L	H	L	L
1	H	L	L	L
0	L	L	L	L

(TC4526BP/BF)

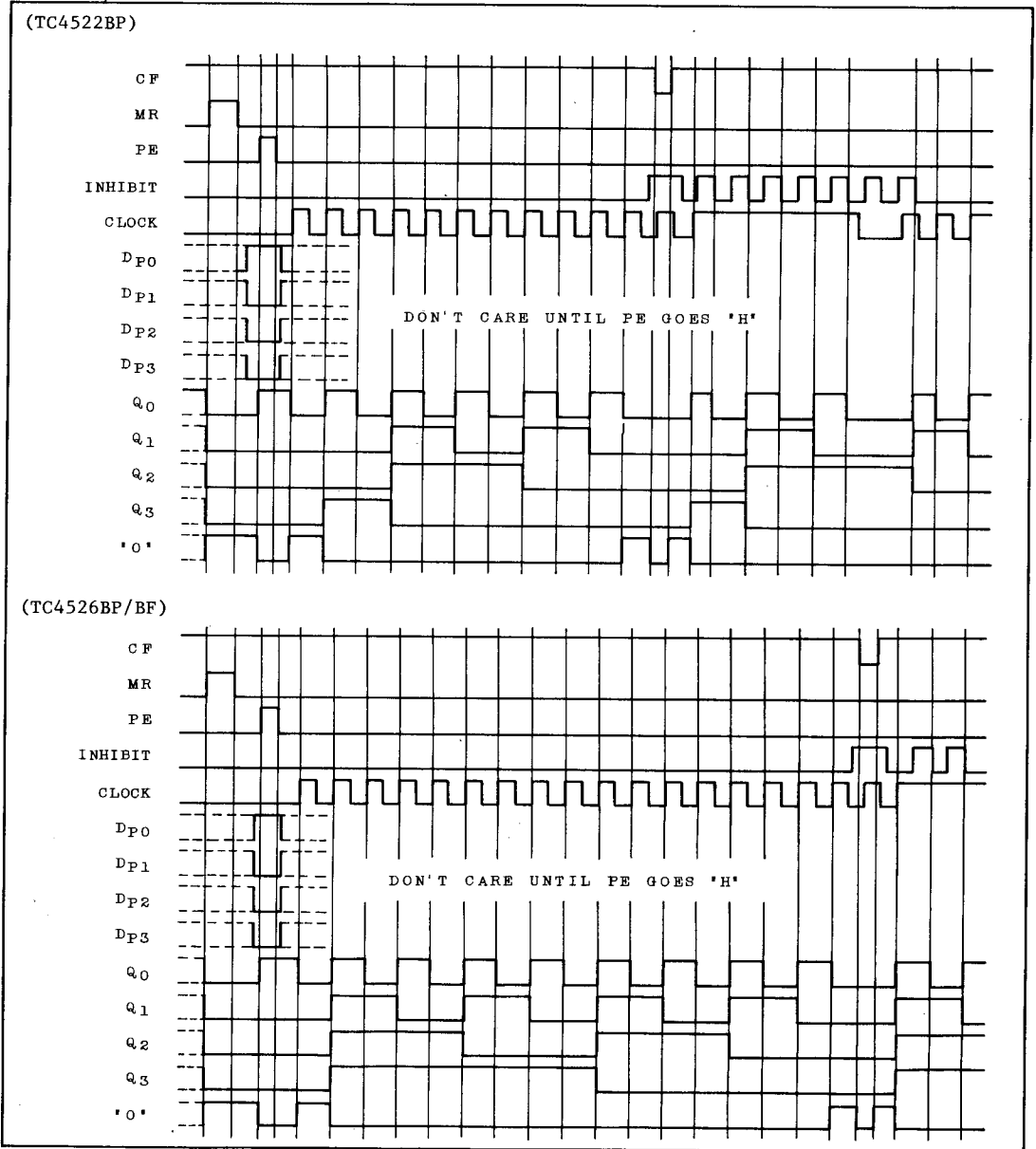
Count	Q ₀	Q ₁	Q ₂	Q ₃
15	H	H	H	H
14	L	H	H	H
13	H	L	H	H
12	L	L	H	H
11	H	H	L	H
10	L	H	L	H
9	H	L	L	H
8	L	L	L	H
7	H	H	H	L
6	L	H	H	L
5	H	L	H	L
4	L	L	H	L
3	H	H	L	L
2	L	H	L	L
1	H	L	L	L
0	L	L	L	L

TC4522BP, TC4526BP/BF

LOGIC DIAGRAM



TIMING CHART



TC4522BP, TC4526BP/BF

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

CHARACTERISTIC	SYMBOL	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	0.00	-	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}	VOH=4.6V	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA	
		VOH=2.5V	5	-2.5	-	-2.1	-4.0	-	-1.7	-		
		VOH=9.5V	10	-1.5	-	-1.3	-2.2	-	-1.1	-		
		VOH=13.5V	15	-4.0	-	-3.4	-9.0	-	-2.8	-		
		V _{IN} =V _{SS} , V _{DD}										
Output Low Current	I _{OL}	VOL=0.4V	5	0.61	-	0.51	1.5	-	0.42	-	mA	
		VOL=0.5V	10	1.5	-	1.3	3.8	-	1.1	-		
		VOL=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	

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.	
Quiescent Device Current	I _{DD}	V _{IN} =V _{SS} , V _{DD} *	5	-	5	-	0.005	5	-	150	#A
			10	-	10	-	0.010	10	-	300	
			15	-	20	-	0.015	20	-	600	

* All valid input combinations.

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

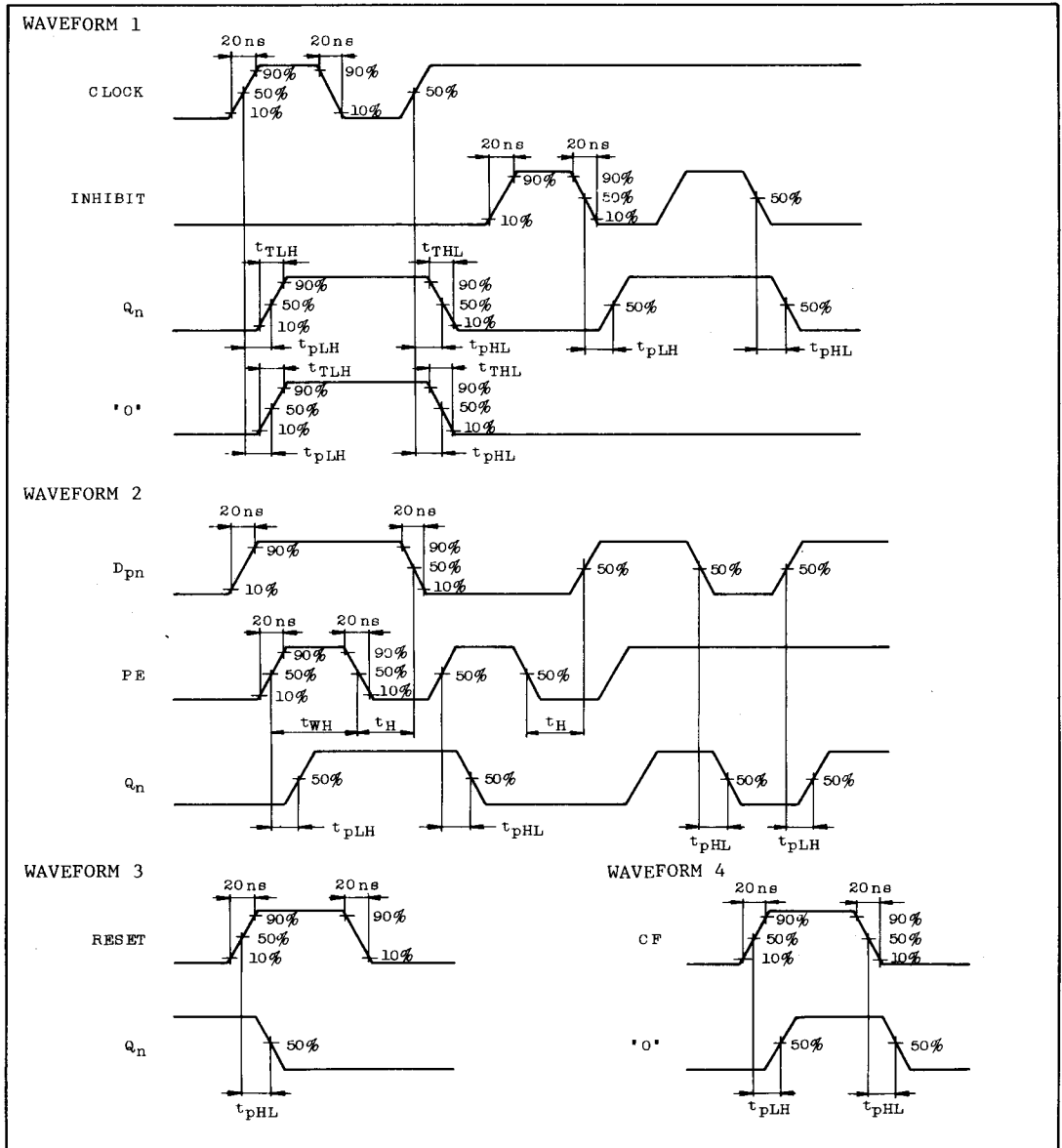
CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{DD} (V)	MIN.	TYP.	MAX.	UNIT
			10	-	50	100	
			15	-	40	80	
Output Transition Time (High to Low)	t _{THL}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Propagation Delay Time (CLOCK, INHIBIT - Q _n)	t _{pLH} t _{pHL}		5	-	450	1100	ns
			10	-	170	450	
			15	-	120	320	
Propagation Delay Time (CLOCK - "0")	t _{pLH} t _{pHL}		5	-	500	1100	
			10	-	190	450	
			15	-	130	320	
Propagation Delay Time (PE - Q _n)	t _{pLH} t _{pHL}		5	-	470	1100	
			10	-	190	450	
			15	-	130	320	
Propagation Delay Time (D _{pn} - Q _n)	t _{pLH} t _{pHL}		5	-	280	1100	
			10	-	120	450	
			15	-	80	320	
Propagation Delay Time (RESET - Q _n)	t _{pHL}		5	-	430	1100	
			10	-	170	450	
			15	-	125	320	
Propagation Delay Time (CF - "0")	t _{pLH} t _{pHL}		5	-	160	480	
			10	-	100	260	
			15	-	70	200	

TC4522BP, TC4526BP/BF

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	VDD(V)	MIN.	TYP.	MAX.	UNIT
Max. Clock Frequency	f _{CL}		5	1.0	2	-	MHz
			10	3.0	6	-	
			15	4.0	9	-	
Max. Clock Input Rise/ Fall Time	t _{rCL} t _{fCL}		5	20	-	-	μs
			10	2.5	-	-	
			15	1.0	-	-	
Max. Input Rise/ Fall Time (INHIBIT)	t _r t _f		5	20	-	-	
			10	2.5	-	-	
			15	1.0	-	-	
Min. Clock Pulse Width	t _w		5	-	250	500	
			10	-	85	170	
			15	-	55	110	
Min. Pulse Width (PRESET ENABLE)	t _{WH}		5	-	330	660	ns
			10	-	140	280	
			15	-	100	200	
Min. Pulse Width (RESET)	t _{WH}		5	-	270	540	
			10	-	110	250	
			15	-	80	200	
Min. Hold Time (D _{pn} -PE)	t _H		5	-	30	150	ns
			10	-	20	50	
			15	-	15	40	
Input Capacitance	C _{IN}			-	5	7.5	pF

WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS



APPLICATION CIRCUIT

