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4-BIT BINARY COUNTER

MTTL MC5400/7400 Series Complex Functions

MC5493L\*  
MC7493L,P\*

TRUTH TABLE

Connect A to C2

COUNT	OUTPUT			
	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Input Loading Factor

R0 = 1

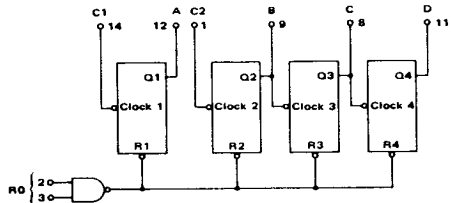
C1, C2 = 2

Output Loading Factor = 10

Total Power Dissipation = 180 mW typ/pkg

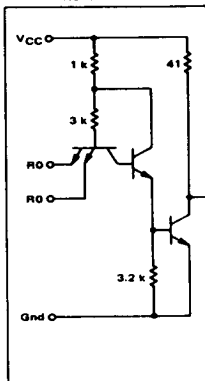
Propagation Delay Time = 20 ns typ/bit

This 4-bit counter is comprised of two sections: a divide-by-two section and a divide-by-eight section. These sections can be used independently, or can be connected to provide the divide-by-16 function. All outputs of the counter can be set to the logic "0" state by applying a logic "1" level to the Reset input.

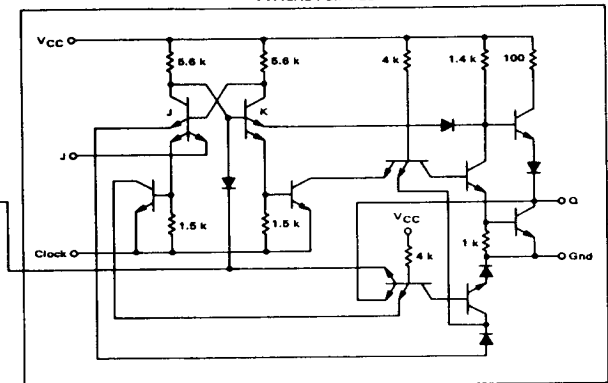


VCC = PIN 5  
GND = PIN 10

RESET GATE



TYPICAL FLIP-FLOP



\*L suffix = TO-116 ceramic dual in-line package (Case 632).  
P suffix = TO-116 ceramic dual in-line package (Case 606).

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MC5493L, MC7493L, P (continued)

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one input of the reset gate. The other input is tested in the same manner.

Characteristic	Pin Under Test	Symbol	MC5493 Test Limits -35 to +125 C		MC7493 Test Limits 0 to +70 C		TEST CURRENT / VOLTAGE VALUES (All Temperatures)												
			Min	Max	Unit	Min	Max	mA		Volts									
								I <sub>OL</sub>	I <sub>OH</sub>	V <sub>L</sub>	V <sub>M</sub>	V <sub>MH</sub>	V <sub>BI</sub>	V <sub>M1</sub>	V <sub>M0</sub>	V <sub>OL</sub>	V <sub>CC</sub>	V <sub>COH</sub>	
Input Forward Current	R0	I <sub>F</sub>	-	-1.6	mAdc	-	-1.6	mAdc	2	-	-	3	-	-	-	-	5		
	C1		-	-3.2	↓	-	-3.2	↓	14	-	-	-	-	-	-	-	↓		
	C2		-	-3.2	↓	-	-3.2	↓	1	-	-	-	-	-	-	-	↓		
Leakage Current	R1	I <sub>R1</sub>	2	40	μA dc	80	80	μA dc	-	2	-	-	-	-	-	-	5		
	C1		-	80	μA dc	80	80	μA dc	14	-	-	-	-	-	-	-	10		
	C2		-	80	μA dc	80	80	μA dc	1	-	-	-	-	-	-	-	10		
Output Output Voltage	R0	I <sub>R2</sub>	2	1.0	mA dc	-	-	-	-	2	-	-	-	-	-	-	5		
	C1		-	1.0	mA dc	-	-	-	-	14	-	-	-	-	-	-	↓		
	C2		-	1.0	mA dc	-	-	-	-	1	-	-	-	-	-	-	↓		
Short-Circuit Current	A (1)	V <sub>OL</sub>	-	0.4	V dc	-	0.4	V dc	-	-	-	2.3	-	-	-	-	5		
	B (1)	I <sub>SC</sub>	-20	-65	mA dc	-18	-65	mA dc	-	-	-	-	2.3	14	-	5	14		
		V <sub>OH</sub>	2.4	-	V dc	2.4	-	V dc	12	-	-	-	-	2.3	14	-	5		
Output Voltage	B (1)	V <sub>OL</sub>	-	0.4	V dc	-	0.4	V dc	9	-	-	2.3	-	-	-	-	5		
	C (1)	I <sub>SC</sub>	-20	-65	mA dc	-18	-65	mA dc	-	-	-	-	2.3	1	-	5	1		
		V <sub>OH</sub>	2.4	-	V dc	2.4	-	V dc	9	-	-	-	-	2.3	1	-	5		
Power Requirements (Total Device)	D (1)	V <sub>OL</sub>	-	0.4	V dc	-	0.4	V dc	8	-	-	-	2.3	1	-	5	-		
		I <sub>SC</sub>	-20	-65	mA dc	-18	-65	mA dc	-	-	-	-	-	2.3	1	-	5		
		V <sub>OH</sub>	2.4	-	V dc	2.4	-	V dc	8	-	-	-	-	2.3	1	-	5		
	V <sub>OL</sub>	11	-	0.4	V dc	-	0.4	V dc	11	-	-	-	2.3	1	-	5	1		
	I <sub>SC</sub>	-20	-65	mA dc	-18	-65	mA dc	-	-	-	-	-	-	2.3	1	-	5		
	V <sub>OH</sub>	2.4	-	V dc	2.4	-	V dc	11	-	-	-	-	-	2.3	1	-	5		
	I <sub>PD</sub>	5	-	48	mA dc	-	48	mA dc	-	-	-	-	-	-	-	5	-		

Pulse 1: Momentarily apply V<sub>th1</sub> then V<sub>th0</sub> prior to taking measurement to set the device in the desired state.

Maintain V<sub>th0</sub> voltage for measurement.

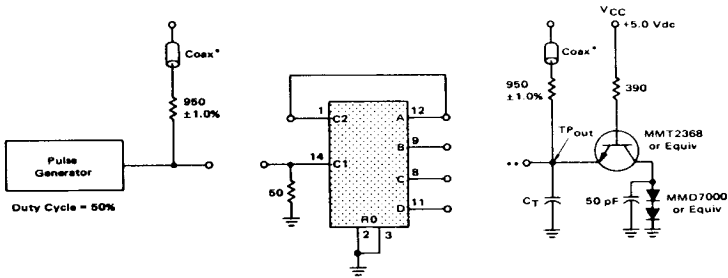
Pulse 2: Apply positive pulse prior to taking measurement to set the device in the desired state.

Maintain V<sub>thL</sub> voltage for measurement.

(1) All input, power supply and ground voltages must be maintained between each test unless otherwise noted.

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SWITCHING TIME TEST CIRCUIT



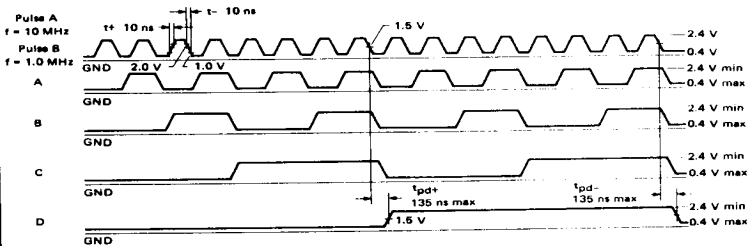
$f_{Tog} = 10 \text{ MHz min}$

$C_T = 15 \text{ pF}$  = total parasitic capacitance, which includes probe, wiring, and load capacitances.

\*The coax delays from input to scope and output to scope must be matched. The scope must be terminated in 50-ohm impedance. The 950-ohm resistor and the scope termination impedance constitute a 20:1 attenuator probe. Coax shall be CT-070-50 or equivalent.

\*\*A load is connected to each output during the test.

VOLTAGE WAVEFORMS AND DEFINITIONS



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