

4-54

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

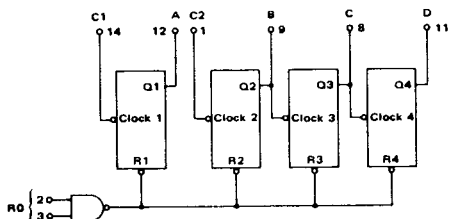
C1, C2 = 2

Output Loading Factor = 10

Total Power Dissipation = 160 mW typ/pkg

Propagation Delay Time = 20 ns typ/bit

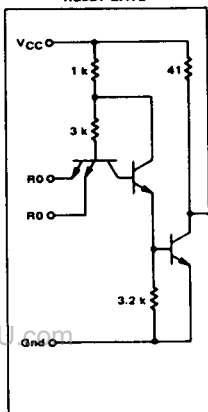
This 4-bit counter is comprised of two sections: a divide-by-two section and a divide-by-eight section. These sections can be used independently, or can be connected to provide the divide-by-16 function. All outputs of the counter can be set to the logic "0" state by applying a logic "1" level to the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



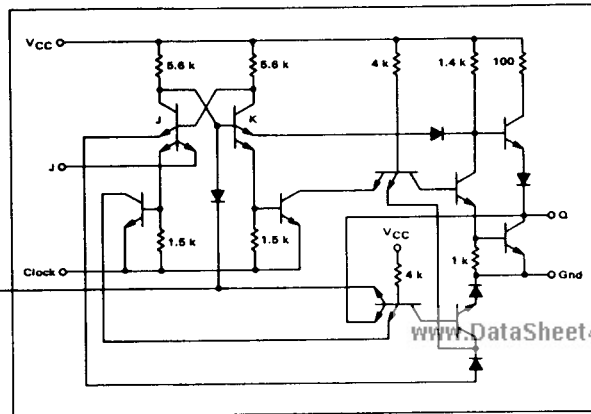
DataSheet4U.com

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).

MC5493L, MC7493L, P (continued)

ELECTRICAL CHARACTERISTICS		TEST CURRENT / VOLTAGE VALUES (All Temperatures)																	
		mA								Volts									
		$I_{OL}$	$I_{OH}$	$V_L$	$V_H$	$V_{MH}$	$V_{BH}$	$V_{H1}$	$V_{H0}$	$V_{CL}$	$V_{CH}$	$V_{ML}$	$V_{MH}$	$V_{H1}$	$V_{H0}$	$V_{CL}$	$V_{CH}$		
MC5493	MC7493	16	-0.4	0.4	2.4	5.5	4.5	2.0	0.8	0.7	5.0	4.5	5.3	0.8	0.8	5.0	4.75	5.25	
		TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW:																	
Characteristic	Symbol	Pin Under Test	MC5493 Test Limits -55 to +125 C			MC7493 Test Limits 0 to +70 C			Pulse 1			Pulse 2							
			Min	Max	Unit	Min	Max	Unit	$I_{OL}$	$V_L$	$V_H$	$V_{MH}$	$V_{BH}$	$V_{H1}$	$V_{H0}$	$V_{CL}$	$V_{CH}$	Grd	
Input Forward Current	$I_F$	2	-1.6	mAdc	-1.6	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	10
	R0	14	-3.2	mAdc	-3.2	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	10
	C2	1	-3.2	mAdc	-3.2	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	10
Leakage Current	$I_{R1}$	2	40	$\mu$ Adc	40	$\mu$ Adc	-	-	-	-	-	-	-	-	-	-	-	-	3,10
	C1	14	80	$\mu$ Adc	80	$\mu$ Adc	-	-	-	-	-	-	-	-	-	-	-	-	10
	C2	1	80	$\mu$ Adc	80	$\mu$ Adc	-	-	-	-	-	-	-	-	-	-	-	-	10
Output Output Voltage	$V_{OL}$	12	-	0.4	Vdc	-	0.4	Vdc	-	-	-	-	-	-	-	-	-	-	10
	$I_{SC}$	-	-20	-85	mAdc	-18	-65	mAdc	-	-	-	-	-	-	-	-	-	-	10,12
	$V_{OH}$	9	2.4	-	Vdc	2.4	-	Vdc	-	12	-	-	-	-	-	-	-	-	10
Short-Circuit Current	$V_{OL}$	9	-	0.4	Vdc	-	0.4	Vdc	-	-	-	-	-	-	-	-	-	-	10
	$I_{SC}$	-	-20	-65	mAdc	-18	-65	mAdc	-	-	-	-	-	-	-	-	-	-	10
	$V_{OH}$	9	2.4	-	Vdc	2.4	-	Vdc	-	9	-	-	-	-	-	-	-	-	10
Output Voltage	$V_{OL}$	8	-	0.4	Vdc	-	0.4	Vdc	-	-	-	-	-	-	-	-	-	-	10
	$I_{SC}$	-	-20	-65	mAdc	-18	-65	mAdc	-	-	-	-	-	-	-	-	-	-	10
	$V_{OH}$	8	2.4	-	Vdc	2.4	-	Vdc	-	8	-	-	-	-	-	-	-	-	10
Power Requirements (TTL Device) Power Supply/Drain	$V_{OL}$	11	-	0.4	Vdc	-	0.4	Vdc	-	-	-	-	-	-	-	-	-	-	10
	$I_{SC}$	-	-20	-65	mAdc	-18	-65	mAdc	-	-	-	-	-	-	-	-	-	-	10,11
	$V_{OH}$	11	2.4	-	Vdc	2.4	-	Vdc	-	11	-	-	-	-	-	-	-	-	10
$I_{PD}$	5	-	48	mAdc	-	48	mAdc	-	-	-	-	-	-	-	-	-	-	-	10

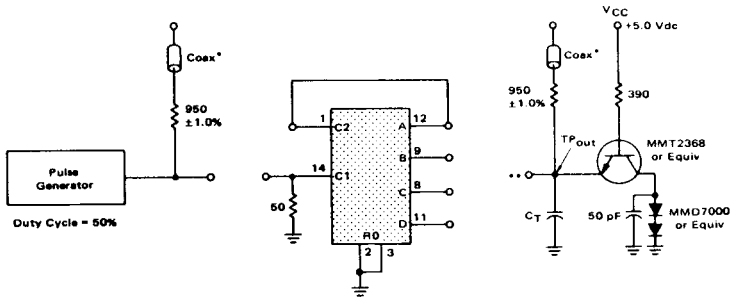
Pulse 1: Immediately apply  $V_{th1}$ , then  $V_{th0}$  prior to taking measurement to set the device in the desired state. Maintain  $V_{th0}$  voltage for measurement.

Pulse 2: Apply positive pulse prior to taking measurement to set the device in the desired state. Maintain  $V_{th1}$  voltage for measurement.

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

## MC5493L, MC7493L, P (continued)

## SWITCHING TIME TEST CIRCUIT



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

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

\*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

