

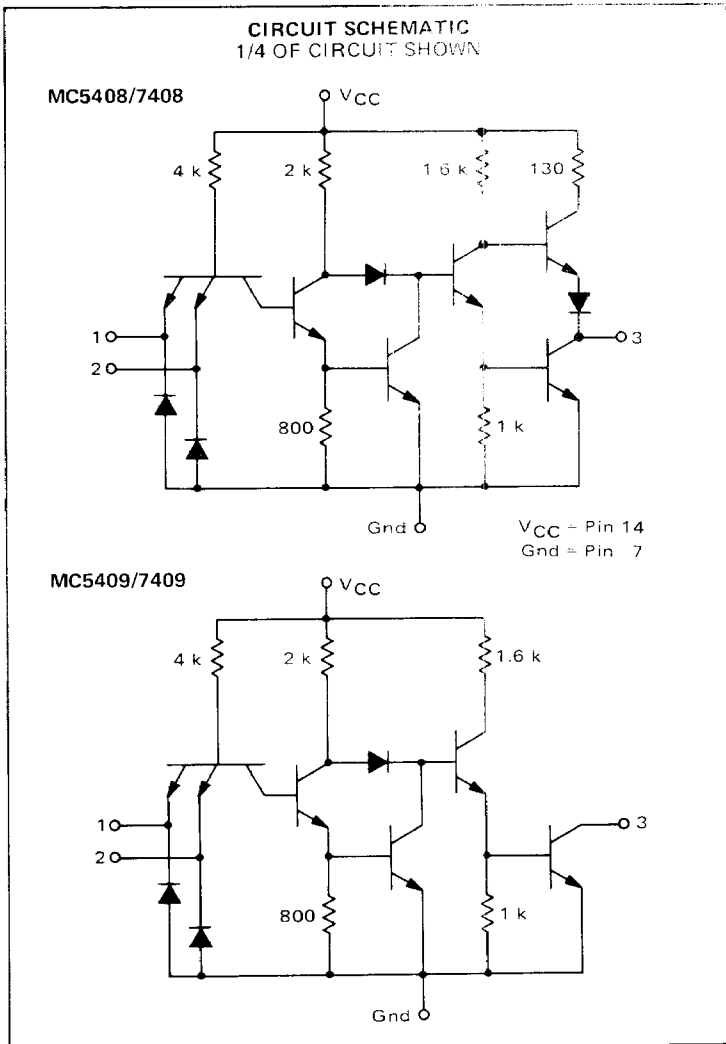


MC5408 • MC7408
MC5409 • MC7409
 (With Open Collector)

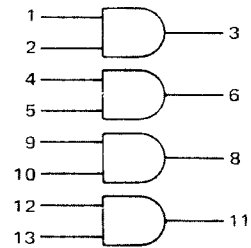
MAY 1971

L
 004470
 4470
 ORIG
 MOT

Add Suffix L for TO-116 ceramic package (Case 632) MC5408/09
 Suffix P for TO-116 plastic package (Case 605) MC7408/09.



This device consists of four 2-input AND gates. This non-inverting function is useful for optimizing logic equations. The MC5408/7408 has totem-pole outputs and the MC5409/7409 has open collector outputs.

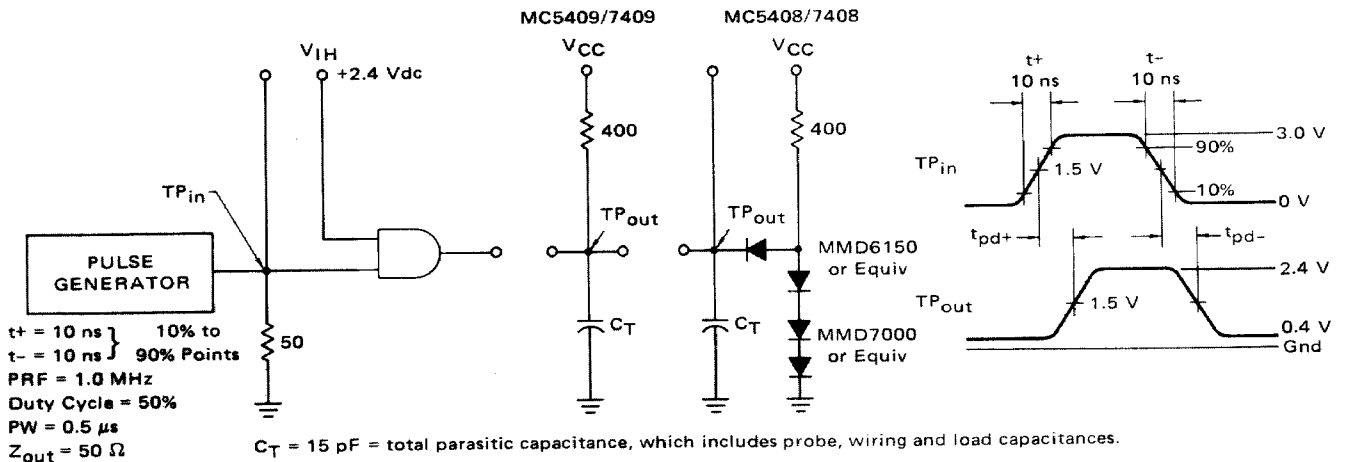


Positive Logic: $3 = 1 \cdot 2$
 Negative Logic: $3 = 1 + 2$

Input Loading Factor = 1
 Output Loading Factor = 10
 Total Power Dissipation = 70 mW typ/pkg
 Propagation Delay Time = 15 ns typ

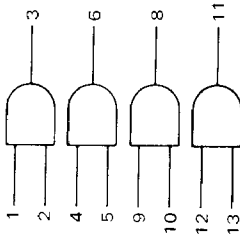
Pin numbers are the same in both packages.

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS



ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates are tested in the same manner.

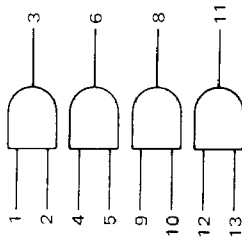


Characteristic	Symbol	Pin Under Test	MC5408 Test Limits -55 to +125°C						MC7408 Test Limits 0 to +70°C						TEST CURRENT / VOLTAGE VALUES (All Temperatures)											
			Min	Max	Unit	Min	Max	Unit	Volts																	
			I_{OL}	I_{OH}	V_{OL}	V_{OH}	I_{SC}^*	I_{DDH}	I_{DDL}	t_{pd-}	t_{pd+}	I_{OL}	I_{OH}	V_{IL}	V_{IH}	V_{IHH}	V_{RI}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}			
Input Forward Current	I_F	1	-	-1.6	mAde	-	-1.6	mAde	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-			
Leakage Current	I_{R1}	1	-	40	μ Ade	-	40	μ Ade	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-			
	I_{R2}	1	-	1.0	mAde	-	1.0	mAde	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-			
	Output	V_{OL}	3	-	0.4	Vdc	-	0.4	Vdc	-	-	-	-	-	-	-	-	2	1	-	14	-	14			
Short-Circuit Current	V_{OH}	3	2.4	-	Vdc	2.4	-	Vdc	-	-	-	-	-	-	-	-	1.2	-	-	14	-	14	-			
	I_{SC}^*	3	-20	-55	mAde	-18	-55	mAde	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Power Requirements (Total Device)	I_{DDH}	14	-	15	mAde	-	15	mAde	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Switching Parameters	I_{DDL}	14	-	26	mAde	-	26	mAde	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Turn-On Delay	t_{pd-}	1,3	-	19	ns	-	19	ns	-	-	-	-	-	-	-	-	2	-	14	-	-	-	7*		
	Turn-Off Delay	t_{pd+}	1,3	-	27	ns	-	27	ns	-	-	-	-	-	-	-	-	-	-	14	-	-	-	7*		

*Ground inputs to gates not under test.
*Only one output should be shorted at a time.

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates are tested in the same manner.



		TEST CURRENT/VOLTAGE VALUES (All Temperatures)																
		mA		Volts														
		I_{OL}	V_{CEX}	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}					
		16	5.5	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.5	5.5					
		16	5.5	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.75	5.25					
		TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:																
Characteristic	Symbol	Pin Under Test	MC5409 Test Limits -55 to +125°C			MC7409 Test Limits 0 to +70°C			V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}
			Min	Max	Unit	Min	Max	Unit										
Input Forward Current	I_F	1	-	-1.6	mAde	-	-1.6	mAde	1	-	-	2	-	-	-	14	-	7*
Leakage Current	I_{R1}	1	-	40	μ Ade	-	40	μ Ade	1	-	-	-	-	-	-	14	-	2, 7*
	I_{R2}	1	-	1.0	mAde	-	1.0	mAde	-	1	-	-	-	-	-	14	-	2, 7*
Output Output Voltage	V_{OL}	3	-	0.4	Vde	-	0.4	Vde	-	-	-	-	2	1	-	14	-	7*
Output Leakage Current	I_{CEX}	3	0.25	-	mAde	0.25	-	mAde	-	-	-	-	1, 2	-	-	14	-	7*
Power Requirements (Total Device)																		
Power Supply Drain	I_{PDH}	14	-	15	mAde	-	15	mAde	-	-	-	-	ALL Inputs	-	-	-	14	-
	I_{PDL}	14	-	26	mAde	-	26	mAde	-	-	-	-	-	-	-	-	14	-
Switching Parameters																		
Turn-On Delay	t_{pd}	1, 3	-	24	ns	-	24	ns	-	-	-	-	-	-	-	14	-	7*
Turn-Off Delay	t_{pdr}	1, 3	-	32	ns	-	32	ns	-	-	-	-	-	-	-	14	-	7*

* Ground inputs to inverters not under test.