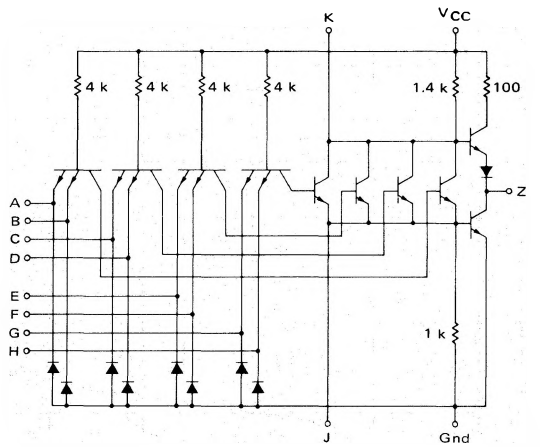
EXPANDABLE 4-WIDE 2-INPUT "AND-OR-INVERT" GATE

MC5453 • MC7453

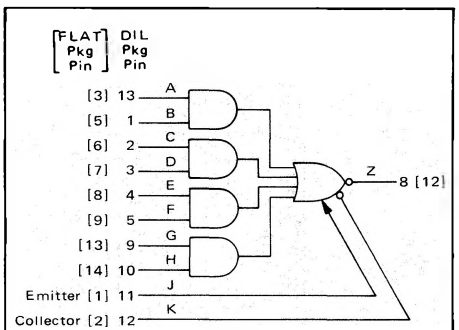
Add Suffix F for TO-86 ceramic package (Case 607).
Suffix L for TO-116 ceramic package (Case 632).
Suffix P for TO-116 plastic package (Case 605) MC7453 only.

CIRCUIT SCHEMATIC



V_{CC} = Pin 14 [4]
Gnd = Pin 7 [11]

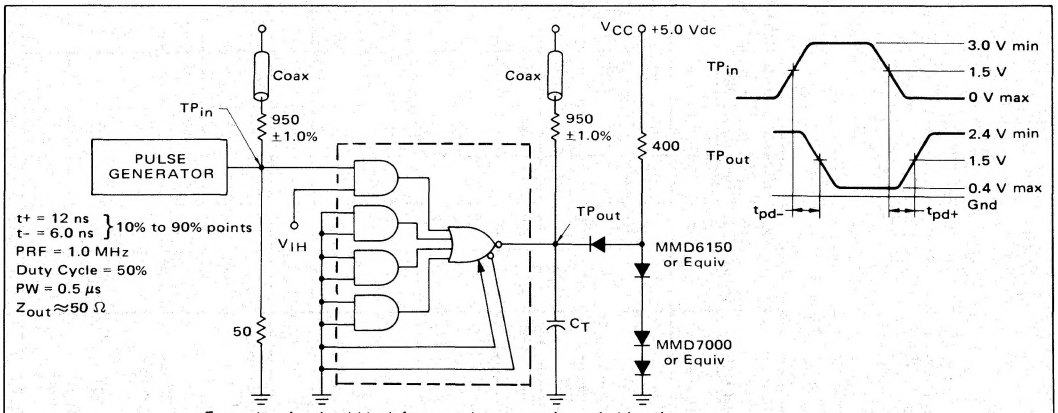
This device consists of four 2-input AND gates ORed together and inverted. Up to four MC5460/7460 expander gates may be ORed with the device at the expander points.



Positive Logic:
$Z = \overline{(A \bullet B) + (C \bullet D) + (E \bullet F) + (G \bullet H) + (\text{Expanders})}$
Negative Logic:
$Z = \overline{(A + B) \bullet (C + D) \bullet (E + F) \bullet (G + H) \bullet (\text{Expanders})}$

Input Loading Factor = 1
Output Loading Factor = 10
Total Power Dissipation = 22 mW typ/pkg
Propagation Delay Time = 13 ns typ

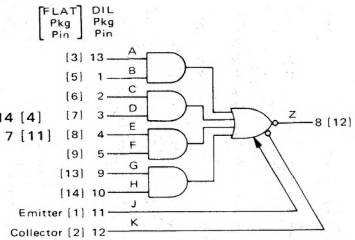
SWITCHING TIME TEST CIRCUIT AND WAVEFORMS



Expander pins should be left open when measuring switching times.

C_T = 15 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.



ELECTRICAL CHARACTERISTICS

Test procedures are shown for one input of the device. To complete testing, sequence through remaining inputs in a similar manner.

	TEST CURRENT/VOLTAGE VALUES (All Temperatures)																	Pin 7[11] is grounded for all tests in addition to the pins listed below:
	mA						Ohms	Volts										
	I_{OL}	I_{OH}	I_{X1}	I_{X2}	I_{X3}	I_{X4}	R_{EX}③	V_{EX}①	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}
MC5453	16	-0.4	0.41	0.27	-0.27	0.3	138	0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.50	5.50
MC7453	16	-0.4	0.62	0.15	-0.15	0.43	130	0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.75	5.25

Characteristic	Symbol	Pin Under Test	MC5453 Test Limits −55 to +125°C			MC7453 Test Limits 0 to +70°C			TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:																	Gnd
			Min	Max	Unit	Min	Max	Unit	I_{OL}	I_{OH}	I_{X1}	I_{X2}	I_{X3}	I_{X4}	R_{EX}③	V_{EX}①	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	
Input																										
Forward Current	I_F	B	-	-1.6	mAdc	-	-1.6	mAdc	-	-	-	-	-	-	-	-	B	-	-	A	-	-	-	-	-	V	-
Leakage Current	I_{R1}	B	-	40	μAdc	-	40	μAdc	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-	-	V	A,C,D,E, F,G,H
	I_{R2}	B	-	1.0	mAdc	-	1.0	mAdc	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-	V	A,C,D,E, F,G,H
Expander Input Current	I_{EX}	K ①	-	-2.9#	mAdc	-	-3.1#	mAdc	Z	-	-	-	-	-	-	J,K	-	-	-	-	-	-	-	-	V	-	All Inputs
Base-Emitter Voltage	V_{BE}	J ②	-	1.0#	Vdc	-	1.0#	Vdc	Z	-	J,K	-	-	-	-	-	-	-	-	-	-	-	-	-	V	-	All Inputs
Output																										
Output Voltage	V_{OL}	Z	-	0.4	Vdc	-	0.4	Vdc	Z	-	-	-	-	-	-	-	-	-	-	-	A,B	-	-	V	-	C,D,E,F,G,H
		Z ③	-	0.4	Vdc	-	0.4	Vdc	Z	-	-	-	-	J	K	-	-	-	-	-	-	-	-	V	-	All Inputs
	V_{OH}	Z	2.4	-	Vdc	2.4	-	Vdc	-	Z	-	-	-	-	-	-	-	-	-	A,D, F,H	-	-	B,C, E,G	-	V	-	-
		Z	2.4#	-	Vdc	2.4#	-	Vdc	-	Z	-	J	K	-	-	-	-	-	-	-	-	-	-	-	V	-	All Inputs
Short-Circuit Current	I_{SC}†	Z	-20	-55	mAdc	-18	-55	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	All Inputs,Z
Power Requirements																										
Power Supply Drain	I_{PDH}	V	-	9.5	mAdc	-	9.5	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	All Inputs	-	-	-	-	V	-
	I_{PDL}	V	-	8.0	mAdc	-	8.0	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	V	All Inputs
Switching Parameters									Pulse In	Pulse Out																
Turn-On Delay	t_{pd-}	B,Z	-	15*	ns	-	15*	ns	B	Z	-	-	-	-	-	-	-	A	-	-	-	-	-	V	-	-	C,D,E,F, G,H
Turn-Off Delay	t_{pd+}	B,Z	-	22*	ns	-	22*	ns	B	Z	-	-	-	-	-	-	-	A	-	-	-	-	-	V	-	-	C,D,E,F, G,H

* Tested only at 25°C. †Only one output should be shorted at a time. # Tested at low temperature limits

① See Figure 1. ② See Figure 2. ③ See Figure 3.

FIGURE 1 – I_{EX} TEST CIRCUIT

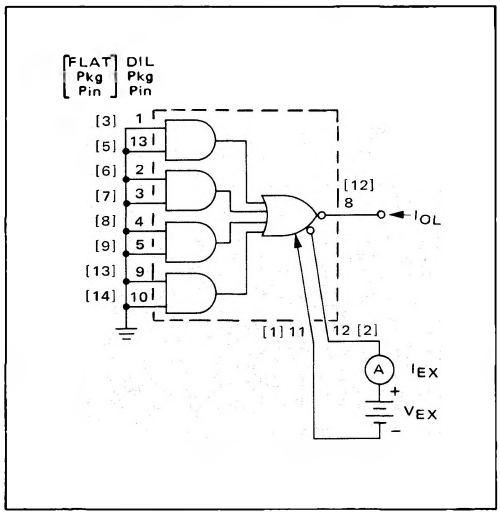


FIGURE 2 – V_{BE} TEST CIRCUIT

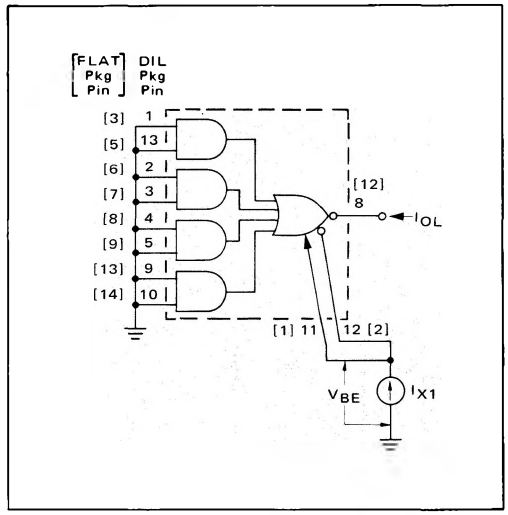


FIGURE 3 – V_{OL} TEST CIRCUIT