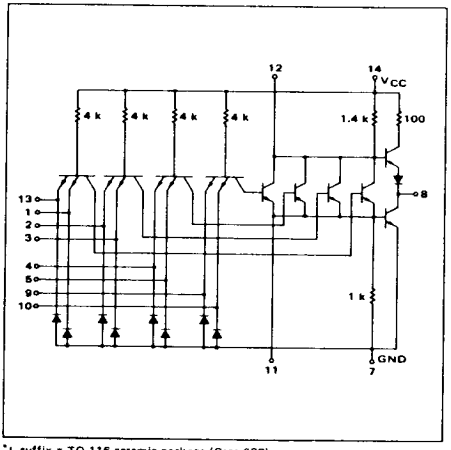
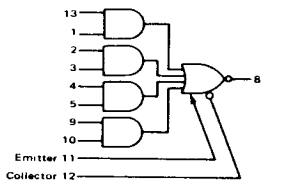
EXPANDABLE 4-WIDE 2-INPUT "AND-OR-INVERT" GATE

MC5453L*
MC7453P,L*



*L suffix = TO-116 ceramic package (Case 632)
P suffix = TO-116 plastic package (Case 605)
See General Information section for package outline dimensions.

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.



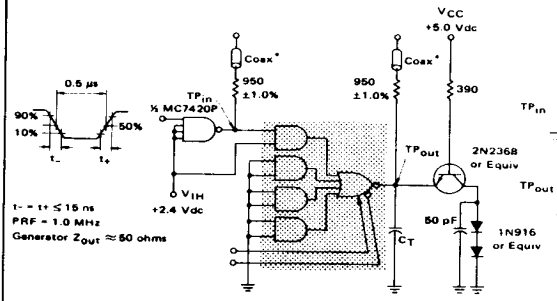
Positive Logic
$8 = \overline{(13 \cdot 1) + (2 \cdot 3) + (4 \cdot 5) + (9 \cdot 10) + \text{(Expanders)}}$

Negative Logic
$8 = \overline{(13 + 1) \cdot (2 + 3) \cdot (4 + 5) \cdot (9 + 10) \cdot \text{(Expanders)}}$

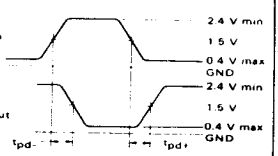
Input Loading Factor = 1
Output Loading Factor = 10

Total Power Dissipation = 22 mW typ/pkg
Propagation Delay Time = 13 ns typ

SWITCHING TIME TEST CIRCUIT



VOLTAGE WAVEFORMS AND DEFINITIONS



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.

FIGURE 1 – I_{EX} TEST CIRCUIT

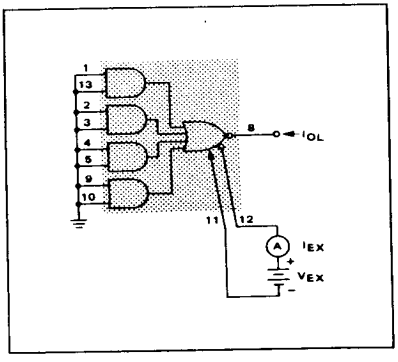


FIGURE 2 – V_{BE} TEST CIRCUIT

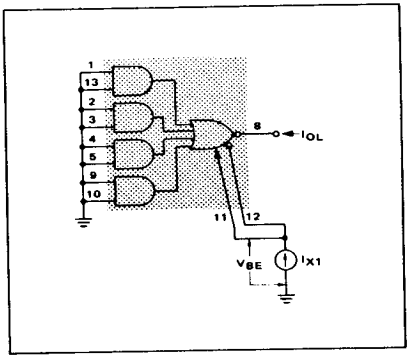
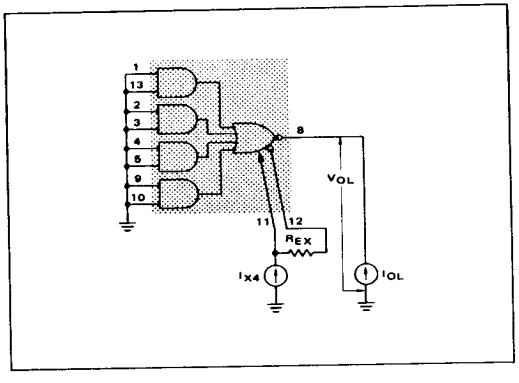
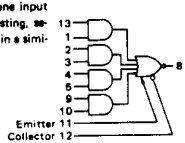


FIGURE 3 – V_{OL} TEST CIRCUIT



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)																				
		mA						Ohms	Volts													
		I_{OL}	I_{OH}	I_{X1}	I_{X3}	I_{X3}	I_{X4}	R_{EX} [3]	V_{EX} [1]	V_{IL}	V_{IH}	V_{BBH}	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	4.5	5.5	
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 Min	Max	Unit	MC7453 Test Limits 0 to +70°C Min	Max	Unit	TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW: I_{OL}	I_{OH}	I_{X1}	I_{X3}	I_{X3}	I_{X4}	R_{EX} [3]	V_{EX} [1]	V_{IL}	V_{IH}	V_{BBH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	Gnd
Input																										
Forward Current	I_F	1	-	-1.6	mAdc	-	-1.6	mAdc	-	-	-	-	-	-	-	-	1	-	-	13	-	-	-	-	-	14	7
Leakage Current	I_{R1}	1	-	40	µAdc	-	40	µAdc	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	14	2,3,4,5, 7,9,10,13
	I_{R2}	1	-	1.0	mAdc	-	1.0	mAdc	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	14	2,3,4,5, 7,9,10,13
Expander Input Current	I_{EX}	12 [1]	-	-2.9	mAdc	-	-3.1	mAdc	8	-	-	-	-	-	-	11,12	-	-	-	-	-	-	-	-	14	-	1,2,3,4,5, 7,9,10,13
Base-Emitter Voltage	V_{BE}	11 [2]	-	1.0	Vdc	-	1.0	Vdc	8	-	11,12	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	1,2,3,4,5, 7,9,10,13
Output																										
Output Voltage	V_{OL}	8	-	0.4	Vdc	-	0.4	Vdc	8	-	-	-	-	-	-	-	-	-	-	-	-	1,13	-	-	14	-	2,3,4,5, 7,9,10
		8 [3]	-	0.4	Vdc	-	0.4	Vdc	8	-	-	-	-	11	12	-	-	-	-	-	-	1,13	-	-	14	-	1,2,3,4,5, 7,9,10,13
	V_{OH}	8	2.4	-	Vdc	2.4	-	Vdc	-	8	-	-	-	-	-	-	-	-	-	3,5, 10,13	-	-	1,2,4,9	-	14	-	7
		8	2.4	-	Vdc	2.4	-	Vdc	-	8	-	11	12	-	-	-	-	-	-	-	-	-	-	-	14	-	1,2,3,4,5, 7,9,10,13
Short-Circuit Current	I_{SC}	8	-20	-55	mAdc	-18	-55	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	1,2,3,4,5, 7,8,9,10,13
Power Requirements																										
Power Supply Drain	I_{PDH}	14	-	9.2	mAdc	-	9.2	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	1,2,3,4,5, 9,10,13	-	-	14	-	-	7
	I_{PDL}	14	-	7.2	mAdc	-	7.2	mAdc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	1,2,3,4,5, 7,9,10,13
Switching Parameters									Pulse In	Pulse Out																	
Turn-On Delay	t_{pd-}	1,8	-	15**	ns	-	15**	ns	1	b	-	-	-	-	-	-	-	13	-	-	-	-	-	14	-	-	2,3,4,5, 7,9,10
Turn-Off Delay	t_{pd+}	1,8	-	29**	ns	-	29**	ns	1	b	-	-	-	-	-	-	-	13	-	-	-	-	-	14	-	-	2,3,4,5, 7,9,10

** Tested only at 25°C.

[1] See Figure 1. [2] See Figure 2. [3] See Figure 3.