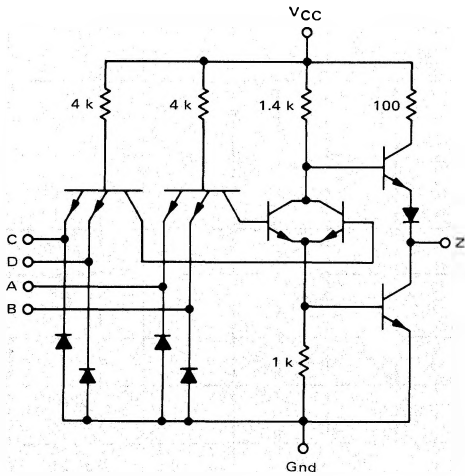DUAL 2-WIDE 2-INPUT
"AND-OR-INVERT" GATE
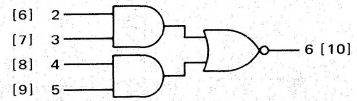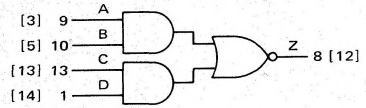
MC5451 · MC7451

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) MC7451 only.

CIRCUIT SCHEMATIC
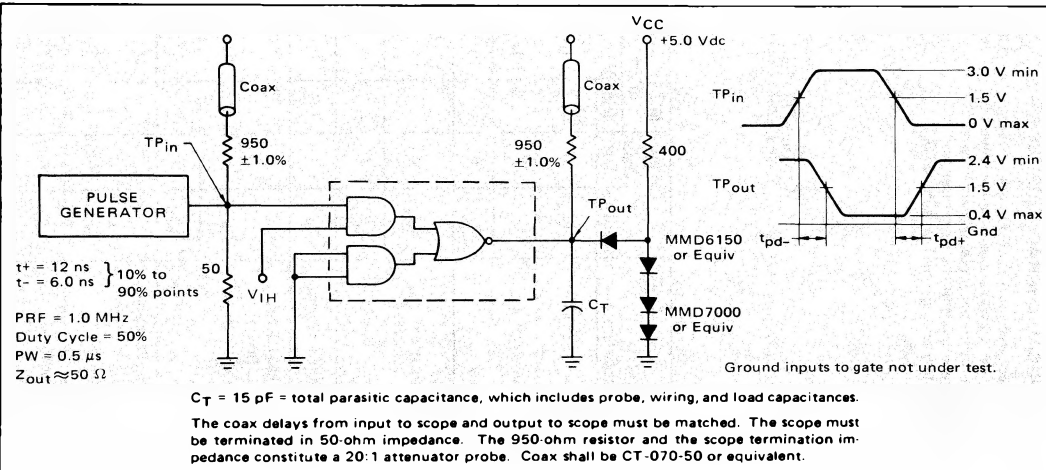1/2 OF CIRCUIT SHOWN

V_{CC}

4 k   4 k   1.4 k   100

C
D
A
B

1 k

Z

Gnd

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

FLAT Pkg Pin	DIL Pkg Pin		
[3]	9	A	
[5]	10	B	
[13]	13	C	
[14]	1	D	Z 8 [12]
[6]	2		
[7]	3		
[8]	4		6 [10]
[9]	5		

Positive Logic: $Z = \overline{(A \cdot B) + (C \cdot D)}$
Negative Logic: $Z = \overline{(A + B) \cdot (C + D)}$

Input Loading Factor = 1
Output Loading Factor = 10
Total Power Dissipation = 28 mW typ/pkg
Propagation Delay Time = 13 ns typ

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS

V_{CC}
+5.0 Vdc

Coax   Coax

TP_{in}

950
±1.0%   950
±1.0%   400

PULSE
GENERATOR

TP_{out}

TP_{in} 3.0 V min
1.5 V
0 V max

TP_{out} 2.4 V min
1.5 V
0.4 V max
Gnd

t_{pd-} t_{pd+}

t+ = 12 ns } 10% to
t- = 6.0 ns } 90% points

50

V_{IH}

MMD6150
or Equiv

C_T

MMD7000
or Equiv

PRF = 1.0 MHz
Duty Cycle = 50%
PW = 0.5 µs
$Z_{out} \approx 50\ \Omega$

Ground inputs to gate not under test.

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 im-
pedance constitute a 20:1 attenuator probe. Coax shall be CT-070-50 or equivalent.
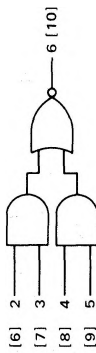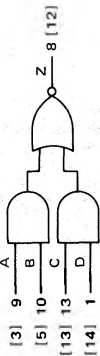
MC5451, MC7451 (continued)

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one gate. The other gates are tested in the same manner. Further, test procedures are shown for only one input of the gate under test. To complete testing, sequence through remaining inputs.

V = V_CC = Pin 14 [4]
Gnd = Pin 7 [11]

[FLAT Pkg Pin]	[DIL Pkg Pin]	
[3]	9	A
[5]	10	B
[13]	13	C
[14]	1	D

6 [10]
[6] 2
[7] 3
[8] 4
[9] 5
Z 8 [12]

Characteristic	Symbol	Pin Under Test	MC5451 Test Limits −55 to +125°C			MC7451 Test Limits 0 to +70°C			TEST CURRENT/VOLTAGE VALUES (All Temperatures)												
									mA		Volts											Gnd
			Min	Max	Unit	Min	Max	Unit	I_{OL}	I_{OH}	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	Pin 7 [11] is grounded for all tests in addition to the pins listed below:
MC5451									16	−0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.50	5.50	
MC7451									16	−0.4	0.4	2.4	5.5	4.5	5.0	2.0	0.8	5.0	4.75	5.25	
									I_{OL}	I_{OH}	V_{IL}	V_{IH}	V_{IHH}	V_{R1}	V_{R2}	V_{th1}	V_{th0}	V_{CC}	V_{CCL}	V_{CCH}	Gnd
Input Forward Current	I_F	D	−	−1.6	mAdc	−	−1.6	mAdc	−	−	D	−	−	C	−	−	−	−	−	V	*
Leakage Current	I_{R1}	D	−	40	μAdc	−	40	μAdc	−	−	−	D	−	−	−	−	−	−	−	V	A,B,C*
	I_{R2}	D	−	1.0	mAdc	−	1.0	mAdc	−	−	−	−	D	−	−	−	−	−	−	V	A,B,C*
Output Output Voltage	V_{OL}	Z	−	0.4	Vdc	−	0.4	Vdc	Z	−	−	−	−	−	−	−	−	−	V	−	A,B*
	V_{OH}	Z	2.4	−	Vdc	2.4	−	Vdc	−	Z	−	−	−	C	−	C,D	D	−	V	−	A,B*
Short-Circuit Current	I_{SC}†	Z	−20	−55	mAdc	−18	−55	mAdc	−	−	−	−	−	C	−	−	D	−	−	V	A,B,C*,D,Z
Power Requirements (Total Device) Power Supply Drain	I_{PDH}	V	−	14	mAdc	−	14	mAdc	−	−	−	−	−	−	All Inputs	−	−	−	−	V	−
	I_{PDL}	V	−	8.0	mAdc	−	8.0	mAdc	−	−	−	−	−	−	−	−	−	−	−	V	A,B,C*,D
Switching Parameters Turn-On Delay	t_{pd-}	D,Z	−	15**	ns	−	15**	ns	Pulse In D	Pulse Out Z	−	C	−	−	−	−	−	V	−	−	A,B*
Turn-Off Delay	t_{pd+}	D,Z	−	22**	ns	−	22**	ns	Pulse In D	Pulse Out Z	−	C	−	−	−	−	−	V	−	−	A,B*

*Ground inputs to gates not under test.
**Tested only at 25°C.
†Only one output should be shorted at a time.