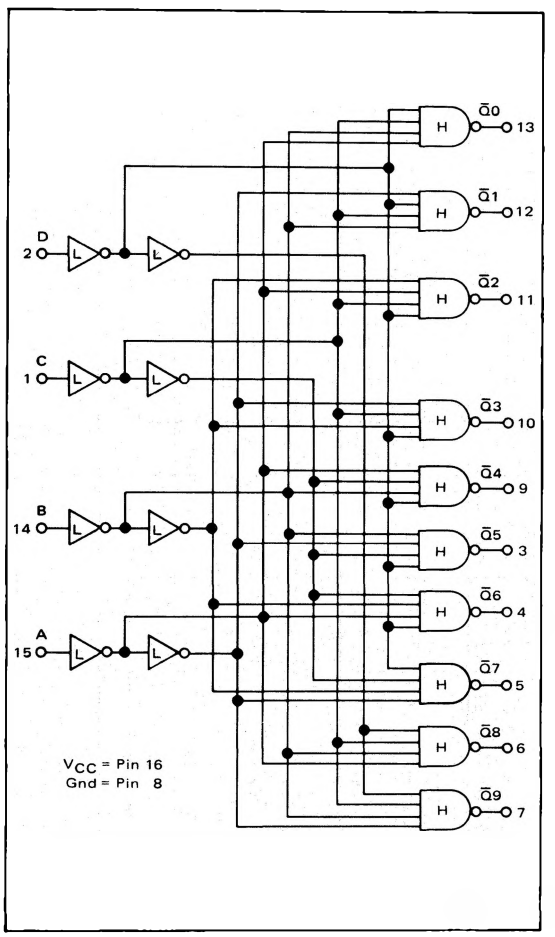
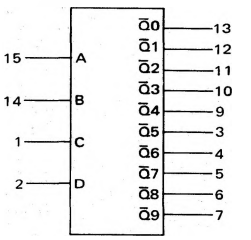
MC9301L*
MC8301L, P*



This decoder converts four-bit BCD inputs to select one-of-ten outputs. The selected output is in the logic "0" state while all other outputs are in the logic "1" state. When a binary code greater than nine is applied to the inputs, all outputs will be in the logic "1" state. This device is useful in memory selection, industrial control, and data routing applications.

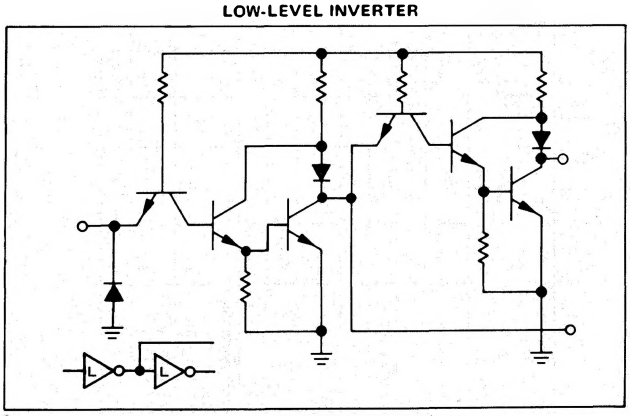


Input Loading Factor = 1
Output Loading Factor = 10
Total Power Dissipation = 125 mW typ/pkg
Propagation Delay Time = 22 ns typ

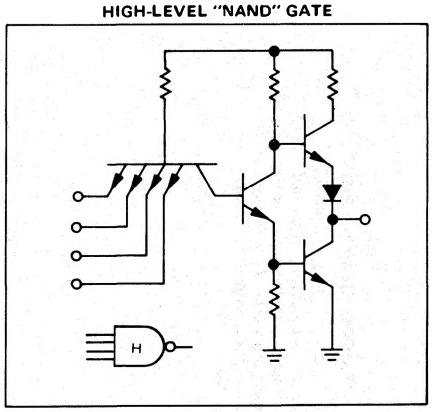
TRUTH TABLE

INPUT				OUTPUT									
D	C	B	A	9	8	7	6	5	4	3	2	1	0
0	0	0	0	1	1	1	1	1	1	1	1	1	0
0	0	0	1	1	1	1	1	1	1	1	1	0	1
0	0	1	0	1	1	1	1	1	1	1	0	1	1
0	0	1	1	1	1	1	1	1	1	0	1	1	1
0	1	0	0	1	1	1	1	1	0	1	1	1	1
0	1	0	1	1	1	1	1	0	1	1	1	1	1
0	1	1	0	1	1	1	0	1	1	1	1	1	1
0	1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	0	0	1	0	1	1	1	1	1	1	1	1
1	0	0	1	0	1	1	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1

LOW-LEVEL INVERTER



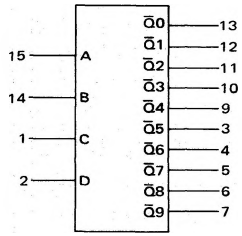
HIGH-LEVEL "NAND" GATE



*L suffix = 16-pin dual in-line ceramic package (Case 620).
P suffix = 16-pin dual in-line plastic package (Case 612).

ELECTRICAL CHARACTERISTICS

Test procedures are shown for only one input and one output. Test other inputs and outputs in the same manner according to the truth table. Additionally, test all input-output combinations according to the truth table.



@ Test Temperature		TEST CURRENT/VOLTAGE VALUES												
		mA				Volts								
		I_{OL1}	I_{OL2}	I_{OH}	I_D	V_{IL}	V_{IH}	V_F	V_R	V_{CC}	V_{CCL}	V_{CCH}	V_{IHX}	
MC9301	−55°C	12.4	16	-0.6	-	0.80	2.0	0.4	4.5	-	4.5	5.5	-	
	+25°C	12.4	16	-0.6	-10	0.90	1.7	0.4	4.5	5.0	4.5	5.5	2.4	
	+125°C	12.4	16	-0.6	-	0.80	1.4	0.4	4.5	-	4.5	5.5	-	
MC8301	0°C	14.1	16	-0.6	-	0.85	1.9	0.45	4.5	-	4.75	5.25	-	
	+25°C	14.1	16	-0.6	-10	0.85	1.8	0.45	4.5	5.0	4.75	5.25	2.4	
	+75°C	14.1	16	-0.6	-	0.85	1.6	0.45	4.5	-	4.75	5.25	-	

Characteristic	Symbol	Pin Under Test	MC9301 Test Limits							MC8301 Test Limits							TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:										
			−55°C		+25°C		+125°C			0°C		+25°C		+75°C													
			Min	Max	Min	Max	Min	Max	Unit	Min	Max	Min	Max	Min	Max	Unit	I_{OL1}	I_{OL2}	I_{OH}	I_D	V_{IL}	V_{IH}	V_F	V_R	V_{CC}	V_{CCL}	V_{CCH}	V_{IHX}	Gnd
Input Forward Current	I_{F1}	1	-	-1.6	-	-1.6	-	-1.6	mAdc	-	-1.6	-	-1.6	-	-1.6	mAdc	-	-	-	-	-	-	1	-	-	-	16	-	8
	I_{F2}	1	-	-1.24	-	-1.24	-	-1.24	mAdc	-	-1.41	-	-1.41	-	-1.41	mAdc	-	-	-	-	-	-	1	-	-	16	-	-	8
Leakage Current	I_R	1	-	-	-	60	-	60	μAdc	-	60	-	60	-	60	μAdc	-	-	-	-	-	-	-	1	-	-	16	-	8
Clamp Voltage	V_D	1	-	-	-	-1.5	-	-	Vdc	-	-	-	-1.5	-	-	Vdc	-	-	-	1	-	-	-	-	-	16	-	-	8
Output Output Voltage	V_{OL1}	3	-	0.4	-	0.4	-	0.4	Vdc	-	0.45	-	0.45	-	0.45	Vdc	3	-	-	-	2,14	1,15	-	-	-	16	-	-	8
	V_{OL2}	3	-	0.4	-	0.4	-	0.4	Vdc	-	0.45	-	0.45	-	0.45	Vdc	-	3	-	-	2,14	1,15	-	-	-	-	16	-	8
	V_{OH}	3	2.4	-	2.4	-	2.4	-	Vdc	2.4	-	2.4	-	2.4	-	Vdc	-	-	3	-	14	1,2,15	-	-	-	16	-	-	8
Power Requirements (Total Device) Power Supply Drain	I_{PD}	16	-	-	-	50	-	-	mAdc	-	-	-	50	-	-	mAdc	Pulse In: -	Pulse Out: -	-	-	-	-	-	-	16	-	-	-	8
Switching Parameters Turn-On Delay	t_{pd-}	15,3	-	-	-	30	-	-	ns	-	-	-	30	-	-	ns	15	3	-	-	-	-	-	-	16	-	-	1	2,8,14
Turn-Off Delay	t_{pd+}	15,3	-	-	-	35	-	-	ns	-	-	-	35	-	-	ns	15	3	-	-	-	-	-	-	16	-	-	1	2,8,14

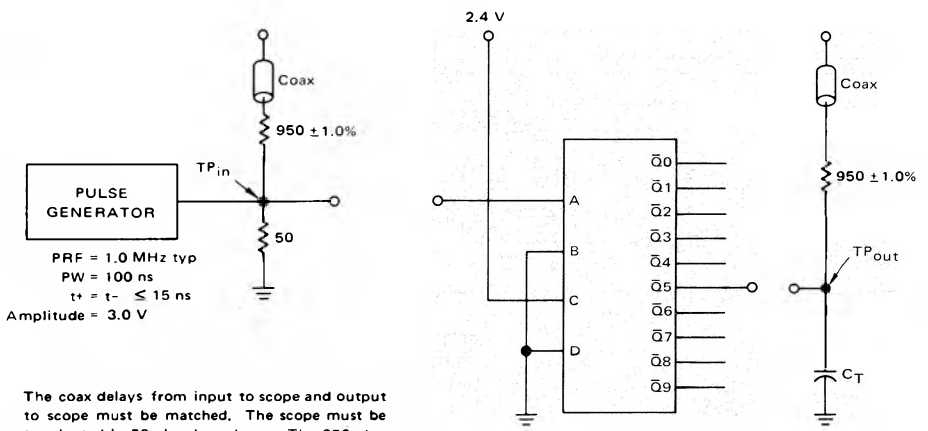
INPUT and OUTPUT LOADING FACTORS
with respect to MTTL and MDTL families

FAMILY	MC9301 INPUT LOADING FACTOR	MC9301 OUTPUT LOADING FACTOR
MC9300	1.0	10
MC500	1.06	10.6
MC2100	0.7	7.0
MC3100	0.7	7.0
MC4300	1.0	10
MC5400	1.0	7.75
MC930*	Fan-Out = 2 (6.0 k ohm pullup) Fan-Out = 8 (2.0 k ohm pullup)	9.4

FAMILY	MC8301 INPUT LOADING FACTOR	MC8301 OUTPUT LOADING FACTOR
MC8300	1.0	10
MC400	1.0	9.0
MC2000	0.6	6.0
MC3000	0.7	7.4
MC4000	1.0	10
MC7400	1.0	8.75
MC830*	Fan-Out = 2 (6.0 k ohm pullup) Fan-Out = 8 (2.0 k ohm pullup)	10.8

*Due to logic "1" state drive limitations of the MDTL family.

SWITCHING TIME TEST CIRCUIT



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.

C_T = 15 pF = total parasitic capacitance, which includes probe, wiring, and load capacitances.

VOLTAGE WAVEFORMS