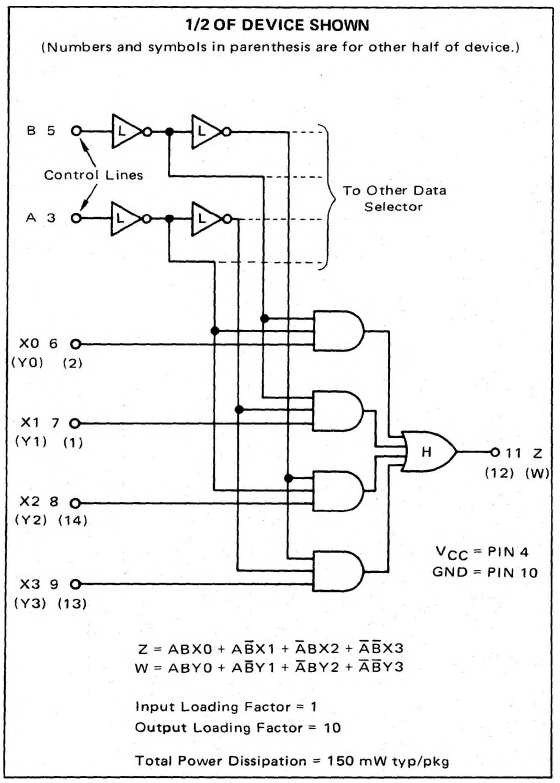
DUAL 4-CHANNEL
DATA SELECTOR

MC4300F,L*
MC4000F,L,P*



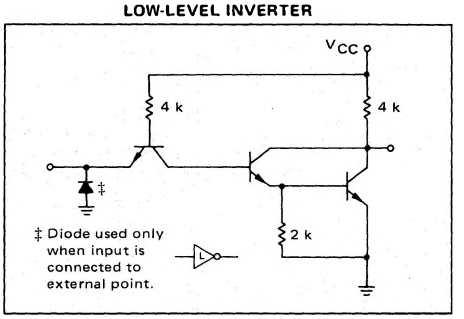
This device consists of two four-channel data selectors with common control lines, constructed from high-level AND-OR gates and low-level inverters. By selecting one of four logic combinations, information on one of the four data inputs will be routed to the output.

Data selectors are useful in applications where digital data is to be routed from one of several registers or locations to another register or location for processing.

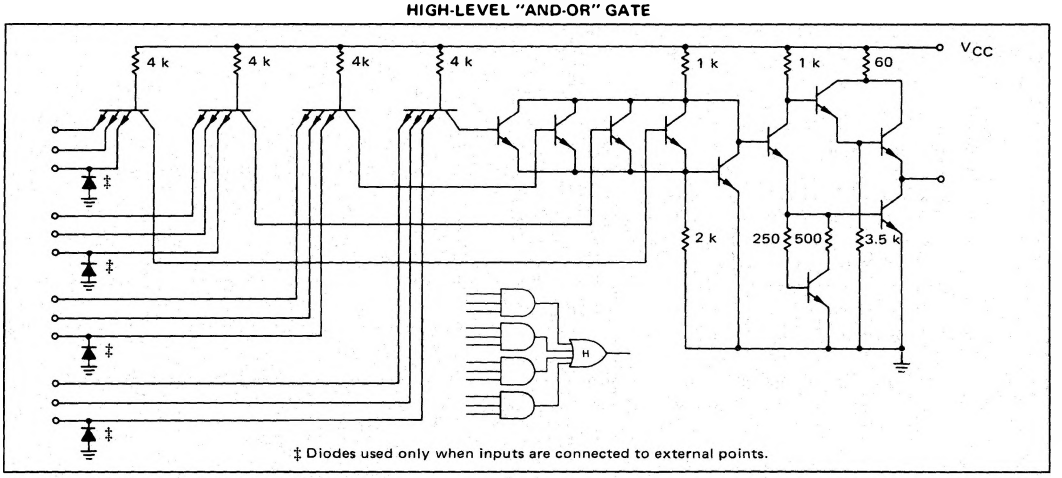
TYPICAL PROPAGATION DELAY TIMES (ns)
$T_A = 25^oC$

INPUT	Z	CONDITIONS
A	18	X0 = X2 = X3 = logic "0", X1 =
B	15	logic "1". A and B are de-
X1	11	fined by the logic equations.

LOW-LEVEL INVERTER

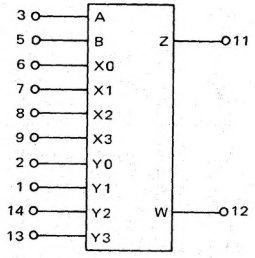


HIGH-LEVEL "AND-OR" GATE



*F suffix = TO-86 ceramic flat package (Case 607).
L suffix = TO-116 ceramic dual in-line package (Case 632).
P suffix = TO-116 plastic dual in-line package (Case 605).

ELECTRICAL CHARACTERISTICS



	@ Test Temperature	TEST CURRENT/VOLTAGE VALUES														
		mA					Volts									
		I_{OL1}	I_{OL2}	I_{OH}	I_{in}	I_D	V_{IL}	V_{IH}	V_{IHX}	V_F	V_R	V_{RH}	V_{max}	V_{CC}	V_{CCL}	V_{CCH}
MC4300	-55°C	16	18.4	-1.6	–	–	1.1	2.0	–	0.4	2.4	4.0	–	5.0	4.5	5.5
	+25°C	16	18.4	-1.6	1.0	-10	1.1	1.8	2.5	0.4	2.4	4.0	7.0	5.0	4.5	5.5
	+125°C	16	18.4	-1.6	–	–	0.8	1.8	–	0.4	2.4	4.0	–	5.0	4.5	5.5
MC4000	0°C	16	17.6	-1.6	–	–	1.1	2.0	–	0.4	2.5	4.0	–	5.0	4.75	5.25
	+25°C	16	17.6	-1.6	1.0	-10	1.1	1.8	2.5	0.4	2.5	4.0	7.0	5.0	4.75	5.25
	+75°C	16	17.6	-1.6	–	–	0.9	1.8	–	0.4	2.5	4.0	–	5.0	4.75	5.25

Characteristic	Symbol	Pin Under Test	MC4300 Test Limits						MC4000 Test Limits						Unit	TEST CURRENT/VOLTAGE APPLIED TO PINS LISTED BELOW:													Gnd
			-55°C		+25°C		+125°C		0°C		+25°C		+75°C			I_{OL1}	I_{OL2}	I_{OH}	I_{in}	I_D	V_{IL}	V_{IH}	V_{IHX}	V_F	V_R	V_{RH}	V_{max}	V_{CC}	V_{CCL}	V_{CCH}	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max																
Input																														
Forward Current	I_{F1}	6	–	-1.6	–	-1.6	–	-1.6	–	-1.6	–	-1.6	–	-1.6	mAdc	–	–	–	–	–	–	–	–	6	–	–	–	–	–	4	3,5,10
	I_{F2}	6	–	-1.4	–	-1.4	–	-1.4	–	-1.4	–	-1.4	–	-1.4	mAdc	–	–	–	–	–	–	–	–	6	–	–	–	–	4	–	3,5,10
Leakage Current	I_R	6	–	40	–	40	–	40	–	40	–	40	–	40	µAdc	–	–	–	–	–	–	–	–	–	3,5,6	–	–	–	–	4	10
Breakdown Voltage	BV_{in}	6	–	–	5.5	–	–	–	–	–	5.5	–	–	–	Vdc	–	–	–	6	–	–	–	–	–	–	3,5	–	–	–	4	10
Clamp Voltage	V_D	6	–	–	–	-1.5	–	–	–	–	–	-1.5	–	–	Vdc	–	–	–	–	6	–	–	–	–	–	–	–	–	4	–	10
Output																														
Output Voltage	V_{OL}	11	–	0.4	–	0.4	–	0.4	–	0.4	–	0.4	–	0.4	Vdc	11	–	–	–	–	1,2,3,5,6,7,8,9,13,14	–	–	–	–	–	–	–	–	4	–	10
		11	–	0.4	–	0.4	–	0.4	–	0.4	–	0.4	–	0.4	Vdc	–	11	–	–	–	1,2,3,5,6,7,8,9,13,14	–	–	–	–	–	–	–	–	–	4	10
	V_{OH}	11	2.4	–	2.4	–	2.4	–	2.4	–	2.4	–	2.4	–	Vdc	–	–	11	–	–	1,3,5,7,8,9,13,14	2,6	–	–	–	–	–	–	–	4	–	10
Short-Circuit Current	I_{SC}	11	-30	-100	-30	-100	-30	-100	-30	-100	-30	-100	-30	-100	mAdc	–	–	–	–	–	–	–	–	2,5,6,8,9,13,14	–	1,3,7	–	4	–	–	10,11
Power Requirements (Total Device)																														
Maximum Power Supply Current	I_{max}	4	–	–	–	65	–	–	–	–	–	65	–	–	mAdc	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–	1,2,3,5,6,7, 8,9,10,13,14
Power Supply Drain	I_{PD}	4	–	–	–	45	–	–	–	–	–	45	–	–	mAdc	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	1,2,3,5,6,7, 8,9,10,13,14
Switching Parameters																Pulse In		Pulse Out												
Turn-On Delay	t_{pd-1}	11	–	–	–	16	–	–	–	–	–	16	–	–	ns	6		11		–	–		–	–	–	–	–	4	–	–	1,2,3,5,7,8, 9,10,13,14
	t_{pd-2}	11	–	–	–	22	–	–	–	–	–	22	–	–	ns	5		11		–	–		6	–	–	–	–	4	–	–	1,2,3,7,8, 9,10,13,14
	t_{pd-3}	11	–	–	–	27	–	–	–	–	–	27	–	–	ns	3		11		–	–		7	–	–	–	–	4	–	–	1,2,5,6,8, 9,10,13,14
Turn-Off Delay	t_{pd+1}	11	–	–	–	16	–	–	–	–	–	16	–	–	ns	6		11		–	–		–	–	–	–	–	4	–	–	1,2,3,5,7,8, 9,10,13,14
	t_{pd+2}	11	–	–	–	22	–	–	–	–	–	22	–	–	ns	5		11		–	–		6	–	–	–	–	4	–	–	1,2,3,7,8, 9,10,13,14
	t_{pd+3}	11	–	–	–	27	–	–	–	–	–	27	–	–	ns	3		11		–	–		7	–	–	–	–	4	–	–	1,2,5,6,8, 9,10,13,14

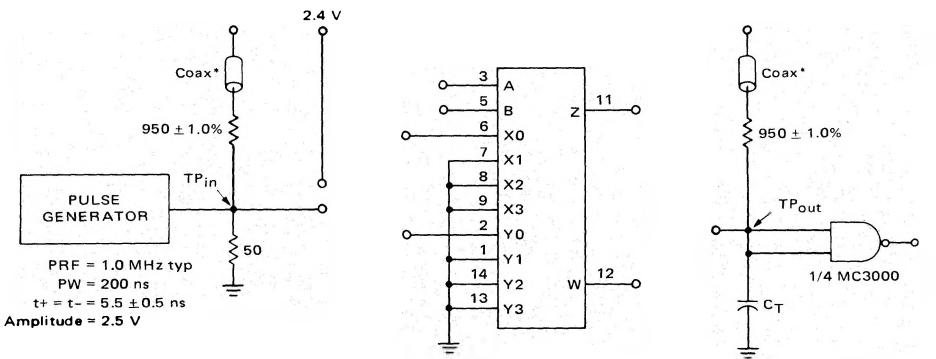
INPUT AND OUTPUT LOADING FACTORS
with respect to MTTL and MDTL families

FAMILY	MC4300 INPUT LOADING FACTOR	MC4300 OUTPUT LOADING FACTOR
MC4300	1.0	10
MC500	1.23	12.3
MC2100	0.8	8
MC3100	0.8	8
MC5400	1.0	10
MC930	1.0*	10

FAMILY	MC4000 INPUT LOADING FACTOR	MC4000 OUTPUT LOADING FACTOR
MC4000	1.0	10
MC400	1.0	10
MC2000	0.67	6
MC3000	0.7	8
MC7400	1.0	10
MC830	1.15*	12

*Applies only when input is being driven by MDTL gate with 2.0 kilohm pullup resistor. Logic "1" state drive limitations of gates with 6.0 kilohm pullup resistors reduce drive capability to fan-out of 3.

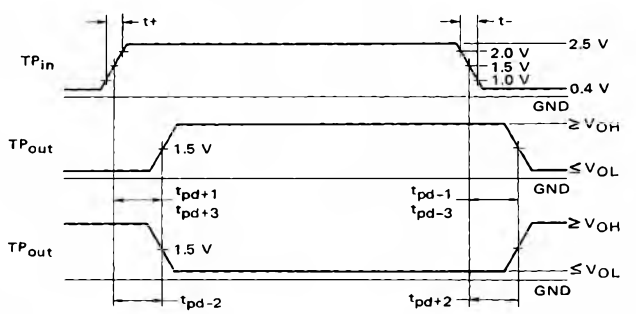
SWITCHING TIME TEST CIRCUIT



C_T = 25 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.

VOLTAGE WAVEFORMS



TYPICAL PROPAGATION DELAY TIMES

FIGURE 1 – FOUR-GATE DELAY versus TEMPERATURE

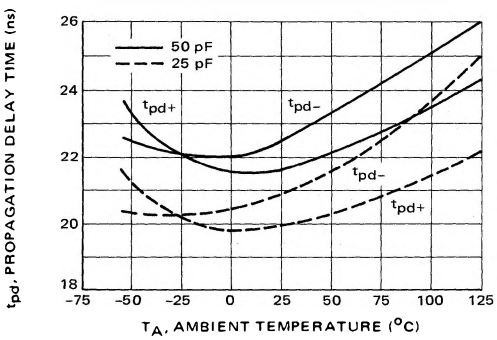


FIGURE 2 – THREE-GATE DELAY versus TEMPERATURE

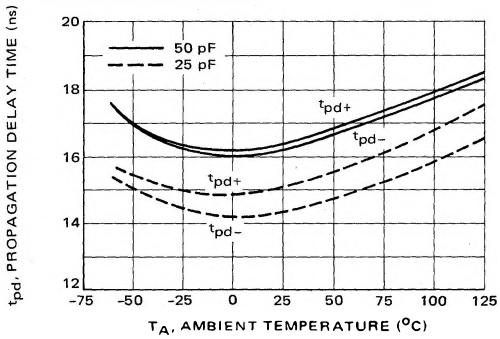


FIGURE 3 – TWO-GATE DELAY versus TEMPERATURE

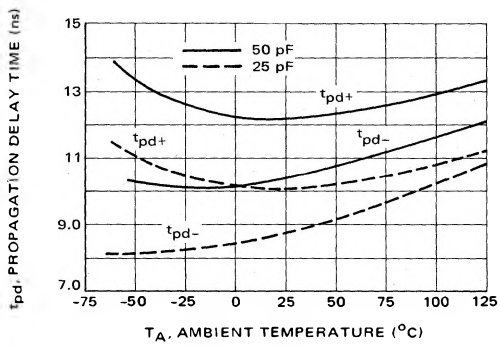


FIGURE 4 – DELAY versus LOAD CAPACITANCE

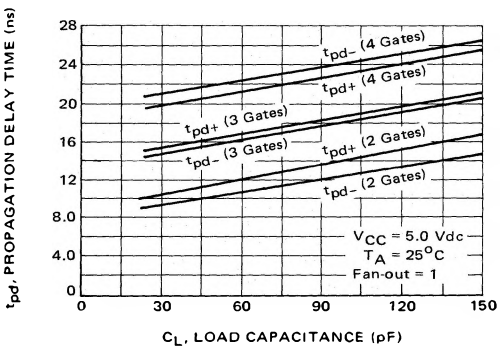


FIGURE 5 – DELAY versus SUPPLY VOLTAGE

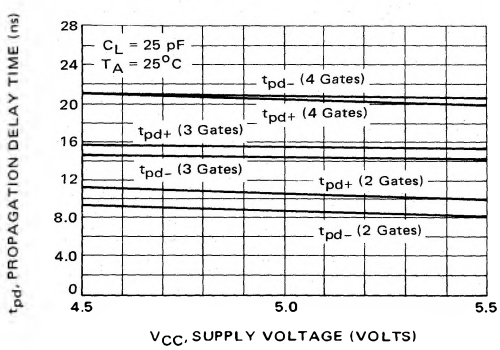
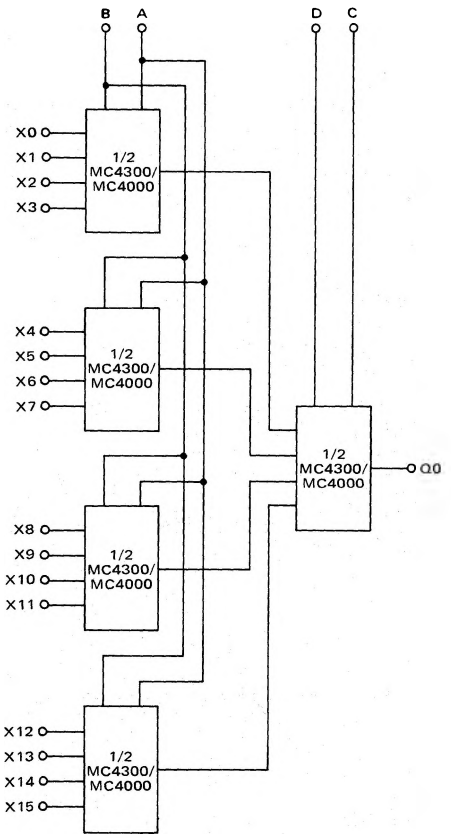


FIGURE 6 – 1-BIT 16-LINE DATA SELECTOR



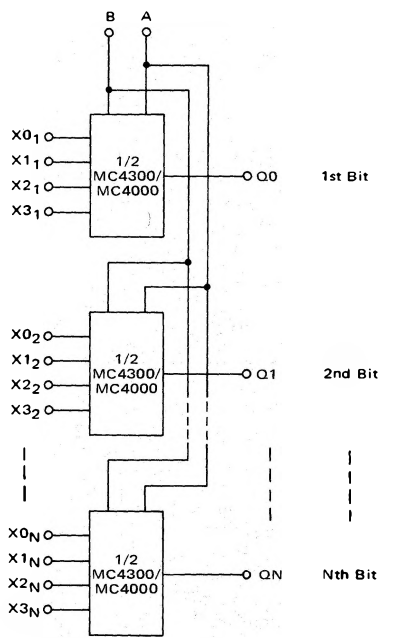
D	C	B	A	Q0
0	0	0	0	X0
0	0	0	1	X1
0	0	1	0	X2
0	0	1	1	X3
0	1	0	0	X4
0	1	0	1	X5
0	1	1	0	X6
0	1	1	1	X7
1	0	0	0	X8
1	0	0	1	X9
1	0	1	0	X10
1	0	1	1	X11
1	1	0	0	X12
1	1	0	1	X13
1	1	1	0	X14
1	1	1	1	X15

TYPICAL APPLICATIONS

Data selection from one of sixteen inputs can be accomplished by using multiple MC4300/4000 data selector units, as shown in Figure 6.

An N-bit data selector network may be realized by paralleling N/2 data selectors as shown in Figure 7. Each bit is selected from its own group of four different inputs; therefore from each dual data selector we can obtain two bits. Thus, for N bits we need N/2 dual 4-line selectors.

FIGURE 7 – N-BIT 4-LINE DATA SELECTOR



B	A	$X0_n$	$X1_n$	$X2_n$	$X3_n$	Q_n
0	0	1	ϕ	ϕ	ϕ	X0
0	1	ϕ	1	ϕ	ϕ	X1
1	0	ϕ	ϕ	1	ϕ	X2
1	1	ϕ	ϕ	ϕ	1	X3

ϕ = Don't care
n = any number up to N