

QUAD PREDRIVER

MC4042F, L, P*

DUAL LINE SELECTOR

MC4043F, L, P*

MC4300/MC4000 series

The MC4042 and MC4043 are designed for magnetic memory driver/selector applications.

The MC4042 monolithic quad predriver consists of four high-speed switching transistors, each driven by an MTTL compatible NOR gate. Each NOR gate has an individual address input and a common timing input. The inputs of the MC4042 can be driven directly with standard MTTL decoders such as the MC4006 binary to one-of-eight decoder or the MC4007 dual binary to one-of-four decoder. The open-collector output transistor of the MC4042 will sink 50 mA.

The MC4043 monolithic dual line selector consists of two high-speed 400 mA switches driven by MTTL compatible NOR gates. Each NOR gate has an individual address input and a common timing input. The address and timing inputs of the MC4043 can also be driven directly with standard MTTL decoders such as the MC4006 and MC4007.

The MC4042 and MC4043 input circuits are the same, but the output circuitry is different as shown in the device schematics. The output transistors of both devices have a minimum BV_{CEX} of 15 volts, and are gold doped to increase switching speeds.

Many memory predriver applications employ transformer coupling between the predriver and driver stages. In such designs, large

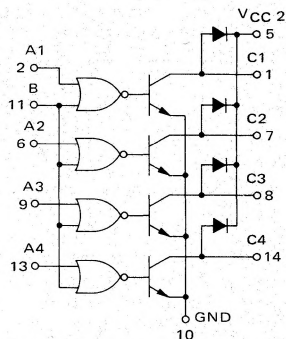
voltage overshoots occur due to the transformer inductance and high-speed switching currents. The collector of the MC4042 is internally clamped to prevent the collector from exceeding the maximum rated voltage during the switching transitions. The voltage applied to the diode clamp, pin 5, should be the same or greater than the collector voltages at pins 1, 7, 8, and 14, to prevent the diode clamp from being forward biased during nonswitching periods. The output transistor is driven with a conventional totem pole arrangement to provide active pullup and pulldown.

The collectors of the pullup transistors of the MC4043 are available at pins 1 and 7. An external load resistor to V_{CC} must be provided. This reduces power dissipation of the package and provides a means by which the speed of the device can be varied by changing the value of the pullup resistance.

The internal decoding circuitry of the MC4043 is such that both switches can be turned on at one time. However, due to power limitations, care must be taken to ensure that only one switch is turned on at any one time.

The MC4042 and MC4043 can provide a memory system with an inexpensive, reliable, fast drive system. They are also useful as relay or lamp drivers, high fan-out gates, and MOS drivers.

MC4042



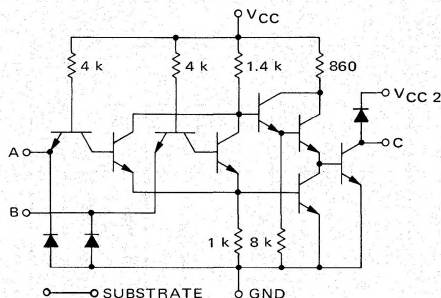
Input Loading Factors:

A = 1, B = 4

Total Power Dissipation = 120 mW typ/pkg

Propagation Delay Time = 15 ns typ

SCHEMATIC (1/2 OF DEVICE SHOWN)



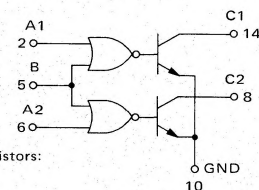
MC4042 AND MC4043

V_{CC} = PIN 4
GND = PIN 10
SUBSTRATE = PIN 3

TRUTH TABLE
(One gate only)

A1	B	C1
0	0	0
0	1	1
1	0	1
1	1	1

MC4043



Collectors of Output Transistors:

Gate 1 = Pin 1

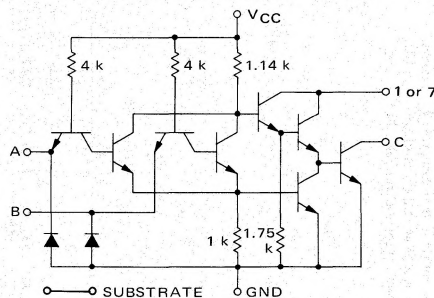
Gate 2 = Pin 7

Input Loading Factors: A = 1, B = 2

Total Power Dissipation = 70 mW typ/pkg

Propagation Delay Time = 20 ns typ

SCHEMATIC (1/2 OF DEVICE SHOWN)



* 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 – MC4042

Test procedures are shown for the timing input, one address input, and one output. Test other inputs and outputs in the same manner.

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ELECTRICAL CHARACTERISTICS – MC4043

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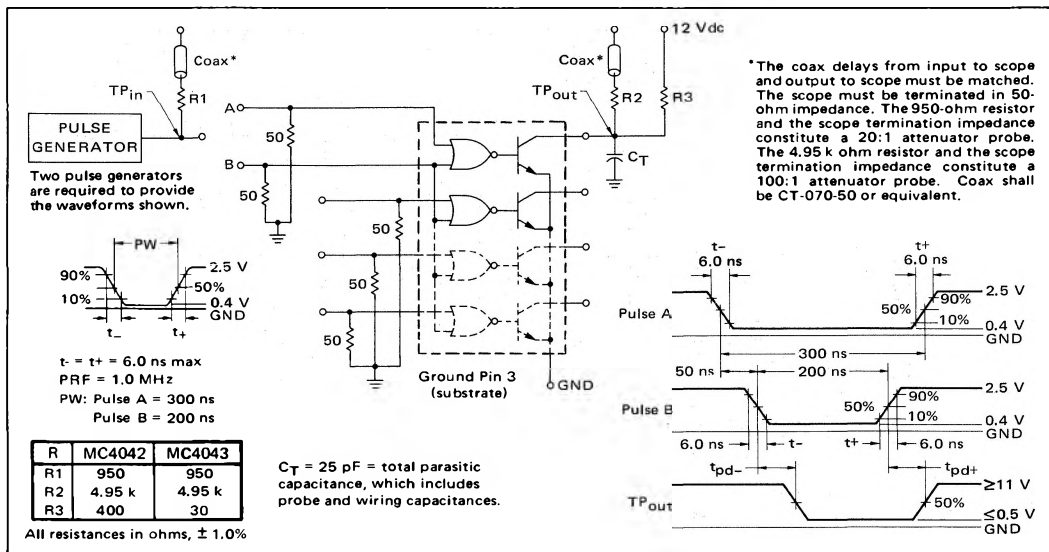
MC4042F,L,P, MC4043F,L,P (continued)

TEST CURRENT / VOLTAGE VALUES																								
Characteristic	Symbol	Pin Under Test	@ Test Temperature						mA				Volts				Grnd	**						
									I _{OL}	I _{in}	2 I _{in}	V _{IL}	V _{IH}	V _F	V _R	V _{out}			V _{CEX}	V _{max}	V _{CC}	V _{CCL}	V _{CCH}	
Input Forward Current	I _F	5	0°C						400*	1.0	2.0	1.1	2.0	0.4	2.5	5.5	15	-	5.0	4.75	5.25	3,10 3,10	-	-
			+25°C						400*	1.0	2.0	1.1	1.8	0.4	2.5	5.5	15	7.0	5.0	4.75	5.25			
			+75°C						400*	1.0	2.0	0.9	1.8	0.4	2.5	5.5	15	-	5.0	4.75	5.25			
MC4043 Test Limits													TEST CURRENT / VOLTAGE APPLIED TO PINS LISTED BELOW:											
Leakage Current	I _R	5							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Breakdown Voltage	BV _{in}	5							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Output	V _{OL} *	14							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Output Leakage Current	I _{CEX 1}	14							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Requirements	I _{max}	4							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Switching Parameters	t _{pd}	5,14							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turn-On Delay Time	t _{pd}	5,14							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pulsed, 40% duty cycle @ 1.0 MHz.
** Connect pins to V_{CC} through a 75-ohm resistor.

MC4042F,L,P, MC4043F,L,P (continued)

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS



MC4042 TYPICAL SWITCHING TIMES

FIGURE 1 – TURN-ON DELAY TIME versus TEMPERATURE

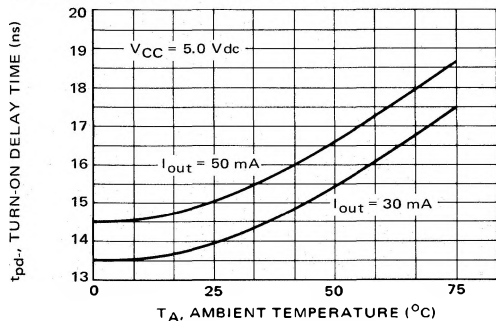


FIGURE 2 – TURN-OFF DELAY TIME versus $T_{E_{off}}$

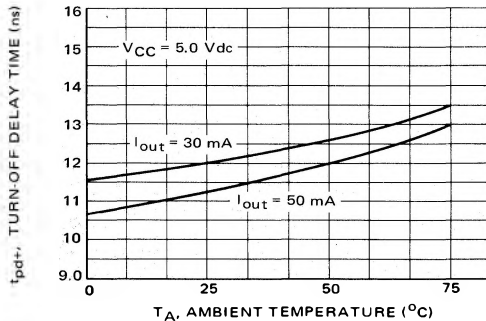


FIGURE 3 – TURN-ON DELAY TIME versus POWER SUPPLY VOLTAGE

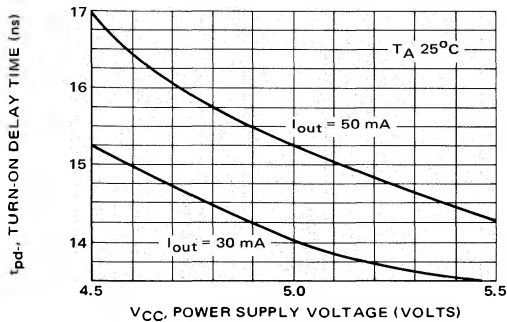
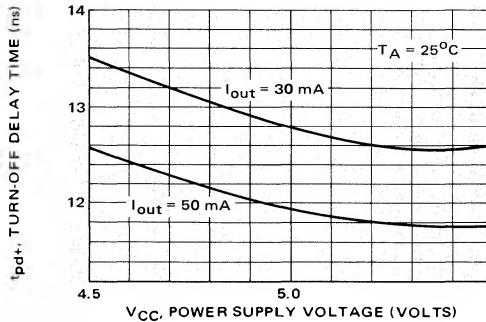
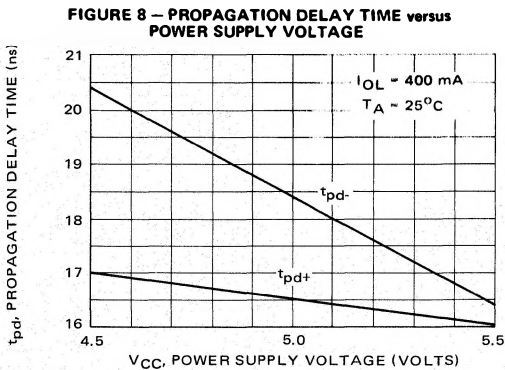
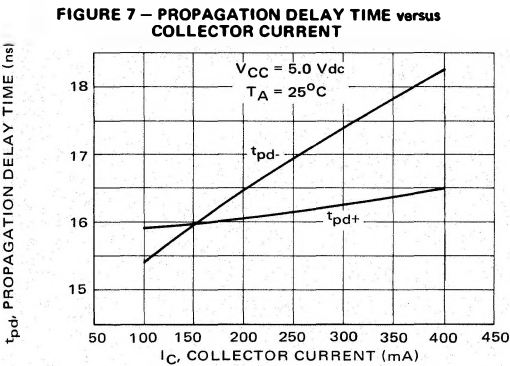
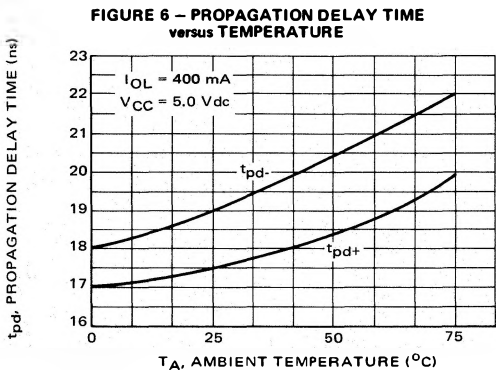
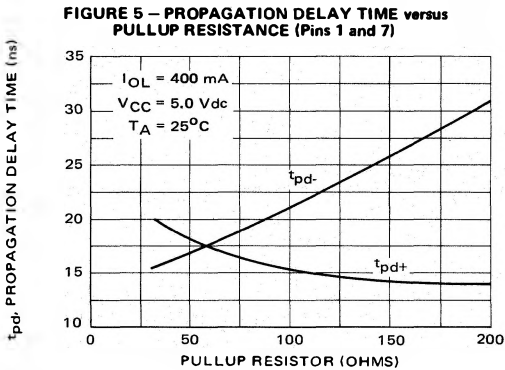


FIGURE 4 – TURN-OFF DELAY TIME versus POWER SUPPLY VOLTAGE

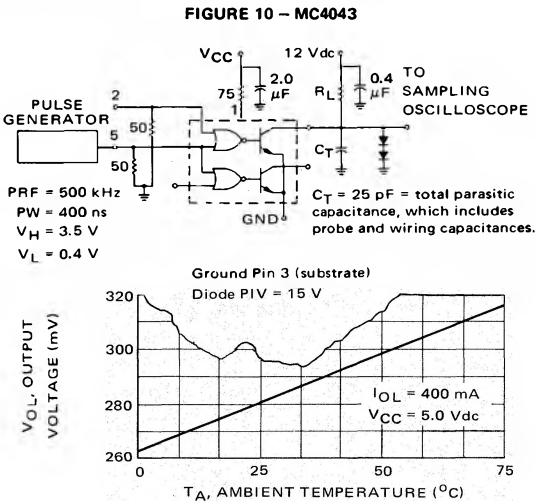
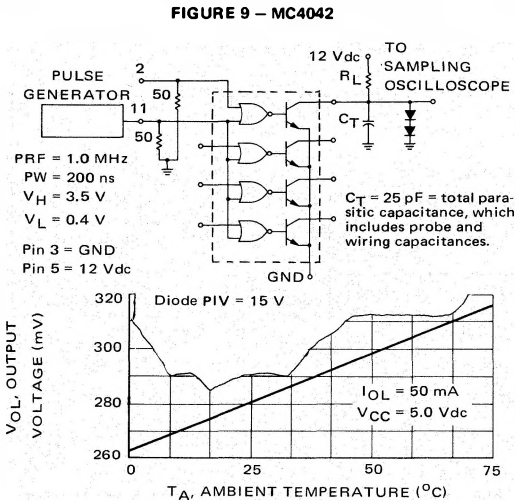


MC4042F,L,P, MC4043F,L,P (continued)

MC4043 TYPICAL SWITCHING TIMES



OUTPUT VOLTAGE VARIATIONS



MC4042F,L,P, MC4043F,L,P (continued)

TYPICAL APPLICATION

Figure 11 illustrates a typical core memory driver/selector using MC4042 and MC4043 devices. The source circuit for the X or Y drive line consists of an MC4042 predriver transformer coupled to a fast high-current transistor. The sink circuit is the MC4043 line selector. The source and sink circuits are used in pairs and are arranged to permit bipolar currents to pass through a selected drive line. Supply voltage and resistor values are determined by system requirements.

FIGURE 11 - X or Y DRIVE SELECTION MATRIX

