signetics

DUAL 4 LINE TO 1 LINE MULTIPLEXER (WITH ENABLE) 10174

10174F: −30 to +85°C, CERDIP

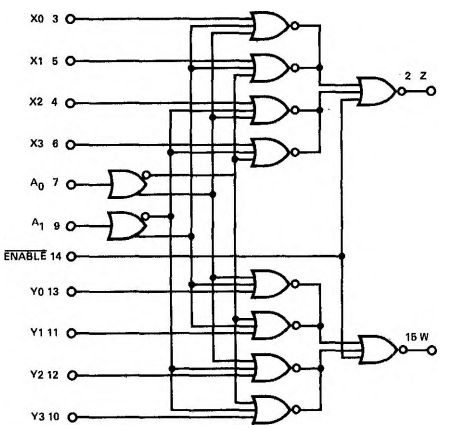
DIGITAL 10,000 SERIES ECL

DESCRIPTION

The 10174 is a high speed dual channel multiplexer with output enable capability. The select inputs determine one of four active data inputs for each multiplexer. An output enable forces both outputs low when in the high state. The enable is also useful in wire-ORing several multiplexers to achieve additional channel capability. Delay from data input to output is typically 3.5 nanoseconds.

LOGIC DIAGRAM

10174



V_{CC1} = 1, V_{CC2} = 16, V_{EE} = 8
POSITIVE LOGIC: HIGH LEVEL = '1'

FEATURES

- FAST PROPAGATION DELAY
  = 3.5 ns TYP DATA TO OUTPUT
  = 5.0 ns TYP ADDRESS TO OUTPUT
  = 2.0 ns TYP ENABLE TO OUTPUT
- OUTPUT ENABLE TO PERMIT OUTPUT BUSSING
- LOW POWER DISSIPATION = 290 mW/PACKAGE TYP (NO LOAD)
- HIGH FANOUT CAPABILITY – CAN DRIVE TWO 50 Ω LINES
- HIGH IMMUNITY FROM POWER SUPPLY VARIATIONS: V_{EE} = −5.2 V ±5% RECOMMENDED
- MEETS ECL 10,000 SERIES STANDARD INTERFACE SPECIFICATIONS

APPLICATIONS

- Dual 4 to 1 Multiplexer
- Dual 4 to 1 Data Selector
- Cross Bar Switch Applications

TRUTH TABLE

ENABLE	ADDRESS INPUTS		OUTPUTS	
$\overline{E}$	A1	A0	Z	W
H	ϕ	ϕ	L	L
L	L	L	X0	Y0
L	L	H	X1	Y1
L	H	L	X2	Y2
L	H	H	X3	Y3

ϕ = Don't Care.

TEMPERATURE RANGE

- −30 to +85°C Operating Ambient

PACKAGE TYPE

- F: 16 Pin CERDIP

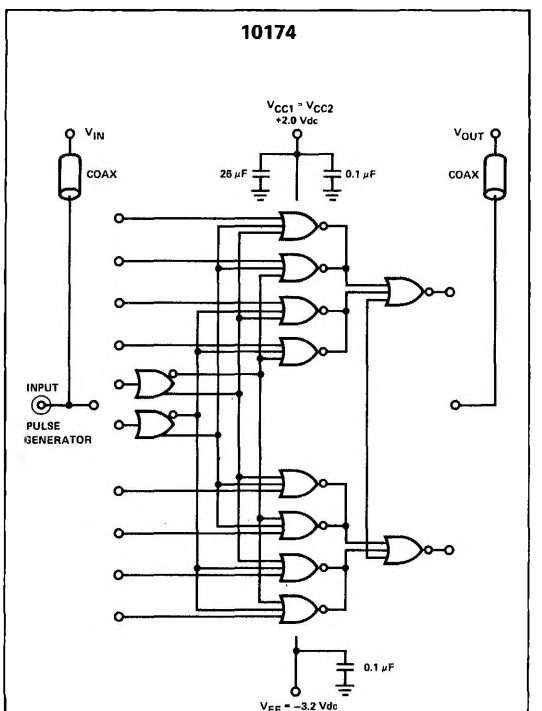
ELECTRICAL CHARACTERISTICS
(at Listed Voltages and Ambient Temperatures).

@ Test Temperature	TEST VOLTAGE VALUES (Volts) V_{IH} max	V_{IL} min	V_{IHA} min	V_{ILA} max	V_{EE}
−30°C	−0.890	−1.890	−1.205	−1.500	−5.2
+25°C	−0.810	−1.850	−1.105	−1.475	−5.2
+85°C	−0.700	−1.825	−1.035	−1.440	−5.2

Characteristic	Symbol	Pin Under Test	10174 Test Limits −30°C Min	−30°C Max	+25°C Min	+25°C Typ	+25°C Max	+85°C Min	+85°C Max	Unit	TEST VOLTAGE APPLIED TO PINS LISTED BELOW: V_{IH} max	V_{IL} min	V_{IHA} min	V_{ILA} max	V_{EE}	(V_{CC}) Gnd
Power Supply Drain Current	I_E	8	–	–	–	55	73	–	–	mAdc	–	–	–	–	8	1,16
Input Current	I_{inH}	4	–	–	–	–	220	–	–	μAdc	4	–	–	–	8	1,16
		14	–	–	–	–	330	–	–		14	–	–	–	8	1,16
	I_{inL}	4	–	–	0.5	–	–	–	–	μAdc	–	4	–	–	8	1,16
Logic "1" Output Voltage	V_{OH}	15	−1.060	0.890	−0.960	–	0.810	−0.890	−0.700	Vdc	13	–	–	–	8	1,16
Logic "0" Output Voltage	V_{OL}	15	−1.890	−1.675	−1.850	–	−1.650	−1.825	−1.616	Vdc	14	–	–	–	8	1,16
Logic "1" Threshold Voltage	V_{OHA}	15	−1.080	–	−0.980	–	–	−0.910	–	Vdc	–	–	–	14	8	1,16
Logic "0" Threshold Voltage	V_{OLA}	15	–	−1.655	–	–	−1.630	–	−1.595	Vdc	–	–	14	–	8	1,16
Switching Times* (50 Ω load)											+1.11 V		Pulse In	Pulse Out	−3.2 V	+2.0 V
Propagation Delay	$t_{13+\ 15+}$	15	–	–	–	3.6	–	–	–	ns	–	–	13	15	8	1,16
	$t_{13-\ 15-}$	15	–	–	–	3.5	–	–	–		–	–	13			
	$t_{7+\ 15-}$	15	–	–	–	5.0	–	–	–		11	–	7			
	$t_{7-\ 15+}$	15	–	–	–	5.0	–	–	–		11	–	7			
	$t_{14+\ 15-}$	15	–	–	–	2.0	–	–	–		–	–	14			
	$t_{14-\ 15+}$	15	–	–	–	2.0	–	–	–		–	–	14			
Rise Time (20% to 80%)	t_+	15	–	–	–	2.0	–	–	–		–	–	14			
Fall Time (20% to 80%)	t_-	15	–	–	–	2.0	–	–	–		–	–	14			

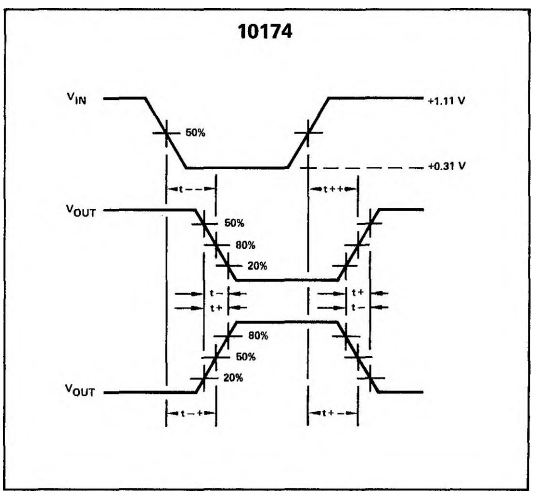
*Unused outputs connected to a 50 Ω resistor to ground

SWITCHING TIME TEST CIRCUIT



INPUT PULSE
t+ = t− = 2.0 ± 0.2 ns
(20% to 80%)

PROPAGATION DELAY WAVEFORMS @ 25°C



NOTES:

1. Each ECL 10,000 series device has been designed to meet the DC specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 fpm is maintained. Voltage levels will shift approximately 5 mV with an air flow of 200 linear fpm. Outputs are terminated through a 50-ohm resistor to −2.0 volts.
2. For AC tests, all input and output cables to the scope are equal lengths of 50-ohm coaxial cable. Wire length should be < 1/4 inch from TP_{in} to input pin and TP_{out} to output pin. A 50-ohm termination to ground is located in each scope channel input. Unused outputs are connected to a 50-ohm resistor to ground.
3. Test procedures are shown for only one input or set of input conditions. Other inputs are tested in the same manner.
4. All voltage measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.