signetics

DUAL 1 OF 4 DEMULTIPLEXER/DECODER (SELECTED OUTPUT IS LOW) 10171

10171F: –30 to +85°C, CERDIP

DIGITAL 10,000 SERIES ECL

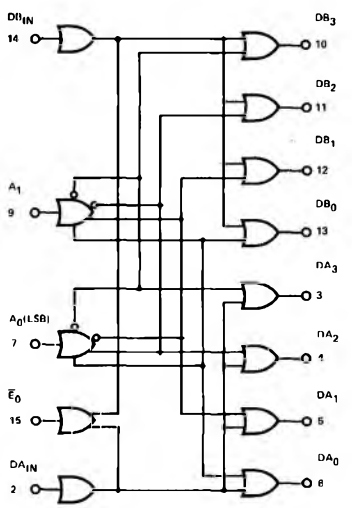
DESCRIPTION

The 10171 is a binary coded 2 line to dual 4 line decoder/demultiplexer. Outputs are normally high with the selected outputs going low. There are two parallel 1 line to 4 line non-inverting data paths and a common enable input. Each data input when high forces its four outputs high. The enable input when high forces all eight outputs high.

The 10171 is a true parallel decoder using internal emitter dotting techniques. Hence it eliminates unequal delay times found in other decoders. The 10171 is a low power, high speed device with high Z input pulldown resistors and open emitter outputs.

LOGIC DIAGRAM

10171



(INTERNAL CONNECTIONS ARE EMITTER-DOT OR)

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

FEATURES

- **FAST PROPAGATION DELAY**
  = 4.0 ns TYP ADDRESS TO OUTPUT
  = 4.5 ns TYP ENABLE OR DATA TO OUTPUT
- **LOW POWER DISSIPATION = 310 mW/PACKAGE TYP (NO LOAD)**
- **HIGH FANOUT CAPABILITY – CAN DRIVE EIGHT 50 Ω LINES**
- **TRUE PARALLEL DECODER – ELIMINATES UNEQUAL DELAY TIMES**
- **HIGH IMMUNITY FROM POWER SUPPLY VARIATIONS: V_{EE} = –5.2 V ±5% RECOMMENDED**
- **HIGH Z INPUTS – INTERNAL 50 kΩ PULLDOWNS**
- **OPEN EMITTER OUTPUTS**
- **MEETS ECL 10,000 SERIES STANDARD INTERFACE SPECIFICATIONS**

APPLICATIONS

- Dual 1 line to 4 line Demultiplexer
- Crossbar Switch Applications
- High Fanout 1 of 4 Decoder
- Memory Chip Select Decoder

TRUTH TABLE

INPUTS				OUTPUTS			
$\bar{E}0$	A1	A0	DAIN	DA0	DA1	DA2	DA3
L	L	L	L	L	H	H	H
L	L	L	H	H	H	H	H
L	L	H	L	H	L	H	H
L	L	H	H	H	H	H	H
L	H	L	L	H	H	L	H
L	H	L	H	H	H	H	H
L	H	H	L	H	H	H	L
L	H	H	H	H	H	H	H
H	ϕ	ϕ	ϕ	H	H	H	H

DB is Similar. ϕ = Don't Care.

TEMPERATURE RANGE

- –30 to +85°C Operating Ambient

PACKAGE TYPE

- F: 16-Pin CERDIP

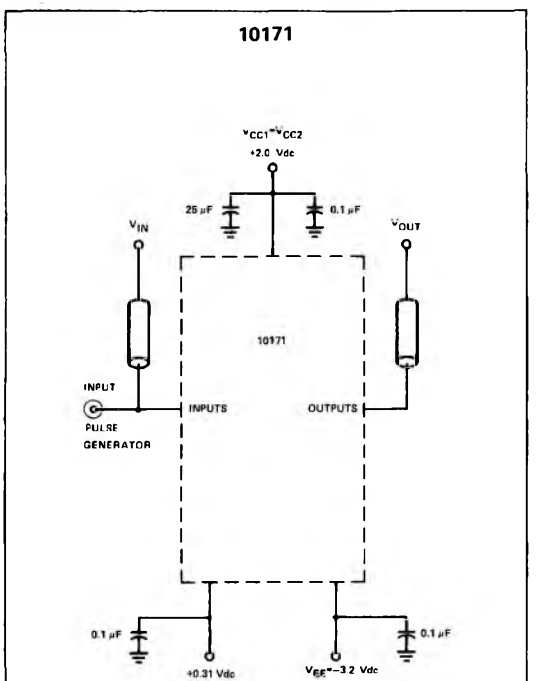
ELECTRICAL CHARACTERISTICS
(at Listed Voltages and Ambient Temperatures).

@ 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	−1.600	−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	10171 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	–	–	–	60	75	–	–	mAdc	2,7,9,14,15	–	–	–	8	1,16
Input Current	I_{inH}	14	–	–	–	–	265	–	–	μAdc	14	–	–	–	8	1,16
	I_{inL}	14	–	–	0.5	–	–	–	–	μAdc	–	14	–	–	8	1,16
Logic "1" Output Voltage	V_{OH}	13	−1.060	−0.890	−0.960	–	−0.810	−0.890	−0.700	Vdc	14	–	–	–	8	1,16
		13	−1.060	−0.890	−0.960	–	−0.810	−0.890	−0.700	Vdc	15	–	–	–	8	1,16
Logic "0" Output Voltage	V_{OL}	13	−1.890	−1.675	−1.850	–	−1.650	−1.825	−1.615	Vdc	–	–	–	–	8	1,16
Logic "1" Threshold Voltage	V_{OHA}	13	−1.080	–	−0.980	–	–	−0.910	–	Vdc	–	–	14	–	8	1,16
		13	−1.080	–	−0.980	–	–	−0.910	–	Vdc	–	–	15	–	8	1,16
Logic "0" Threshold Voltage	V_{OLA}	13	–	−1.655	–	–	−1.630	–	−1.595	Vdc	–	–	–	14	8	1,16
Switching Times * (50-ohm load)													Pulse In	Pulse Out	−3.2 V	+2.0 V
Propagation Delay	t_{9+13+}	13	–	–	–	4.0	–	–	–	ns	–	–	9	13	8	1,16
	t_{9-13-}	13	–	–	–	4.0	–	–	–	↓	–	–	↓	↓	↓	↓
Rise Time (20% to 80%)	t_{13+}	13	–	–	–	2.0	–	–	–		–	–				
Fall Time (20% to 80%)	t_{13-}	13	–	–	–	2.0	–	–	–	↓	–	–	↓	↓	↓	↓

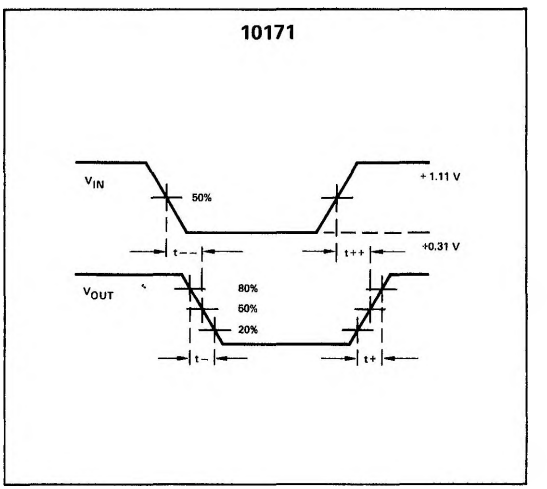
*Unused outputs connected to a 50-ohm resistor to ground.

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 6 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 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.