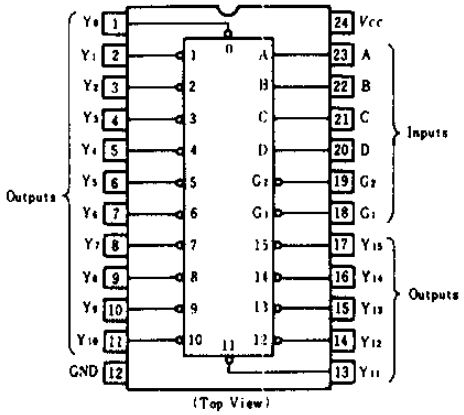
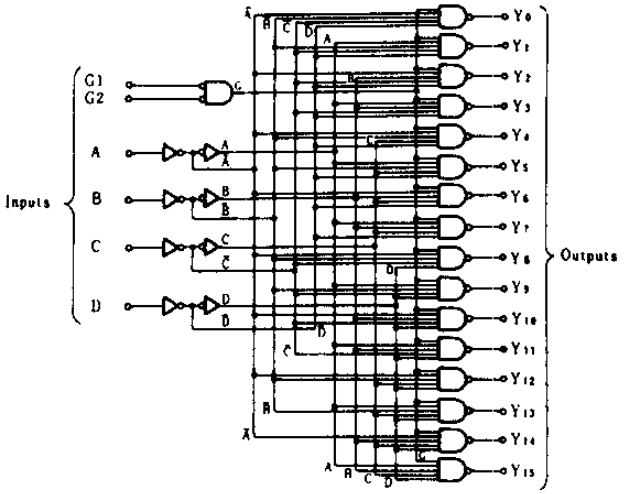
HD74LS159 ● 4-line-to-16-line Decoders/Demultiplexers (with Open Collector Outputs)

This decoder utilizes TTL circuitry to decode four binary-coded inputs into one of sixteen mutually exclusive outputs when both the strobe inputs, G1 and G2, are low. The demultiplexing function is performed by using the 4 input lines to address the output line, passing data from the one of the strobe inputs with the other strobe input low. When either strobe input is high, all outputs are high.

■PIN ARRANGEMENT



■BLOCK DIAGRAM



■FUNCTION TABLE

Inputs						Outputs															
G_1	G_2	D	C	B	A	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	L	L	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H
L	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
L	L	H	L	L	L	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H
L	L	H	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
L	L	H	L	H	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H
L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H
L	L	H	H	L	L	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H
L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H
L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H
L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L
L	H	×	×	×	×	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	L	×	×	×	×	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	×	×	×	×	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

* H; high level, L; low level, X; irrelevant

■ELECTRICAL CHARACTERISTICS ($Ta = -20 \sim +75°C$)

Item	Symbol	Test Conditions	min	typ*	max	Unit
Input voltage	V_{IH}		2.0	-	—	V
	V_{IL}		—	—	0.8	V
Output current	I_{OH}	V_{CC} = 4.75V, V_{IH} = 2V, V_{IL} = 0.8V, V_{OH} = 5.5V	—	—	100	μA
Output voltage	V_{OL}	V_{CC} = 4.75V, V_{IH} = 2V, I_{OL} = 4mA	—	—	0.4	V
		V_{IL} = 0.8V, I_{OL} = 8mA	—	—	0.5	V
Input current	I_{IH}	V_{CC} = 5.25V, V_I = 2.7V	—	—	20	μA
	I_{IL}	V_{CC} = 5.25V, V_I = 0.4V	—	—	-0.4	mA
	I_I	V_{CC} = 5.25V, V_I = 7V	—	—	0.1	mA
Supply current**	I_{CC}	V_{CC} = 5.25V	—	9	14	mA
Input clamp voltage	V_{IK}	V_{CC} = 4.75V, I_{IN} = -18mA	—	—	-1.5	V

* V_{CC}=5V, Ta=25°C

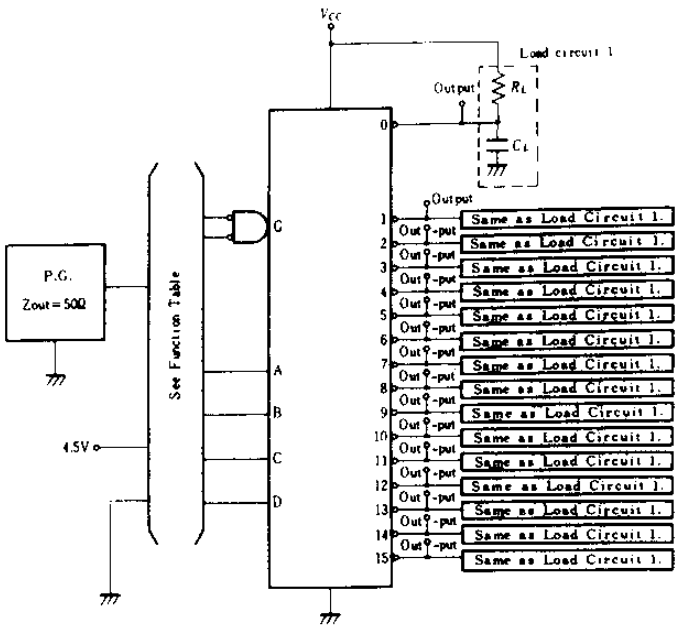
** I_{CC} is measured with all outputs open and all inputs grounded.

■SWITCHING CHARACTERISTICS (V_{CC} = 5V, Ta = 25°C)

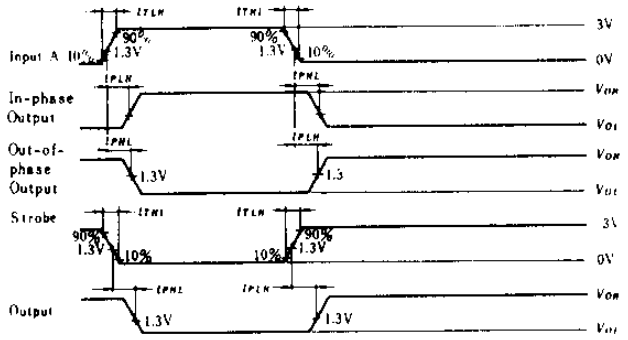
Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Propagation delay time	t_{PLH}	A, B, C, D	$Y_0 \sim Y_{15}$	C_L = 15pF, R_L = 2kΩ	—	23	36	ns
	t_{PHL}	A, B, C, D	$Y_0 \sim Y_{15}$		—	24	36	ns
	t_{PLH}	G1, G2	$Y_0 \sim Y_{15}$			15	25	ns
	t_{PHL}	G1, G2	$Y_0 \sim Y_{15}$			22	36	ns

■TESTING METHOD

1) Test Circuit



Waveform



Notes) 1. Input pulse; $t_{TLH} \leqq 15$ns, $t_{THL} \leqq 6$ns, PRR=1MHz, duty cycle=50%

2. C_L includes probe and jig capacitance.

3. All diodes are 1S2074 Ⓗ.