

GD54/74LS157

QUADRUPLE 2-TO-1-LINE DATA SELECTORS/MULTIPLEXERS (NON INVERTED DATA OUTPUTS)

Feature

- Buffered Inputs and Outputs
- Common Strobe/Select input for all 4 circuits.

Descriptions

This monolithic data selector/multiplexer contains inverters and drivers to supply full on-chip data selection to the four output gates. A separate strobe input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The LS157 has the same functions and pin connections as the LS257 but the latter is provided with 3-state outputs.

Applications

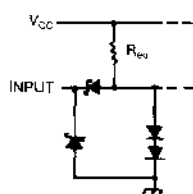
- Expand Any Data Input Point
- Multiplex Dual Data Buses
- Generate Four Functions of Two Variables (One Variables Is Common)
- Source Programmable Counters

Function Table

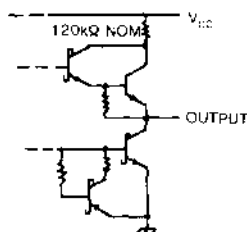
INPUTS				OUTPUT
STROBE	SELECT	A	B	Y
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

Schematics of Inputs and Outputs

EQUIVALENT OF EACH INPUT

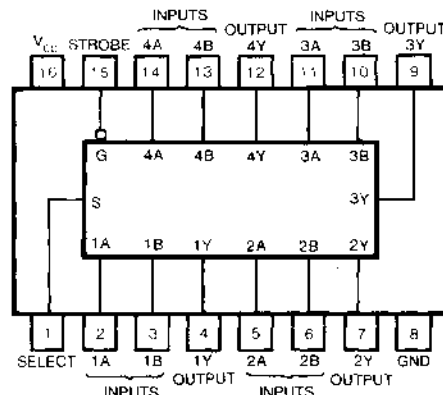


TYPICAL OF ALL OUTPUTS



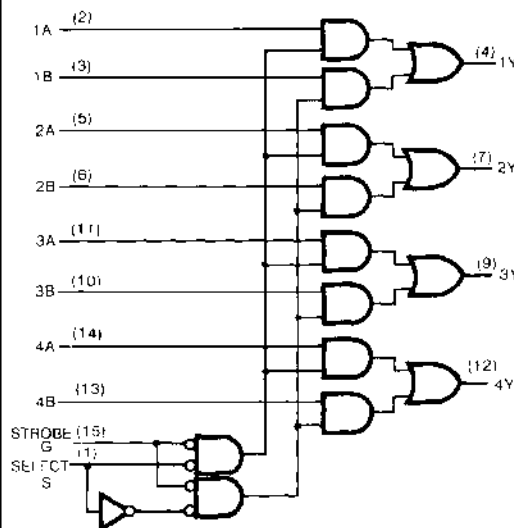
S or G inputs: $R_{eq} = 8.5 \text{ k}\Omega \text{ NOM}$
A or B inputs: $R_{eq} = 17 \text{ k}\Omega \text{ NOM}$

Pin Configuration



Suffix-Blank: Plastic Dual In Line Package
Suffix-J: Ceramic Dual In Line Package

Function Block Diagram



Absolute Maximum Ratings

- Supply voltage, V_{CC} 7V
- Input voltage 7V
- Operating free-air temperature range 54LS -55°C to 125°C
74LS 0°C to 70°C
- Storage temperature range -65°C to 150°C

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
I_{OH}	High-level output current	54, 74			-400	μA
I_{OL}	Low-level output current	54			4	mA
		74			8	
T_A	Operating free-air temperature	54	-55		125	$^{\circ}\text{C}$
		74	0		70	

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP (Note 1)	MAX	UNIT
V_{IH}	High-level input voltage		2			V
V_{IL}	Low-level input voltage	54			0.7	V
		74			0.8	
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}, I_I = -12\text{mA}$			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}$ $V_{IL} = \text{Max}, I_{OH} = \text{Max}$	54	2.5	3.4	μA
			74	2.7	3.4	
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}$ $V_{IL} = \text{Max}$ $V_{IH} = \text{Min}$ $I_{OL} = 4\text{mA}$	54, 74	0.25	0.4	V
		$I_{OL} = 8\text{mA}$	74	0.35	0.6	
I_I	Input current at maximum input voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}$	S or G input		0.2	mA
			A or B input		0.1	
I_{IH}	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7\text{V}$	S or G input		40	μA
			A or B input		20	
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$	S or G input		-0.8	mA
			A or B input		-0.4	
I_{OS}	Short-circuit output current	$V_{CC} = \text{Max}$ (Note 2)	-20		-100	mA
I_{CC}	Supply current	$V_{CC} = \text{Max}$ (Note 3)		9.6	16	mA

Note 1: All typical values are at $V_{CC} = 5\text{V}$, $T_A = 25^{\circ}\text{C}$.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with all outputs open and 4.5V applied to all inputs.

Switching Characteristics, $V_{CC} = 5\text{V}$, $T_A = 25^{\circ}\text{C}$

PARAMETER*	FROM (INPUT)	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Data	$C_L = 15\text{pF}$ $R_L = 2\text{k}\Omega$		9	14	ns
t_{PHL}				9	14	
t_{PLH}	Strobe			13	20	ns
t_{PHL}				14	21	
t_{PLH}	Select			15	23	ns
t_{PHL}				18	27	

* t_{PLH} = propagation delay time, low-to-high-level output.

* t_{PHL} = propagation delay time, high-to-low-level output.

For load circuit and voltage waveforms, see page 3-11.