

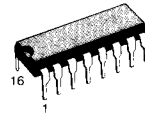


DUAL 4-INPUT MULTIPLEXER

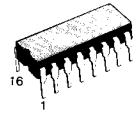
DESCRIPTION

The T54LS352/T74LS352 is a very high speed Dual 4-Input Multiplexer with Common Select inputs and individual Enable inputs for each section. It can select two bits data from four sources. The two buffered outputs present data in the inverted (complementary) form.

The T54LS352/T74LS352 is the functional equivalent of the T54LS153/T74LS153 except with inverted outputs.



B1
Plastic Package



D1/D2
Ceramic Package



M1
Micro Package



C1
Plastic Chip Carrier

ORDERING NUMBERS:

T54LS352 D2	T74LS352 C1
T74LS352 D1	T74LS352 M1
T74LS352 B1	

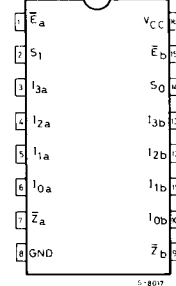
- INVERTED VERSION OF THE 54/74LS153
- SEPARATE ENABLES FOR EACH MULTIPLEXER
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS
- FULLY TTL AND CMOS COMPATIBLE

PIN NAMES

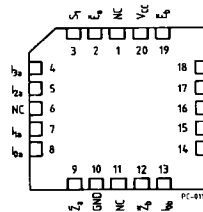
S_0 - S_1	Common Select Inputs
\bar{E}	Enable (Active LOW) Input
I_0 - I_1	Multiplexer Inputs
\bar{Z}	Multiplexer Output

PIN CONNECTION (top view)

DUAL IN LINE

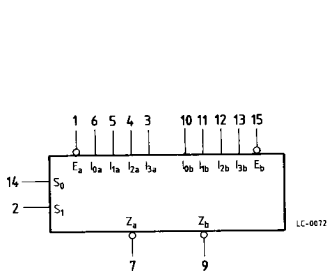


CHIP CARRIER

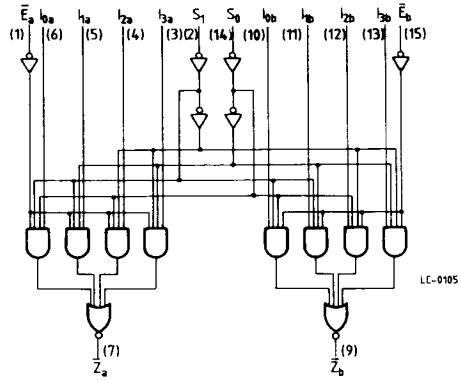


NC = No Internal Connection

LOGIC SYMBOL AND LOGIC DIAGRAM



V_{CC} = Pin 16
 GND = Pin 8
 () = Pin number



ABSOLUTE MAXIMUM RATINGS

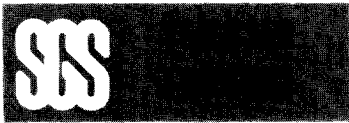
Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	- 0.5 to 7	V
V _I	Input Voltage, Applied to Input	- 0.5 to 15	V
V _O	Output Voltage, Applied to Output	- 0.5 to 10	V
I _I	Input Current, Into Inputs	- 30 to 5	mA
I _O	Output Current, Into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

GUARANTEED OPERATING RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS352D2	4.5 V	5.0 V	5.5 V	- 55°C to + 125°C
T74LS352XX	4.75 V	5.0 V	5.25 V	0°C to + 70°C

XX = package type.



FUNCTIONAL DESCRIPTION

The LS352 is a Dual 4-Input Multiplexer. It selects two bits of data from up to four sources under the control of the common Select Inputs (S_0, S_1). The two 4-input multiplexer circuits have individual active LOW Enables (\bar{E}_a, \bar{E}_b) which can be used to stro-

be outputs independently. When the Enable (\bar{E}_a, \bar{E}_b) are HIGH, the corresponding outputs (Z_a, Z_b) are forced HIGH.

The logic equations for the outputs are shown below.

$$\bar{Z}_a = \bar{E}_a \cdot (I_{0a} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1a} \cdot \bar{S}_1 \cdot S_0 + I_{2a} \cdot S_1 \cdot \bar{S}_0 + I_{3a} \cdot S_1 \cdot S_0)$$

$$\bar{Z}_b = \bar{E}_b \cdot (I_{0b} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1b} \cdot \bar{S}_1 \cdot S_0 + I_{2b} \cdot S_1 \cdot \bar{S}_0 + I_{3b} \cdot S_1 \cdot S_0)$$

The LS352 can be used to move data from a group of registers to a common output bus. The particular register from which the data came would be determined by the state of the Select Inputs. A less ob-

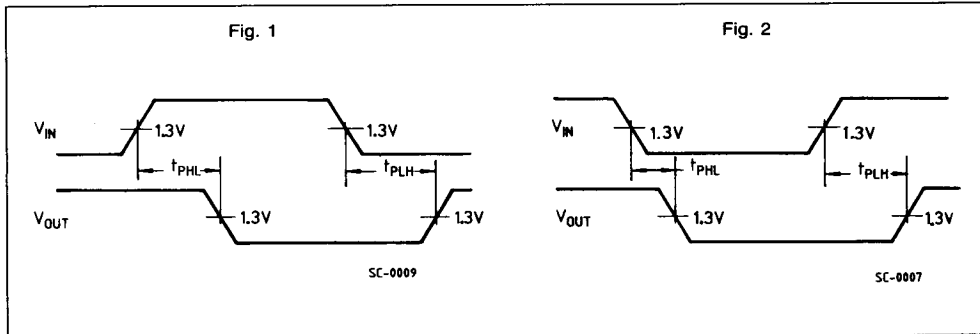
vious application is a function generator. The LS352 can generate two functions of three variables. This is useful for implementing highly irregular random logic.

TRUTH TABLE

SELECT INPUTS		INPUTS (a or b)					OUTPUT
S_0	S_1	\bar{E}	I_0	I_1	I_2	I_3	\bar{Z}
X	X	H	X	X	X	X	H
L	L	L	L	X	X	X	H
L	L	L	H	X	X	X	L
H	L	L	X	L	X	X	H
H	L	L	X	H	X	X	L
L	H	L	X	X	L	X	H
L	H	L	X	X	H	X	L
H	H	L	X	X	X	L	H
H	H	L	X	X	X	H	L

H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care

AC WAVEFORMS



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter	Values			Test Conditions (Note 1)	Units
		Min.	Typ.	Max.		
V_{IH}	Input HIGH Voltage	2.0			Guaranteed input HIGH Voltage for all Inputs	V
V_{IL}	Input LOW Voltage	54		0.7	Guaranteed input LOW Voltage for all Inputs	V
		74		0.8		
V_{CD}	Input Clamp Diode Voltage		-0.65	-1.5	$V_{CC} = \text{MIN}, I_{IN} = -18\text{mA}$	V
V_{OH}	Output HIGH Voltage	54	2.5	3.4	$V_{CC} = \text{MIN}, I_{OH} = -400\mu\text{A}, V_{IN} = V_{IH}$ or V_{IL} per Truth Table	V
		74	2.7	3.4		
V_{OL}	Output LOW Voltage	54,74	0.25	0.4	$I_{OL} = 4.0\text{mA}$ $I_{OL} = 8.0\text{mA}$ $V_{CC} = \text{MIN}, V_{IN} = V_{IH}$ or V_{IL} per Truth Table	V
		74	0.35	0.5		
I_{IH}	Input HIGH Current		1.0	20 0.1	$V_{CC} = \text{MAX}, V_{IN} = 2.7\text{V}$ $V_{CC} = \text{MAX}, V_{IN} = 7.0\text{V}$	μA mA
I_{IL}	Input LOW Current			-0.36	$V_{CC} = \text{MAX}, V_{IN} = 0.4\text{V}$	mA
I_{OS}	Output Short Circuit Current (Note 2)	-20		-100	$V_{CC} = \text{MAX}, V_{OUT} = 0\text{V}$	
I_{CC}	Supply Current		6.2	10	$V_{CC} = \text{MAX}$	mA

AC CHARACTERISTICS: $T_A = 25^\circ\text{C}$

Symbol	Parameter	Limits			Test Conditions	Units
		Min.	Typ.	Max.		
t_{PLH} t_{PHL}	Propagation Delay, Select to Output		19 25	29 38	Fig. 2	$V_{CC} = 5.0\text{V}$ $C_L = 15\text{pF}$
t_{PLH} t_{PHL}	Propagation Delay, Enable to Output		16 21	24 32	Fig. 1	
t_{PLH} t_{PHL}	Propagation Delay, Data to Output		13 17	20 26	Fig. 2	

Notes:

- 1) Conditions for testing, not shown in the Table, are chosen to guarantee operation under "worst case" conditions.
- 2) Not more than one output should be shorted at a time.
- 3) Typical values are at $V_{CC} = 5.0\text{V}, T_A = 25^\circ\text{C}$