SGS-THOMSON MICROELECTRONICS

T74LS352

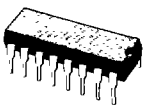
DUAL 4-INPUT MULTIPLEXER

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

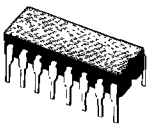
DESCRIPTION

The 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 the sources. The two buffered outputs present data in the inverted (complementary) form.

The T74LS352 is the functional equiva-lent of the T74LS153 except with inverted outputs.



B1
(Plastic Package)



D1
(Ceramic Package)

M1
(Micro Package)

C1
(Plastic Chip Carrier)

ORDER CODES :

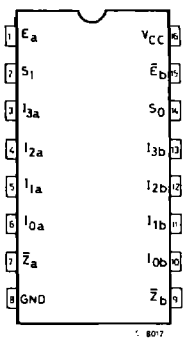
T74LS352 D1 T74LS352 C1
T74LS352 B1 T74LS352 M1

PIN NAMES

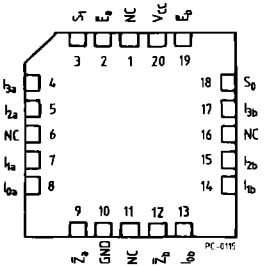
$\overline{S}_0$-S_1	COMMON SELECT INPUTS
$\overline{E}$	ENABLE (active LOW) INPUT
$\overline{I}_0$-I_1	MULTIPLEXER INPUTS
$\overline{Z}$	MULTIPLEXER OUTPUTS

PIN CONNECTION (top view)

DUAL IN LINE

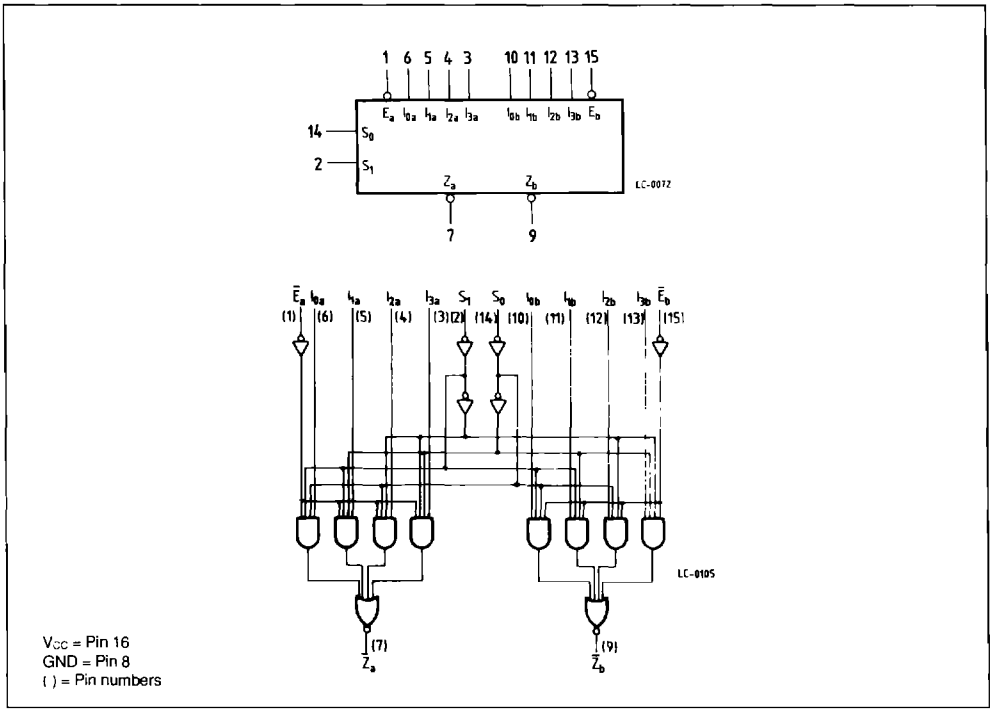


CHIP CARRIER



NC = No Internal Connection

LOGIC SYMBOL AND LOGIC DIAGRAM



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

TRUTH TABLE

Select Inputs		Inputs (a or b)					Ouputs
S_0	S_1	$\overline{E}$	I_0	I_1	I_2	I_3	$\overline{Z}$
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

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 RANGE

Part Numbers	Supply Voltage			Temperature
	Min.	Typ.	Max.	
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 (E_a, E_b) which can be used to strobe outputs independently. When the Enable (E_a, E_b) are HIGH, the corresponding outputs (Z_a, Z_b) are forced HIGH.

The logic equations for the outputs are shown below.

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

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

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

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter	Limits			Test Condition (note 1)		Unit
		Min.	Typ. (*)	Max.			
V_{IH}	Input HIGH Voltage	2.0			Guaranteed Input HIGH Voltage for All Input		V
V_{IL}	Input LOW Voltage			0.8	Guaranteed Input LOW Voltage for All Input		V
V_{CD}	Input Clamp Diode Voltage		- 0.65	- 1.5	V_{CC} = MIN. I_{IN} = -18 mA		V
V_{OH}	Output HIGH Voltage	2.7	3.4		V_{CC} = MIN. I_{OH} = - 400 µA V_{IN} = V_{IH} or V_{IL} per Truth Table		V
V_{OL}	Output LOW Voltage		0.25	0.4	I_{OL} = 4.0 mA	V_{CC} = MIN V_{IN} = V_{IH} or V_{IL} per Truth Table	V
			0.35	0.5	I_{OL} = 8.0 mA		V
I_{IH}	Input HIGH Current		1.0	20 0.1	V_{CC} = MAX, V_{IN} = 2.7 V V_{CC} = MAX, V_{IN} = 7.0 V		µA mA
I_{IL}	Input LOW Current			- 0.36	V_{CC} = MAX, V_{IN} = 0.4 V		mA
I_{OS}	Output Short Circuit Current (note 2)	- 20		- 100	V_{CC} = MAX, V_{IN} = 0 V		mA
I_{CC}	Power Supply Current		6.2	10	V_{CC} = MAX		mA

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.
(*) Typical values are at V_{CC} = 5.0 V, T_A = 25 °C.

AC CHARACTERISTICS : T_A = 25 °C

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

AC WAVEFORMS

Figure 1.

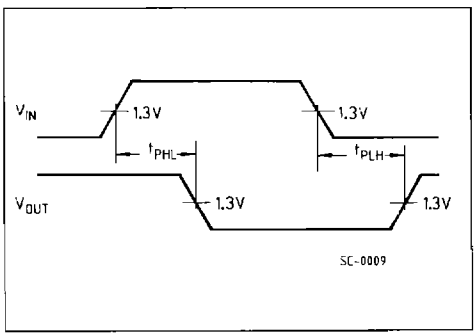
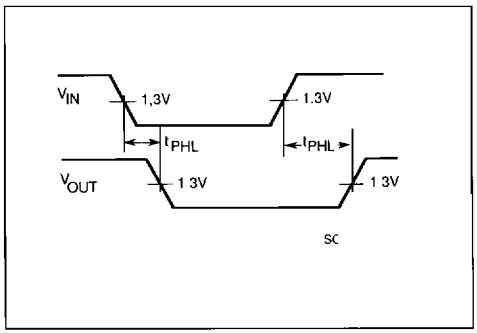



Figure 2.