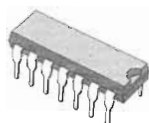


## 8-INPUT MULTIPLEXER

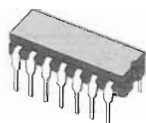
- SCHOTTKY PROCESS FOR HIGH SPEED
- MULTIFUNCTION CAPABILITY
- ON-CHIP SELECT LOGIC DECODING
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS
- FULLY TTL AND CMOS COMPATIBLE

## DESCRIPTION

The T74LS152 is a MSI high speed 8-input Digital Multiplexer. It provides, in one package, the ability to select one bit of data from up to eight sources. It can be used as a universal function generator to generate any logic function of four variables.



**B1**  
(Plastic Package)



**D1**  
(Ceramic Package)



**M1**  
(Micro Package)

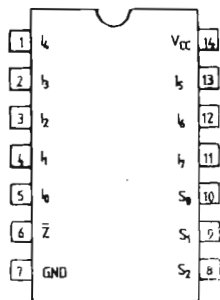


**C1**  
(Plastic Chip Carrier)

**ORDER CODES :**

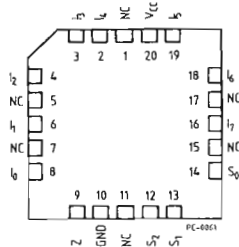
T74LS152 D1      T74LS152 C1  
T74LS152 B1      T74LS152 M1

**PIN CONNECTION** (top view)  
DUAL IN LINE



PC-0085

## CHIP CARRIER

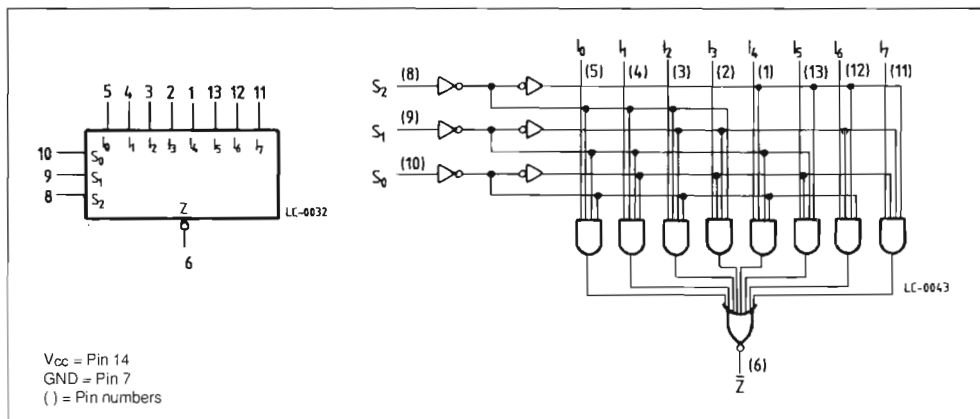


NC = No Internal Connection

## PIN NAMES

|             |                           |
|-------------|---------------------------|
| $S_0 - S_2$ | SELECT INPUT              |
| $I_0 - I_7$ | MULTIPLEXER INPUTS        |
| Z           | COMPLEMENTARY MULTIPLEXER |

## LOGIC SYMBOL AND LOGIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol          | Parameter                         | Value        | Unit |
|-----------------|-----------------------------------|--------------|------|
| V <sub>CC</sub> | Supply Voltage                    | - 0.5 to 7   | V    |
| V <sub>I</sub>  | Input Voltage, Applied to Input   | - 1.5 to 15  | V    |
| V <sub>O</sub>  | Output Voltage, Applied to Output | - 0.5 to 5.5 | V    |
| I <sub>I</sub>  | Input Current, into Inputs        | - 30 to 5    | mA   |
| I <sub>O</sub>  | Output Current, into Outputs      | 60           | 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.   |                 |
| T74LS152XX   | 4.75 V         | 5.0 V | 5.25 V | 0 °C to + 70 °C |

XX = package type.

## FUNCTIONAL DESCRIPTION

This device is a logical implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs, S<sub>0</sub>, S<sub>1</sub>, S<sub>2</sub>.

The logic function provided at the output is :

This device provides the ability, in one package, to select from eight sources of data or control information.

$$\bar{Z} = (I_0 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_1 \cdot S_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_2 \cdot \bar{S}_0 \cdot S_1 \cdot \bar{S}_2 + I_3 \cdot S_0 \cdot S_1 \cdot \bar{S}_2 + I_4 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot S_2 + I_5 \cdot S_0 \cdot \bar{S}_1 \cdot S_2 + I_6 \cdot \bar{S}_0 \cdot S_1 \cdot S_2 + I_7 \cdot S_0 \cdot S_1 \cdot S_2)$$

## TRUTH TABLE

| S <sub>2</sub> | S <sub>1</sub> | S <sub>0</sub> | I <sub>0</sub> | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | I <sub>6</sub> | I <sub>7</sub> | $\bar{Z}$ |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|
| L              | L              | L              | L              | X              | X              | X              | X              | X              | X              | X              | H         |
| L              | L              | L              | H              | X              | X              | X              | X              | X              | X              | X              | L         |
| L              | L              | H              | X              | L              | X              | X              | X              | X              | X              | X              | H         |
| L              | L              | H              | X              | H              | X              | X              | X              | X              | X              | X              | L         |
| L              | H              | L              | X              | X              | L              | X              | X              | X              | X              | X              | H         |
| L              | H              | L              | X              | X              | H              | X              | X              | X              | X              | X              | L         |
| L              | H              | H              | X              | X              | X              | L              | X              | X              | X              | X              | H         |
| L              | H              | H              | X              | X              | X              | H              | X              | X              | X              | X              | L         |
| H              | L              | L              | X              | X              | X              | X              | L              | X              | X              | X              | H         |
| H              | L              | L              | X              | X              | X              | X              | H              | X              | X              | X              | L         |
| H              | L              | H              | X              | X              | X              | X              | X              | L              | X              | X              | H         |
| H              | L              | H              | X              | X              | X              | X              | X              | H              | X              | X              | L         |
| H              | H              | L              | X              | X              | X              | X              | X              | X              | L              | X              | H         |
| H              | H              | L              | X              | X              | X              | X              | X              | X              | H              | X              | L         |
| H              | H              | H              | X              | X              | X              | X              | X              | X              | X              | L              | H         |
| H              | H              | H              | X              | X              | X              | X              | X              | X              | X              | H              | L         |

H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

| Symbol          | Parameter                                | Limits |          |           | Test Condition<br>(note 1)                                                                                                     | Unit          |
|-----------------|------------------------------------------|--------|----------|-----------|--------------------------------------------------------------------------------------------------------------------------------|---------------|
|                 |                                          | Min.   | Typ. (*) | Max.      |                                                                                                                                |               |
| V <sub>IH</sub> | Input HIGH Voltage                       | 2.0    |          |           | Guaranteed Input HIGH Threshold Voltage for All Inputs                                                                         | V             |
| V <sub>IL</sub> | Input LOW Voltage                        |        |          | 0.8       | Guaranteed Input LOW Threshold Voltage for All Inputs                                                                          | V             |
| V <sub>CD</sub> | Input Clamp Diode Voltage                |        | - 0.65   | - 1.5     | V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18 mA                                                                                | V             |
| V <sub>OH</sub> | Output HIGH Voltage                      | 2.7    | 3.4      |           | V <sub>CC</sub> = MIN, I <sub>OH</sub> = - 400 $\mu$ A<br>V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table | V             |
| V <sub>OL</sub> | Output LOW Voltage                       |        | 0.25     | 0.4       | I <sub>OL</sub> = 4.0 mA                                                                                                       | V             |
|                 |                                          |        | 0.35     | 0.5       | I <sub>OL</sub> = 8.0 mA                                                                                                       | V             |
| I <sub>IH</sub> | Input HIGH Current                       |        |          | 20<br>0.1 | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V<br>V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V                               | $\mu$ A<br>mA |
| I <sub>IL</sub> | Input LOW Current                        |        |          | - 0.4     | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V                                                                                 | mA            |
| I <sub>OS</sub> | Output Short Circuit Current<br>(note 2) | - 20   |          | - 100     | V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V                                                                                  | mA            |
| I <sub>CC</sub> | Power Supply Current                     |        | 6.0      | 9.0       | V <sub>CC</sub> = MAX                                                                                                          | mA            |

Notes : 1. Conditions for testing, not shown in the table, are chosen to guarantee under "worst case" conditions.

2. Not more than one output should be shorted at a time.

(\*) Typical values are at V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 25 °C.

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

| Symbol                 | Parameter                                        | Limits |          |          | Tests Conditions | Unit |
|------------------------|--------------------------------------------------|--------|----------|----------|------------------|------|
|                        |                                                  | Min.   | Typ.     | Max.     |                  |      |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay,<br>Select to $\bar{Z}$ Output |        | 14<br>20 | 23<br>32 | Fig. 1           | ns   |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay,<br>Select to $\bar{Z}$ Output |        | 13<br>12 | 21<br>20 | Fig. 1           | ns   |

 $V_{CC} = 5.0\text{ V}$   
 $C_L = 15\text{ pF}$ 

## AC WAVEFORMS

Figure 1.

