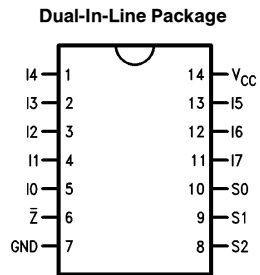


54LS152 8-Input Multiplexer

General Description

The 54LS152 is a high speed 8-input digital multiplexer. It provides, in one package, the ability to select one line of data from up to eight sources. The 54LS152 can be used as a universal function generator to generate any logic function of four variables. It is supplied in Flatpak only; for Dual-In-Line Package applications use the ^uLS151.

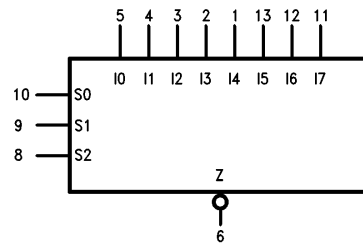
Connection Diagram



TL/F/10206-1

Order Number 54LS152FMQB
See NS Package Number W14B

Logic Symbol



TL/F/10206-2

V_{CC} = Pin 14
GND = Pin 7

| Pin Names | Description |
|--------------------------------|-----------------------|
| I ₀ -I ₇ | Data Inputs |
| S ₀ -S ₂ | Select Inputs |
| \bar{Z} | Inverted Data Outputs |

Truth Table

| Inputs | | | Output |
|----------------|----------------|----------------|----------------|
| S ₂ | S ₁ | S ₀ | \bar{Z} |
| L | L | L | I ₀ |
| L | L | H | I ₁ |
| L | H | L | I ₂ |
| L | H | H | I ₃ |
| H | L | L | I ₄ |
| H | L | H | I ₅ |
| H | H | L | I ₆ |
| H | H | H | I ₇ |

H = HIGH Voltage Level
L = LOW Voltage Level

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| Operating Free Air Temperature Range | –55°C to +25°C |
| 54LS | |
| Storage Temperature Range | –65°C to +150°C |

Note: The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the “Electrical Characteristics” table are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Recommended Operating Conditions

| Symbol | Parameter | 54LS152 | | | Units |
|-----------------|--------------------------------|---------|-----|------|-------|
| | | Min | Nom | Max | |
| V _{CC} | Supply Voltage | 4.5 | 5 | 5.5 | V |
| V _{IH} | High Level Input Voltage | 2 | | | V |
| V _{IL} | Low Level Input Voltage | | | 0.7 | V |
| I _{OH} | High Level Output Current | | | –0.4 | mA |
| I _{OL} | Low Level Output Current | | | 4.0 | mA |
| T _A | Free Air Operating Temperature | –55 | | 125 | °C |

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

| Symbol | Parameter | Conditions | Min | Typ (Note 1) | Max | Units |
|-----------------|-----------------------------------|--|-----|--------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = –18 mA | | | –1.5 | V |
| V _{OH} | High Level Output Voltage | V _{CC} = Min, I _{OH} = Max, V _{IL} = Max, V _{IH} = Min | 2.5 | 3.4 | | V |
| V _{OL} | Low Level Output Voltage | V _{CC} = Min, I _{OL} = Max, V _{IH} = Min, V _{IL} = Max | | | 0.4 | V |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 10.0V | | | 0.1 | mA |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _I = 2.7V | | | 20 | μA |
| I _{IL} | Low Level Input Current | V _{CC} = Max, V _I = 0.5V | –30 | | –400 | μA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (Note 2) | –20 | | –100 | mA |
| I _{CC} | Supply Current | V _{CC} = Max (Note 3) | | | 9 | mA |

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

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

Switching Characteristics V_{CC} = +5.0V, T_A = +25°C (See Section 1 for test waveforms and output load)

| Symbol | Parameter | C _L = 15 pF | | Units |
|--------------------------------------|------------------------------------|------------------------|----------|-------|
| | | Min | Max | |
| t _{PLH} t _{PHL} | Propagation Delay, Sn to \bar{Z} | | 23 32 | ns |
| t _{PLH} t _{PHL} | Propagation Delay, In to \bar{Z} | | 21 20 | ns |

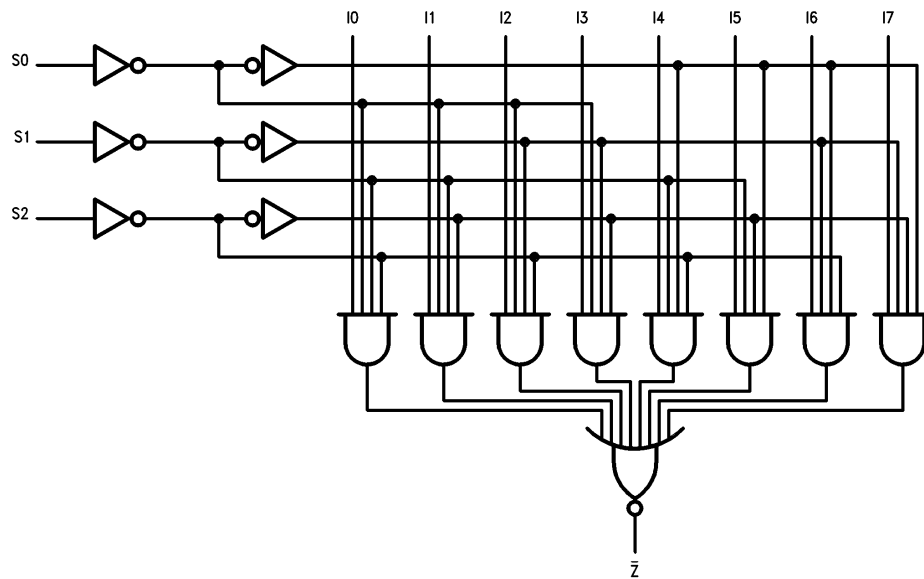
Functional Description

The 54LS152 is a logical implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs, S0, S1, S2. The logic function provided at the output is:

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

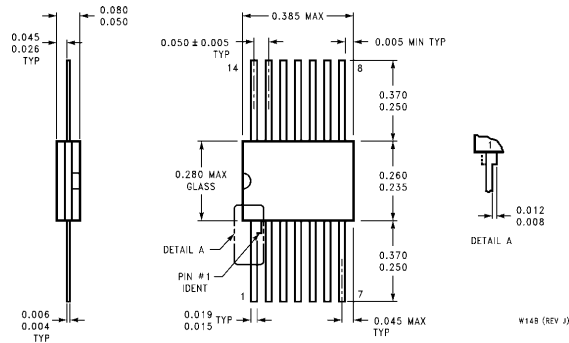
The 54LS152 provides the ability, in one package, to select from eight sources of data or control information.

Logic Diagram



TL/F/10206-3

Physical Dimensions inches (millimeters)



**14-Lead Ceramic Flat Package (W)
Order Number 54LS152FMQB
NS Package Number W14B**

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



National Semiconductor Corporation
1111 West Bardin Road
Arlington, TX 76017
Tel: 1(800) 272-9959
Fax: 1(800) 737-7018

National Semiconductor Europe
Fax: (+49) 0-180-530 85 86
Email: cnjwge@tevm2.nsc.com
Deutsch Tel: (+49) 0-180-530 85 85
English Tel: (+49) 0-180-532 78 32
Français Tel: (+49) 0-180-532 93 58
Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
19th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
Tel: 81-043-299-2309
Fax: 81-043-299-2408

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.

National Semiconductor was acquired by Texas Instruments.

http://www.ti.com/corp/docs/investor_relations/pr_09_23_2011_national_semiconductor.html

This file is the datasheet for the following electronic components:

54LS152 - <http://www.ti.com/product/54ls152?HQS=TI-null-null-dscatalog-df-pf-null-ww>



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.