

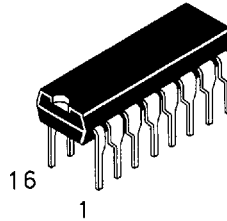
Available Q3, 1995

# 1-of-8 Selector/Multiplexer

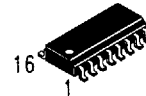
This device is a high speed, 1-of-8 digital multiplexer. It is able to select one line of data from up to eight inputs. Both true and complementary outputs are provided.

- Advanced very high speed CMOS
- Outputs source/sink 24 mA
- Transmission line driving 50 ohms
- ACT has TTL compatible inputs
- AC Device Operation from 2 to 6 volts guaranteed
- DC & AC Parameters guaranteed over -40 to +85°C

## DV74AC151 DV74ACT151

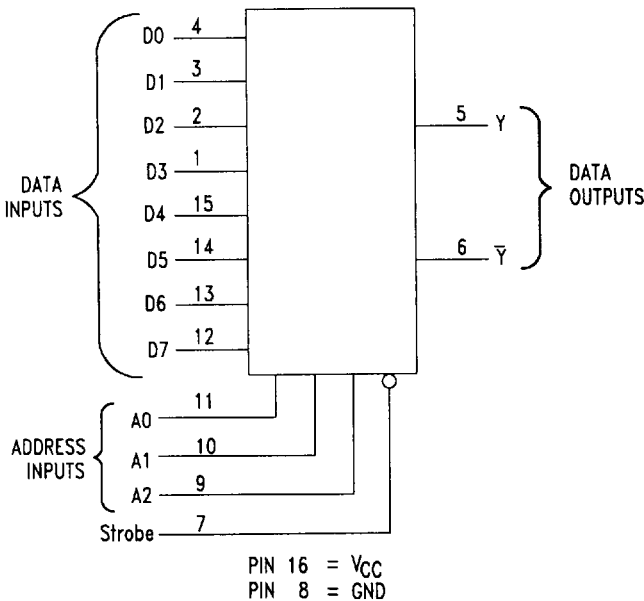


N Suffix  
Plastic DIP  
AVG-003 Case

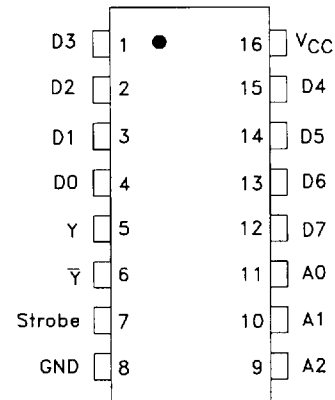


D Suffix  
Plastic SOP  
AVG-004 Case

### LOGIC DIAGRAM



### PIN ASSIGNMENT



### TRUTH TABLE

| Inputs |                |                |                | Outputs        |                |
|--------|----------------|----------------|----------------|----------------|----------------|
| Strobe | A <sub>2</sub> | A <sub>1</sub> | A <sub>0</sub> | Ȳ             | Y              |
| H      | X              | X              | X              | H              | L              |
| L      | L              | L              | L              | D <sub>0</sub> | D <sub>0</sub> |
| L      | L              | L              | H              | D <sub>1</sub> | D <sub>1</sub> |
| L      | L              | H              | L              | D <sub>2</sub> | D <sub>2</sub> |
| L      | L              | H              | H              | D <sub>3</sub> | D <sub>3</sub> |
| L      | H              | L              | L              | D <sub>4</sub> | D <sub>4</sub> |
| L      | H              | L              | H              | D <sub>5</sub> | D <sub>5</sub> |
| L      | H              | H              | L              | D <sub>6</sub> | D <sub>6</sub> |
| L      | H              | H              | H              | D <sub>7</sub> | D <sub>7</sub> |

H=HIGH Logic Level

L=LOW Logic Level

X=Don't Care

D<sub>0</sub>, D<sub>1</sub>...D<sub>7</sub> = Level of the respective D input

### ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

| Symbol           | Parameter                              | AC151, ACT151                 | Unit |
|------------------|--|-------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage (Referenced to GND)  | - 0.5 to +7.0                 | V    |
| V <sub>IN</sub>  | DC Input Voltage (Referenced to GND)   | - 0.5 to V <sub>CC</sub> +0.5 | V    |
| V <sub>OUT</sub> | DC Output Voltage (Referenced to GND)  | - 0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>IN</sub>  | DC Input Current, per Pin              | ± 20                          | mA   |
| I <sub>OUT</sub> | DC Output Sink/Source Current, per Pin | ± 50                          | mA   |

**ABSOLUTE MAXIMUM RATINGS** (continued)

|                  |                                      |              |    |
|------------------|--------------------------------------|--------------|----|
| I <sub>CC</sub>  | DC VCC or GND Current per Output Pin | ± 50         | mA |
| T <sub>STG</sub> | Storage Temperature                  | - 65 to +150 | °C |

**GUARANTEED OPERATING CONDITIONS**

| Symbol                             | Parameter  | Min                     | Typ | Max             | Unit |      |
|------------------------------------|--|-------------------------|-----|-----------------|------|------|
| V <sub>CC</sub>                    | Supply Voltage                                   | 'AC                     | 2.0 | 5.0             | 6.0  | V    |
|                                    |  | 'ACT                    | 4.5 | 5.0             | 5.5  |      |
| V <sub>IN</sub> , V <sub>OUT</sub> | DC Input Voltage, Output Voltage, (Ref. to GND)  | 0                       |     | V <sub>CC</sub> | V    |      |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 1)<br>AC Devices  | V <sub>CC</sub> @ 3.0 V |     |                 | 150  | ns/V |
|                                    |  | V <sub>CC</sub> @ 4.5 V |     |                 | 40   | ns/V |
|                                    |  | V <sub>CC</sub> @ 5.5 V |     |                 | 25   | ns/V |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 2)<br>ACT Devices | V <sub>CC</sub> @ 4.5 V |     |                 | 10   | ns/V |
|                                    |  | V <sub>CC</sub> @ 5.5 V |     |                 | 8.0  | ns/V |
| T <sub>A</sub>                     | Operating Ambient Temperature Range              | -40                     |     | 85              | °C   |      |
| CPD                                | Power Dissipation Capacitance                    | V <sub>CC</sub> = 5.0 V | 70  |                 | pF   |      |
| C <sub>IN</sub>                    | Input Capacitance V <sub>CC</sub> = 5.0 V        | V <sub>CC</sub> = 5.0 V | 4.5 |                 | pF   |      |

 1. V<sub>IN</sub> from 30% to 70% V<sub>CC</sub>

 2. V<sub>IN</sub> from 0.8 to 2.0 V

# AC — 151

**DC ELECTRICAL CHARACTERISTICS**

| Symbol          | Parameter                            | Conditions  | V <sub>CC</sub><br>(V) | AC151                  |                   |                                  | Unit |   |
|-----------------|--------------------------------------|---|------------------------|------------------------|-------------------|----------------------------------|------|---|
|                 |                                      |   |                        | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> = -40<br>to +85°C |      |   |
|                 |                                      |   |                        | Typ                    | Guaranteed Limits |                                  |      |   |
| V <sub>IH</sub> | Minimum High Level<br>Input Voltage  | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V | 3.0                    | 1.5                    | 2.1               | 2.1                              | V    |   |
|                 |                                      |   | 4.5                    | 2.25                   | 3.15              | 3.15                             |      |   |
|                 |                                      |   | 5.5                    | 2.75                   | 3.85              | 3.85                             |      |   |
| V <sub>IL</sub> | Maximum Low Level<br>Input Voltage   | V <sub>OUT</sub> = 0.1V<br>or V <sub>CC</sub> - 0.1 V | 3.0                    | 1.5                    | 0.9               | 0.9                              | V    |   |
|                 |                                      |   | 4.5                    | 2.25                   | 1.35              | 1.35                             |      |   |
|                 |                                      |   | 5.5                    | 2.75                   | 1.65              | 1.65                             |      |   |
| V <sub>OH</sub> | Minimum High Level<br>Output Voltage | I <sub>OUT</sub> = -50 μA                             | 3.0                    | 2.99                   | 2.9               | 2.9                              | V    |   |
|                 |                                      |   | 4.5                    | 4.49                   | 4.4               | 4.4                              |      |   |
|                 |                                      |   | 5.5                    | 5.49                   | 5.4               | 5.4                              |      |   |
|                 |                                      | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  | -12mA                  | 3.0                    |                   | 2.56                             | 2.46 | V |
|                 |                                      |   | I <sub>OH</sub> -24mA  | 4.5                    |                   | 3.86                             | 3.76 |   |
|                 |                                      | -24 mA  | 5.5                    |                        | 4.86              | 4.76                             |      |   |
| V <sub>OL</sub> | Maximum Low Level<br>Output Voltage  | I <sub>OUT</sub> = 50 μA                              | 3.0                    | 0.002                  | 0.1               | 0.1                              | V    |   |
|                 |                                      |   | 4.5                    | 0.001                  | 0.1               | 0.1                              |      |   |
|                 |                                      |   | 5.5                    | 0.001                  | 0.1               | 0.1                              |      |   |
|                 |                                      | V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>  | 12mA                   | 3.0                    |                   | 0.36                             | 0.44 | V |
|                 |                                      |   | I <sub>OH</sub> 24mA   | 4.5                    |                   | 0.36                             | 0.44 |   |
|                 |                                      | 24 mA   | 5.5                    |                        | 0.36              | 0.44                             |      |   |
| I <sub>IN</sub> | Maximum Input Leakage Current        | V <sub>I</sub> = V <sub>CC</sub> , GND                | 5.5                    |                        | ±0.1              | ±1.0                             | μA   |   |
| I <sub>CC</sub> | Maximum Quiescent Supply Current     | V <sub>IN</sub> = V <sub>CC</sub> or GND              | 5.5                    |                        | 8.0               | 80                               | μA   |   |

151

## AC CHARACTERISTICS

| Symbol    | Parameter<br>( $C_L = 50 \text{ pF}$ )          | $V_{CC}$<br>$\pm 10\%$<br>(V) | ACT151                    |      |   |      | Unit |
|-----------|---|-------------------------------|---------------------------|------|---|------|------|
|           |   |                               | $T_A = +25^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      |      |
|           |   |                               | Min                       | Max  | Min   | Max  |      |
| $t_{PLH}$ | Propagation Delay<br>$A_n$ to $Y$ or $\bar{Y}$  | 3.3                           | 3.0                       | 18   | 3.0   | 20   | ns   |
| $t_{PHL}$ |   | 5.0                           | 2.5                       | 13   | 2.0   | 15   |      |
| $t_{PLH}$ | Propagation Delay<br>Strobe to $Y$ or $\bar{Y}$ | 3.3                           | 2.5                       | 13   | 2.0   | 14   | ns   |
| $t_{PHL}$ |   | 5.0                           | 2.0                       | 10   | 1.5   | 11   |      |
| $t_{PLH}$ | Propagation Delay<br>$D_n$ to $Y$ or $\bar{Y}$  | 3.3                           | 2.5                       | 14   | 2.0   | 15.5 | ns   |
| $t_{PHL}$ |   | 5.0                           | 2.0                       | 10.5 | 1.5   | 11   |      |
| $t_{PLH}$ |   | 3.3                           | 2.5                       | 15   | 2.0   | 16   | ns   |
| $t_{PHL}$ |   | 5.0                           | 1.5                       | 11   | 1.5   | 11   |      |

## ACT — 151

### DC ELECTRICAL CHARACTERISTICS

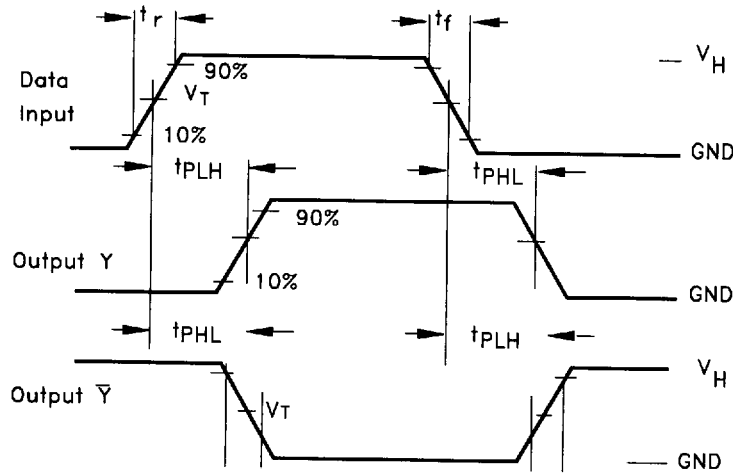
| Symbol           | Parameter                            | Conditions   | $V_{CC}$<br>$\pm 10\%$<br>(V) | ACT151                    |                   |                                       | Unit          |
|------------------|--------------------------------------|--|-------------------------------|---------------------------|-------------------|---------------------------------------|---------------|
|                  |                                      |  |                               | $T_A = +25^\circ\text{C}$ |                   | $T_A = -40$<br>to $+85^\circ\text{C}$ |               |
|                  |                                      |  |                               | Typ                       | Guaranteed Limits |                                       |               |
| $V_{IH}$         | Minimum High Level<br>Input Voltage  | $V_{OUT} = 0.1\text{V}$<br>or $V_{CC} - 0.1\text{V}$                       | 4.5<br>5.5                    | 1.5<br>1.5                | 2.0<br>2.0        | 2.0<br>2.0                            | V             |
| $V_{IL}$         | Maximum Low Level<br>Input Voltage   | $V_{OUT} = 0.1\text{V}$<br>or $V_{CC} - 0.1\text{V}$                       | 4.5<br>5.5                    | 1.5<br>1.5                | 0.8<br>0.8        | 0.8<br>0.8                            | V             |
| $V_{OH}$         | Minimum High Level<br>Output Voltage | $I_{OUT} = -50 \mu\text{A}$  | 4.5<br>5.5                    | 4.49<br>5.49              | 4.4<br>5.4        | 4.4<br>5.4                            | V             |
|                  |                                      | $V_{IN} = V_{IL}$ or $V_{IH}$<br>$I_{OH} = -24\text{mA}$<br>$-24\text{mA}$ | 4.5<br>5.5                    |                           | 3.86<br>4.86      | 3.76<br>4.76                          | V             |
| $V_{OL}$         | Maximum Low Level<br>Output Voltage  | $I_{OUT} = 50 \mu\text{A}$   | 4.5<br>5.5                    | 0.001<br>0.001            | 0.1<br>0.1        | 0.1<br>0.1                            | V             |
|                  |                                      | $V_{IN} = V_{IL}$ or $V_{IH}$<br>$I_{OL} = 24\text{mA}$<br>$24\text{mA}$   | 4.5<br>5.5                    |                           | 0.36<br>0.36      | 0.44<br>0.44                          | V             |
| $I_{IN}$         | Maximum Input Leakage Current        | $V_I = V_{CC}, \text{GND}$   | 5.5                           |                           | $\pm 0.1$         | $\pm 1.0$                             | $\mu\text{A}$ |
| $\Delta I_{CCT}$ | Additional Max $I_{CC}$ /Input       | $V_I = V_{CC} - 2.1\text{V}$   | 5.5                           | 0.6                       |                   | 1.5                                   | $\text{mA}$   |
| $I_{CC}$         | Maximum Quiescent Supply Current     | $V_{IN} = V_{CC}$ or $\text{GND}$  | 5.5                           |                           | 8.0               | 80                                    | $\mu\text{A}$ |

### AC CHARACTERISTICS

| Symbol    | Parameter<br>( $C_L = 50 \text{ pF}$ )         | $V_{CC}$<br>$\pm 10\%$<br>(V) | ACT151                    |      |   |      | Unit |
|-----------|--|-------------------------------|---------------------------|------|---|------|------|
|           |  |                               | $T_A = +25^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      |      |
|           |  |                               | Min                       | Max  | Min   | Max  |      |
| $t_{PLH}$ | Propagation Delay<br>$A_n$ to $Y$ or $\bar{Y}$ | 5.0                           | 3.5                       | 15.5 | 3.0   | 17.0 | ns   |
| $t_{PHL}$ |  | 5.0                           | 3.5                       | 15.5 | 3.0   | 16.5 |      |
| $t_{PLH}$ | Propagation Delay<br>$A_n$ to $Y$ or $\bar{Y}$ | 5.0                           | 3.5                       | 15.0 | 3.0   | 16.5 | ns   |
| $t_{PHL}$ |  | 5.0                           | 4.0                       | 16.5 | 3.5   | 18.5 |      |
| $t_{PLH}$ | Propagation Delay<br>Strobe to $Y$             | 5.0                           | 2.5                       | 9.5  | 2.5   | 10.0 | ns   |
| $t_{PHL}$ |  | 5.0                           | 2.5                       | 9.0  | 2.5   | 10.0 |      |

| Symbol    | Parameter<br>( $C_L = 50 \text{ pF}$ )   | $V_{CC}$<br>$\pm 10\%$<br>(V) | ACT151                    |      |   |      | Unit |
|-----------|--|-------------------------------|---------------------------|------|---|------|------|
|           |  |                               | $T_A = +25^\circ\text{C}$ |      | $T_A = -40^\circ\text{C to } +85^\circ\text{C}$ |      |      |
|           |  |                               | Min                       | Max  | Min   | Max  |      |
| $t_{PLH}$ | Propagation Delay<br>Strobe to $\bar{Y}$ | 5.0                           | 2.5                       | 8.5  | 2.5   | 9.5  | ns   |
| $t_{PHL}$ |  |                               | 3.0                       | 10.0 | 2.5   | 10.5 |      |
| $t_{PLH}$ | Propagation Delay<br>Dn to Y             | 5.0                           | 2.5                       | 11.5 | 3.0   | 12.5 | ns   |
| $t_{PHL}$ |  |                               | 2.5                       | 12.0 | 3.0   | 13.5 |      |
| $t_{PLH}$ | Propagation Delay<br>Dn to $\bar{Y}$     | 5.0                           | 2.5                       | 12.0 | 3.0   | 13.0 | ns   |
| $t_{PHL}$ |  |                               | 2.5                       | 12.5 | 3.0   | 14.0 |      |

## SWITCHING WAVEFORMS



Input and output threshold voltage:  
 $V_T = 50\% V_{CC}$  for AC; 1.5V for ACT  
 $V_H = V_{CC}$  for AC, 3V for ACT