

## 16-channel analog multiplexer/demultiplexer

## 74LV4067

## FEATURES

- Optimized for low voltage applications: 1.0 to 6.0 V
- Accepts TTL input levels between  $V_{CC} = 2.7$  V and  $V_{CC} = 3.6$  V
- Low typ "ON" resistance:  
60  $\Omega$  at  $V_{CC} - GND = 4.5$  V  
90  $\Omega$  at  $V_{CC} - GND = 3.0$  V  
145  $\Omega$  at  $V_{CC} - GND = 2.0$  V
- Typical "break before make" built in
- Output capability: non-standard
- $I_{CC}$  category: MSI

## DESCRIPTION

The 74LV4067 is a low-voltage CMOS device and is pin and function compatible with 74HC/HCT4067.

The 74LV4067 is an 16-channel analog multiplexer/demultiplexer with four address inputs ( $S_0$  to  $S_3$ ), an active LOW enable input ( $\bar{E}$ ), sixteen independent inputs/outputs ( $Y_0$  to  $Y_{15}$ ) and a common input/output (Z).

The 74LV4067 contains sixteen bidirectional analog switches, each with one side connected to an independent input/output ( $Y_0$  to  $Y_{15}$ ) and the other side connected to a common input/output (Z).

With  $\bar{E}$  LOW, one of the sixteen switches is selected (low impedance ON-state) by  $S_0$  to  $S_3$ . All unselected switches are in the high impedance OFF-state. With  $\bar{E}$  HIGH, all switches are in the high impedance OFF-state, independent of  $S_0$  to  $S_3$ .

The analog inputs/outputs ( $Y_0$  to  $Y_{15}$ , and Z) can swing between  $V_{CC}$  as a positive limit and GND as a negative limit.  
 $V_{CC} - GND$  may not exceed 6.0 V.

## QUICK REFERENCE DATA

GND = 0 V;  $T_{amb} = 25^\circ\text{C}$ ;  $t_r = t_f \leq 2.5$  ns

| SYMBOL            | PARAMETER                                                | CONDITIONS                                                | TYPICAL  | UNIT |
|-------------------|----------------------------------------------------------|-----------------------------------------------------------|----------|------|
| $t_{PZH}/t_{PZL}$ | Turn "ON" time<br>E to $V_{OS}$<br>$S_n$ to $V_{OS}$     | $C_L = 15$ pF<br>$R_L = 1$ K $\Omega$<br>$V_{CC} = 3.3$ V | 25<br>27 | ns   |
| $t_{PHZ}/t_{PLZ}$ | Turn "OFF" time<br>E to $V_{OS}$<br>$S_n$ to $V_{OS}$    |                                                           | 25<br>27 | ns   |
| $C_I$             | Input capacitance                                        |                                                           | 3.5      | pF   |
| $C_{PD}$          | Power dissipation capacitance per switch                 | See Notes 1 and 2                                         | 29       | pF   |
| $C_S$             | Maximum switch capacitance<br>independent (Y) common (Z) |                                                           | 5<br>45  | pF   |

## NOTE:

1.  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ )  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$  where:  
 $f_i$  = input frequency in MHz;  $C_L$  = output load capacity in pF;  
 $f_o$  = output frequency in MHz;  $C_S$  = max. switch capacitance in pF;  $V_{CC}$  = supply voltage in V;  
 $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.
2. The condition is  $V_i = GND$  to  $V_{CC}$ .

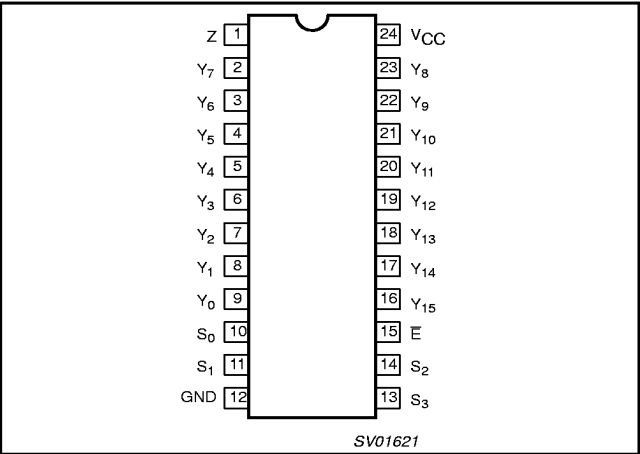
## ORDERING INFORMATION

| PACKAGES                    | TEMPERATURE RANGE | OUTSIDE NORTH AMERICA | NORTH AMERICA | PKG. DWG. # |
|-----------------------------|-------------------|-----------------------|---------------|-------------|
| 24-Pin Plastic DIL          | -40°C to +125°C   | 74LV4067 N            | 74LV4067 N    | SOT101-1    |
| 24-Pin Plastic SO           | -40°C to +125°C   | 74LV4067 D            | 74LV4067 D    | SOT137-1    |
| 24-Pin Plastic SSOP Type II | -40°C to +125°C   | 74LV4067 DB           | 74LV4067 DB   | SOT340-1    |
| 24-Pin Plastic TSSOP Type I | -40°C to +125°C   | 74LV4067 PW           | 74LV4067PW DH | SOT355-1    |

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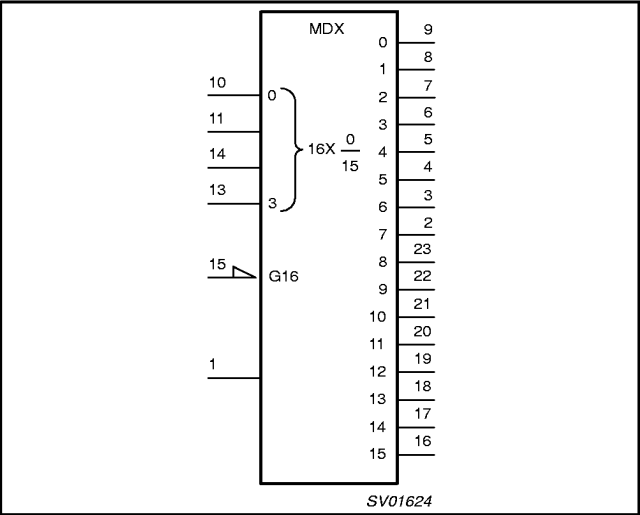
PIN CONFIGURATION



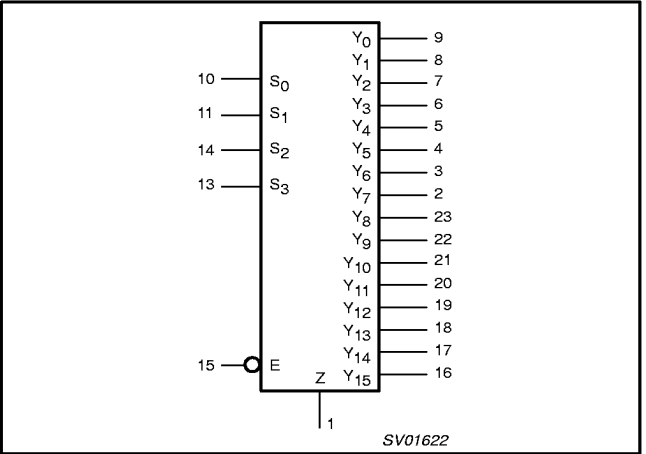
PIN DESCRIPTION

| PIN NUMBER                                             | SYMBOL                            | FUNCTION                   |
|--------------------------------------------------------|-----------------------------------|----------------------------|
| 1                                                      | Z                                 | Common input/output        |
| 9, 8, 7, 6, 5, 4, 3, 2, 23, 22, 21, 20, 19, 18, 17, 16 | Y <sub>0</sub> to Y <sub>15</sub> | Independent inputs/outputs |
| 10, 11, 14, 13                                         | S <sub>0</sub> to S <sub>3</sub>  | Select inputs              |
| 12                                                     | GND                               | Ground (0 V)               |
| 15                                                     | $\overline{E}$                    | Enable input (active LOW)  |
| 24                                                     | V <sub>CC</sub>                   | Positive supply voltage    |

LOGIC SYMBOL (IEEE/IEC)



LOGIC SYMBOL



16-channel analog multiplexer/demultiplexer

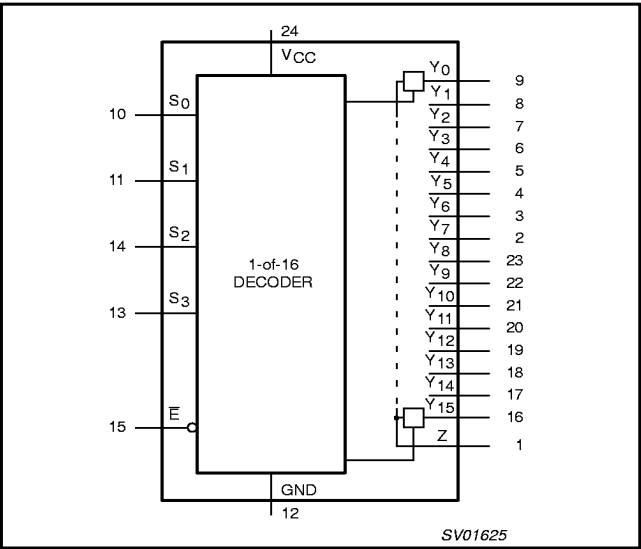
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FUNCTION TABLE

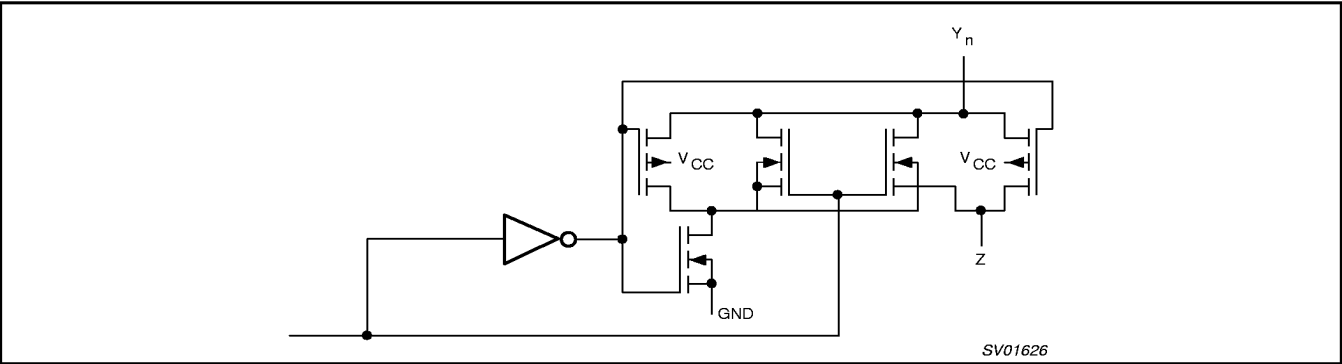
| INPUTS |                |                |                |                | CHANNEL ON          |
|--------|----------------|----------------|----------------|----------------|---------------------|
| E      | S <sub>3</sub> | S <sub>2</sub> | S <sub>1</sub> | S <sub>0</sub> |                     |
| L      | L              | L              | L              | L              | Y <sub>0</sub> – Z  |
| L      | L              | L              | L              | H              | Y <sub>1</sub> – Z  |
| L      | L              | L              | H              | L              | Y <sub>2</sub> – Z  |
| L      | L              | L              | H              | H              | Y <sub>3</sub> – Z  |
| L      | L              | H              | L              | L              | Y <sub>4</sub> – Z  |
| L      | L              | H              | L              | H              | Y <sub>5</sub> – Z  |
| L      | L              | H              | H              | L              | Y <sub>6</sub> – Z  |
| L      | L              | H              | H              | H              | Y <sub>7</sub> – Z  |
| L      | H              | L              | L              | L              | Y <sub>8</sub> – Z  |
| L      | H              | L              | L              | H              | Y <sub>9</sub> – Z  |
| L      | H              | L              | H              | L              | Y <sub>10</sub> – Z |
| L      | H              | L              | H              | H              | Y <sub>11</sub> – Z |
| L      | H              | H              | L              | L              | Y <sub>12</sub> – Z |
| L      | H              | H              | L              | H              | Y <sub>13</sub> – Z |
| L      | H              | H              | H              | L              | Y <sub>14</sub> – Z |
| L      | H              | H              | H              | H              | Y <sub>15</sub> – Z |
| H      | X              | X              | X              | X              | None                |

NOTES:  
H = HIGH voltage level  
L = LOW voltage level  
X = don't care

FUNCTIONAL DIAGRAM



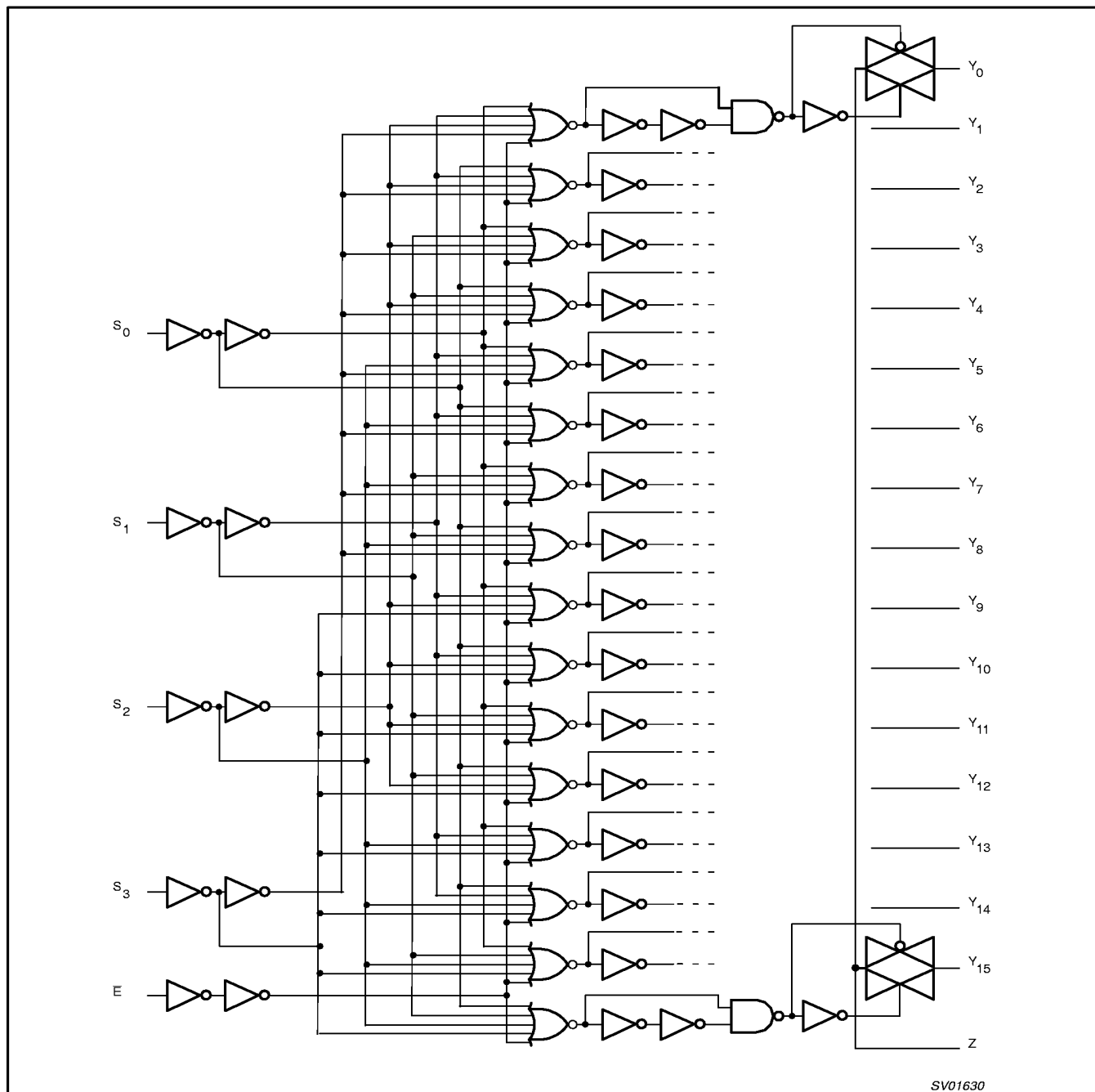
SCHEMATIC DIAGRAM (ONE SWITCH)



## 16-channel analog multiplexer/demultiplexer

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## LOGIC DIAGRAM



## 16-channel analog multiplexer/demultiplexer

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**ABSOLUTE MAXIMUM RATINGS<sup>1, 2</sup>**

In accordance with the Absolute Maximum Rating System (IEC 134).

Voltages are referenced to GND (ground = 0 V).

| SYMBOL       | PARAMETER                                                                                                                 | CONDITIONS                                                                                                                                                               | RATING            | UNIT |
|--------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|
| $V_{CC}$     | DC supply voltage                                                                                                         |                                                                                                                                                                          | -0.5 to +7.0      | V    |
| $\pm I_{IK}$ | DC input diode current                                                                                                    | $V_I < -0.5$ or $V_I > V_{CC} + 0.5$ V                                                                                                                                   | 20                | mA   |
| $\pm I_{SK}$ | DC switch diode current                                                                                                   | $V_S < -0.5$ or $V_S > V_{CC} + 0.5$ V                                                                                                                                   | 20                | mA   |
| $\pm I_S$    | DC switch current                                                                                                         | $-0.5$ V $< V_S < V_{CC} + 0.5$ V                                                                                                                                        | 25                | mA   |
| $T_{stg}$    | Storage temperature range                                                                                                 |                                                                                                                                                                          | -65 to +150       | °C   |
| $P_{TOT}$    | Power dissipation per package<br>– plastic DIL<br>– plastic mini-pack (SO)<br>– plastic shrink mini-pack (SSOP and TSSOP) | for temperature range: -40 to +125°C<br>above +70°C derate linearly with 12 mW/K<br>above +70°C derate linearly with 8 mW/K<br>above +60°C derate linearly with 5.5 mW/K | 750<br>500<br>400 | mW   |

**NOTES:**

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

**RECOMMENDED OPERATING CONDITIONS**

| SYMBOL     | PARAMETER                                       | CONDITIONS                                                                          | MIN         | TYP         | MAX               | UNIT |
|------------|-------------------------------------------------|-------------------------------------------------------------------------------------|-------------|-------------|-------------------|------|
| $V_{CC}$   | DC supply voltage                               | See Note 1 and Figure 5                                                             | 1.0         | 3.3         | 6.0               | V    |
| $V_I$      | Input voltage                                   |                                                                                     | 0           | –           | $V_{CC}$          | V    |
| $V_O$      | Output voltage                                  |                                                                                     | 0           | –           | $V_{CC}$          | V    |
| $T_{amb}$  | Operating ambient temperature range in free air | See DC and AC characteristics                                                       | -40<br>-40  |             | +85<br>+125       | °C   |
| $t_r, t_f$ | Input rise and fall times                       | $V_{CC} = 1.0$ V to 2.0 V<br>$V_{CC} = 2.0$ V to 2.7 V<br>$V_{CC} = 2.7$ V to 6.0 V | –<br>–<br>– | –<br>–<br>– | 500<br>200<br>100 | ns/V |

**NOTE:**

- The LV is guaranteed to function down to  $V_{CC} = 1.0$  V (input levels GND or  $V_{CC}$ ); DC characteristics are guaranteed from  $V_{CC} = 1.2$  V to  $V_{CC} = 6.0$  V.

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**DC ELECTRICAL CHARACTERISTICS**

Over recommended operating conditions, voltages are referenced to GND (ground = 0 V)

| SYMBOL           | PARAMETER                                     | TEST CONDITIONS                |                                                                                                                          | LIMITS         |                  |      |                 |      | UNIT |
|------------------|-----------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------|------------------|------|-----------------|------|------|
|                  |                                               |                                |                                                                                                                          | -40°C to +85°C |                  |      | -40°C to +125°C |      |      |
|                  |                                               |                                |                                                                                                                          | MIN            | TYP <sup>1</sup> | MAX  | MIN             | MAX  |      |
| V <sub>IH</sub>  | HIGH level Input voltage                      | V <sub>CC</sub> = 1.2 V        |                                                                                                                          | 0.9            |                  |      | 0.9             |      | V    |
|                  |                                               | V <sub>CC</sub> = 2.0 V        |                                                                                                                          | 1.4            |                  |      | 1.4             |      |      |
|                  |                                               | V <sub>CC</sub> = 2.7 to 3.6 V |                                                                                                                          | 2.0            |                  |      | 2.0             |      |      |
|                  |                                               | V <sub>CC</sub> = 4.5 V        |                                                                                                                          | 3.15           |                  |      | 3.15            |      |      |
|                  |                                               | V <sub>CC</sub> = 6.0 V        |                                                                                                                          | 4.20           |                  |      | 4.20            |      |      |
| V <sub>IL</sub>  | LOW level Input voltage                       | V <sub>CC</sub> = 1.2 V        |                                                                                                                          |                |                  | 0.3  |                 | 0.3  | V    |
|                  |                                               | V <sub>CC</sub> = 2.0 V        |                                                                                                                          |                |                  | 0.6  |                 | 0.6  |      |
|                  |                                               | V <sub>CC</sub> = 2.7 to 3.6 V |                                                                                                                          |                |                  | 0.8  |                 | 0.8  |      |
|                  |                                               | V <sub>CC</sub> = 4.5 V        |                                                                                                                          |                |                  | 1.35 |                 | 1.35 |      |
|                  |                                               | V <sub>CC</sub> = 6.0 V        |                                                                                                                          |                |                  | 1.80 |                 | 1.80 |      |
| ±I <sub>I</sub>  | Input leakage current                         | V <sub>CC</sub> = 3.6          | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                                  |                |                  | 1.0  |                 | 1.0  | μA   |
|                  |                                               | V <sub>CC</sub> = 6.0          |                                                                                                                          |                |                  | 2.0  |                 | 2.0  |      |
| ±I <sub>S</sub>  | Analog switch OFF-state current per channel   | V <sub>CC</sub> = 3.6          | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                      |                |                  | 1.0  |                 | 1.0  | μA   |
|                  |                                               | V <sub>CC</sub> = 6.0          | V <sub>SI</sub>   = V <sub>CC</sub> - GND (See Figure 2)                                                                 |                |                  | 2.0  |                 | 2.0  |      |
| ±I <sub>S</sub>  | Analog switch ON-state current                | V <sub>CC</sub> = 3.6          | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                                                      |                |                  | 1.0  |                 | 1.0  | μA   |
|                  |                                               | V <sub>CC</sub> = 6.0          | V <sub>SI</sub>   = V <sub>CC</sub> - GND (See Figure 3)                                                                 |                |                  | 2.0  |                 | 2.0  |      |
| I <sub>CC</sub>  | Quiescent supply current                      | V <sub>CC</sub> = 3.6 V        | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                                  |                |                  | 20.0 |                 | 40   | μA   |
|                  |                                               | V <sub>CC</sub> = 6.0 V        | V <sub>IS</sub> = GND or V <sub>CC</sub> ; V <sub>OS</sub> = V <sub>CC</sub> or GND                                      |                |                  | 40.0 |                 | 80   |      |
| ΔI <sub>CC</sub> | Additional quiescent supply current per input | V <sub>CC</sub> = 2.7 to 3.6 V | V <sub>I</sub> = V <sub>CC</sub> – 0.6 V                                                                                 |                |                  | 500  |                 | 850  | μA   |
| R <sub>ON</sub>  | ON-resistance (peak)                          | V <sub>CC</sub> = 1.2 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; I <sub>S</sub> = 100 μA; V <sub>IS</sub> = V <sub>CC</sub> to GND  |                |                  |      |                 |      | Ω    |
|                  |                                               | V <sub>CC</sub> = 2.0 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; I <sub>S</sub> = 1000 μA; V <sub>IS</sub> = V <sub>CC</sub> to GND |                | 145              | 325  |                 | 375  |      |
|                  |                                               | V <sub>CC</sub> = 2.7 V        |                                                                                                                          |                | 90               | 200  |                 | 235  |      |
|                  |                                               | V <sub>CC</sub> = 3.0 to 3.6 V |                                                                                                                          |                | 80               | 180  |                 | 210  |      |
|                  |                                               | V <sub>CC</sub> = 4.5 V        |                                                                                                                          |                | 60               | 135  |                 | 160  |      |
|                  |                                               | V <sub>CC</sub> = 6.0 V        |                                                                                                                          |                | 55               | 125  |                 | 145  |      |
| R <sub>ON</sub>  | ON-resistance (rail)                          | V <sub>CC</sub> = 1.2 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; I <sub>S</sub> = 100 μA; V <sub>IS</sub> = GND                     |                | 225              |      |                 |      | Ω    |
|                  |                                               | V <sub>CC</sub> = 2.0 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; I <sub>S</sub> = 1000 μA; V <sub>IS</sub> = GND                    |                | 110              | 235  |                 | 270  |      |
|                  |                                               | V <sub>CC</sub> = 2.7 V        |                                                                                                                          |                | 70               | 145  |                 | 165  |      |
|                  |                                               | V <sub>CC</sub> = 3.0 to 3.6 V |                                                                                                                          |                | 60               | 130  |                 | 150  |      |
|                  |                                               | V <sub>CC</sub> = 4.5 V        |                                                                                                                          |                | 45               | 100  |                 | 115  |      |
|                  |                                               | V <sub>CC</sub> = 6.0 V        |                                                                                                                          |                | 40               | 85   |                 | 100  |      |

**NOTES:**

1. All typical values are measured at  $T_{amb} = 25^\circ\text{C}$ .
2. At supply voltages approaching 1.2 V, the analog switch ON-resistance becomes extremely non-linear. Therefore, it is recommended that these devices be used to transmit digital signals only, when using these supply voltages.
3.  $R_{ON}$  (MAX) data is preliminary.

16-channel analog multiplexer/demultiplexer

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DC ELECTRICAL CHARACTERISTICS (Continued)

| SYMBOL           | PARAMETER                                                   | TEST CONDITIONS                |                                                                                                                         | LIMITS         |                  |     |                 |     | UNIT |
|------------------|-------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------|------------------|-----|-----------------|-----|------|
|                  |                                                             |                                |                                                                                                                         | -40°C to +85°C |                  |     | -40°C to +125°C |     |      |
|                  |                                                             |                                |                                                                                                                         | MIN            | TYP <sup>1</sup> | MAX | MIN             | MAX |      |
| R <sub>ON</sub>  | ON-resistance (rail)                                        | V <sub>CC</sub> = 1.2 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>I <sub>S</sub> = 100 μA;<br>V <sub>IS</sub> = V <sub>CC</sub>  |                | 250              |     |                 |     | Ω    |
|                  |                                                             | V <sub>CC</sub> = 2.0 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>I <sub>S</sub> = 1000 μA;<br>V <sub>IS</sub> = V <sub>CC</sub> |                | 120              | 320 |                 | 370 | Ω    |
|                  |                                                             | V <sub>CC</sub> = 2.7 V        |                                                                                                                         |                | 75               | 195 |                 | 225 |      |
|                  |                                                             | V <sub>CC</sub> = 3.0 to 3.6 V |                                                                                                                         |                | 70               | 175 |                 | 205 |      |
|                  |                                                             | V <sub>CC</sub> = 4.5 V        |                                                                                                                         |                | 50               | 130 |                 | 150 |      |
|                  |                                                             | V <sub>CC</sub> = 6.0 V        |                                                                                                                         |                | 45               | 120 |                 | 135 |      |
| ΔR <sub>ON</sub> | Maximum variation of ON-resistance between any two channels | V <sub>CC</sub> = 1.2 V        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ;<br>V <sub>IS</sub> = V <sub>CC</sub> to GND                       |                |                  |     |                 |     | Ω    |
|                  |                                                             | V <sub>CC</sub> = 2.0 V        |                                                                                                                         |                | 5                |     |                 |     |      |
|                  |                                                             | V <sub>CC</sub> = 2.7 V        |                                                                                                                         |                | 4                |     |                 |     |      |
|                  |                                                             | V <sub>CC</sub> = 3.0 to 3.6 V |                                                                                                                         |                | 4                |     |                 |     |      |
|                  |                                                             | V <sub>CC</sub> = 4.5 V        |                                                                                                                         |                | 3                |     |                 |     |      |
|                  |                                                             | V <sub>CC</sub> = 6.0 V        |                                                                                                                         |                | 2                |     |                 |     |      |

NOTES:

- 1. All typical values are measured at T<sub>amb</sub> = 25°C.
- 2. At supply voltages approaching 1.2 V, the analog switch ON-resistance becomes extremely non-linear. Therefore, it is recommended that these devices be used to transmit digital signals only, when using these supply voltages.
- 3. R<sub>ON</sub> (MAX) data is preliminary.

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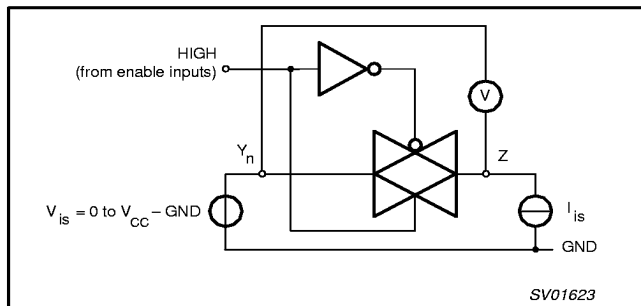
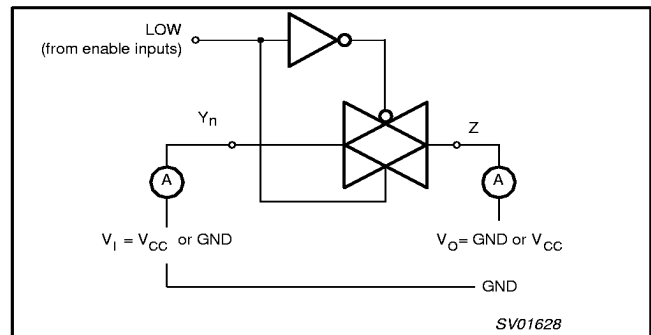
Figure 1. Test circuit for measuring ON-resistance ( $R_{ON}$ ).

Figure 2. Test circuit for measuring OFF-state current.

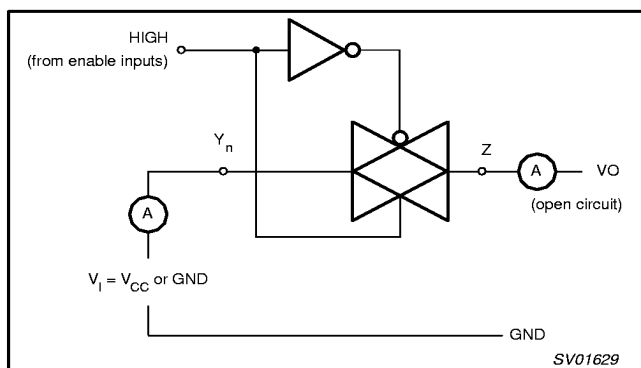


Figure 3. Test circuit for measuring ON-state current.

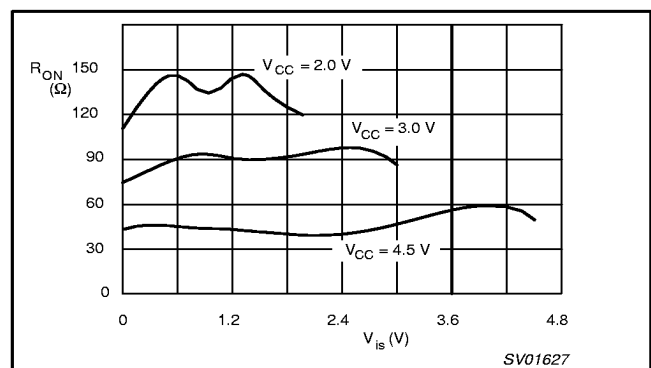
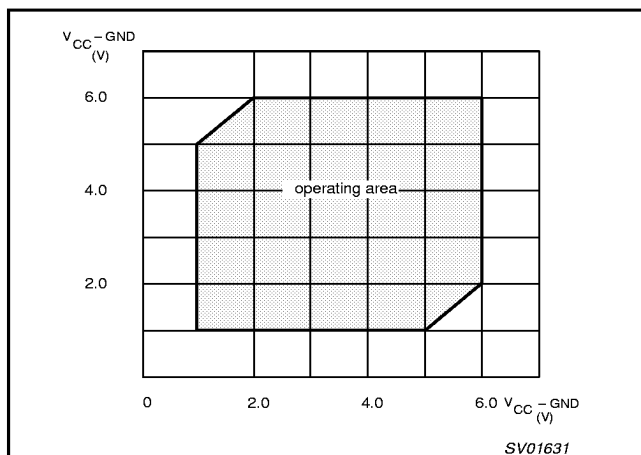
Figure 4. Typical ON-resistance ( $R_{on}$ ) as a function of input voltage ( $V_{is}$  for  $V_{is} = 0$  to  $V_{CC} - GND$ ).

Figure 5. Guaranteed operating area as a function of the supply voltages.

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**AC CHARACTERISTICS**GND = 0 V;  $t_r = t_f \leq 2.5\text{ ns}$ ;  $C_L = 50\text{ pF}$ 

| SYMBOL                             | PARAMETER                                                                      | CONDITION              |                                                                     | LIMITS        |                  |     |                |     | UNIT |
|------------------------------------|--------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------|---------------|------------------|-----|----------------|-----|------|
|                                    |                                                                                |                        |                                                                     | −40 to +85 °C |                  |     | −40 to +125 °C |     |      |
|                                    |                                                                                | V <sub>CC</sub><br>(V) | OTHER                                                               | MIN           | TYP <sup>1</sup> | MAX | MIN            | MAX |      |
| t <sub>PHL</sub> /t <sub>PLH</sub> | Propagation delay<br>V <sub>is</sub> to V <sub>os</sub><br>Z to Y <sub>n</sub> | 1.2                    | R <sub>L</sub> = ∞;<br>C <sub>L</sub> = 50 pF<br>Figure 13          |               | 30               |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 10               | 19  |                | 24  |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 8                | 14  |                | 18  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 6 <sup>2</sup>   | 11  |                | 14  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 5                | 9   |                | 12  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 4                | 7   |                | 9   |      |
| t <sub>PHL</sub> /t <sub>PLH</sub> | Propagation delay<br>V <sub>is</sub> to V <sub>os</sub><br>Y <sub>n</sub> to Z | 1.2                    | R <sub>L</sub> = ∞;<br>C <sub>L</sub> = 50 pF<br>Figure 13          |               | 45               |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 15               | 31  |                | 36  |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 11               | 23  |                | 26  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 9 <sup>2</sup>   | 18  |                | 21  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 8                | 15  |                | 18  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 6                | 12  |                | 14  |      |
| t <sub>PZH</sub> /t <sub>PZL</sub> | Turn-on time<br>E to Y <sub>n</sub>                                            | 1.2                    | R <sub>L</sub> = 1kΩ<br>C <sub>L</sub> = 50 pF<br>Figures 14 and 15 |               | 145              |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 49               | 94  |                | 112 |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 36               | 69  |                | 86  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 28 <sup>2</sup>  | 55  |                | 66  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 25               | 47  |                | 56  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 19               | 38  |                | 43  |      |
| t <sub>PZH</sub> /t <sub>PZL</sub> | Turn-on time<br>Z to Y <sub>n</sub>                                            | 1.2                    | R <sub>L</sub> = 1kΩ<br>C <sub>L</sub> = 50 pF<br>Figures 14 and 15 |               | 160              |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 54               | 102 |                | 122 |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 40               | 75  |                | 94  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 30 <sup>2</sup>  | 60  |                | 72  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 27               | 51  |                | 61  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 21               | 39  |                | 47  |      |
| t <sub>PHZ</sub> /t <sub>PLZ</sub> | Turn-off time<br>E to Y <sub>n</sub>                                           | 1.2                    | R <sub>L</sub> = 1kΩ<br>C <sub>L</sub> = 50 pF<br>Figures 14 and 15 |               | 125              |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 43               | 80  |                | 95  |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 33               | 59  |                | 71  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 26 <sup>2</sup>  | 48  |                | 57  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 23               | 41  |                | 49  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 18               | 32  |                | 38  |      |
| t <sub>PHZ</sub> /t <sub>PLZ</sub> | Turn-off time<br>Sn to Y <sub>n</sub>                                          | 1.2                    | R <sub>L</sub> = 1kΩ<br>C <sub>L</sub> = 50 pF<br>Figures 14 and 15 |               | 140              |     |                |     | ns   |
|                                    |                                                                                | 2.0                    |                                                                     |               | 49               | 90  |                | 109 |      |
|                                    |                                                                                | 2.7                    |                                                                     |               | 37               | 67  |                | 81  |      |
|                                    |                                                                                | 3.0 to 3.6             |                                                                     |               | 29 <sup>2</sup>  | 54  |                | 65  |      |
|                                    |                                                                                | 4.5                    |                                                                     |               | 26               | 46  |                | 56  |      |
|                                    |                                                                                | 6.0                    |                                                                     |               | 20               | 36  |                | 43  |      |

**NOTES:**

1. Unless otherwise stated, all typical values are measured at  $T_{amb} = 25^\circ\text{C}$
2. Typical values are measured at  $V_{CC} = 3.3\text{ V}$ .

## 16-channel analog multiplexer/demultiplexer

74LV4067

**AC CHARACTERISTICS** (Continued)GND = 0 V;  $t_r = t_f \leq 2.5\text{ns}$ ;  $C_L = 50\text{pF}$ 

| SYMBOL            | PARAMETER                       | CONDITION       |                                                                        | -40 to +85 °C |                  |     | -40 to +125 °C |     | UNIT |
|-------------------|---------------------------------|-----------------|------------------------------------------------------------------------|---------------|------------------|-----|----------------|-----|------|
|                   |                                 | $V_{CC}$<br>(V) | OTHER                                                                  | MIN           | TYP <sup>1</sup> | MAX | MIN            | MAX |      |
| $t_{PZH}/t_{PZL}$ | Turn-on time<br>E to Z          | 1.2             | $R_L = 1\text{k}\Omega$<br>$C_L = 50\text{pF}$<br>Figures 14<br>and 15 |               | 145              |     |                |     | ns   |
|                   |                                 | 2.0             |                                                                        |               | 51               | 93  |                | 110 |      |
|                   |                                 | 2.7             |                                                                        |               | 39               | 70  |                | 83  |      |
|                   |                                 | 3.0 to 3.6      |                                                                        |               | 29 <sup>2</sup>  | 56  |                | 66  |      |
|                   |                                 | 4.5             |                                                                        |               | 26               | 48  |                | 56  |      |
|                   |                                 | 6.0             |                                                                        |               | 20               | 36  |                | 43  |      |
| $t_{PZH}/t_{PZL}$ | Turn-on time<br>$S_n$ to $Y_n$  | 1.2             | $R_L = 1\text{k}\Omega$<br>$C_L = 50\text{pF}$<br>Figures 14<br>and 15 |               | 170              |     |                |     | ns   |
|                   |                                 | 2.0             |                                                                        |               | 58               | 109 |                | 131 |      |
|                   |                                 | 2.7             |                                                                        |               | 42               | 80  |                | 96  |      |
|                   |                                 | 3.0 to 3.6      |                                                                        |               | 32 <sup>2</sup>  | 64  |                | 77  |      |
|                   |                                 | 4.5             |                                                                        |               | 29               | 54  |                | 65  |      |
|                   |                                 | 6.0             |                                                                        |               | 21               | 42  |                | 50  |      |
| $t_{PHZ}/t_{PLZ}$ | Turn-off time<br>E to Z         | 1.2             | $R_L = 1\text{k}\Omega$<br>$C_L = 50\text{pF}$<br>Figures 14<br>and 15 |               | 145              |     |                |     | ns   |
|                   |                                 | 2.0             |                                                                        |               | 51               | 93  |                | 110 |      |
|                   |                                 | 2.7             |                                                                        |               | 38               | 69  |                | 82  |      |
|                   |                                 | 3.0 to 3.6      |                                                                        |               | 30 <sup>2</sup>  | 56  |                | 66  |      |
|                   |                                 | 4.5             |                                                                        |               | 29               | 48  |                | 56  |      |
|                   |                                 | 6.0             |                                                                        |               | 21               | 37  |                | 44  |      |
| $t_{PHZ}/t_{PLZ}$ | Turn-off time<br>$S_n$ to $Y_n$ | 1.2             | $R_L = 1\text{k}\Omega$<br>$C_L = 50\text{pF}$<br>Figures 14<br>and 15 |               | 160              |     |                |     | ns   |
|                   |                                 | 2.0             |                                                                        |               | 56               | 104 |                | 124 |      |
|                   |                                 | 2.7             |                                                                        |               | 42               | 77  |                | 92  |      |
|                   |                                 | 3.0 to 3.6      |                                                                        |               | 32 <sup>2</sup>  | 62  |                | 74  |      |
|                   |                                 | 4.5             |                                                                        |               | 29               | 53  |                | 61  |      |
|                   |                                 | 6.0             |                                                                        |               | 23               | 41  |                | 49  |      |

**NOTES:**

1. Unless otherwise stated, all typical values are measured at  $T_{amb} = 25^\circ\text{C}$
2. Typical values are measured at  $V_{CC} = 3.3\text{ V}$ .

16-channel analog multiplexer/demultiplexer

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ADDITIONAL AC CHARACTERISTICS

Recommended conditions and typical values  
GND = 0 V;  $t_r = t_f \leq 2.5\text{ns}$

| SYMBOL      | PARAMETER                                                                                  | TYP.         | UNIT | $V_{CC}$<br>(V) | $V_{is(p-p)}$<br>(V) | CONDITIONS                                                                                                                                                             |
|-------------|--------------------------------------------------------------------------------------------|--------------|------|-----------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | Sine-wave distortion<br>$f = 1\text{ kHz}$                                                 | 0.80<br>0.40 | %    | 3.0<br>6.0      | 2.75<br>5.50         | $R_L = 10\text{ k}\Omega$ ; $C_L = 50\text{ pf}$<br>Figures 10 and 11                                                                                                  |
|             | Sine-wave distortion<br>$f = 10\text{ kHz}$                                                | 2.40<br>1.20 | %    | 3.0<br>6.0      | 2.75<br>5.50         | $R_L = 10\text{ k}\Omega$ ; $C_L = 50\text{ pf}$<br>Figures 10 and 11                                                                                                  |
|             | Switch "OFF" signal feed through                                                           | -50<br>-50   | dB   | 3.0<br>6.0      | Note 1               | $R_L = 600\ \Omega$ ; $C_L = 50\text{ pf}$ ; $f = 1\text{ MHz}$<br>Figures 6 and 12                                                                                    |
|             | Crosstalk between any two<br>switches/multiplexers                                         | -60<br>-60   | dB   | 3.0<br>6.0      | Note 1               | $R_L = 600\ \Omega$ ; $C_L = 50\text{ pf}$ ; $f = 1\text{ MHz}$<br>Figure 8                                                                                            |
| $V_{(p-p)}$ | Crosstalk voltage between enable or<br>address input to any switch<br>(peak-to-peak value) | 110<br>120   | mV   | 3.0<br>6.0      |                      | $R_L = 600\ \Omega$ ; $C_L = 50\text{ pf}$ ; $f = 1\text{ MHz}$<br>( $S_n$ or $\bar{E}$ , square wave between $V_{CC}$<br>and GND $t_r = t_f = 6\text{ ns}$ ) Figure 9 |
| $f_{max}$   | Minimum frequency response<br>(-3 dB)                                                      | 180<br>200   | MHz  | 3.0<br>6.0      | Note 2               | $R_L = 50\ \Omega$ ; $C_L = 50\text{ pF}$<br>Figures 7 and 10                                                                                                          |
| $C_S$       | Maximum switch capacitance                                                                 | 5            | pf   |                 |                      |                                                                                                                                                                        |

GENERAL NOTES:

$V_{is}$  is the input voltage at nY or Z terminal, whichever is assigned as an input.  
 $V_{os}$  is the output voltage at nY or Z terminal, whichever is assigned as an output.

NOTES:

- Adjust input voltage  $V_{is}$  is 0 dBm level (0 dBm = 1 mW into 600  $\Omega$ ).
- Adjust input voltage  $V_{is}$  is 0 dBm level at  $V_{os}$  for 1 MHz (0 dBm = 1 mW into 50  $\Omega$ ).

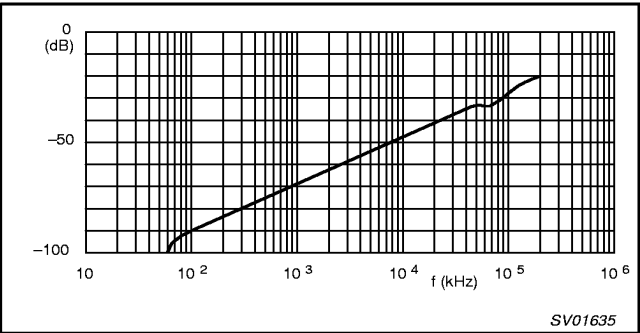


Figure 6. Typical switch "OFF" signal feed-through as a function of frequency.

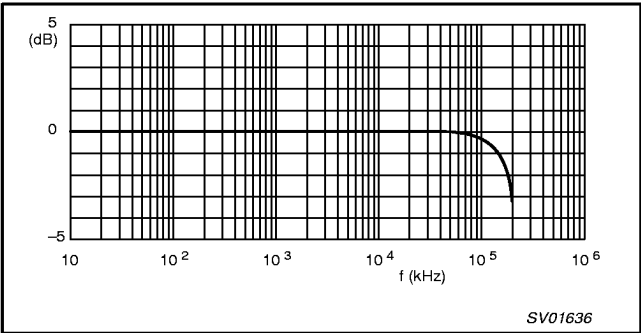


Figure 7. Typical frequency response.

NOTES TO FIGURES 6 AND 7:

Test conditions:  $V_{CC} = 3.0\text{ V}$ ; GND = 0 V;  $R_L = 50\ \Omega$ ;  $R_{SOURCE} = 1\text{ k}\Omega$ .

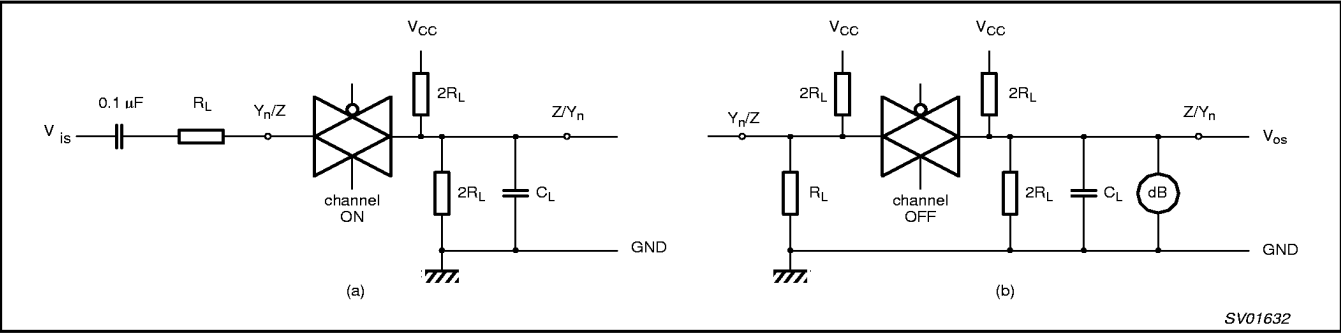


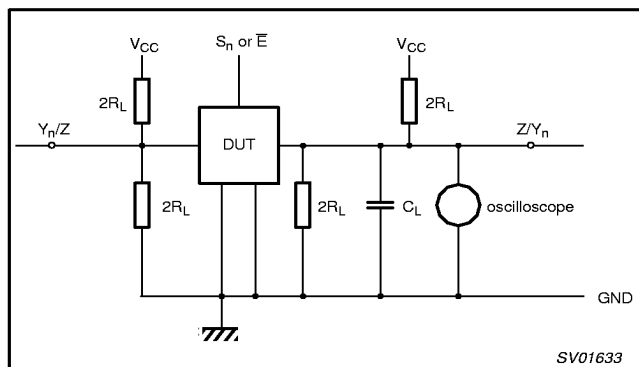
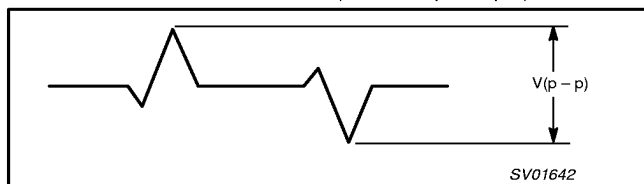
Figure 8. Test circuit for measuring crosstalk between any two switches.  
(a) channel ON condition; (b) channel OFF condition.

## 16-channel analog multiplexer/demultiplexer

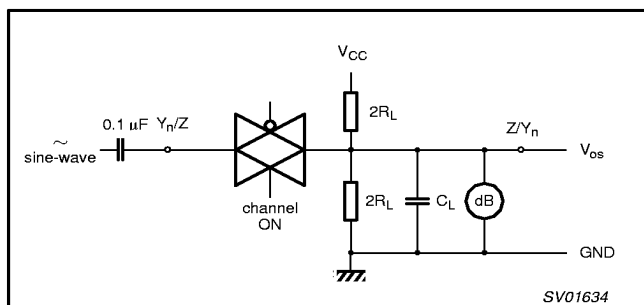
74LV4067

**NOTE TO FIGURE 9:**

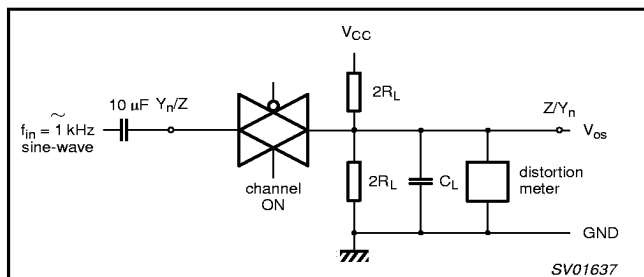
The crosstalk is defined as follows (oscilloscope output):



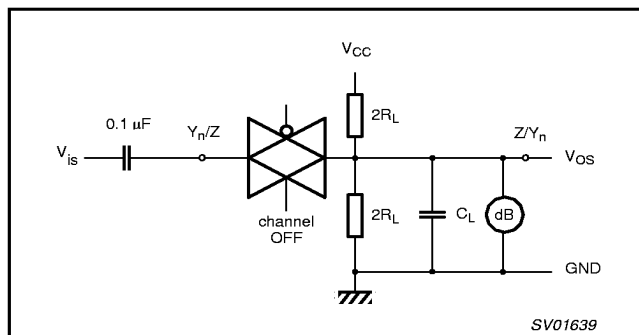
**Figure 9. Test circuit for measuring crosstalk between control and any switch.**

**NOTE TO FIGURE 10:**Adjust input voltage to obtain 0 dBm at  $V_{OS}$  when  $F_{in} = 1$  MHz. After set-up frequency of  $f_{in}$  is increased to obtain a reading of  $-3$  dB at  $V_{OS}$ .

**Figure 10. Test circuit for measuring minimum frequency response.**



**Figure 11. Test circuit for measuring sine-wave distortion.**



**Figure 12. Test circuit for measuring switch "OFF" signal feed-through.**

16-channel analog multiplexer/demultiplexer

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WAVEFORMS

$V_M = 1.5\text{ V}$  at  $2.7\text{ V} \leq V_{CC} \leq 3.6\text{ V}$   
 $V_M = 0.5 \times V_{CC}$  at  $2.7\text{ V} > V_{CC} > 3.6\text{ V}$   
 $V_{OL}$  and  $V_{OH}$  are the typical output voltage drop that occur with the output load  
 $V_X = V_{OL} + 0.3\text{ V}$  at  $2.7\text{ V} \leq V_{CC} \leq 3.6\text{ V}$   
 $V_X = V_{OL} + 0.1 \times V_{CC}$  at  $2.7\text{ V} > V_{CC} > 3.6\text{ V}$   
 $V_Y = V_{OH} - 0.3\text{ V}$  at  $2.7\text{ V} \leq V_{CC} \leq 3.6\text{ V}$   
 $V_Y = V_{OH} - 0.1 \times V_{CC}$  at  $2.7\text{ V} > V_{CC} > 3.6\text{ V}$

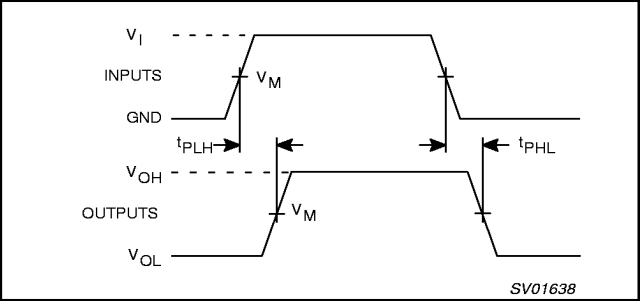


Figure 13. Input ( $V_{is}$ ) to output ( $V_{os}$ ) propagation delays.

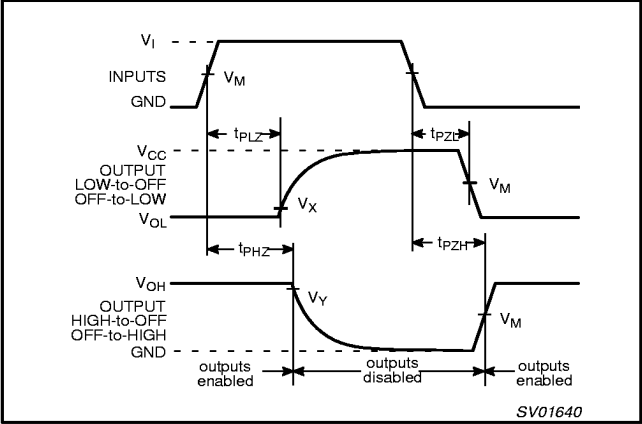


Figure 14. Turn-on and turn-off times for the inputs ( $S_n$ ,  $E$ ) to the output ( $V_{os}$ ).

TEST CIRCUIT

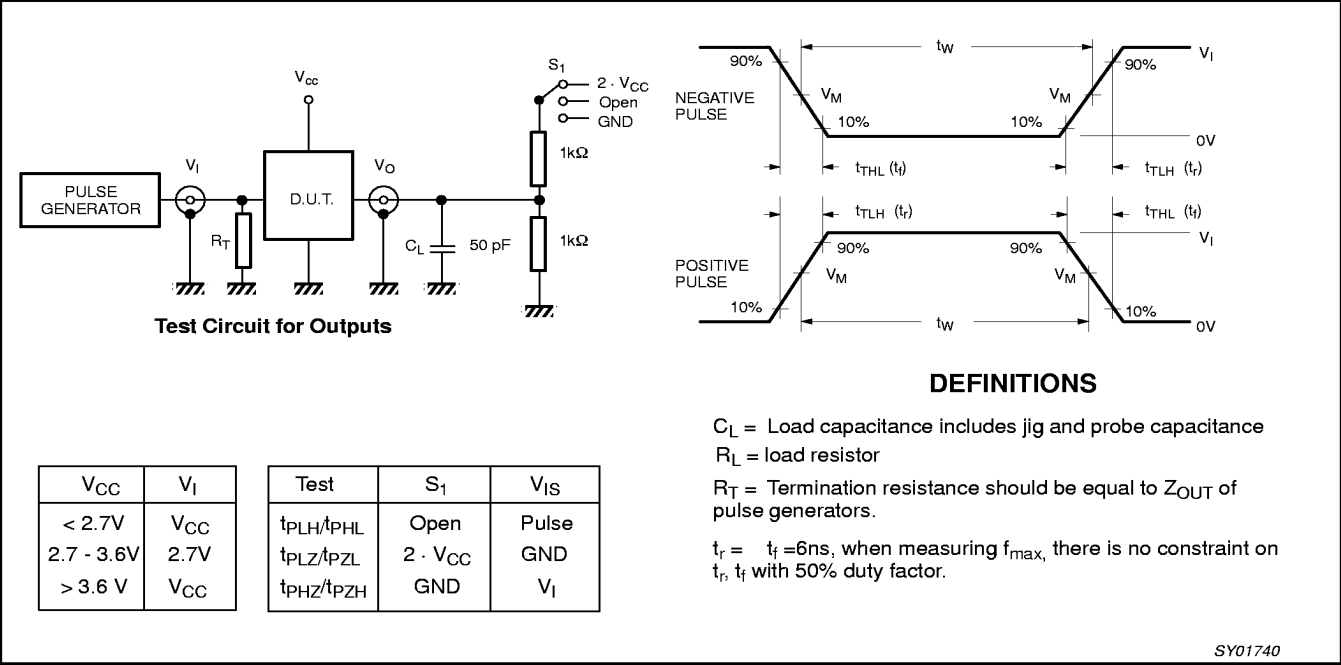


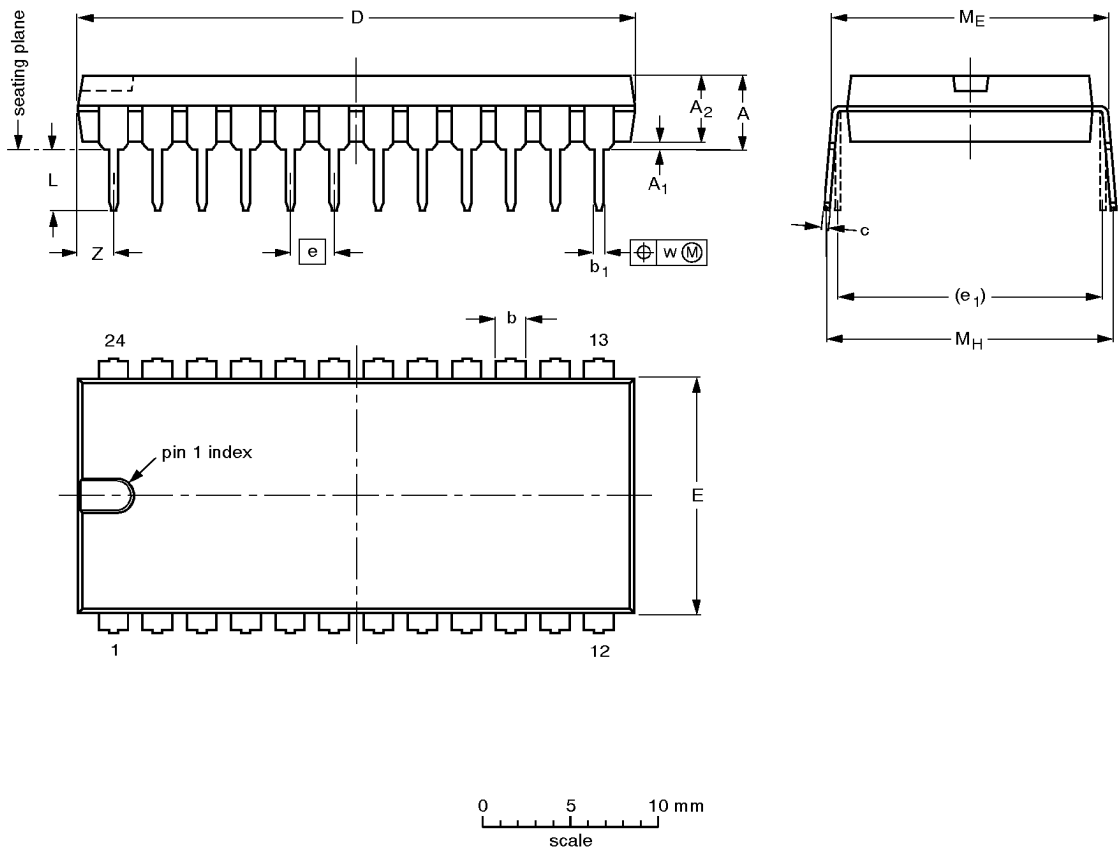
Figure 15. Load circuitry for switching times.

16-channel analog multiplexer/demultiplexer

74LV4067

DIP24: plastic dual in-line package; 24 leads (600 mil)

SOT101-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

| UNIT   | A<br>max. | A <sub>1</sub><br>min. | A <sub>2</sub><br>max. | b              | b <sub>1</sub> | c              | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | e <sub>1</sub> | L            | M <sub>E</sub> | M <sub>H</sub> | w    | Z <sup>(1)</sup><br>max. |
|--------|-----------|------------------------|------------------------|----------------|----------------|----------------|------------------|------------------|------|----------------|--------------|----------------|----------------|------|--------------------------|
| mm     | 5.1       | 0.51                   | 4.0                    | 1.7<br>1.3     | 0.53<br>0.38   | 0.32<br>0.23   | 32.0<br>31.4     | 14.1<br>13.7     | 2.54 | 15.24          | 3.9<br>3.4   | 15.80<br>15.24 | 17.15<br>15.90 | 0.25 | 2.2                      |
| inches | 0.20      | 0.020                  | 0.16                   | 0.066<br>0.051 | 0.021<br>0.015 | 0.013<br>0.009 | 1.26<br>1.24     | 0.56<br>0.54     | 0.10 | 0.60           | 0.15<br>0.13 | 0.62<br>0.60   | 0.68<br>0.63   | 0.01 | 0.087                    |

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

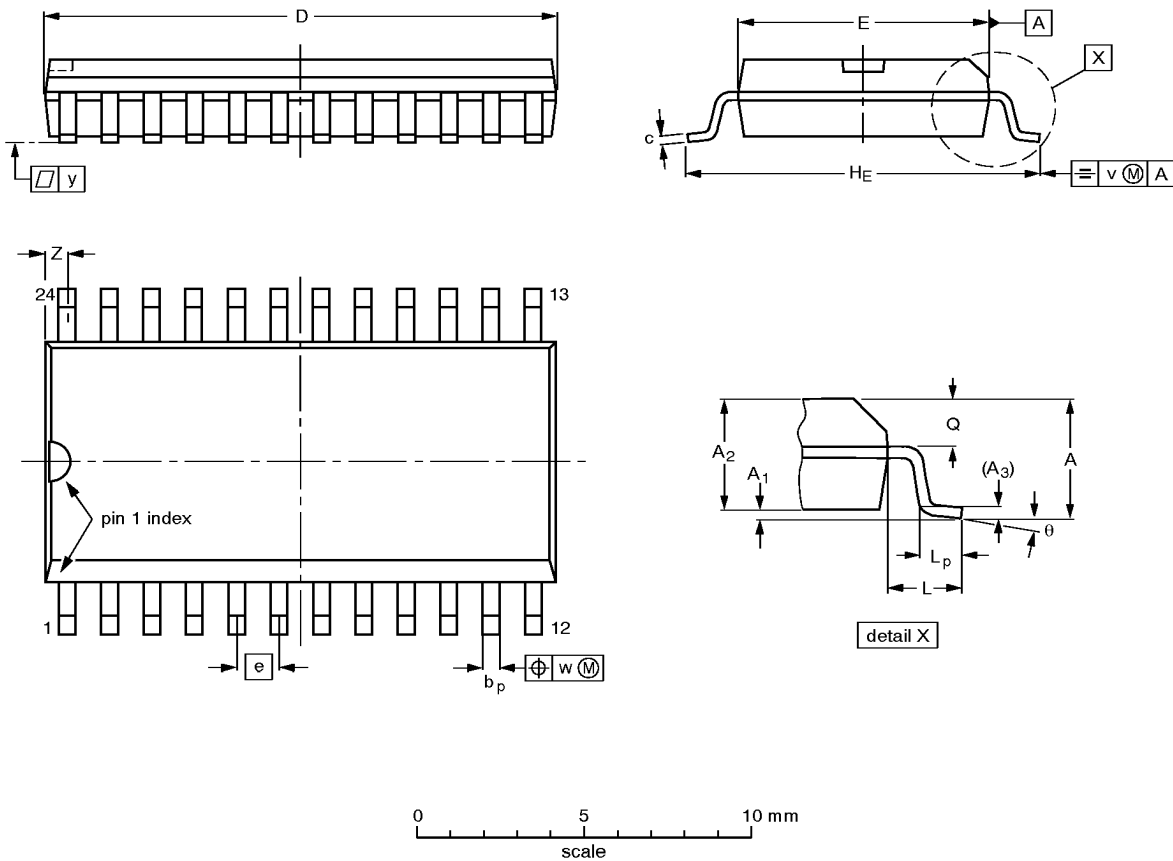
| OUTLINE<br>VERSION | REFERENCES |          |      |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE           |
|--------------------|------------|----------|------|--|---------------------------------------------------------------------------------------|----------------------|
|                    | IEC        | JEDEC    | EIAJ |  |                                                                                       |                      |
| SOT101-1           | 051G02     | MO-015AD |      |  |  | 92-11-17<br>95-01-23 |

16-channel analog multiplexer/demultiplexer

74LV4067

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

| UNIT   | A max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c              | D <sup>(1)</sup> | E <sup>(1)</sup> | e     | H <sub>E</sub> | L     | L <sub>p</sub> | Q              | v    | w    | y     | Z <sup>(1)</sup> | θ        |
|--------|--------|----------------|----------------|----------------|----------------|----------------|------------------|------------------|-------|----------------|-------|----------------|----------------|------|------|-------|------------------|----------|
| mm     | 2.65   | 0.30<br>0.10   | 2.45<br>2.25   | 0.25           | 0.49<br>0.36   | 0.32<br>0.23   | 15.6<br>15.2     | 7.6<br>7.4       | 1.27  | 10.65<br>10.00 | 1.4   | 1.1<br>0.4     | 1.1<br>1.0     | 0.25 | 0.25 | 0.1   | 0.9<br>0.4       | 8°<br>0° |
| inches | 0.10   | 0.012<br>0.004 | 0.096<br>0.089 | 0.01           | 0.019<br>0.014 | 0.013<br>0.009 | 0.61<br>0.60     | 0.30<br>0.29     | 0.050 | 0.42<br>0.39   | 0.055 | 0.043<br>0.016 | 0.043<br>0.039 | 0.01 | 0.01 | 0.004 | 0.035<br>0.016   |          |

**Note**  
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

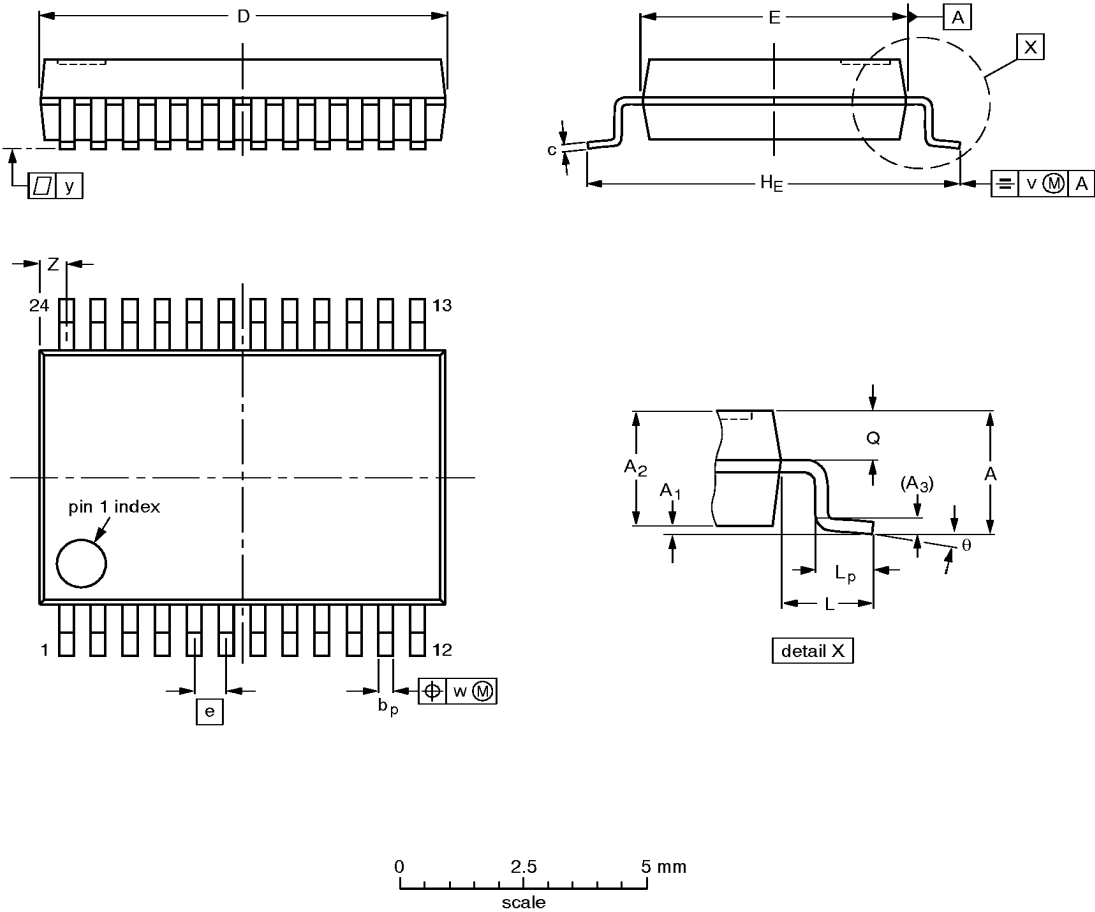
| OUTLINE<br>VERSION | REFERENCES |          |      |  | EUROPEAN<br>PROJECTION | ISSUE DATE            |
|--------------------|------------|----------|------|--|------------------------|-----------------------|
|                    | IEC        | JEDEC    | EIAJ |  |                        |                       |
| SOT137-1           | 075E05     | MS-013AD |      |  |                        | -92-11-17<br>95-01-24 |

16-channel analog multiplexer/demultiplexer

74LV4067

SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm

SOT340-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c            | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | H <sub>E</sub> | L    | L <sub>p</sub> | Q          | v   | w    | y   | Z <sup>(1)</sup> | θ        |
|------|-----------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|------|----------------|------------|-----|------|-----|------------------|----------|
| mm   | 2.0       | 0.21<br>0.05   | 1.80<br>1.65   | 0.25           | 0.38<br>0.25   | 0.20<br>0.09 | 8.4<br>8.0       | 5.4<br>5.2       | 0.65 | 7.9<br>7.6     | 1.25 | 1.03<br>0.63   | 0.9<br>0.7 | 0.2 | 0.13 | 0.1 | 0.8<br>0.4       | 8°<br>0° |

Note
1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

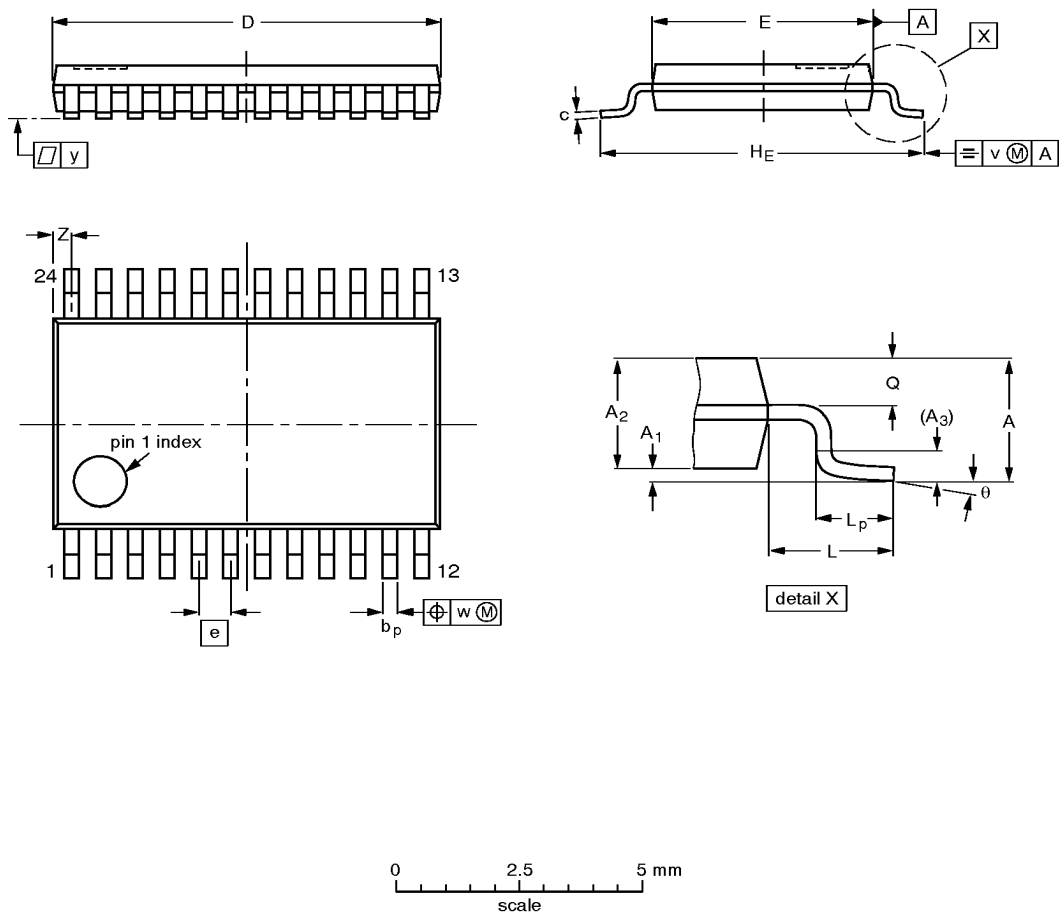
| OUTLINE<br>VERSION | REFERENCES |          |      |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|----------|------|--|------------------------|----------------------|
|                    | IEC        | JEDEC    | EIAJ |  |                        |                      |
| SOT340-1           |            | MO-150AG |      |  |                        | 93-09-08<br>95-02-04 |

16-channel analog multiplexer/demultiplexer

74LV4067

TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm

SOT355-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c          | D <sup>(1)</sup> | E <sup>(2)</sup> | e    | H <sub>E</sub> | L   | L <sub>p</sub> | Q          | v   | w    | y   | Z <sup>(1)</sup> | θ        |
|------|-----------|----------------|----------------|----------------|----------------|------------|------------------|------------------|------|----------------|-----|----------------|------------|-----|------|-----|------------------|----------|
| mm   | 1.10      | 0.15<br>0.05   | 0.95<br>0.80   | 0.25           | 0.30<br>0.19   | 0.2<br>0.1 | 7.9<br>7.7       | 4.5<br>4.3       | 0.65 | 6.6<br>6.2     | 1.0 | 0.75<br>0.50   | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.5<br>0.2       | 8°<br>0° |

Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |          |      |  | EUROPEAN<br>PROJECTION | ISSUE DATE            |
|--------------------|------------|----------|------|--|------------------------|-----------------------|
|                    | IEC        | JEDEC    | EIAJ |  |                        |                       |
| SOT355-1           |            | MO-153AD |      |  |                        | -93-06-16<br>95-02-04 |