



## 3-STATE HEX BUFFERS

These devices are high speed hex buffers with 3-state outputs. They are organized as single 6-bit or 2-bit/4-bit, with inverting or non-inverting data (D) paths. The outputs are designed to drive 15 TTL Unit Loads or 60 Low Power Schottky loads when the Enable (E) is LOW.

When the Output Enable (E) is HIGH, the outputs are forced to a high impedance "off" state. If the outputs of the 3-state devices are tied together, all but one device must be in the high impedance state to avoid high currents that would exceed the maximum ratings. Designers should ensure that Output Enable signals to 3-state devices whose outputs are tied together are designed so there is no overlap.

**SN54/74LS365A**  
**SN54/74LS366A**  
**SN54/74LS367A**  
**SN54/74LS368A**

**3-STATE HEX BUFFERS**  
**LOW POWER SCHOTTKY**

**J SUFFIX**  
 CERAMIC  
 CASE 620-09

**N SUFFIX**  
 PLASTIC  
 CASE 648-08

**D SUFFIX**  
 SOIC  
 CASE 751B-03

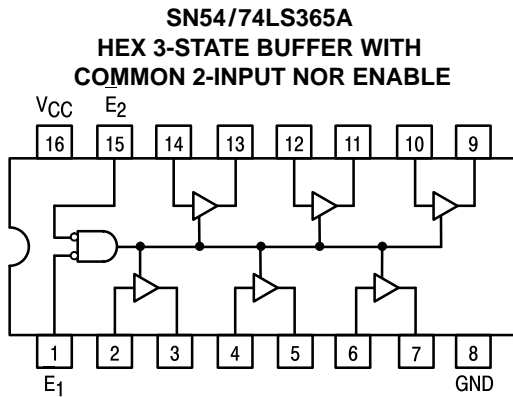
**ORDERING INFORMATION**

SN54LSXXXJ Ceramic  
 SN74LSXXXN Plastic  
 SN74LSXXXD SOIC

### GUARANTEED OPERATING RANGES

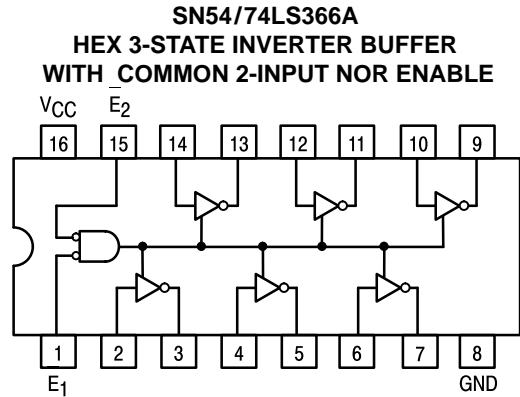
| Symbol          | Parameter                           |    | Min  | Typ  | Max  | Unit |
|-----------------|-------------------------------------|----|------|------|------|------|
| V <sub>CC</sub> | Supply Voltage                      | 54 | 4.5  | 5.0  | 5.5  | V    |
|                 |                                     | 74 | 4.75 | 5.0  | 5.25 |      |
| T <sub>A</sub>  | Operating Ambient Temperature Range | 54 | -55  | 25   | 125  | °C   |
|                 |                                     | 74 | 0    | 25   | 70   |      |
| I <sub>OH</sub> | Output Current — High               | 54 |      |      | -1.0 | mA   |
| 74              |                                     |    |      | -2.6 |      |      |
| I <sub>OL</sub> | Output Current — Low                | 54 |      |      | 12   | mA   |
|                 |                                     | 74 |      |      | 24   |      |

**SN54/74LS365A • SN54/74LS366A  
SN54/74LS367A • SN54/74LS368A**



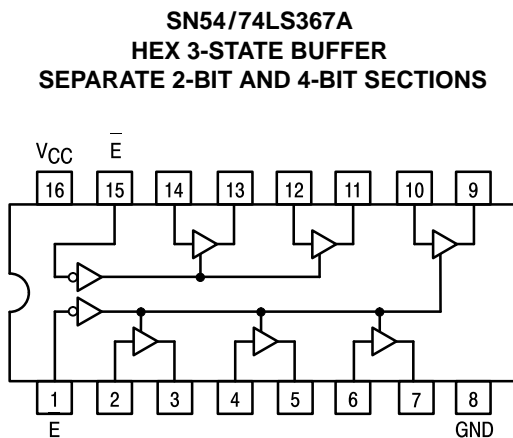
**TRUTH TABLE**

| INPUTS      |             |   | OUTPUT |
|-------------|-------------|---|--------|
| $\bar{E}_1$ | $\bar{E}_2$ | D |        |
| L           | L           | L | L      |
| L           | L           | H | H      |
| H           | X           | X | (Z)    |
| X           | H           | X | (Z)    |



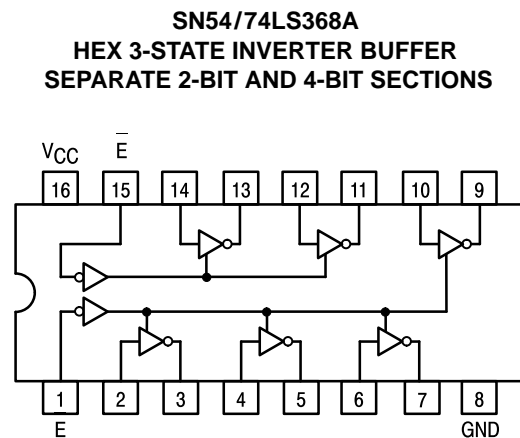
**TRUTH TABLE**

| INPUTS      |             |   | OUTPUT |
|-------------|-------------|---|--------|
| $\bar{E}_1$ | $\bar{E}_2$ | D |        |
| L           | L           | L | H      |
| L           | L           | H | L      |
| H           | X           | X | (Z)    |
| X           | H           | X | (Z)    |



**TRUTH TABLE**

| INPUTS    |   | OUTPUT |
|-----------|---|--------|
| $\bar{E}$ | D |        |
| L         | L | L      |
| L         | H | H      |
| H         | X | (Z)    |



**TRUTH TABLE**

| INPUTS    |   | OUTPUT |
|-----------|---|--------|
| $\bar{E}$ | D |        |
| L         | L | H      |
| L         | H | L      |
| H         | X | (Z)    |

# SN54/74LS365A • SN54/74LS366A SN54/74LS367A • SN54/74LS368A

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| Symbol           | Parameter                            | Limits |       |      | Unit | Test Conditions  |  |
|------------------|--------------------------------------|--------|-------|------|------|--|--|
|                  |                                      | Min    | Typ   | Max  |      |  |  |
| V <sub>IH</sub>  | Input HIGH Voltage                   | 2.0    |       |      | V    | Guaranteed Input HIGH Voltage for All Inputs   |  |
| V <sub>IL</sub>  | Input LOW Voltage                    | 54     |       | 0.7  | V    | Guaranteed Input LOW Voltage for All Inputs  |  |
|                  |                                      | 74     |       | 0.8  |      |  |  |
| V <sub>IK</sub>  | Input Clamp Diode Voltage            |        | -0.65 | -1.5 | V    | V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18 mA  |  |
| V <sub>OH</sub>  | Output HIGH Voltage                  | 54     | 2.4   | 3.4  | V    | V <sub>CC</sub> = MIN, I <sub>OH</sub> = MAX, V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> per Truth Table |  |
|                  |                                      | 74     | 2.4   | 3.1  | V    |  |  |
| V <sub>OL</sub>  | Output LOW Voltage                   | 54, 74 |       | 0.25 | 0.4  | V  | I <sub>OL</sub> = 12 mA<br>V <sub>CC</sub> = V <sub>CC</sub> MIN, V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> per Truth Table |
|                  |                                      | 74     |       | 0.35 | 0.5  | V  |  |
| I <sub>OZH</sub> | Output Off Current HIGH              |        |       | 20   | μA   | V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 2.7 V  |  |
| I <sub>OZL</sub> | Output Off Current LOW               |        |       | -20  | μA   | V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0.4 V  |  |
| I <sub>IH</sub>  | Input HIGH Current                   |        |       | 20   | μA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V   |  |
|                  |                                      |        |       | 0.1  | mA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V   |  |
| I <sub>IL</sub>  | Input LOW Current<br>E Inputs        |        |       | -0.4 | mA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V   |  |
|                  | D Inputs                             |        |       | -20  | μA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.5 V<br>Either E Input at 2.0 V  |  |
|                  |                                      |        |       | -0.4 | mA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V<br>Both E Inputs at 0.4 V   |  |
| I <sub>OS</sub>  | Short Circuit Current (Note 1)       | -40    |       | -225 | mA   | V <sub>CC</sub> = MAX  |  |
| I <sub>CC</sub>  | Power Supply Current<br>LS365A, 367A |        |       | 24   | mA   | V <sub>CC</sub> = MAX  |  |
|                  | LS366A, 368A                         |        |       | 21   | mA   |  |  |

Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

## AC CHARACTERISTICS (T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0 V)

| Symbol                               | Parameter           | Limits        |           |          |               |           |          | Unit | Test Conditions                                   |
|--------------------------------------|---------------------|---------------|-----------|----------|---------------|-----------|----------|------|---|
|                                      |                     | LS365A/LS367A |           |          | LS366A/LS368A |           |          |      |   |
|                                      |                     | Min           | Typ       | Max      | Min           | Typ       | Max      |      |   |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay   |               | 10<br>9.0 | 16<br>22 |               | 7.0<br>12 | 15<br>18 | ns   | C <sub>L</sub> = 45 pF,<br>R <sub>L</sub> = 667 Ω |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output Enable Time  |               | 19<br>24  | 35<br>40 |               | 18<br>28  | 35<br>45 | ns   |   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output Disable Time |               |           | 30<br>35 |               |           | 32<br>35 | ns   | C <sub>L</sub> = 5.0 pF                           |

**Case 751B-03 D Suffix  
16-Pin Plastic  
SO-16**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
  5. 751B-01 IS OBSOLETE, NEW STANDARD 751B-03.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 9.80        | 10.00 | 0.386     | 0.393 |
| B   | 3.80        | 4.00  | 0.150     | 0.157 |
| C   | 1.35        | 1.75  | 0.054     | 0.068 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.40        | 1.25  | 0.016     | 0.049 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.19        | 0.25  | 0.008     | 0.009 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0°          | 7°    | 0°        | 7°    |
| P   | 5.80        | 6.20  | 0.229     | 0.244 |
| R   | 0.25        | 0.50  | 0.010     | 0.019 |

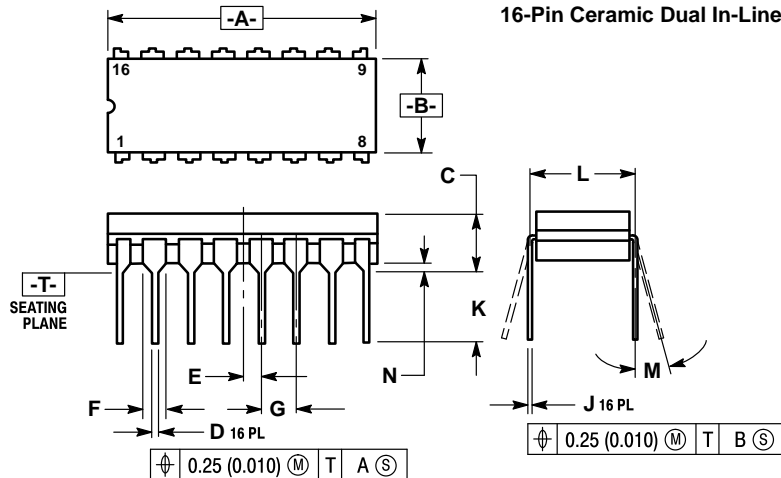
**Case 648-08 N Suffix  
16-Pin Plastic**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.
  4. DIMENSION "B" DOES NOT INCLUDE MOLD FLASH.
  5. ROUNDED CORNERS OPTIONAL.
  6. 648-01 THRU -07 OBSOLETE, NEW STANDARD 648-08.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 18.80       | 19.55 | 0.740     | 0.770 |
| B   | 6.35        | 6.85  | 0.250     | 0.270 |
| C   | 3.69        | 4.44  | 0.145     | 0.175 |
| D   | 0.39        | 0.53  | 0.015     | 0.021 |
| F   | 1.02        | 1.77  | 0.040     | 0.070 |
| G   | 2.54 BSC    |       | 0.100 BSC |       |
| H   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.21        | 0.38  | 0.008     | 0.015 |
| K   | 2.80        | 3.30  | 0.110     | 0.130 |
| L   | 7.50        | 7.74  | 0.295     | 0.305 |
| M   | 0°          | 10°   | 0°        | 10°   |
| S   | 0.51        | 1.01  | 0.020     | 0.040 |

**Case 620-09 J Suffix  
16-Pin Ceramic Dual In-Line**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
  4. DIM F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
  5. 620-01 THRU -08 OBSOLETE, NEW STANDARD 620-09.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 19.05       | 19.55 | 0.750     | 0.770 |
| B   | 6.10        | 7.36  | 0.240     | 0.290 |
| C   | —           | 4.19  | —         | 0.165 |
| D   | 0.39        | 0.53  | 0.015     | 0.021 |
| E   | 1.27 BSC    |       | 0.050 BSC |       |
| F   | 1.40        | 1.77  | 0.055     | 0.070 |
| G   | 2.54 BSC    |       | 0.100 BSC |       |
| J   | 0.23        | 0.27  | 0.009     | 0.011 |
| K   | —           | 5.08  | —         | 0.200 |
| L   | 7.62 BSC    |       | 0.300 BSC |       |
| M   | 0°          | 15°   | 0°        | 15°   |
| N   | 0.39        | 0.88  | 0.015     | 0.035 |

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