

# SN74LS365A, SN74LS367A, SN74LS368A

## 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.

### GUARANTEED OPERATING RANGES

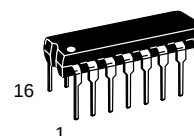
| Symbol          | Parameter                           | Min  | Typ | Max  | Unit |
|-----------------|-------------------------------------|------|-----|------|------|
| V <sub>CC</sub> | Supply Voltage                      | 4.75 | 5.0 | 5.25 | V    |
| T <sub>A</sub>  | Operating Ambient Temperature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



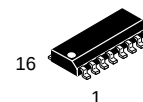
ON Semiconductor™

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**LOW  
POWER  
SCHOTTKY**



**PLASTIC  
N SUFFIX  
CASE 648**

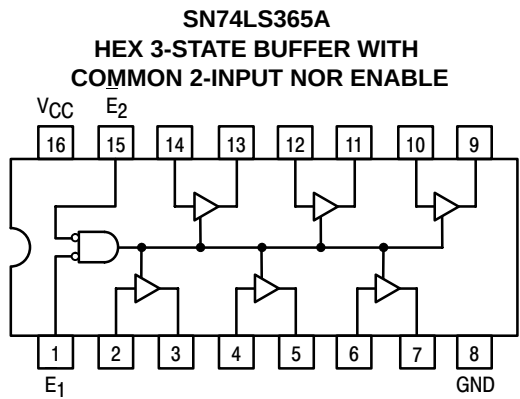


**SOIC  
D SUFFIX  
CASE 751B**

### ORDERING INFORMATION

| Device        | Package    | Shipping         |
|---------------|------------|------------------|
| SN74LS365AN   | 16 Pin DIP | 2000 Units/Box   |
| SN74LS365AD   | SOIC–16    | 38 Units/Rail    |
| SN74LS365ADR2 | SOIC–16    | 2500/Tape & Reel |
| SN74LS367AN   | 16 Pin DIP | 2000 Units/Box   |
| SN74LS367AD   | SOIC–16    | 38 Units/Rail    |
| SN74LS367ADR2 | SOIC–16    | 2500/Tape & Reel |
| SN74LS368AN   | 16 Pin DIP | 2000 Units/Box   |
| SN74LS368AD   | SOIC–16    | 38 Units/Rail    |
| SN74LS368ADR2 | SOIC–16    | 2500/Tape & Reel |

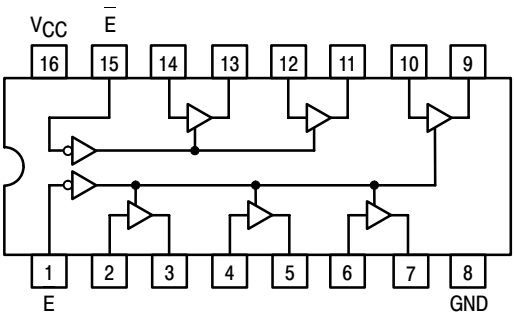
SN74LS365A, SN74LS367A, SN74LS368A



TRUTH TABLE

| INPUTS           |                  |   | OUTPUT |
|------------------|------------------|---|--------|
| $\overline{E_1}$ | $\overline{E_2}$ | D |        |
| L                | L                | L | L      |
| L                | L                | H | H      |
| H                | X                | X | (Z)    |
| X                | H                | X | (Z)    |

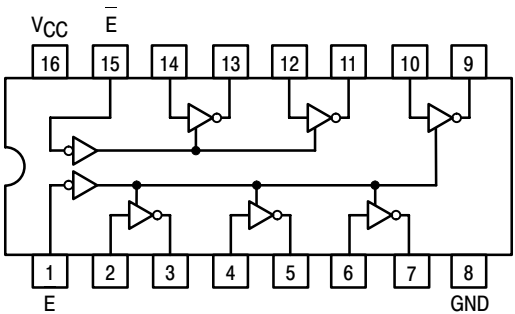
SN74LS367A  
HEX 3-STATE BUFFER  
SEPARATE 2-BIT AND 4-BIT SECTIONS



TRUTH TABLE

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

SN74LS368A  
HEX 3-STATE INVERTER BUFFER  
SEPARATE 2-BIT AND 4-BIT SECTIONS



TRUTH TABLE

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

# SN74LS365A, SN74LS367A, SN74LS368A

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

| Symbol    | Parameter                            | Limits |       |      | Unit          | Test Conditions                                                                               |
|-----------|--------------------------------------|--------|-------|------|---------------|-----------------------------------------------------------------------------------------------|
|           |                                      | Min    | Typ   | Max  |               |                                                                                               |
| $V_{IH}$  | Input HIGH Voltage                   | 2.0    |       |      | V             | Guaranteed Input HIGH Voltage for All Inputs                                                  |
| $V_{IL}$  | Input LOW Voltage                    |        |       | 0.8  | V             | Guaranteed Input LOW Voltage for All Inputs                                                   |
| $V_{IK}$  | Input Clamp Diode Voltage            |        | -0.65 | -1.5 | V             | $V_{CC} = \text{MIN}$ , $I_{IN} = -18 \text{ mA}$                                             |
| $V_{OH}$  | Output HIGH Voltage                  | 2.4    | 3.1   |      | V             | $V_{CC} = \text{MIN}$ , $I_{OH} = \text{MAX}$ , $V_{IN} = V_{IH}$ or $V_{IL}$ per Truth Table |
| $V_{OL}$  | Output LOW Voltage                   |        | 0.25  | 0.4  | V             | $I_{OL} = 12 \text{ mA}$                                                                      |
|           |                                      |        | 0.35  | 0.5  | V             | $I_{OL} = 24 \text{ mA}$                                                                      |
|           |                                      |        |       |      |               | $V_{CC} = V_{CC} \text{ MIN}$ , $V_{IN} = V_{IL}$ or $V_{IH}$ per Truth Table                 |
| $I_{OZH}$ | Output Off Current HIGH              |        |       | 20   | $\mu\text{A}$ | $V_{CC} = \text{MAX}$ , $V_{OUT} = 2.7 \text{ V}$                                             |
| $I_{OZL}$ | Output Off Current LOW               |        |       | -20  | $\mu\text{A}$ | $V_{CC} = \text{MAX}$ , $V_{OUT} = 0.4 \text{ V}$                                             |
| $I_{IH}$  | Input HIGH Current                   |        |       | 20   | $\mu\text{A}$ | $V_{CC} = \text{MAX}$ , $V_{IN} = 2.7 \text{ V}$                                              |
|           |                                      |        |       | 0.1  | mA            | $V_{CC} = \text{MAX}$ , $V_{IN} = 7.0 \text{ V}$                                              |
| $I_{IL}$  | Input LOW Current<br>E Inputs        |        |       | -0.4 | mA            | $V_{CC} = \text{MAX}$ , $V_{IN} = 0.4 \text{ V}$                                              |
|           | D Inputs                             |        |       | -20  | $\mu\text{A}$ | $V_{CC} = \text{MAX}$ , $V_{IN} = 0.5 \text{ V}$<br>Either E Input at 2.0 V                   |
|           |                                      |        |       | -0.4 | mA            | $V_{CC} = \text{MAX}$ , $V_{IN} = 0.4 \text{ V}$<br>Both E Inputs at 0.4 V                    |
| $I_{OS}$  | Short Circuit Current (Note 1)       | -40    |       | -225 | mA            | $V_{CC} = \text{MAX}$                                                                         |
| $I_{CC}$  | Power Supply Current<br>LS365A, 367A |        |       | 24   | mA            | $V_{CC} = \text{MAX}$                                                                         |
|           | LS368A                               |        |       | 21   |               |                                                                                               |

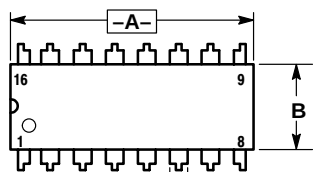
Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

## AC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , $V_{CC} = 5.0 \text{ V}$ )

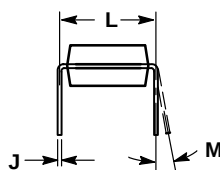
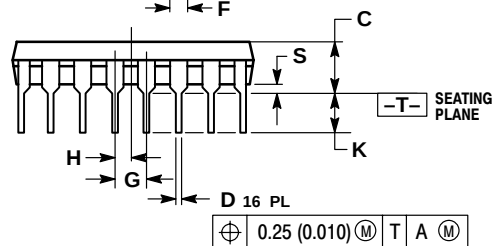
| Symbol                               | Parameter           | Limits        |           |          |               |           |          | Unit | Test Conditions                                   |
|--------------------------------------|---------------------|---------------|-----------|----------|---------------|-----------|----------|------|---------------------------------------------------|
|                                      |                     | 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                           |

# SN74LS365A, SN74LS367A, SN74LS368A

## PACKAGE DIMENSIONS



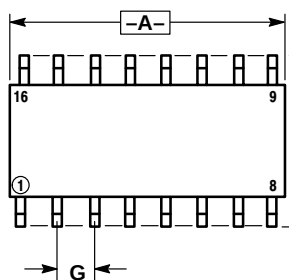
**N SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08  
ISSUE R



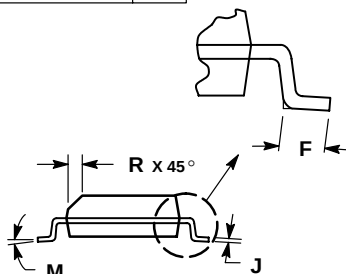
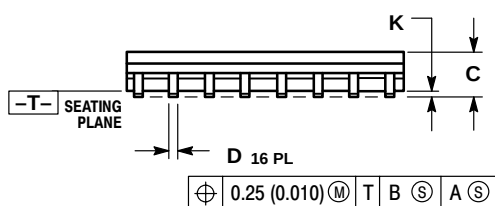
### NOTES:

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.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.740     | 0.770 | 18.80       | 19.55 |
| B   | 0.250     | 0.270 | 6.35        | 6.85  |
| C   | 0.145     | 0.175 | 3.69        | 4.44  |
| D   | 0.015     | 0.021 | 0.39        | 0.53  |
| F   | 0.040     | 0.70  | 1.02        | 1.77  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.050 BSC |       | 1.27 BSC    |       |
| J   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.110     | 0.130 | 2.80        | 3.30  |
| L   | 0.295     | 0.305 | 7.50        | 7.74  |
| M   | 0°        | 10°   | 0°          | 10°   |
| S   | 0.020     | 0.040 | 0.51        | 1.01  |



**D SUFFIX**  
PLASTIC SOIC PACKAGE  
CASE 751B-05  
ISSUE J



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| 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 |

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