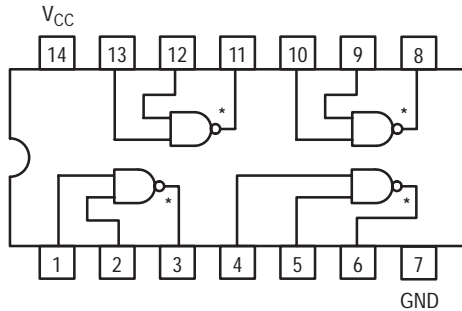


# SN74LS38

## Quad 2-Input NAND Buffer



\*OPEN COLLECTOR OUTPUTS

### GUARANTEED OPERATING RANGES

| Symbol   | Parameter                           | Min  | Typ | Max  | Unit |
|----------|-------------------------------------|------|-----|------|------|
| $V_{CC}$ | Supply Voltage                      | 4.75 | 5.0 | 5.25 | V    |
| $T_A$    | Operating Ambient Temperature Range | 0    | 25  | 70   | °C   |
| $V_{OH}$ | Output Voltage – High               |      |     | 5.5  | V    |
| $I_{OL}$ | Output Current – Low                |      |     | 24   | mA   |

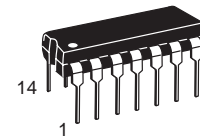


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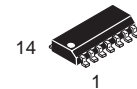
Formerly a Division of Motorola

<http://onsemi.com>

**LOW  
POWER  
SCHOTTKY**



**PLASTIC  
N SUFFIX  
CASE 646**



**SOIC  
D SUFFIX  
CASE 751A**

### ORDERING INFORMATION

| Device    | Package    | Shipping         |
|-----------|------------|------------------|
| SN74LS38N | 14 Pin DIP | 2000 Units/Box   |
| SN74LS38D | 14 Pin     | 2500/Tape & Reel |

# SN74LS38

## 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             | $V_{CC} = \text{MIN}$ , $I_{IN} = -18 \text{ mA}$ |
| $I_{OH}$ | Output HIGH Current   |        |       | 250  | $\mu\text{A}$ | $V_{CC} = \text{MIN}$ , $V_{OH} = \text{MAX}$     |
| $V_{OL}$ | Output LOW Voltage  |        | 0.25  | 0.4  | V             | $I_{OL} = 12 \text{ mA}$                          |
|          |   |        | 0.35  | 0.5  | V             | $I_{OL} = 24 \text{ mA}$                          |
| $I_{IH}$ | Input HIGH Current  |        |       | 20   | $\mu\text{A}$ | $V_{CC} = \text{MAX}$ , $V_{IN} = 2.4 \text{ V}$  |
|          |   |        |       | 0.1  | mA            | $V_{CC} = \text{MAX}$ , $V_{IN} = 7.0 \text{ V}$  |
| $I_{IL}$ | Input LOW Current   |        |       | -0.4 | mA            | $V_{CC} = \text{MAX}$ , $V_{IN} = 0.4 \text{ V}$  |
| $I_{CC}$ | Power Supply Current<br>Total, Output HIGH<br>Total, Output LOW |        |       | 2.0  | mA            | $V_{CC} = \text{MAX}$                             |
|          |   |        |       | 12   |               |   |

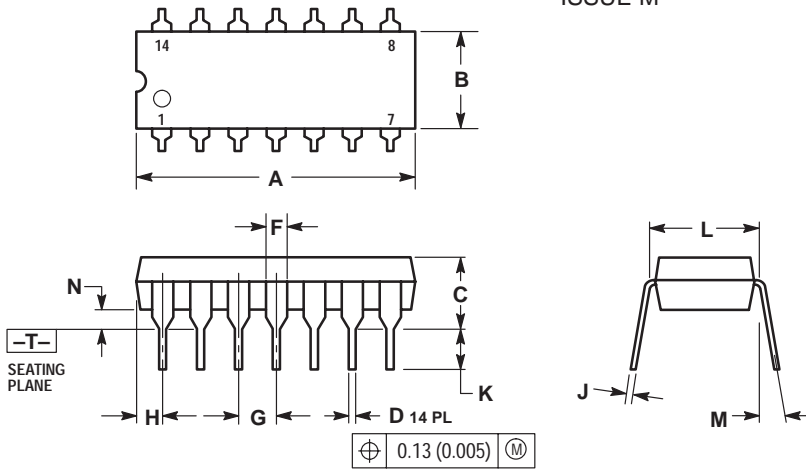
## AC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| Symbol    | Parameter                       | Limits |     |     | Unit | Test Conditions  |
|-----------|---------------------------------|--------|-----|-----|------|--|
|           |                                 | Min    | Typ | Max |      |  |
| $t_{PLH}$ | Turn-Off Delay, Input to Output |        | 20  | 32  | ns   | $V_{CC} = 5.0 \text{ V}$ , $R_L = 667 \Omega$<br>$C_L = 45 \text{ pF}$ |
| $t_{PHL}$ | Turn-On Delay, Input to Output  |        | 18  | 28  | ns   |  |

# SN74LS38

## PACKAGE DIMENSIONS

### N SUFFIX PLASTIC PACKAGE CASE 646-06 ISSUE M

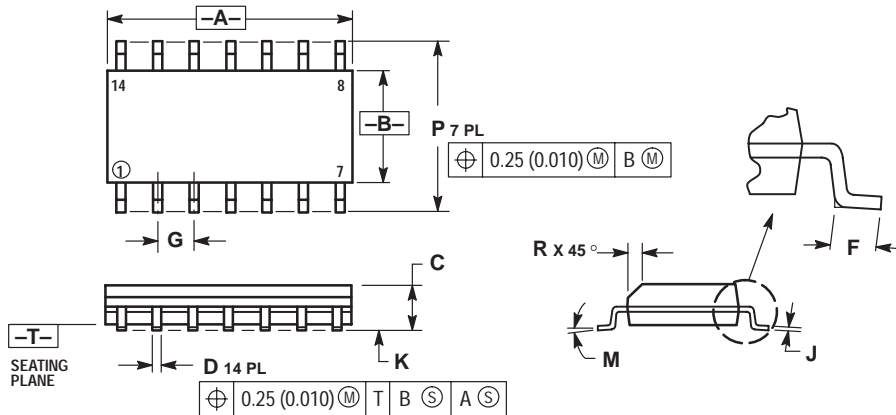


NOTES:

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   | 0.715              | 0.770 | 18.16       | 18.80 |
| B   | 0.240              | 0.260 | 6.10        | 6.60  |
| C   | 0.145              | 0.185 | 3.69        | 4.69  |
| D   | 0.015              | 0.021 | 0.38        | 0.53  |
| F   | 0.040              | 0.070 | 1.02        | 1.78  |
| G   | 0.100 BSC 2.54 BSC |       |             |       |
| H   | 0.052              | 0.095 | 1.32        | 2.41  |
| J   | 0.008              | 0.015 | 0.20        | 0.38  |
| K   | 0.115              | 0.135 | 2.92        | 3.43  |
| L   | 0.290              | 0.310 | 7.37        | 7.87  |
| M   | ---                | 10°   | ---         | 10°   |
| N   | 0.015              | 0.039 | 0.38        | 1.01  |


### D SUFFIX PLASTIC SOIC PACKAGE CASE 751A-03 ISSUE F



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   | 8.55        | 8.75 | 0.337     | 0.344 |
| 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 | 0.228     | 0.244 |
| R   | 0.25        | 0.50 | 0.010     | 0.019 |

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