

## Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

## Quality Overview

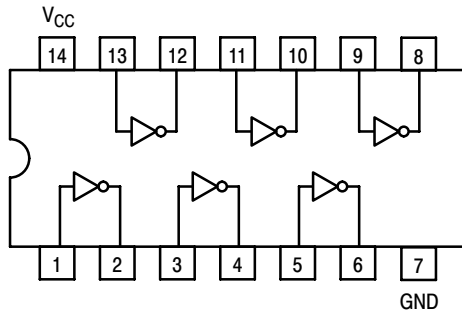
- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

# SN74LS04

## Hex Inverter



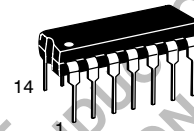
ON Semiconductor™

<http://onsemi.com>

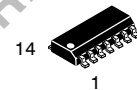
**LOW  
POWER  
SCHOTTKY**

### GUARANTEED OPERATING RANGES

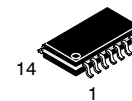
| Symbol   | Parameter                           | Min  | Typ | Max  | Unit |
|----------|-------------------------------------|------|-----|------|------|
| $V_{CC}$ | Supply Voltage                      | 4.75 | 5.0 | 5.25 | V    |
| $T_A$    | Operating Ambient Temperature Range | 0    | 25  | 70   | °C   |
| $I_{OH}$ | Output Current - High               |      |     | -0.4 | mA   |
| $I_{OL}$ | Output Current - Low                |      |     | 8.0  | mA   |



**PLASTIC  
N SUFFIX  
CASE 646**



**SOIC  
D SUFFIX  
CASE 751A**



**SOEIAJ  
M SUFFIX  
CASE 965**

OBSOLETE  
THIS DEVICE IS OBSOLETE ON SEMICONDUCTOR  
PLEASE CONTACT YOUR ON SEMICONDUCTOR REPRESENTATIVE FOR INFORMATION

### ORDERING INFORMATION

| Device      | Package    | Shipping         |
|-------------|------------|------------------|
| SN74LS04N   | 14 Pin DIP | 2000 Units/Box   |
| SN74LS04D   | SOIC-14    | 55 Units/Rail    |
| SN74LS04DR2 | SOIC-14    | 2500/Tape & Reel |
| SN74LS04M   | SOEIAJ-14  | See Note 1       |
| SN74LS04MEL | SOEIAJ-14  | See Note 1       |

1. For ordering information on the EIAJ version of the SOIC package, please contact your local ON Semiconductor representative.

# SN74LS04

## 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                          |        |       | 0.8  | V    | Guaranteed Input LOW Voltage for All Inputs   |
| 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                        | 2.7    | 3.5   |      | 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                      |
| V <sub>OL</sub> | Output LOW Voltage                         |        | 0.25  | 0.4  | V    | I <sub>OL</sub> = 4.0 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 |
|                 |  |        | 0.35  | 0.5  | 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                          |        |       | -0.4 | mA   | V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4 V  |
| I <sub>OS</sub> | Short Circuit Current (Note 2)             | -20    |       | -100 | mA   | V <sub>CC</sub> = MAX   |
| I <sub>CC</sub> | Power Supply Current<br>Total, Output HIGH |        |       | 2.4  | mA   | V <sub>CC</sub> = MAX   |
|                 | Total, Output LOW                          |        |       | 6.6  |      |   |

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

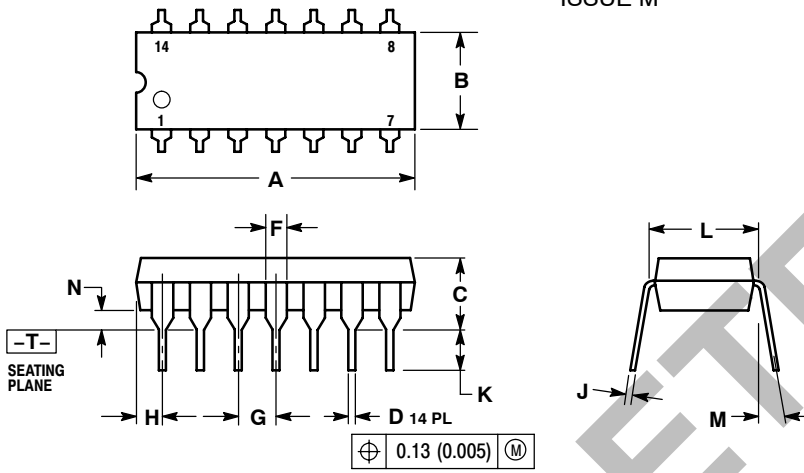
## AC CHARACTERISTICS (T<sub>A</sub> = 25°C)

| Symbol           | Parameter                       | Limits |     |     | Unit | Test Conditions                                   |
|------------------|---------------------------------|--------|-----|-----|------|---|
|                  |                                 | Min    | Typ | Max |      |   |
| t <sub>PLH</sub> | Turn-Off Delay, Input to Output |        | 9.0 | 15  | ns   | V <sub>CC</sub> = 5.0 V<br>C <sub>L</sub> = 15 pF |
| t <sub>PHL</sub> | Turn-On Delay, Input to Output  |        | 10  | 15  | ns   |   |

# SN74LS04

## PACKAGE DIMENSIONS

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

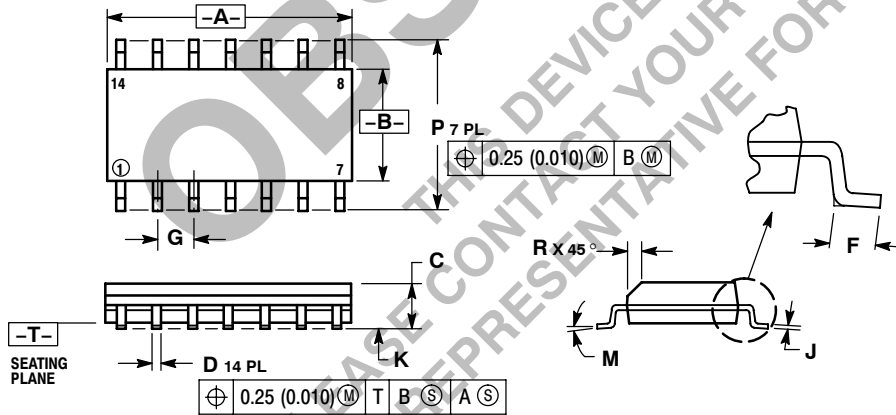


**NOTES:**

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:**

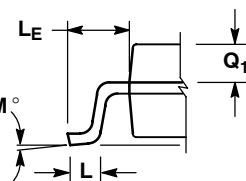
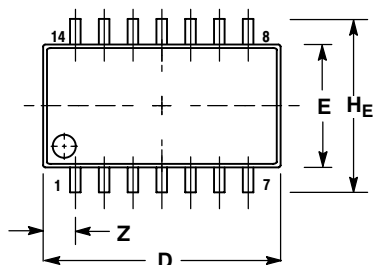
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

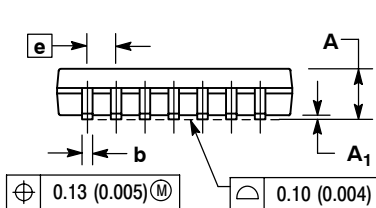
# SN74LS04

## PACKAGE DIMENSIONS

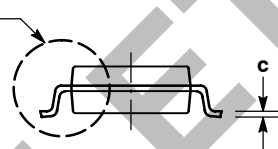
**M SUFFIX**  
**SOEIAJ PACKAGE**  
**CASE 965-01**  
**ISSUE O**



**DETAIL P**



**VIEW P**



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

| DIM            | MILLIMETERS |       | INCHES    |       |
|----------------|-------------|-------|-----------|-------|
|                | MIN         | MAX   | MIN       | MAX   |
| A              | ---         | 2.05  | ---       | 0.081 |
| A <sub>1</sub> | 0.05        | 0.20  | 0.002     | 0.008 |
| b              | 0.35        | 0.50  | 0.014     | 0.020 |
| c              | 0.18        | 0.27  | 0.007     | 0.011 |
| D              | 9.90        | 10.50 | 0.390     | 0.413 |
| E              | 5.10        | 5.45  | 0.201     | 0.215 |
| e              | 1.27 BSC    |       | 0.050 BSC |       |
| H <sub>E</sub> | 7.40        | 8.20  | 0.291     | 0.323 |
| 0.50           | 0.50        | 0.85  | 0.020     | 0.033 |
| L <sub>E</sub> | 1.10        | 1.50  | 0.043     | 0.059 |
| M              | 0°          | 10°   | 0°        | 10°   |
| Q <sub>1</sub> | 0.70        | 0.90  | 0.028     | 0.035 |
| Z              | ---         | 1.42  | ---       | 0.056 |

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