

# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

- Complementary Outputs
- Direct Overriding Load (Data) Inputs
- Gated Clock Inputs
- Parallel-to-Serial Data Conversion

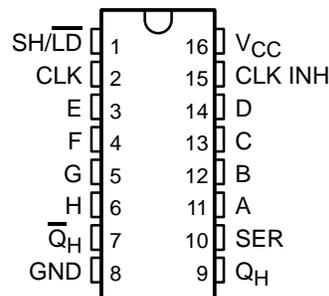
| TYPE    | TYPICAL MAXIMUM<br>CLOCK FREQUENCY | TYPICAL<br>POWER DISSIPATION |
|---------|------------------------------------|------------------------------|
| '165    | 26 MHz                             | 210 mW                       |
| 'LS165A | 35 MHz                             | 90 mW                        |

## description

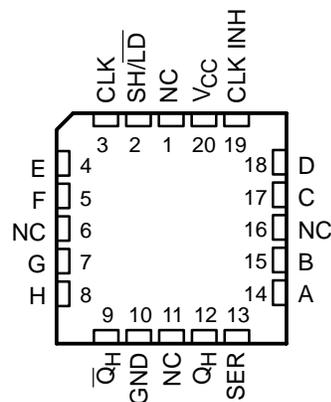
The '165 and 'LS165A are 8-bit serial shift registers that shift the data in the direction of  $Q_A$  toward  $Q_H$  when clocked. Parallel-in access to each stage is made available by eight individual, direct data inputs that are enabled by a low level at the shift/load ( $SH/\overline{LD}$ ) input. These registers also feature gated clock (CLK) inputs and complementary outputs from the eighth bit. All inputs are diode-clamped to minimize transmission-line effects, thereby simplifying system design.

Clocking is accomplished through a two-input positive-NOR gate, permitting one input to be used as a clock-inhibit function. Holding either of the clock inputs high inhibits clocking, and holding either clock input low with  $SH/\overline{LD}$  high enables the other clock input. Clock inhibit (CLK INH) should be changed to the high level only while CLK is high. Parallel loading is inhibited as long as  $SH/\overline{LD}$  is high. Data at the parallel inputs are loaded directly into the register while  $SH/\overline{LD}$  is low, independently of the levels of CLK, CLK INH, or serial (SER) inputs.

SN54165, SN54LS165A . . . J OR W PACKAGE  
SN74165 . . . N PACKAGE  
SN74LS165A . . . D, N, OR NS PACKAGE  
(TOP VIEW)



SN54LS165A . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS  
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2002, Texas Instruments Incorporated  
On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## ORDERING INFORMATION

| T <sub>A</sub> | PACKAGE†  |               | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|-----------|---------------|-----------------------|------------------|
| 0°C to 70°C    | PDIP – N  | Tube          | SN74LS165AN           | SN74LS165AN      |
|                | SOIC – D  | Tube          | SN74LS165AD           | LS165A           |
|                |           | Tape and reel | SN74LS165ADR          |                  |
|                | SOP – NS  | Tape and reel | SN74LS165ANSR         | 74LS165A         |
| –55°C to 125°C | CDIP – J  | Tube          | SN54LS165AJ           | SN54LS165AJ      |
|                |           | Tube          | SNJ54LS165AJ          | SNJ54LS165AJ     |
|                | CFP – W   | Tube          | SNJ54LS165AW          | SNJ54LS165AW     |
|                | LCCC – FK | Tube          | SNJ54LS165AFK         | SNJ54LS165AFK    |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

## FUNCTION TABLE

| INPUTS              |         |     |     |                    | INTERNAL OUTPUTS |                  | OUTPUT Q <sub>H</sub> |
|---------------------|---------|-----|-----|--------------------|------------------|------------------|-----------------------|
| SH/ $\overline{LD}$ | CLK INH | CLK | SER | PARALLEL A . . . H | $\overline{Q}_A$ | $\overline{Q}_B$ |                       |
| L                   | X       | X   | X   | a . . . h          | a                | b                | h                     |
| H                   | L       | L   | X   | X                  | Q <sub>A0</sub>  | Q <sub>B0</sub>  | Q <sub>H0</sub>       |
| H                   | L       | ↑   | H   | X                  | H                | Q <sub>An</sub>  | Q <sub>Gn</sub>       |
| H                   | L       | ↑   | L   | X                  | L                | Q <sub>An</sub>  | Q <sub>Gn</sub>       |
| H                   | H       | X   | X   | X                  | Q <sub>A0</sub>  | Q <sub>B0</sub>  | Q <sub>H0</sub>       |



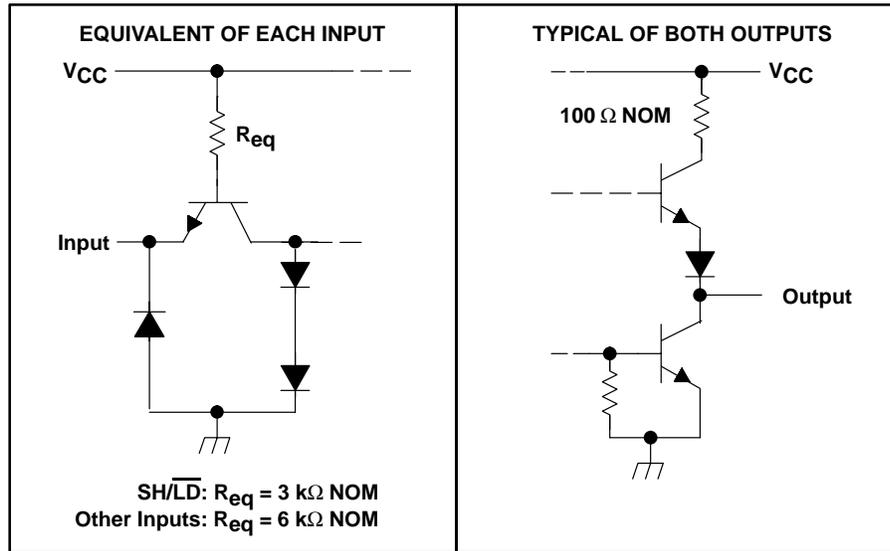
# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

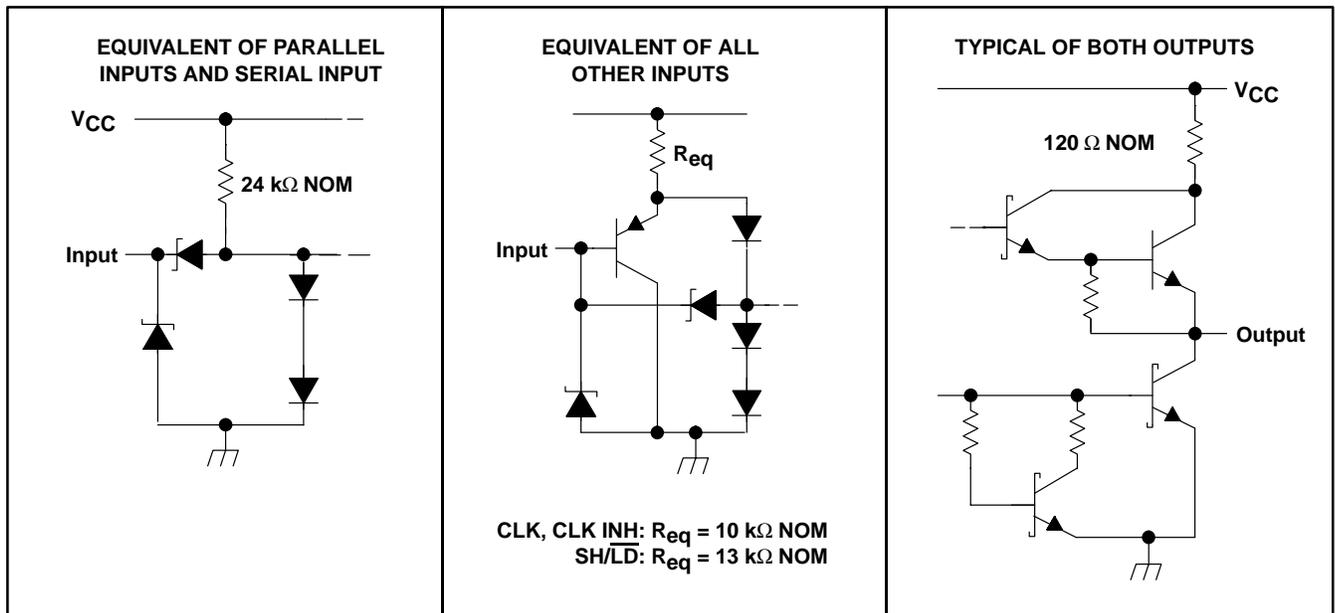
SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## schematics of inputs and outputs

'165



'LS165A

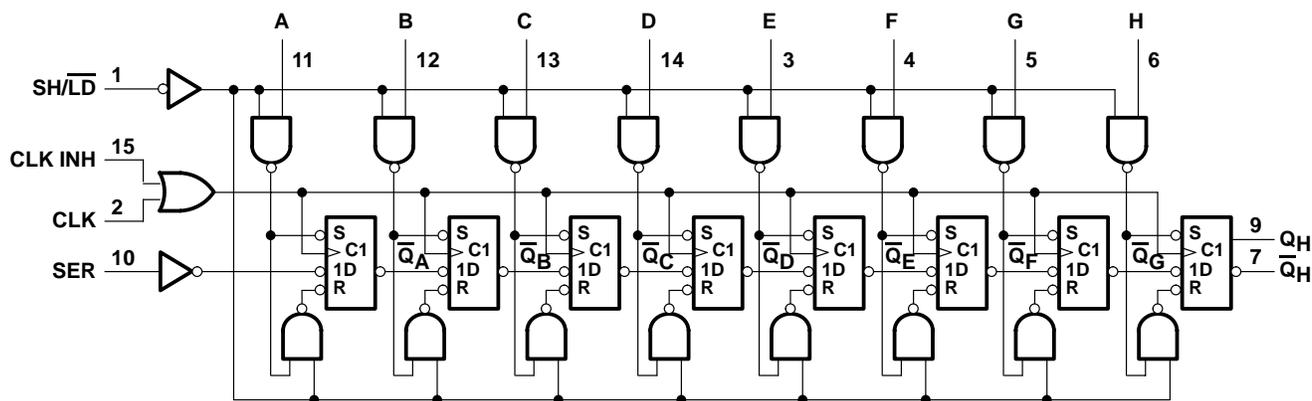


# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

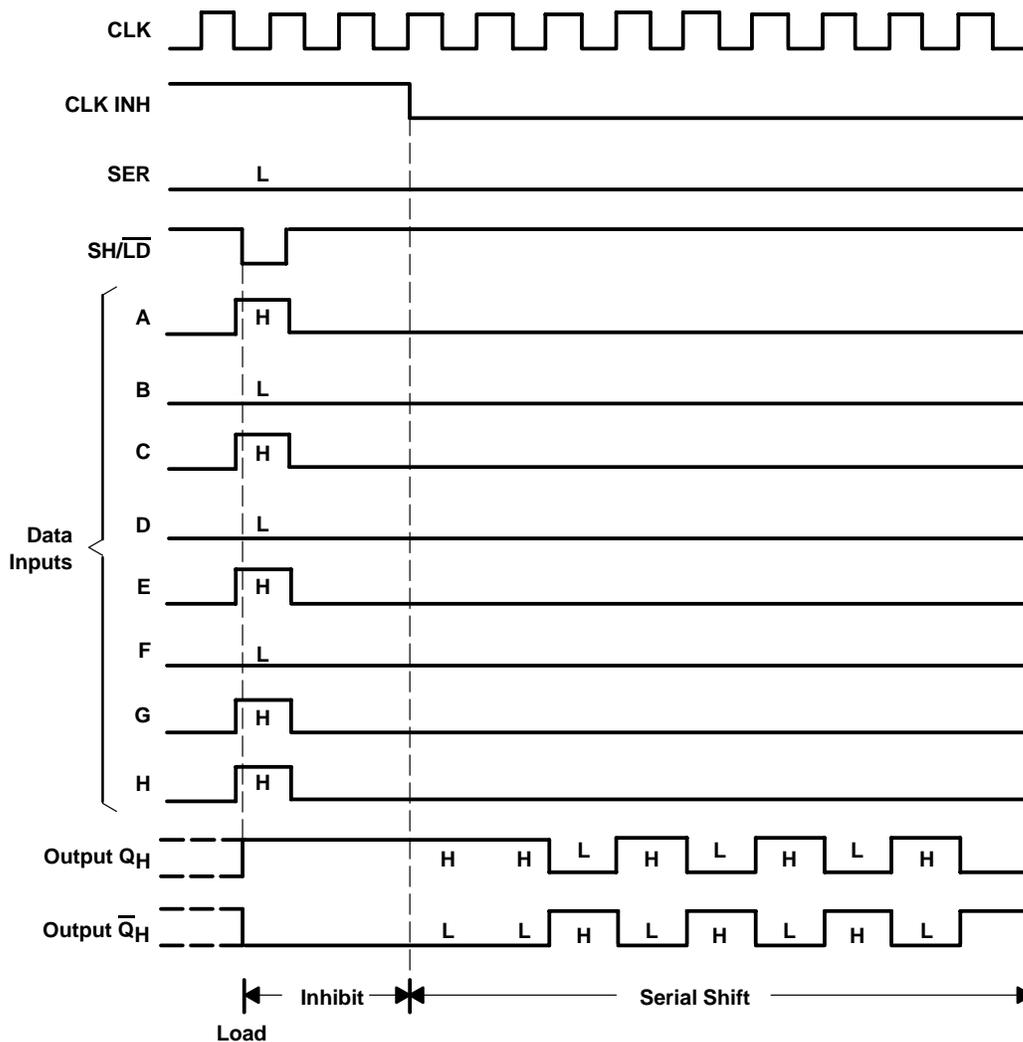
SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## logic diagram (positive logic)



Pin numbers shown are for D, J, N, NS, and W packages.

## typical shift, load, and inhibit sequences



# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## absolute maximum ratings over operating free-air temperature (unless otherwise noted)<sup>†</sup>

|   |                |
|---|----------------|
| Supply voltage, $V_{CC}$ (see Note 1)                           | 7 V            |
| Input voltage, $V_I$ : SN54165, SN74165                         | 5.5 V          |
| SN54LS165A, SN74LS165A  | 7 V            |
| Interemitter voltage (see Note 2)                               | 5.5 V          |
| Package thermal impedance $\theta_{JA}$ (see Note 3): D package | 73°C/W         |
| N package   | 67°C/W         |
| NS package  | 64°C/W         |
| Storage temperature range, $T_{stg}$                            | -65°C to 150°C |

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” 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.

- NOTES:
1. Voltage values, except interemitter voltage, are with respect to network ground terminal.
  2. This is the voltage between two emitters of a multiple-emitter transistor. This rating applies for the '165 to the  $\overline{SH/LD}$  input in conjunction with the CLK INH input.
  3. The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions

|                |  | SN54165 |     |      | SN74165 |     |      | UNIT    |
|----------------|--|---------|-----|------|---------|-----|------|---------|
|                |  | MIN     | NOM | MAX  | MIN     | NOM | MAX  |         |
| $V_{CC}$       | Supply voltage                           | 4.5     | 5   | 5.5  | 4.75    | 5   | 5.25 | V       |
| $I_{OH}$       | High-level output current                |         |     | -800 |         |     | -800 | $\mu$ A |
| $I_{OL}$       | Low-level output current                 |         |     | 16   |         |     | 16   | mA      |
| $f_{clock}$    | Clock frequency                          | 0       |     | 20   | 0       |     | 20   | MHz     |
| $t_{w(clock)}$ | Width of clock input pulse               | 25      |     |      | 25      |     |      | ns      |
| $t_{w(load)}$  | Width of load input pulse                | 15      |     |      | 15      |     |      | ns      |
| $t_{su}$       | Clock-enable setup time (see Figure 1)   | 30      |     |      | 30      |     |      | ns      |
| $t_{su}$       | Parallel input setup time (see Figure 1) | 10      |     |      | 10      |     |      | ns      |
| $t_{su}$       | Serial input setup time (see Figure 1)   | 20      |     |      | 20      |     |      | ns      |
| $t_{su}$       | Shift setup time (see Figure 1)          | 45      |     |      | 45      |     |      | ns      |
| $t_h$          | Hold time at any input                   | 0       |     |      | 0       |     |      | ns      |
| $T_A$          | Operating free-air temperature           | -55     |     | 125  | 0       |     | 70   | °C      |

# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER   | TEST CONDITIONS†   | SN54165 |      |      | SN74165 |      |      | UNIT |
|---|--|---------|------|------|---------|------|------|------|
|   |  | MIN     | TYP‡ | MAX  | MIN     | TYP‡ | MAX  |      |
| V <sub>IH</sub> High-level input voltage              |  | 2       |      |      | 2       |      |      | V    |
| V <sub>IL</sub> Low-level input voltage               |  |         |      | 0.8  |         |      | 0.8  | V    |
| V <sub>IK</sub> Input clamp voltage                   | V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA   |         |      | -1.5 |         |      | -1.5 | V    |
| V <sub>OH</sub> High-level output voltage             | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -800 μA | 2.4     | 3.4  |      | 2.4     | 3.4  |      | V    |
| V <sub>OL</sub> Low-level output voltage              | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 16 mA   |         | 0.2  | 0.4  |         | 0.2  | 0.4  | V    |
| I <sub>I</sub> Input current at maximum input voltage | V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V  |         |      | 1    |         |      | 1    | mA   |
| I <sub>IH</sub> High-level input current              | SH/LD  |         |      | 80   |         |      | 80   | μA   |
|   | Other inputs   |         |      | 40   |         |      | 40   |      |
| I <sub>IL</sub> Low-level input current               | SH/LD  |         |      | -3.2 |         |      | -3.2 | mA   |
|   | Other inputs   |         |      | -1.6 |         |      | -1.6 |      |
| I <sub>OS</sub> Short-circuit output current§         | V <sub>CC</sub> = MAX  | -20     |      | -55  | -18     |      | -55  | mA   |
| I <sub>CC</sub> Supply current                        | V <sub>CC</sub> = MAX, See Note 4  |         | 42   | 63   |         | 42   | 63   | mA   |

NOTE 4: With the outputs open, CLK INH and CLK at 4.5 V, and a clock pulse applied to SH/LD, I<sub>CC</sub> is measured first with the parallel inputs at 4.5 V, then with the parallel inputs grounded.

† For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

## SN54165 and SN74165 switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see Figure 1)

| PARAMETER¶       | FROM (INPUT) | TO (OUTPUT)    | TEST CONDITIONS                                | MIN | TYP | MAX | UNIT |
|------------------|--------------|----------------|--|-----|-----|-----|------|
| f <sub>max</sub> |              |                |  | 20  | 26  |     | MHz  |
| t <sub>PLH</sub> | LD           | Any            | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 400 Ω |     | 21  | 31  | ns   |
| t <sub>PHL</sub> |              |                |  |     | 27  | 40  |      |
| t <sub>PLH</sub> | CLK          | Any            | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 400 Ω |     | 16  | 24  | ns   |
| t <sub>PHL</sub> |              |                |  |     | 21  | 31  |      |
| t <sub>PLH</sub> | H            | Q <sub>H</sub> | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 400 Ω |     | 11  | 17  | ns   |
| t <sub>PHL</sub> |              |                |  |     | 24  | 36  |      |
| t <sub>PLH</sub> | H            | Q <sub>H</sub> | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 400 Ω |     | 18  | 27  | ns   |
| t <sub>PHL</sub> |              |                |  |     | 18  | 27  |      |

¶ f<sub>max</sub> = maximum clock frequency, t<sub>PLH</sub> = propagation delay time, low-to-high-level output, t<sub>PHL</sub> = propagation delay time, high-to-low-level output



# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## recommended operating conditions

|                       |   | SN54LS165A |     |      | SN74LS165A |     |      | UNIT |    |
|-----------------------|---|------------|-----|------|------------|-----|------|------|----|
|                       |   | MIN        | NOM | MAX  | MIN        | NOM | MAX  |      |    |
| V <sub>CC</sub>       | Supply voltage                            | 4.5        | 5   | 5.5  | 4.75       | 5   | 5.25 | V    |    |
| V <sub>IH</sub>       | High-level input voltage                  | 2          |     |      | 2          |     |      | V    |    |
| V <sub>IL</sub>       | Low-level input voltage                   |            |     | 0.7  |            |     | 0.8  | V    |    |
| I <sub>OH</sub>       | High-level output current                 |            |     | -0.4 |            |     | -0.4 | mA   |    |
| I <sub>OL</sub>       | Low-level output current                  |            |     | 4    |            |     | 8    | mA   |    |
| f <sub>clock</sub>    | Clock frequency                           | 0          |     | 25   | 0          |     | 25   | MHz  |    |
| t <sub>w(clock)</sub> | Width of clock input pulse (see Figure 2) | Clock high |     | 15   |            |     | 15   | ns   |    |
|                       |   | Clock low  |     | 25   |            |     | 25   |      |    |
| t <sub>w(load)</sub>  | Width of load input pulse                 | Clock high |     | 25   |            |     | 25   | ns   |    |
|                       |   | Clock low  |     | 17   |            |     | 17   |      |    |
| t <sub>su</sub>       | Clock-enable setup time (see Figure 2)    |            |     | 30   |            |     | 30   | ns   |    |
| t <sub>su</sub>       | Parallel input setup time (see Figure 2)  |            |     | 10   |            |     | 10   | ns   |    |
| t <sub>su</sub>       | Serial input setup time (see Figure 2)    |            |     | 20   |            |     | 20   | ns   |    |
| t <sub>su</sub>       | Shift setup time (see Figure 2)           |            |     | 45   |            |     | 45   | ns   |    |
| t <sub>h</sub>        | Hold time at any input                    |            |     | 0    |            |     | 0    | ns   |    |
| T <sub>A</sub>        | Operating free-air temperature            |            |     | -55  |            | 125 | 0    | 70   | °C |

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER         | TEST CONDITION†  | SN54LS165A             |      |      | SN74LS165A |      |      | UNIT |   |
|-------------------|--|------------------------|------|------|------------|------|------|------|---|
|                   |  | MIN                    | TYP‡ | MAX  | MIN        | TYP‡ | MAX  |      |   |
| V <sub>IK</sub>   | V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA   |                        |      | -1.5 |            |      | -1.5 | V    |   |
| V <sub>OH</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX, I <sub>OH</sub> = -0.4 mA | 2.5                    | 3.5  |      | 2.7        | 3.5  |      | V    |   |
| V <sub>OL</sub>   | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX                            | I <sub>OL</sub> = 4 mA |      | 0.25 | 0.4        | 0.25 |      | 0.4  | V |
|                   |  | I <sub>OL</sub> = 8 mA |      |      |            | 0.35 |      | 0.5  |   |
| I <sub>I</sub>    | V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V  |                        |      | 0.1  |            |      | 0.1  | mA   |   |
| I <sub>IH</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V  |                        |      | 20   |            |      | 20   | μA   |   |
| I <sub>IL</sub>   | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V  |                        |      | -0.4 |            |      | -0.4 | mA   |   |
| I <sub>OS</sub> § | V <sub>CC</sub> = MAX  | -20                    |      | -100 | -20        |      | -100 | mA   |   |
| I <sub>CC</sub>   | V <sub>CC</sub> = MAX, See Note 4  |                        | 18   | 30   |            | 18   | 30   | mA   |   |

NOTE 4. With the outputs open, CLK INH and CLK at 4.5 V, and a clock pulse applied to SH/LD, I<sub>CC</sub> is measured first with the parallel inputs at 4.5 V, then with the parallel inputs grounded.

† For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

# SN54165, SN54LS165A, SN74165, SN74LS165A PARALLEL-LOAD 8-BIT SHIFT REGISTERS

The SN54165 and SN74165 devices  
are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

## SN54LS165A and SN74LS165A switching characteristics, $V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$ (see Figure 2)

| PARAMETER† | FROM<br>(INPUT) | TO<br>(OUTPUT)   | TEST CONDITIONS                                 | MIN | TYP | MAX | UNIT |
|------------|-----------------|------------------|---|-----|-----|-----|------|
| $f_{max}$  |                 |                  |   | 25  | 35  |     | MHz  |
| $t_{PLH}$  | $\overline{LD}$ | Any              | $R_L = 2\text{ k}\Omega$ , $C_L = 15\text{ pF}$ |     | 21  | 35  | ns   |
| $t_{PHL}$  |                 |                  |   |     | 26  | 35  |      |
| $t_{PLH}$  | CLK             | Any              | $R_L = 2\text{ k}\Omega$ , $C_L = 15\text{ pF}$ |     | 14  | 25  | ns   |
| $t_{PHL}$  |                 |                  |   |     | 16  | 25  |      |
| $t_{PLH}$  | H               | $Q_H$            | $R_L = 2\text{ k}\Omega$ , $C_L = 15\text{ pF}$ |     | 13  | 25  | ns   |
| $t_{PHL}$  |                 |                  |   |     | 24  | 30  |      |
| $t_{PLH}$  | H               | $\overline{Q}_H$ | $R_L = 2\text{ k}\Omega$ , $C_L = 15\text{ pF}$ |     | 19  | 30  | ns   |
| $t_{PHL}$  |                 |                  |   |     | 17  | 25  |      |

†  $f_{max}$  = maximum clock frequency,  $t_{PLH}$  = propagation delay time, low-to-high-level output,  $t_{PHL}$  = propagation delay time, high-to-low-level output

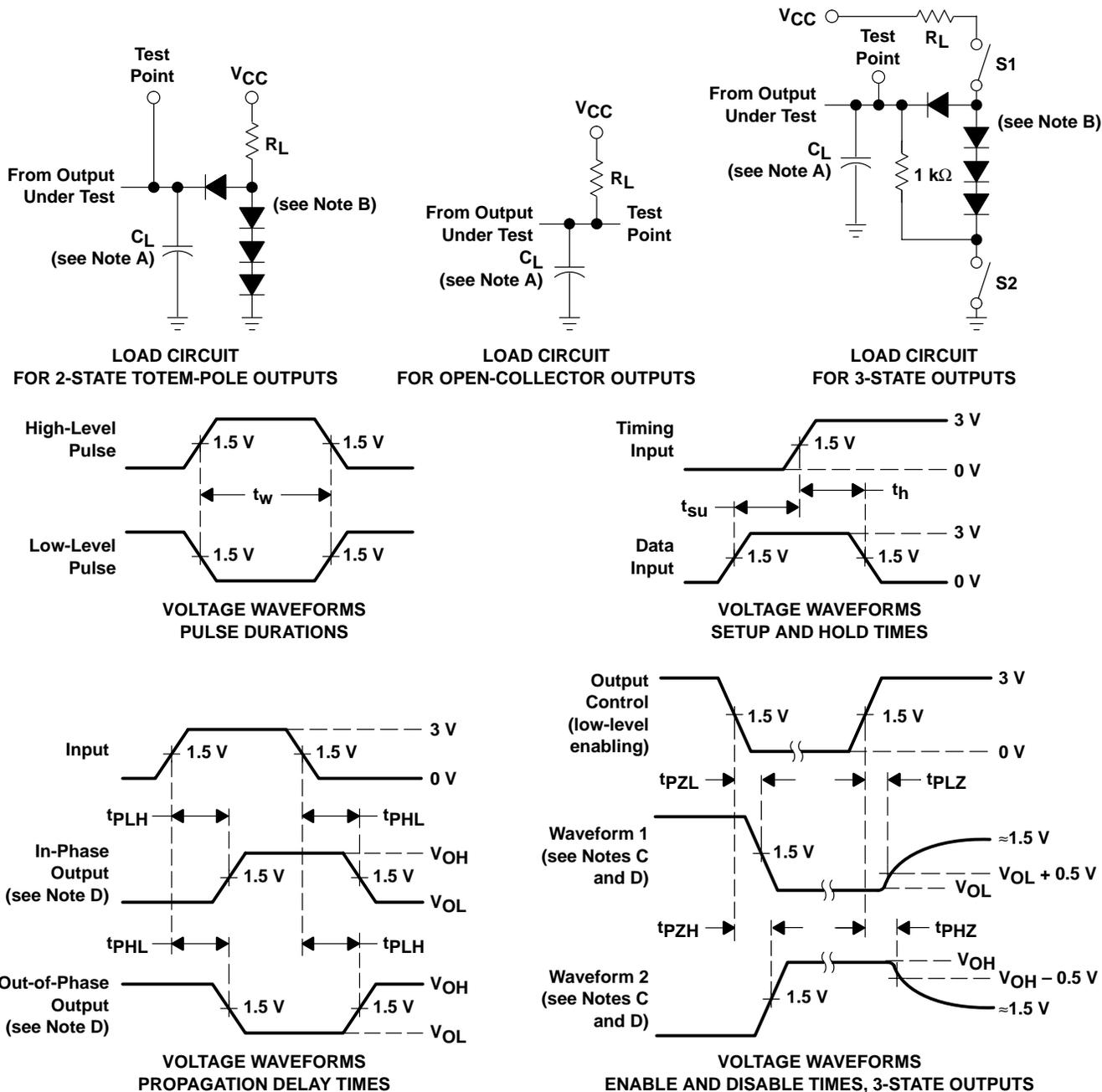




The SN54165 and SN74165 devices are obsolete and are no longer supplied.

SDLS062D – OCTOBER 1976 – REVISED FEBRUARY 2002

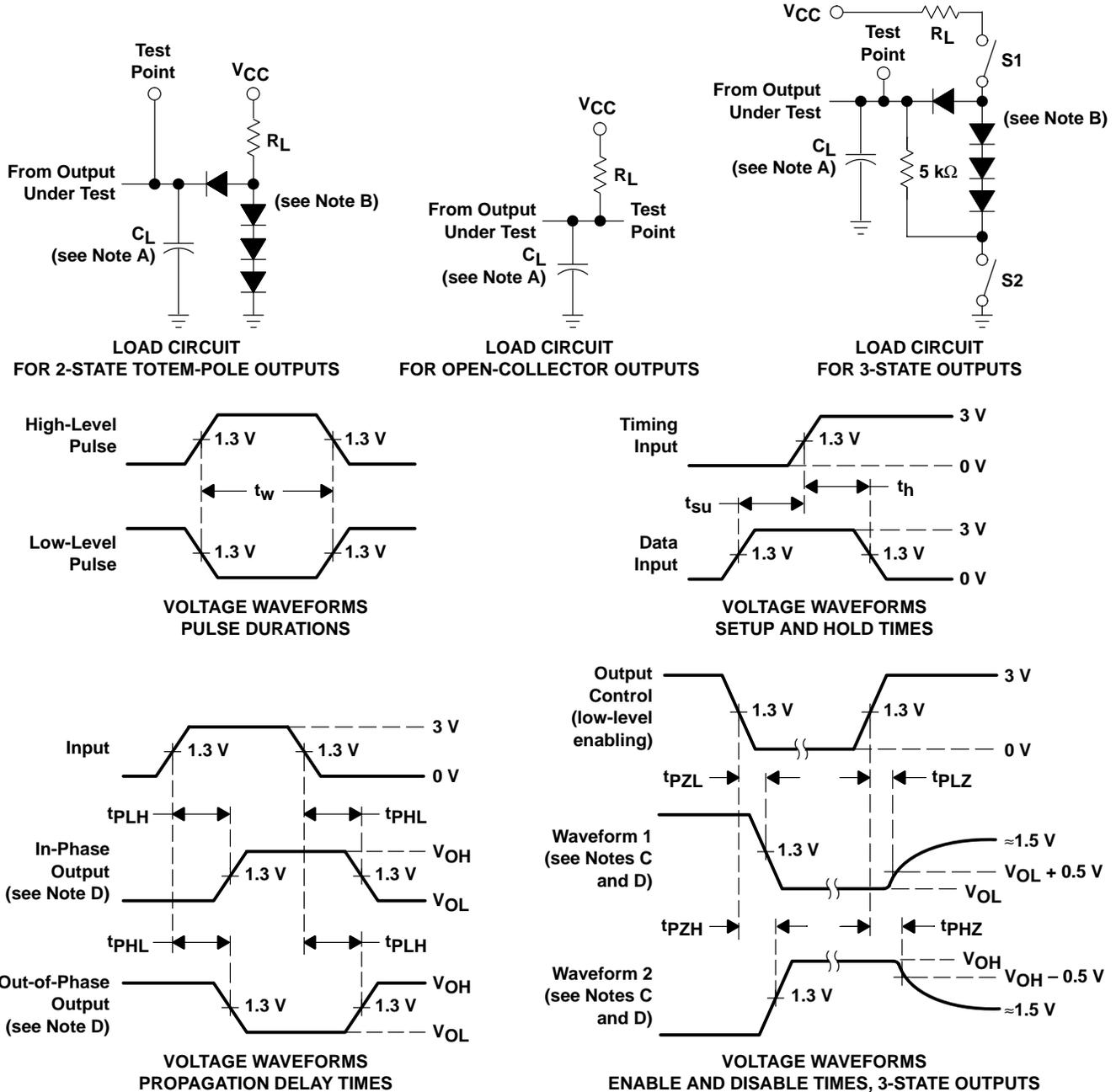
PARAMETER MEASUREMENT INFORMATION  
SERIES 54/74 DEVICES



- NOTES:
- A.  $C_L$  includes probe and jig capacitance.
  - B. All diodes are 1N3064 or equivalent.
  - C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
  - D. S1 and S2 are closed for  $t_{PLH}$ ,  $t_{PHL}$ ,  $t_{PHZ}$ , and  $t_{PLZ}$ ; S1 is open and S2 is closed for  $t_{PZH}$ ; S1 is closed and S2 is open for  $t_{PZL}$ .
  - E. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1$  MHz,  $Z_O \approx 50 \Omega$ ;  $t_r$  and  $t_f \leq 7$  ns for Series 54/74 devices and  $t_r$  and  $t_f \leq 2.5$  ns for Series 54S/74S devices.
  - F. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION  
SERIES 54LS/74LS DEVICES



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. All diodes are 1N3064 or equivalent.  
 C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.  
 D. S1 and S2 are closed for  $t_{PLH}$ ,  $t_{PHL}$ ,  $t_{PHZ}$ , and  $t_{PLZ}$ ; S1 is open and S2 is closed for  $t_{PZH}$ ; S1 is closed and S2 is open for  $t_{PZL}$ .  
 E. Phase relationships between inputs and outputs have been chosen arbitrarily for these examples.  
 F. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1$  MHz,  $Z_O \approx 50 \Omega$ ,  $t_r \leq 1.5$  ns,  $t_f \leq 2.6$  ns.  
 G. The outputs are measured one at a time with one input transition per measurement.

Figure 2. Load Circuits and Voltage Waveforms

**PACKAGING INFORMATION**

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2)            | Lead/Ball Finish | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5)             | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|----------------------------|------------------|----------------------|--------------|-------------------------------------|-------------------------|
| 5962-7700601VEA  | ACTIVE        | CDIP         | J                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | 5962-7700601VE<br>A<br>SNV54LS165AJ | <a href="#">Samples</a> |
| 5962-7700601VFA  | ACTIVE        | CFP          | W                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | 5962-7700601VF<br>A<br>SNV54LS165AW | <a href="#">Samples</a> |
| 7700601EA        | ACTIVE        | CDIP         | J                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | 7700601EA<br>SNJ54LS165AJ           | <a href="#">Samples</a> |
| 7700601FA        | ACTIVE        | CFP          | W                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | 7700601FA<br>SNJ54LS165AW           | <a href="#">Samples</a> |
| JM38510/30608B2A | ACTIVE        | LCCC         | FK                 | 20   | 1              | TBD                        | POST-PLATE       | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608B2A                | <a href="#">Samples</a> |
| JM38510/30608BEA | ACTIVE        | CDIP         | J                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608BEA                | <a href="#">Samples</a> |
| JM38510/30608BFA | ACTIVE        | CFP          | W                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608BFA                | <a href="#">Samples</a> |
| M38510/30608B2A  | ACTIVE        | LCCC         | FK                 | 20   | 1              | TBD                        | POST-PLATE       | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608B2A                | <a href="#">Samples</a> |
| M38510/30608BEA  | ACTIVE        | CDIP         | J                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608BEA                | <a href="#">Samples</a> |
| M38510/30608BFA  | ACTIVE        | CFP          | W                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | JM38510/<br>30608BFA                | <a href="#">Samples</a> |
| SN54LS165AJ      | ACTIVE        | CDIP         | J                  | 16   | 1              | TBD                        | A42              | N / A for Pkg Type   | -55 to 125   | SN54LS165AJ                         | <a href="#">Samples</a> |
| SN74165N         | OBSOLETE      | PDIP         | N                  | 16   |                | TBD                        | Call TI          | Call TI              | 0 to 70      |                                     |                         |
| SN74LS165AD      | ACTIVE        | SOIC         | D                  | 16   | 40             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                              | <a href="#">Samples</a> |
| SN74LS165ADE4    | ACTIVE        | SOIC         | D                  | 16   | 40             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                              | <a href="#">Samples</a> |
| SN74LS165ADG4    | ACTIVE        | SOIC         | D                  | 16   | 40             | Green (RoHS<br>& no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                              | <a href="#">Samples</a> |
| SN74LS165ADR     | ACTIVE        | SOIC         | D                  | 16   | 2500           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                              | <a href="#">Samples</a> |
| SN74LS165ADRE4   | ACTIVE        | SOIC         | D                  | 16   | 2500           | Green (RoHS<br>& no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                              | <a href="#">Samples</a> |

| Orderable Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)         | Lead/Ball Finish | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5)   | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|------------------|----------------------|--------------|---------------------------|-------------------------|
| SN74LS165ADRG4   | ACTIVE        | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | LS165A                    | <a href="#">Samples</a> |
| SN74LS165AJ      | OBSOLETE      | CDIP         | J               | 16   |             | TBD                     | Call TI          | Call TI              | 0 to 70      |                           |                         |
| SN74LS165AN      | ACTIVE        | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type   | 0 to 70      | SN74LS165AN               | <a href="#">Samples</a> |
| SN74LS165AN3     | OBSOLETE      | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI              | 0 to 70      |                           |                         |
| SN74LS165ANE4    | ACTIVE        | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type   | 0 to 70      | SN74LS165AN               | <a href="#">Samples</a> |
| SN74LS165ANSR    | ACTIVE        | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | 74LS165A                  | <a href="#">Samples</a> |
| SN74LS165ANSRG4  | ACTIVE        | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM   | 0 to 70      | 74LS165A                  | <a href="#">Samples</a> |
| SNJ54LS165AFK    | ACTIVE        | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type   | -55 to 125   | SNJ54LS165AFK             | <a href="#">Samples</a> |
| SNJ54LS165AJ     | ACTIVE        | CDIP         | J               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type   | -55 to 125   | 7700601EA<br>SNJ54LS165AJ | <a href="#">Samples</a> |
| SNJ54LS165AW     | ACTIVE        | CFP          | W               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type   | -55 to 125   | 7700601FA<br>SNJ54LS165AW | <a href="#">Samples</a> |

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

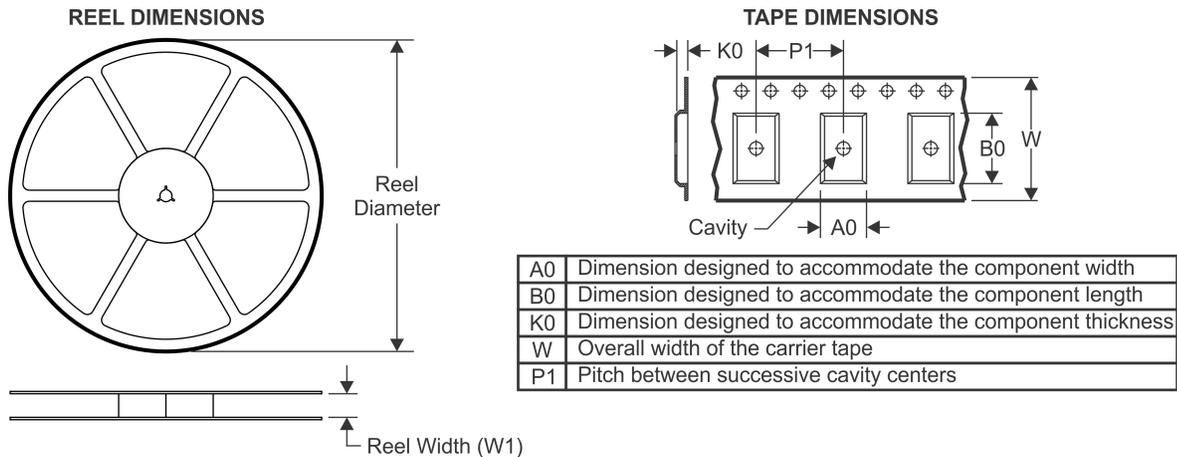
**OTHER QUALIFIED VERSIONS OF SN54LS165A, SN54LS165A-SP, SN74LS165A :**

- Catalog: [SN74LS165A](#), [SN54LS165A](#)
- Military: [SN54LS165A](#)
- Space: [SN54LS165A-SP](#)

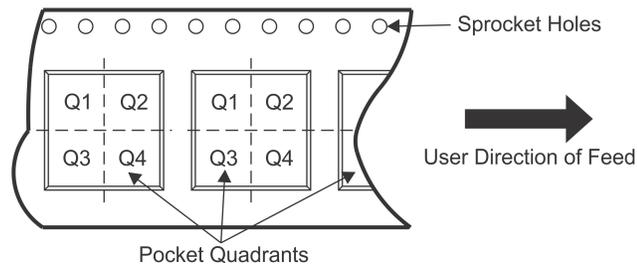
NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

## TAPE AND REEL INFORMATION



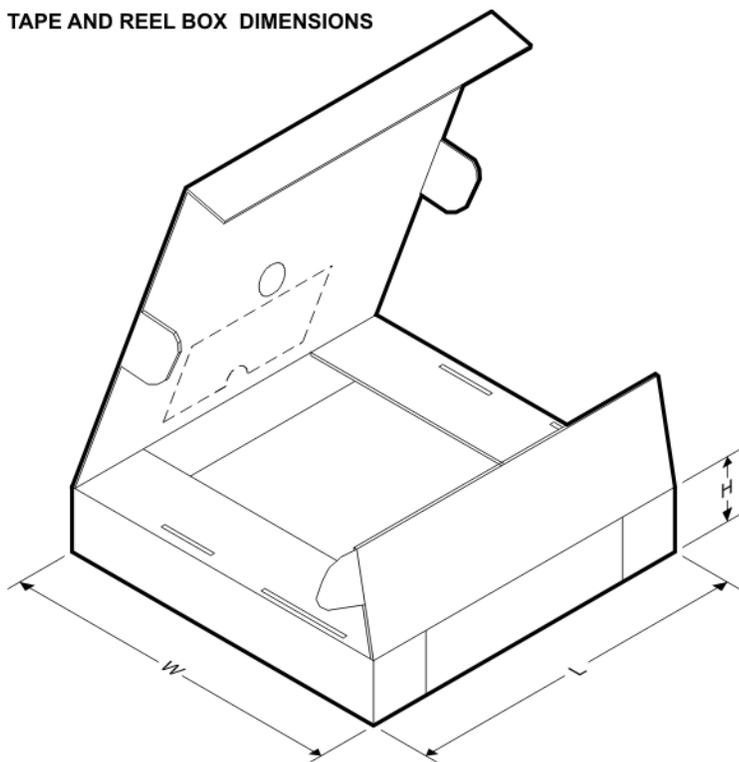
### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



\*All dimensions are nominal

| Device       | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LS165ADR | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 16.0   | Q1            |

**TAPE AND REEL BOX DIMENSIONS**



\*All dimensions are nominal

| Device       | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LS165ADR | SOIC         | D               | 16   | 2500 | 333.2       | 345.9      | 28.6        |

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

### Products

|                              |  |
|------------------------------|--|
| Audio                        | <a href="http://www.ti.com/audio">www.ti.com/audio</a>                               |
| Amplifiers                   | <a href="http://amplifier.ti.com">amplifier.ti.com</a>                               |
| Data Converters              | <a href="http://dataconverter.ti.com">dataconverter.ti.com</a>                       |
| DLP® Products                | <a href="http://www.dlp.com">www.dlp.com</a>   |
| DSP                          | <a href="http://dsp.ti.com">dsp.ti.com</a>   |
| Clocks and Timers            | <a href="http://www.ti.com/clocks">www.ti.com/clocks</a>                             |
| Interface                    | <a href="http://interface.ti.com">interface.ti.com</a>                               |
| Logic                        | <a href="http://logic.ti.com">logic.ti.com</a>                                       |
| Power Mgmt                   | <a href="http://power.ti.com">power.ti.com</a>                                       |
| Microcontrollers             | <a href="http://microcontroller.ti.com">microcontroller.ti.com</a>                   |
| RFID                         | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>                                 |
| OMAP Applications Processors | <a href="http://www.ti.com/omap">www.ti.com/omap</a>                                 |
| Wireless Connectivity        | <a href="http://www.ti.com/wirelessconnectivity">www.ti.com/wirelessconnectivity</a> |

### Applications

|                               |  |
|-------------------------------|--|
| Automotive and Transportation | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>                         |
| Communications and Telecom    | <a href="http://www.ti.com/communications">www.ti.com/communications</a>                 |
| Computers and Peripherals     | <a href="http://www.ti.com/computers">www.ti.com/computers</a>                           |
| Consumer Electronics          | <a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>                   |
| Energy and Lighting           | <a href="http://www.ti.com/energy">www.ti.com/energy</a>                                 |
| Industrial                    | <a href="http://www.ti.com/industrial">www.ti.com/industrial</a>                         |
| Medical                       | <a href="http://www.ti.com/medical">www.ti.com/medical</a>                               |
| Security                      | <a href="http://www.ti.com/security">www.ti.com/security</a>                             |
| Space, Avionics and Defense   | <a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a> |
| Video and Imaging             | <a href="http://www.ti.com/video">www.ti.com/video</a>                                   |

### TI E2E Community

[e2e.ti.com](http://e2e.ti.com)