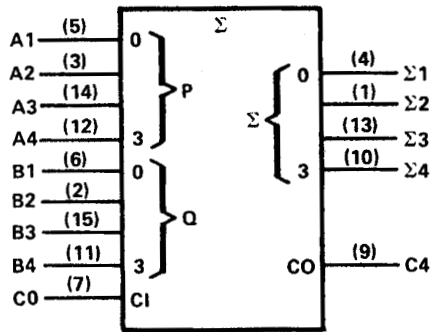




# SN54283, SN54LS283, SN54S283, SN74283, SN74LS283, SN74S283 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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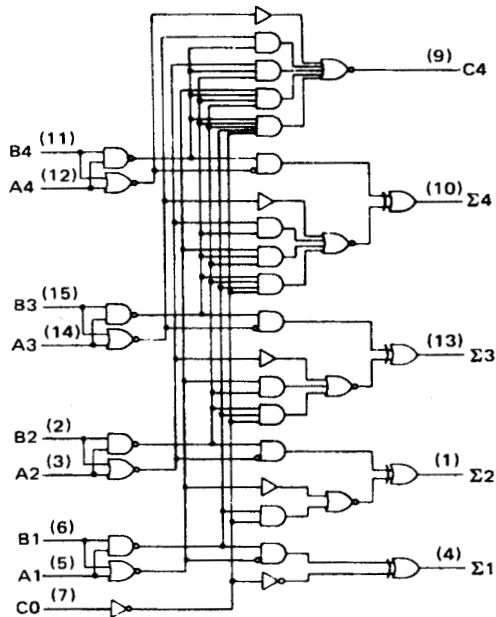
## logic symbol†



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

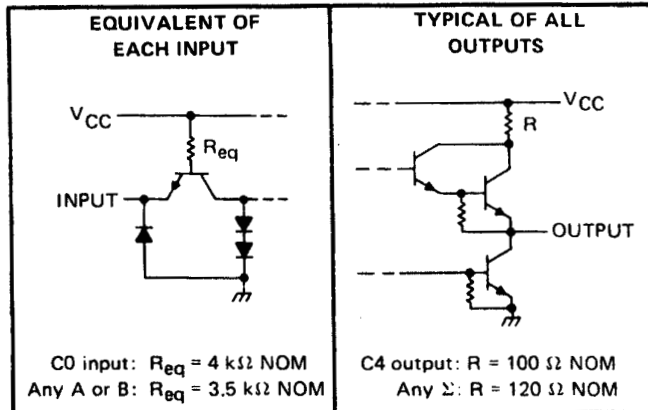
Pin numbers shown are for D, J, N, and W packages.

## logic diagram (positive logic)

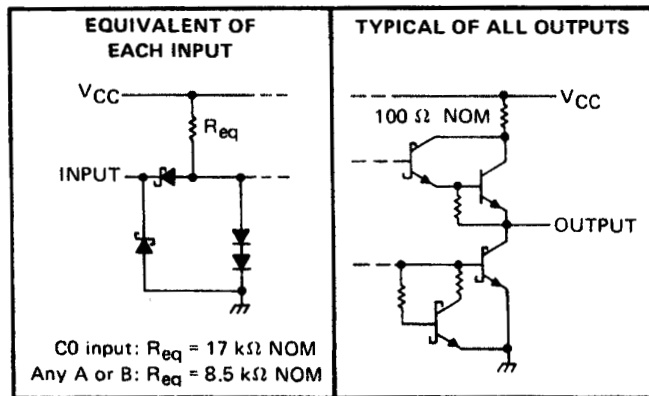


Pin numbers shown are for D, J, N, and W packages.

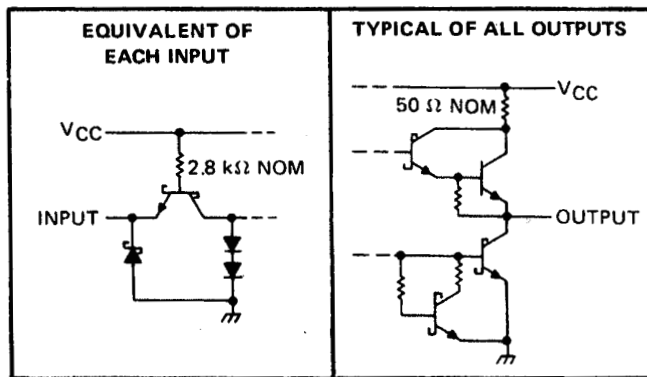
## schematics of inputs and outputs '283



## 'LS283



## 'S283



## absolute maximum ratings over operating free-air temperature (unless otherwise noted)

|  |                |
|--|----------------|
| Supply voltage, $V_{CC}$ (see Note 1)                              | 7V             |
| Input voltage: '283, 'S283   | 5.5V           |
| 'LS283   | 7V             |
| Interemitter voltage (see Note 2)                                  | 5.5V           |
| Operating free-air temperature range: SN54283, SN54LS283, SN54S283 | -55°C to 125°C |
| SN74283, SN74LS283, SN74S283                                       | 0°C to 70°C    |
| Storage temperature range  | -65°C to 150°C |

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 '283 and 'S283 only between the following pairs: A1 and B1, A2 and B2, A3 and B3, A4 and B4.

# SN54283, SN74283

## 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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### recommended operating conditions

|                                       |                      | SN54283 |     |     | SN74283 |     |      | UNIT         |
|---------------------------------------|----------------------|---------|-----|-----|---------|-----|------|--------------|
|                                       |                      | MIN     | NOM | MAX | MIN     | NOM | MAX  |              |
| Supply Voltage, $V_{CC}$              |                      | 4.5     | 5   | 5.5 | 4.75    | 5   | 5.25 | V            |
| High-level output current, $I_{OH}$   | Any output except C4 | -800    |     |     | -800    |     |      | $\mu$ A      |
|                                       | Output C4            | -400    |     |     | -400    |     |      |              |
| Low-level output current, $I_{OL}$    | Any output except C4 | 16      |     |     | 16      |     |      | mA           |
|                                       | Output C4            | 8       |     |     | 8       |     |      |              |
| Operating free-air temperature, $T_A$ |                      | -55     |     |     | 125     |     |      | $^{\circ}$ C |

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

| PARAMETER |  | TEST CONDITIONS <sup>†</sup>   | SN54283                          |                  |     | SN74283 |                  |     | UNIT    |    |
|-----------|--|--|----------------------------------|------------------|-----|---------|------------------|-----|---------|----|
|           |  |  | MIN                              | TYP <sup>‡</sup> | MAX | MIN     | TYP <sup>‡</sup> | MAX |         |    |
| $V_{IH}$  | High-level input voltage               |  | 2                                |                  |     | 2       |                  |     | V       |    |
| $V_{IL}$  | Low-level input voltage                |  | 0.8                              |                  |     | 0.8     |                  |     | V       |    |
| $V_{IK}$  | Input clamp voltage                    | $V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$  | -1.5                             |                  |     | -1.5    |                  |     | V       |    |
| $V_{OH}$  | High-level output voltage              | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = \text{MAX}$ | 2.4                              | 3.6              |     | 2.4     | 3.6              |     | V       |    |
| $V_{OL}$  | Low-level output voltage               | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = \text{MAX}$ |                                  | 0.2              | 0.4 |         | 0.2              | 0.4 | V       |    |
| $I_I$     | Input current at maximum input voltage | $V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$   | 1                                |                  |     | 1       |                  |     | mA      |    |
| $I_{IH}$  | High-level input current               | $V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$   | 40                               |                  |     | 40      |                  |     | $\mu$ A |    |
| $I_{IL}$  | Low-level input current                | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$   | -1.6                             |                  |     | -1.6    |                  |     | mA      |    |
| $I_{OS}$  | Short-circuit output current $\S$      | Any output except C4   | $V_{CC} = \text{MAX}$            |                  |     | -20     | -55              | -18 | -55     | mA |
|           |  | Output C4  | $V_{CC} = \text{MAX}$            |                  |     | -20     | -70              | -18 | -70     |    |
| $I_{CC}$  | Supply current                         | $V_{CC} = \text{MAX},$<br>Outputs open   | All B low, other inputs at 4.5 V |                  | 56  |         | 56               |     | mA      |    |
|           |  |  | All inputs at 4.5 V              |                  | 66  | 99      | 66               | 110 |         |    |

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

<sup>‡</sup> All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$ .

$\S$  Only one output should be shorted at a time.

### switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

| PARAMETER <sup>¶</sup> | FROM (INPUT)   | TO (OUTPUT)  | TEST CONDITIONS  | MIN | TYP | MAX | UNIT |
|------------------------|----------------|--------------|--|-----|-----|-----|------|
| $t_{PLH}$              | C0             | Any $\Sigma$ | $C_L = 15 \text{ pF}, R_L = 400 \Omega,$<br>See Note 3 | 14  | 21  |     | ns   |
| $t_{PHL}$              |                |              |  | 12  | 21  |     |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | $\Sigma_i$   |  | 16  | 24  |     | ns   |
| $t_{PHL}$              |                |              |  | 16  | 24  |     |      |
| $t_{PLH}$              | C0             | C4           | $C_L = 15 \text{ pF}, R_L = 780 \Omega,$<br>See Note 3 | 9   | 14  |     | ns   |
| $t_{PHL}$              |                |              |  | 11  | 16  |     |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | C4           |  | 9   | 14  |     | ns   |
| $t_{PHL}$              |                |              |  | 11  | 16  |     |      |

<sup>¶</sup>  $t_{PLH}$  = propagation delay time, low-to-high-level output

$t_{PHL}$  = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



# SN54LS283, SN74LS283

## 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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### recommended operating conditions

|                                       | SN54LS283 |     |      | SN74LS283 |     |      | UNIT         |
|---------------------------------------|-----------|-----|------|-----------|-----|------|--------------|
|                                       | MIN       | NOM | MAX  | MIN       | NOM | MAX  |              |
| Supply voltage, $V_{CC}$              | 4.5       | 5   | 5.5  | 4.75      | 5   | 5.25 | V            |
| High-level output current, $I_{OH}$   |           |     | -400 |           |     | -400 | $\mu$ A      |
| Low-level output current, $I_{OL}$    |           |     | 4    |           |     | 8    | mA           |
| Operating free-air temperature, $T_A$ | -55       |     | 125  | 0         |     | 70   | $^{\circ}$ C |

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

| PARAMETER |   | TEST CONDITIONS <sup>†</sup>  | SN54LS283                                  |                  | SN74LS283 |      | UNIT |                  |
|-----------|---|---|--|------------------|-----------|------|------|------------------|
|           |   |   | MIN  | TYP <sup>‡</sup> | MAX       | MIN  |      | TYP <sup>‡</sup> |
| $V_{IH}$  | High-level input voltage                  |   | 2  |                  | 2         |      | V    |                  |
| $V_{IL}$  | Low-level input voltage                   |   |  | 0.7              |           | 0.8  | V    |                  |
| $V_{IK}$  | Input clamp voltage                       | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$   |  | -1.5             |           | -1.5 | V    |                  |
| $V_{OH}$  | High-level output voltage                 | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}, I_{OH} = -400 \mu\text{A}$ | 2.5  | 3.4              | 2.7       | 3.4  | V    |                  |
| $V_{OL}$  | Low-level output voltage                  | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}}$                            | $I_{OL} = 4 \text{ mA}$                    | 0.25             | 0.4       | 0.25 | 0.4  | V                |
|           |   |   | $I_{OL} = 8 \text{ mA}$                    |                  |           | 0.35 | 0.5  |                  |
| $I_I$     | Input current at maximum input voltage    | Any A or B  | $V_{CC} = \text{MAX}, V_I = 7 \text{ V}$   |                  |           |      | 0.2  | 0.2              |
|           |   | C0  |  |                  |           |      |      |                  |
| $I_{IH}$  | High-level input current                  | Any A or B  | $V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$ |                  |           |      | 40   | 40               |
|           |   | C0  |  |                  |           |      |      |                  |
| $I_{IL}$  | Low-level input current                   | Any A or B  | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$ |                  |           |      | -0.8 | -0.8             |
|           |   | C0  |  |                  |           |      |      |                  |
| $I_{OS}$  | Short-circuit output current <sup>§</sup> | $V_{CC} = \text{MAX}$   | -20  | -100             | -20       | -100 | mA   |                  |
| $I_{CC}$  | Supply current                            | $V_{CC} = \text{MAX},$<br>Outputs open  | All inputs grounded                        | 22               | 39        | 22   | 39   | mA               |
|           |   |   | All B low, other inputs at 4.5 V           | 19               | 34        | 19   | 34   |                  |
|           |   |   | All inputs at 4.5 V                        | 19               | 34        | 19   | 34   |                  |

<sup>†</sup>For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

<sup>‡</sup>All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$ .

<sup>§</sup>Only one output should be shorted at a time and duration of the short-circuit should not exceed one second.

### switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

| PARAMETER <sup>¶</sup> | FROM (INPUT)   | TO (OUTPUT)  | TEST CONDITIONS                      |                            | MIN | TYP | MAX | UNIT |
|------------------------|----------------|--------------|--------------------------------------|----------------------------|-----|-----|-----|------|
| $t_{PLH}$              | C0             | Any $\Sigma$ | $C_L = 15 \text{ pF},$<br>See Note 3 | $R_L = 2 \text{ k}\Omega,$ | 16  | 24  | ns  |      |
| $t_{PHL}$              |                |              |                                      |                            | 15  | 24  |     |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | $\Sigma_j$   |                                      |                            | 15  | 24  | ns  |      |
| $t_{PHL}$              |                |              |                                      |                            | 15  | 24  |     |      |
| $t_{PLH}$              | C0             | C4           |                                      |                            | 11  | 17  | ns  |      |
| $t_{PHL}$              |                |              |                                      |                            | 11  | 22  |     |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | C4           |                                      |                            | 11  | 17  | ns  |      |
| $t_{PHL}$              |                |              |                                      |                            | 12  | 17  |     |      |

<sup>¶</sup> $t_{PLH}$  = propagation delay time, low-to-high-level output

$t_{PHL}$  = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



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# SN54S283, SN74S283

## 4-BIT BINARY FULL ADDERS WITH FAST CARRY

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### recommended operating conditions

|                                       |                      | SN54S283 |     |     | SN74S283 |     |      | UNIT    |              |
|---------------------------------------|----------------------|----------|-----|-----|----------|-----|------|---------|--------------|
|                                       |                      | MIN      | NOM | MAX | MIN      | NOM | MAX  |         |              |
| Supply voltage, $V_{CC}$              |                      | 4.5      | 5   | 5.5 | 4.75     | 5   | 5.25 | V       |              |
| High-level output current, $I_{OH}$   | Any output except C4 | -1       |     |     | -1       |     |      | mA      |              |
|                                       | Output C4            | -500     |     |     | -500     |     |      | $\mu$ A |              |
| Low-level output current, $I_{OL}$    | Any output except C4 | 20       |     |     | 20       |     |      | mA      |              |
|                                       | Output C4            | 10       |     |     | 10       |     |      |         |              |
| Operating free-air temperature, $T_A$ |                      | -55      |     |     | 0        |     |      | 70      | $^{\circ}$ C |

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

| PARAMETER |   | TEST CONDITIONS <sup>†</sup>  | MIN                              | TYP <sup>‡</sup> | MAX  | UNIT    |    |
|-----------|---|---|----------------------------------|------------------|------|---------|----|
| $V_{IH}$  | High-level input voltage                  |   | 2                                |                  |      | V       |    |
| $V_{IL}$  | Low-level input voltage                   |   |                                  |                  | 0.8  | V       |    |
| $V_{IK}$  | Input clamp voltage                       | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$   |                                  |                  | -1.2 | V       |    |
| $V_{OH}$  | High-level output voltage                 | SN54S283<br>$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V},$                                      | 2.5                              | 3.4              |      | V       |    |
|           |   | SN74S283<br>$V_{IL} = 0.8 \text{ V}, I_{OH} = \text{MAX}$                                     | 2.7                              | 3.4              |      |         |    |
| $V_{OL}$  | Low-level output voltage                  | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V},$<br>$V_{IL} = 0.8 \text{ V}, I_{OL} = \text{MAX}$ |                                  |                  | 0.5  | V       |    |
| $I_I$     | Input current at maximum input voltage    | $V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$  |                                  |                  | 1    | mA      |    |
| $I_{IH}$  | High-level input current                  | $V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$  |                                  |                  | 50   | $\mu$ A |    |
| $I_{IL}$  | Low-level input current                   | $V_{CC} = \text{MAX}, V_I = 0.5 \text{ V}$  |                                  |                  | -2   | mA      |    |
| $I_{OS}$  | Short-circuit output current <sup>§</sup> | Any output except C4<br>Output C4   | $V_{CC} = \text{MAX}$            |                  | -40  | -100    | mA |
|           |   |   |                                  |                  | -20  | -100    |    |
| $I_{CC}$  | Supply current                            | $V_{CC} = \text{MAX},$<br>Outputs open  | All B low, other inputs at 4.5 V |                  | 80   |         | mA |
|           |   |   | All inputs at 4.5 V              |                  | 95   | 160     |    |

<sup>†</sup>For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

<sup>‡</sup>All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$ .

<sup>§</sup>Only one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

### switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

| PARAMETER <sup>†</sup> | FROM (INPUT)   | TO (OUTPUT)  | TEST CONDITIONS  | MIN | TYP  | MAX | UNIT |
|------------------------|----------------|--------------|--|-----|------|-----|------|
| $t_{PLH}$              | C0             | Any $\Sigma$ | $C_L = 15 \text{ pF}, R_L = 280 \Omega,$<br>See Note 3 |     | 11   | 18  | ns   |
| $t_{PHL}$              |                |              |  |     | 12   | 18  |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | $\Sigma_i$   |  |     | 12   | 18  | ns   |
| $t_{PHL}$              |                |              |  |     | 11.5 | 18  |      |
| $t_{PLH}$              | C0             | C4           | $C_L = 15 \text{ pF}, R_L = 560 \Omega,$<br>See Note 3 |     | 6    | 11  | ns   |
| $t_{PHL}$              |                |              |  |     | 7.5  | 11  |      |
| $t_{PLH}$              | $A_i$ or $B_i$ | C4           |  |     | 7.5  | 12  | ns   |
| $t_{PHL}$              |                |              |  |     | 8.5  | 12  |      |

<sup>†</sup> $t_{PLH}$  = propagation delay time, low-to-high-level output

$t_{PHL}$  = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-7604301VEA  | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 76043012A        | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 7604301EA        | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 7604301FA        | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| JM38510/31202B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| JM38510/31202BEA | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| JM38510/31202BFA | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SN54LS283J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN54S283J        | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN74283N         | OBSOLETE              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS283D       | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283DE4     | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283DG4     | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283DR      | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283DRE4    | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283DRG4    | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283N       | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN74LS283N3      | OBSOLETE              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS283NE4     | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN74LS283NSR     | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283NSRE4   | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS283NSRG4   | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74S283D        | OBSOLETE              | SOIC         | D               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74S283N        | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN74S283N3       | OBSOLETE              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74S283NE4      | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SNJ54LS283FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ54LS283J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ54LS283W      | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type           |
| SNJ54S283FK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ54S283J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ54S283W       | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | A42              | N / A for Pkg Type           |

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(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.

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**TAPE AND REEL INFORMATION**



**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**

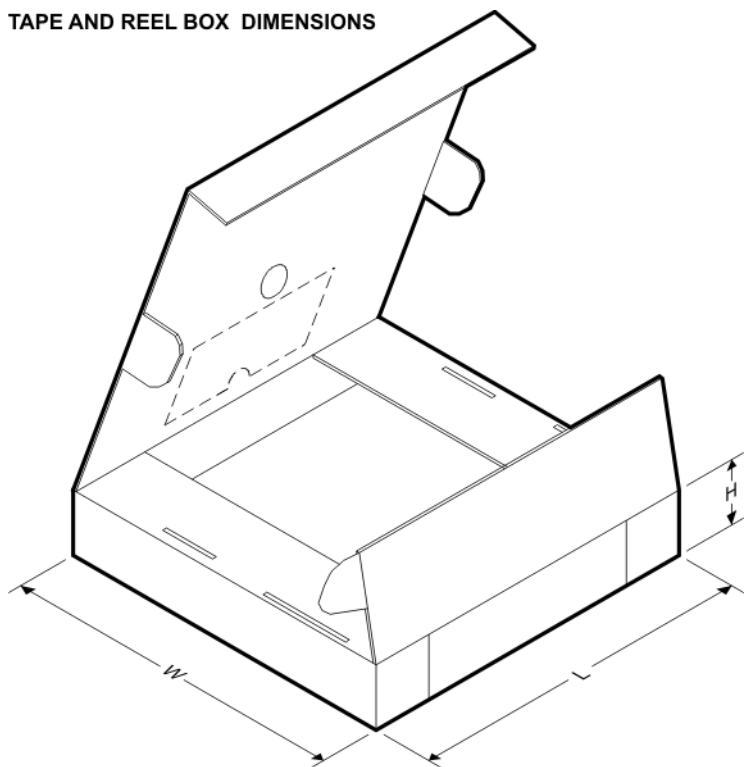


\*All dimensions are nominal

| 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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LS283DR  | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 16.0   | Q1            |
| SN74LS283NSR | SO           | NS              | 16   | 2000 | 330.0              | 16.4               | 8.2     | 10.5    | 2.5     | 12.0    | 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) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LS283DR  | SOIC         | D               | 16   | 2500 | 333.2       | 345.9      | 28.6        |
| SN74LS283NSR | SO           | NS              | 16   | 2000 | 346.0       | 346.0      | 33.0        |

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