Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs.

- Dependable Texas Instruments Quality and Reliability

description

These devices contain four independent 2-input-NOR gates.

The SN5402, SN54LS02, and SN54S02 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN7402, SN74LS02, and SN74S02 are characterized for operation from 0°C to 70°C.

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>H</td>
<td>X</td>
</tr>
<tr>
<td>X</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

**FUNCTION TABLE (each gate)**

**logic symbol†**

```
1A   1B   2A   2B   3A   3B   4A   4B
(1)  (2) (3) (4) (5) (6) (7) (8)

(1)  (2)  (3)  (4)  (5)  (6)  (7)  (8)
```

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

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

**logic diagram (positive logic)**

```
1A

1B

2A

2B

3A

3B

4A

4B

Y = A + B or Y = A + B
```

**Texas Instruments**

POST OFFICE BOX 655112 • DALLAS, TEXAS 75265
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, VCC (see Note 1) .................................................. 7 V
Input voltage: '02, 'SO2 ................................................................. 5.5 V
'LS02 .................................................. 7 V
Off-state output voltage ............................................................... 7 V
Operating free-air temperature range: SN54' ..................................... -55°C to 125°C
SN74' ................................................................. 0°C to 70°C
Storage temperature range ...................................................... -65°C to 150°C

NOTE 1. Voltage values are with respect to network ground terminal.
### Recommended Operating Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SN5402 MIN</th>
<th>SN5402 NOM</th>
<th>SN5402 MAX</th>
<th>SN7402 MIN</th>
<th>SN7402 NOM</th>
<th>SN7402 MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V$_{CC}$ Supply Voltage</td>
<td>4.6</td>
<td>5</td>
<td>5.5</td>
<td>4.75</td>
<td>5</td>
<td>5.25</td>
<td>V</td>
</tr>
<tr>
<td>V$_{IH}$ High-level input voltage</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>V$_{IL}$ Low-level input voltage</td>
<td>0.8</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I$_{OH}$ High-level output current</td>
<td>-0.4</td>
<td>-0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>I$_{OL}$ Low-level output current</td>
<td>16</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>T$_{A}$ Operating free-air temperature</td>
<td>-55</td>
<td>125</td>
<td></td>
<td>0</td>
<td>70</td>
<td></td>
<td>°C</td>
</tr>
</tbody>
</table>

### Electrical Characteristics over Recommended Operating Free-air Temperature Range (unless otherwise noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TEST CONDITIONS</th>
<th>SN5402 MIN</th>
<th>SN5402 TYP</th>
<th>SN5402 MAX</th>
<th>SN7402 MIN</th>
<th>SN7402 TYP</th>
<th>SN7402 MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V$_{IH}$</td>
<td>V$<em>{CC}$ = MIN, V$</em>{IL}$ = 0.8 V, I$_{OH}$ = 0.4 mA</td>
<td>2.4</td>
<td>3.4</td>
<td>3.4</td>
<td>2.4</td>
<td>4.0</td>
<td>4.0</td>
<td>V</td>
</tr>
<tr>
<td>I$_{IH}$</td>
<td>V$<em>{CC}$ = MAX, V$</em>{I}$ = 5.5 V</td>
<td>1</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>mA</td>
</tr>
<tr>
<td>I$_{IL}$</td>
<td>V$<em>{CC}$ = MAX, V$</em>{I}$ = 0.4 V</td>
<td>-1.6</td>
<td>-1.6</td>
<td>-1.6</td>
<td>-1.6</td>
<td>-1.6</td>
<td>-1.6</td>
<td>mA</td>
</tr>
<tr>
<td>I$_{OS}$</td>
<td>V$_{CC}$ = MAX</td>
<td>-20</td>
<td>-55</td>
<td>-18</td>
<td>-55</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>I$_{CH}$</td>
<td>V$<em>{CC}$ = MAX, V$</em>{I}$ = 0 V</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>16</td>
<td>mA</td>
</tr>
<tr>
<td>I$_{CL}$</td>
<td>V$_{CC}$ = MAX, See Note 2</td>
<td>14</td>
<td>27</td>
<td>14</td>
<td>27</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

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

‡ All typical values are at V$_{CC}$ = 5 V, I$_{A}$ = 25°C.

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

NOTE 2: One input at 4.5 V, all others at GND.

### Switching Characteristics, V$_{CC}$ = 5 V, T$_{A}$ = 25°C (see note 3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>FROM (INPUT)</th>
<th>TO (OUTPUT)</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>t$_{PLH}$</td>
<td>A or B</td>
<td>Y</td>
<td>R$<em>{L}$ = 400 Ω, C$</em>{L}$ = 16 pF</td>
<td>12</td>
<td>22</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>t$_{PHL}$</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>16</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.
**SN54LS02, SN74LS02**
**QUADRUPLE 2-INPUT POSITIVE-NOR GATES**

### Recommended Operating Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SN54LS02</th>
<th>SN74LS02</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{CC} )</td>
<td>MIN</td>
<td>NOM</td>
<td>MAX</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>4.75</td>
<td>5</td>
<td>5.25</td>
</tr>
<tr>
<td>( V_{IH} )</td>
<td>NOM</td>
<td>MAX</td>
<td>V</td>
</tr>
<tr>
<td>High-level input voltage</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>( V_{IL} )</td>
<td>NOM</td>
<td>MAX</td>
<td>V</td>
</tr>
<tr>
<td>Low-level input voltage</td>
<td>0.7</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>( I_{OH} )</td>
<td>NOM</td>
<td>MAX</td>
<td>mA</td>
</tr>
<tr>
<td>High-level output current</td>
<td>-0.4</td>
<td>-0.4</td>
<td></td>
</tr>
<tr>
<td>( I_{OL} )</td>
<td>NOM</td>
<td>MAX</td>
<td>mA</td>
</tr>
<tr>
<td>Low-level output current</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>( T_A )</td>
<td>NOM</td>
<td>MAX</td>
<td>°C</td>
</tr>
<tr>
<td>Operating free-air temperature</td>
<td>-55</td>
<td>125</td>
<td>0</td>
</tr>
</tbody>
</table>

### Electrical Characteristics Over Recommended Operating Free-Air Temperature Range (Unless Otherwise Noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TEST CONDITIONS †</th>
<th>SN54LS02</th>
<th>SN74LS02</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{IK} )</td>
<td>( V_{CC} = \text{MIN} ), ( I_I = -18 \text{ mA} )</td>
<td>-1.6</td>
<td>-1.6</td>
<td>V</td>
</tr>
<tr>
<td>( V_{OH} )</td>
<td>( V_{CC} = \text{MIN} ), ( V_{IL} = \text{MAX} ), ( I_{OH} = -0.4 \text{ mA} )</td>
<td>2.5</td>
<td>3.4</td>
<td>V</td>
</tr>
<tr>
<td>( V_{OL} )</td>
<td>( V_{CC} = \text{MIN} ), ( V_{IH} = 2 \text{ V} ), ( I_{OL} = 4 \text{ mA} )</td>
<td>0.25</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>( I_I )</td>
<td>( V_{CC} = \text{MAX} ), ( I_I = 7 \text{ V} )</td>
<td>0.1</td>
<td>0.1</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{IH} )</td>
<td>( V_{CC} = \text{MAX} ), ( V_{IH} = 2.7 \text{ V} )</td>
<td>20</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{IL} )</td>
<td>( V_{CC} = \text{MAX} ), ( V_{IL} = 0.4 \text{ V} )</td>
<td>-0.4</td>
<td>-0.4</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{OS} $</td>
<td>( V_{CC} = \text{MAX} )</td>
<td>-20</td>
<td>-100</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{CC} )</td>
<td>( V_{CC} = \text{MAX} ), ( V_{I} = 0 \text{ V} )</td>
<td>1.6</td>
<td>3.2</td>
<td>mA</td>
</tr>
<tr>
<td>( I_{CL} )</td>
<td>( V_{CC} = \text{MAX} ), See Note 2</td>
<td>2.8</td>
<td>5.4</td>
<td>mA</td>
</tr>
</tbody>
</table>

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

‡ All typical values are at \( V_{CC} = 5 \text{ V}, T_A = 25^\circ \text{C} \)

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

**NOTE 2:** One input at 4.5 V, all others at GND.

### Switching Characteristics, \( V_{CC} = 5 \text{ V}, T_A = 25^\circ \text{C} \) (See Note 3)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>FROM (INPUT)</th>
<th>TO (OUTPUT)</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t_{PLH} )</td>
<td>A or B</td>
<td>Y</td>
<td>( R_L = 7 \text{ k\Omega} ), ( C_L = 15 \text{ pF} )</td>
<td>10</td>
<td>15</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>( t_{PHL} )</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td>15</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE 3:** Load circuits and voltage waveforms are shown in Section 1.
### Recommended Operating Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SN54S02</th>
<th>SN74S02</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCC Supply voltage</td>
<td>4.5 5 5.5</td>
<td>4.75 5 6.25</td>
<td>V</td>
</tr>
<tr>
<td>V_{IH} High-level input voltage</td>
<td>2</td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>V_{IL} Low-level input voltage</td>
<td>0.8</td>
<td>0.8</td>
<td>V</td>
</tr>
<tr>
<td>I_{OH} High-level output current</td>
<td>-1</td>
<td>-1</td>
<td>mA</td>
</tr>
<tr>
<td>I_{OL} Low-level output current</td>
<td>20</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>T_A Operating free-air temperature</td>
<td>-55 125</td>
<td>0 70</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Electrical Characteristics Over Recommended Operating Free-Air Temperature Range

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions I</th>
<th>SN54S02</th>
<th>SN74S02</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{IH}</td>
<td>VCC = MIN, I_I = 8 mA</td>
<td>-1.2</td>
<td>-1.2</td>
<td>V</td>
</tr>
<tr>
<td>V_{OH}</td>
<td>VCC = MIN, V_{IL} = 0.8 V, I_{OH} = -1 mA</td>
<td>2.5 3.4</td>
<td>2.7 3.4</td>
<td>V</td>
</tr>
<tr>
<td>I_{OL}</td>
<td>VCC = MIN, V_{IH} = 2 V, I_{OL} = 20 mA</td>
<td>0.5</td>
<td>0.5</td>
<td>V</td>
</tr>
<tr>
<td>I_{I}</td>
<td>VCC = MAX, V_{I} = 55 V</td>
<td>1</td>
<td>1</td>
<td>mA</td>
</tr>
<tr>
<td>I_{IH}</td>
<td>VCC = MAX, V_{I} = 27 V</td>
<td>50</td>
<td>50</td>
<td>μA</td>
</tr>
<tr>
<td>I_{IL}</td>
<td>VCC = MAX, V_{I} = 0.5 V</td>
<td>-2</td>
<td>-2</td>
<td>mA</td>
</tr>
<tr>
<td>I{OS}</td>
<td>VCC = MAX</td>
<td>-40</td>
<td>-100</td>
<td>-100 mA</td>
</tr>
<tr>
<td>I{CH}</td>
<td>VCC = MAX, V_{I} = 0 V</td>
<td>17 29</td>
<td>17 29</td>
<td>mA</td>
</tr>
<tr>
<td>I{CL}</td>
<td>VCC = MAX, See Note 2</td>
<td>26 45</td>
<td>26 45</td>
<td>mA</td>
</tr>
</tbody>
</table>

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
2. All typical values are at VCC = 5 V, T_A = 25°C.
3. Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

### Switching Characteristics, VCC = 5 V, T_A = 25°C (See Note 3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>From (Input)</th>
<th>To (Output)</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>t_{PLH}</td>
<td>A or B</td>
<td>Y</td>
<td>R_L = 280 Ω, C_L = 15 pF</td>
<td>3.5</td>
<td>6.5</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>t_{PHL}</td>
<td></td>
<td></td>
<td></td>
<td>3.5</td>
<td>6.5</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>t_{PLH}</td>
<td></td>
<td></td>
<td>R_L = 280 Ω, C_L = 50 pF</td>
<td>5</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>t_{PHL}</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Orderable Device</th>
<th>Status (1)</th>
<th>Package Type</th>
<th>Package Drawing</th>
<th>Pins</th>
<th>Package Qty</th>
<th>Eco Plan (2)</th>
<th>Lead finish/ Ball material (3)</th>
<th>MSL Peak Temp (3)</th>
<th>Op Temp (°C)</th>
<th>Device Marking (4/5)</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>JM38510/00401BCA</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/00401BCA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/00401BDA</td>
<td>ACTIVE</td>
<td>CFP</td>
<td>W</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>Call Ti</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/00401BDA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/00401BDA</td>
<td>ACTIVE</td>
<td>CFP</td>
<td>W</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>Call Ti</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/00401BDA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/07301BCA</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/07301BCA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/07301BCA</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/07301BCA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/07301BDA</td>
<td>ACTIVE</td>
<td>CFP</td>
<td>W</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>Call Ti</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/07301BDA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/07301BDA</td>
<td>ACTIVE</td>
<td>CFP</td>
<td>W</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>Call Ti</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/07301BDA</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/30301B2A</td>
<td>ACTIVE</td>
<td>LCCC</td>
<td>FK</td>
<td>20</td>
<td>1</td>
<td>TBD</td>
<td>POST-PLATE</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/30301B2A</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/30301B2A</td>
<td>ACTIVE</td>
<td>LCCC</td>
<td>FK</td>
<td>20</td>
<td>1</td>
<td>TBD</td>
<td>POST-PLATE</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>JM38510/30301B2A</td>
<td>Samples</td>
</tr>
<tr>
<td>JM38510/30301BCA</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
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<td>Package Type</td>
<td>Package Drawing</td>
<td>Pins</td>
<td>Package Qty</td>
<td>Eco Plan (2)</td>
<td>Lead finish/ Ball material (5)</td>
<td>MSL Peak Temp (3)</td>
<td>Op Temp (°C)</td>
<td>Device Marking (4/5)</td>
<td>Samples</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>----------------</td>
<td>------</td>
<td>-------------</td>
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<td>-------------------------------</td>
<td>-----------------</td>
<td>-------------</td>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td>SNJ54S02FK</td>
<td>ACTIVE</td>
<td>LCCC</td>
<td>FK</td>
<td>20</td>
<td>1</td>
<td>TBD</td>
<td>POST-PLATE</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>SNJ54S02FK</td>
<td>Samples</td>
</tr>
<tr>
<td>SNJ54S02J</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>SNJ54S02J</td>
<td>Samples</td>
</tr>
<tr>
<td>SNJ54S02J</td>
<td>ACTIVE</td>
<td>CDIP</td>
<td>J</td>
<td>14</td>
<td>1</td>
<td>TBD</td>
<td>SNPB</td>
<td>N / A for Pkg Type</td>
<td>-55 to 125</td>
<td>SNJ54S02J</td>
<td>Samples</td>
</tr>
</tbody>
</table>

(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) RoHS: TI defines “RoHS” to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substances do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, “RoHS” products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines “RoHS Exempt” to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines “Green” to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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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 SN5402, SN54LS02, SN54LS02-SP, SN54S02, SN7402, SN74LS02, SN74S02 :

- Catalog: SN7402, SN74LS02, SN54LS02, SN74S02
- Military: SN5402, SN54LS02, SN54S02
- Space: SN54LS02-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

#### TAPE DIMENSIONS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>Dimension designed to accommodate the component width</td>
</tr>
<tr>
<td>B0</td>
<td>Dimension designed to accommodate the component length</td>
</tr>
<tr>
<td>K0</td>
<td>Dimension designed to accommodate the component thickness</td>
</tr>
<tr>
<td>W</td>
<td>Overall width of the carrier tape</td>
</tr>
<tr>
<td>P1</td>
<td>Pitch between successive cavity centers</td>
</tr>
</tbody>
</table>

#### REEL DIMENSIONS

*All dimensions are nominal*

<table>
<thead>
<tr>
<th>Device</th>
<th>Package Drawing</th>
<th>Pins</th>
<th>SPQ</th>
<th>Reel Diameter (mm)</th>
<th>Reel Width W1 (mm)</th>
<th>A0 (mm)</th>
<th>B0 (mm)</th>
<th>K0 (mm)</th>
<th>P1 (mm)</th>
<th>W (mm)</th>
<th>Pin1 Quadrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN74LS02DR</td>
<td>SOIC</td>
<td>14</td>
<td>2500</td>
<td>330.0</td>
<td>16.4</td>
<td>6.5</td>
<td>9.0</td>
<td>2.1</td>
<td>8.0</td>
<td>16.0</td>
<td>Q1</td>
</tr>
</tbody>
</table>

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Pack Materials-Page 1
### TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal*

<table>
<thead>
<tr>
<th>Device</th>
<th>Package Type</th>
<th>Package Drawing</th>
<th>Pins</th>
<th>SPQ</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN74LS02DR</td>
<td>SOIC</td>
<td>D</td>
<td>14</td>
<td>2500</td>
<td>367.0</td>
<td>367.0</td>
<td>38.0</td>
</tr>
</tbody>
</table>
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP1–F14
Images above are just a representation of the package family, actual package may vary. Refer to the product data sheet for package details.
NOTES:

1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermitically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.

⚠️ Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0.15) each side.
⚠️ Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0.43) each side.
E. Reference JEDEC MS-012 variation AB.
NOTES:  
A. All linear dimensions are in millimeters.  
B. This drawing is subject to change without notice.  
C. Publication IPC-7351 is recommended for alternate designs.  
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.  
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
**N (R-PDIP-T**)**

**PLASTIC DUAL-IN-LINE PACKAGE**

16 PINS SHOWN

**NOTES:**

A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

C. Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).

D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

**DIMENSIONS (IN INCHES) (UNIT MILLIMETERS):**

<table>
<thead>
<tr>
<th>PINS **</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>A MAX</td>
<td>0.775 (19.69)</td>
<td>0.775 (19.69)</td>
<td>0.920 (23.37)</td>
<td>1.060 (26.92)</td>
</tr>
<tr>
<td>A MIN</td>
<td>0.745 (18.92)</td>
<td>0.745 (18.92)</td>
<td>0.850 (21.59)</td>
<td>0.940 (23.88)</td>
</tr>
</tbody>
</table>

**VARIATION:**

- AA
- BB
- AC
- AD

**MECHANICAL DATA**

**Texas Instruments**

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NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. Falls within JEDEC MS-004
MECHANICAL DATA

14-PINS SHOWN

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0.15.

DIM | PINS ** | 14 | 16 | 20 | 24
--- | ------ | --- | --- | --- | ---
A MAX | 10,50 | 10,50 | 12,90 | 15,30 |
A MIN | 9,90 | 9,90 | 12,30 | 14,70 |

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