Buffer Versions of `ALS05A

Package Options Include Plastic
Small-Outline (D) Packages, Ceramic Chip
Carriers (FK), and Standard Plastic (N) and
Ceramic (J) 300-mil DIPs

description

These devices contain six independent inverting
buffers. They perform the Boolean function \( Y = \bar{A} \).
The open-collector outputs require pullup
resistors to perform correctly. These outputs can
be connected to other open-collector outputs to
implement active-low wired-OR or active-high
wired-AND functions. Open-collector devices are
often used to generate higher \( V_{OH} \) levels.

The SN54ALS1005 is characterized for operation
over the full military temperature range of \(-55^\circ C\)
to \(125^\circ C\). The SN74ALS1005 is characterized for
operation from \(0^\circ C\) to \(70^\circ C\).

FUNCTION TABLE
(each inverter)

<table>
<thead>
<tr>
<th>INPUT A</th>
<th>OUTPUT Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>L</td>
<td>H</td>
</tr>
</tbody>
</table>

logic symbol†

<table>
<thead>
<tr>
<th>1A</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>3</td>
</tr>
<tr>
<td>3A</td>
<td>5</td>
</tr>
<tr>
<td>4A</td>
<td>9</td>
</tr>
<tr>
<td>5A</td>
<td>11</td>
</tr>
<tr>
<td>6A</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1Y</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Y</td>
<td>6</td>
</tr>
<tr>
<td>3Y</td>
<td>8</td>
</tr>
<tr>
<td>4Y</td>
<td>10</td>
</tr>
<tr>
<td>5Y</td>
<td>12</td>
</tr>
<tr>
<td>6Y</td>
<td>14</td>
</tr>
</tbody>
</table>

logic diagram (positive logic)

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and
IEC Publication 617-12.
Pin numbers shown are for the D, J, and N packages.
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Nom</th>
<th>Max</th>
<th>Min</th>
<th>Nom</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, $V_{CC}$</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Input voltage, $V_I$</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Off-state output voltage</td>
<td>0.7</td>
<td></td>
<td></td>
<td>0.8</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Operating free-air temperature range, $T_A$: SN54ALS1005</td>
<td>–55°C to 125°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN74ALS1005</td>
<td>0°C to 70°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>–65°C to 150°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† 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.

recommended operating conditions

- **SN54ALS1005**
  - $V_{CC}$: Supply voltage
  - $V_{IH}$: High-level input voltage
  - $V_{IL}$: Low-level input voltage
  - $V_{OH}$: High-level output voltage
  - $I_{OL}$: Low-level output current
  - $T_A$: Operating free-air temperature

- **SN74ALS1005**
  - $V_{CC}$: Supply voltage
  - $V_{IH}$: High-level input voltage
  - $V_{IL}$: Low-level input voltage
  - $V_{OH}$: High-level output voltage
  - $I_{OL}$: Low-level output current
  - $T_A$: Operating free-air temperature

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>SN54ALS1005</th>
<th>SN74ALS1005</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{IH}$</td>
<td>$V_{CC}$ = 4.5 V, $I_I$ = –18 mA</td>
<td>MIN TYP ‡ MAX</td>
<td>MIN TYP ‡ MAX</td>
<td></td>
</tr>
<tr>
<td>$V_{OL}$</td>
<td>$V_{CC}$ = 4.5 V, $I_{OL}$ = 12 mA</td>
<td>0.25 0.4</td>
<td>0.25 0.4</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>$V_{CC}$ = 4.5 V, $I_{OL}$ = 24 mA</td>
<td>0.35 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{OH}$</td>
<td>$V_{CC}$ = 4.5 V, $V_{OH}$ = 5.5 V</td>
<td>0.1</td>
<td>0.1</td>
<td>mA</td>
</tr>
<tr>
<td>$I_I$</td>
<td>$V_{CC}$ = 5.5 V, $V_I$ = 7 V</td>
<td>0.1</td>
<td>0.1</td>
<td>mA</td>
</tr>
<tr>
<td>$I_{IH}$</td>
<td>$V_{CC}$ = 5.5 V, $V_I$ = 2.7 V</td>
<td>20</td>
<td>20</td>
<td>µA</td>
</tr>
<tr>
<td>$I_{IL}$</td>
<td>$V_{CC}$ = 5.5 V, $V_I$ = 0.4 V</td>
<td>–0.1</td>
<td>–0.1</td>
<td>mA</td>
</tr>
<tr>
<td>$I_{OL}$</td>
<td>$V_{CC}$ = 5.5 V, $V_I$ = 4.5 V</td>
<td>7.3</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>

‡ All typical values are at $V_{CC}$ = 5 V, $T_A$ = 25°C.

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

- **SN54ALS1005**
  - $V_{CC}$: Supply voltage
  - $V_{IH}$: High-level input voltage
  - $V_{IL}$: Low-level input voltage
  - $V_{OH}$: High-level output voltage
  - $I_{OL}$: Low-level output current
  - $T_A$: Operating free-air temperature

- **SN74ALS1005**
  - $V_{CC}$: Supply voltage
  - $V_{IH}$: High-level input voltage
  - $V_{IL}$: Low-level input voltage
  - $V_{OH}$: High-level output voltage
  - $I_{OL}$: Low-level output current
  - $T_A$: Operating free-air temperature

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SN54ALS1005</th>
<th>SN74ALS1005</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{PLH}$</td>
<td>$V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = MIN to MAX $</td>
<td>$</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>$I_{PHL}$</td>
<td>$V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 680 Ω, $T_A$ = MIN to MAX $</td>
<td>$</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

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

switching characteristics (see Figure 1)
PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES

LOAD CIRCUIT FOR
BI-STATE
TOTEM-POLE OUTPUTS

LOAD CIRCUIT FOR
OPEN-COLLECTOR OUTPUTS

LOAD CIRCUIT FOR
3-STATE OUTPUTS

NOTES:
A. \( C_L \) includes probe and jig capacitance.
B. 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.
C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
D. All input pulses have the following characteristics: PRR \( \leq 1 \) MHz, \( t_r = t_f = 2 \) ns, duty cycle = 50%.
E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms
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