74AC86
Quad 2-Input Exclusive-OR Gate

General Description
The AC86 contains four, 2-input exclusive-OR gates.

Features
- \( I_{CC} \) reduced by 50%
- Outputs source/sink 24 mA

Ordering Code:

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Package Number</th>
<th>Package Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>74AC86SC</td>
<td>M14A</td>
<td>14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150” Narrow Body</td>
</tr>
<tr>
<td>74AC86SJ</td>
<td>M14D</td>
<td>14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide</td>
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<tr>
<td>74AC86MTC</td>
<td>MTC14</td>
<td>14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide</td>
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<tr>
<td>74AC86PC</td>
<td>N14A</td>
<td>14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300” Wide</td>
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</tbody>
</table>

*Device also available in Tape and Reel. Specify by appending suffix letter “X” to the ordering code.

Connection Diagram

IEEE/IEC

Pin Descriptions

<table>
<thead>
<tr>
<th>Pin Names</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A_0 - A_3 )</td>
<td>Inputs</td>
</tr>
<tr>
<td>( B_0 - B_3 )</td>
<td>Inputs</td>
</tr>
<tr>
<td>( O_0 - O_3 )</td>
<td>Outputs</td>
</tr>
</tbody>
</table>
### Absolute Maximum Ratings (Note 1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage (V&lt;sub&gt;CC&lt;/sub&gt;)</td>
<td>-0.5V to +7.0V</td>
</tr>
<tr>
<td>DC Input Diode Current (I&lt;sub&gt;IO&lt;/sub&gt;)</td>
<td>50 mA</td>
</tr>
<tr>
<td>DC Output Diode Current (I&lt;sub&gt;OH&lt;/sub&gt;)</td>
<td>50 mA</td>
</tr>
<tr>
<td>DC Output Voltage (V&lt;sub&gt;O&lt;/sub&gt;)</td>
<td>+0.5V</td>
</tr>
</tbody>
</table>

### Recommended Operating Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage (V&lt;sub&gt;CC&lt;/sub&gt;)</td>
<td>2.0V to 6.0V</td>
</tr>
<tr>
<td>Input Voltage (V&lt;sub&gt;i&lt;/sub&gt;)</td>
<td>0V to V&lt;sub&gt;CC&lt;/sub&gt;</td>
</tr>
<tr>
<td>Output Voltage (V&lt;sub&gt;o&lt;/sub&gt;)</td>
<td>0V to V&lt;sub&gt;CC&lt;/sub&gt;</td>
</tr>
<tr>
<td>Operating Temperature (T&lt;sub&gt;A&lt;/sub&gt;)</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Minimum Input Edge Rate (ΔV/Δt)</td>
<td>125 mV/ns</td>
</tr>
</tbody>
</table>

### DC Electrical Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>V&lt;sub&gt;CC&lt;/sub&gt; (V)</th>
<th>V&lt;sub&gt;TH&lt;/sub&gt;</th>
<th>V&lt;sub&gt;IL&lt;/sub&gt;</th>
<th>V&lt;sub&gt;OH&lt;/sub&gt;</th>
<th>V&lt;sub&gt;OL&lt;/sub&gt;</th>
<th>I&lt;sub&gt;IN&lt;/sub&gt;</th>
<th>I&lt;sub&gt;OLD&lt;/sub&gt;</th>
<th>I&lt;sub&gt;OH&lt;/sub&gt;</th>
<th>I&lt;sub&gt;OL&lt;/sub&gt;</th>
<th>ICC</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;TH&lt;/sub&gt;</td>
<td>Minimum HIGH Level</td>
<td>3.0</td>
<td>1.5</td>
<td>0.9</td>
<td>2.9</td>
<td>0.002</td>
<td>±0.1</td>
<td>3.0</td>
<td>0.36</td>
<td>0.36</td>
<td>5.5</td>
<td>V&lt;sub&gt;OUT&lt;/sub&gt; = 0.1V</td>
</tr>
<tr>
<td></td>
<td>Input Voltage</td>
<td>4.5</td>
<td>2.25</td>
<td>1.35</td>
<td>4.4</td>
<td>0.001</td>
<td>±0.1</td>
<td>4.5</td>
<td>0.36</td>
<td>0.36</td>
<td>5.5</td>
<td>V&lt;sub&gt;OUT&lt;/sub&gt; = V&lt;sub&gt;TH&lt;/sub&gt; or V&lt;sub&gt;IL&lt;/sub&gt;</td>
</tr>
<tr>
<td></td>
<td>5.5</td>
<td>2.75</td>
<td>1.65</td>
<td>5.4</td>
<td>0.001</td>
<td>±0.1</td>
<td>5.5</td>
<td>0.36</td>
<td>0.36</td>
<td>5.5</td>
<td>I&lt;sub&gt;OUT&lt;/sub&gt; = 50 µA</td>
<td></td>
</tr>
<tr>
<td>V&lt;sub&gt;IL&lt;/sub&gt;</td>
<td>Maximum LOW Level</td>
<td>3.0</td>
<td>1.5</td>
<td>0.9</td>
<td>2.9</td>
<td>0.002</td>
<td>±0.1</td>
<td>3.0</td>
<td>0.36</td>
<td>0.36</td>
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<td>±0.1</td>
<td>5.5</td>
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<td>0.36</td>
<td>5.5</td>
<td>I&lt;sub&gt;OUT&lt;/sub&gt; = 50 µA</td>
<td></td>
</tr>
<tr>
<td>V&lt;sub&gt;OL&lt;/sub&gt;</td>
<td>Maximum LOW Level</td>
<td>3.0</td>
<td>1.5</td>
<td>0.9</td>
<td>2.9</td>
<td>0.002</td>
<td>±0.1</td>
<td>3.0</td>
<td>0.36</td>
<td>0.36</td>
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<td>0.36</td>
<td>5.5</td>
<td>I&lt;sub&gt;OUT&lt;/sub&gt; = 50 µA</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

Note 2: All outputs loaded; thresholds on input associated with output under test.

Note 3: Maximum test duration 20 ms, one output loaded at a time.

Note 4: I<sub>IN</sub> and I<sub>CC</sub> at 3.0V are guaranteed to be less than or equal to the respective limit at 5.5V V<sub>CC</sub>.
### AC Electrical Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>$V_{CC}$ (V)</th>
<th>$T_{A} = +25°C$</th>
<th>$T_{A} = -40°C$ to $-85°C$</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$V_{CC}$</td>
<td>$C_{L} = 50$ pF</td>
<td>$C_{L} = 40$ pF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>$\tau_{PHL}$</td>
<td>Propagation Delay</td>
<td>3.3</td>
<td>2.0</td>
<td>6.0</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Inputs to Outputs</td>
<td>5.0</td>
<td>1.5</td>
<td>4.5</td>
<td>8.5</td>
</tr>
<tr>
<td>$\tau_{NPH}$</td>
<td>Propagation Delay</td>
<td>3.3</td>
<td>2.0</td>
<td>6.5</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Inputs to Outputs</td>
<td>5.0</td>
<td>1.5</td>
<td>4.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>

**Note 5:** Voltage Range $3.3V$ is $3.3V \pm 0.3V$
Voltage Range $5.0V$ is $5.0V \pm 0.5V$

### Capacitance

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Typ</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C_{IN}$</td>
<td>Input Capacitance</td>
<td>4.5</td>
<td>pF</td>
<td>$V_{CC} = \text{OPEN}$</td>
</tr>
<tr>
<td>$C_{PD}$</td>
<td>Power Dissipation Capacitance</td>
<td>35</td>
<td>pF</td>
<td>$V_{CC} = 5.0V$</td>
</tr>
</tbody>
</table>
Physical Dimensions inches (millimeters) unless otherwise noted

14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150” Narrow Body
Package Number M14A
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D

NOTES:
A. CONFORMS TO EIAJ ED1-2220 REGISTRATION,
  ESTABLISHED IN DECEMBER, 1980.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD
  FLASH, AND TIE BAR EXTRUSIONS.
M14DrEvB1

DIMENSIONS ARE IN MILLIMETERS

LAND PATTERN RECOMMENDATION

SEE DETAIL A

DETAIL A
Physical Dimensions  inches (millimeters) unless otherwise noted (Continued)

14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC14
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

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