The uA9639C is a dual differential line receiver designed to meet ANSI Standards EIA/TIA-422-B and EIA/TIA-423-B and ITU Recommendations V.10 and V.11. It utilizes Schottky circuitry and has TTL-compatible outputs. The inputs are compatible with either a single-ended or a differential-line system. This device operates from a single 5-V power supply and is supplied in an 8-pin, dual-in-line package.

The uA9639C is characterized for operation from 0°C to 70°C.

logic symbol†

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

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

Supply voltage range, $V_{CC}$ (see Note 1) .................................................... $-0.5$ V to 7 V
Input voltage, $V_I$ ................................................................. $\pm 15$ V
Differential input voltage, $V_{ID}$ (see Note 2) ................................................................. $\pm 15$ V
Output voltage range, $V_O$ (see Note 1) .................................................... $-0.5$ V to 5.5 V
Low-level output current, $I_{OL}$ ................................................................. 50 mA
Operating free-air temperature range, $T_A$ .................................................... 0°C to 70°C
Storage temperature range, $T_{stg}$ ................................................................. $-65$°C to 150°C
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds .................................... 260°C

† 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. All voltage values, except differential input voltage, are with respect to the network ground terminal.
2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.

Dissipation rating table

<table>
<thead>
<tr>
<th>PACKAGE</th>
<th>$T_A \leq 25$°C POWER RATING</th>
<th>OPERATING FACTOR ABOVE $T_A = 25$°C</th>
<th>$T_A = 70$°C POWER RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>1000 mW</td>
<td>8.0 mW/°C</td>
<td>640 mW</td>
</tr>
</tbody>
</table>
**recommended operating conditions**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>NOM</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, $V_{CC}$</td>
<td>4.75</td>
<td>5</td>
<td>5.25</td>
<td>V</td>
</tr>
<tr>
<td>Common-mode input voltage, $V_{IC}$</td>
<td>±7 V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating free-air temperature, $T_A$</td>
<td>0</td>
<td>70</td>
<td></td>
<td>°C</td>
</tr>
</tbody>
</table>

**electrical characteristics over recommended ranges of supply voltage, common-mode input voltage, and operating free-air temperature (unless otherwise noted)**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP†</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{IT+}$ Positive-going input threshold voltage</td>
<td>See Note 3</td>
<td>0.2</td>
<td>0.4</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$V_{IT−}$ Negative-going input threshold voltage</td>
<td>See Note 3</td>
<td>−0.2</td>
<td></td>
<td>−0.4‡</td>
<td>V</td>
</tr>
<tr>
<td>$V_{HY}$ Hysteresis voltage ($V_{IT+−}−V_{IT−}$)</td>
<td></td>
<td>70</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>$V_{OH}$ High-level output voltage</td>
<td>$V_{ID} = 0.2$ V, $I_O = −1$ mA</td>
<td>2.5</td>
<td>3.5</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$V_{OL}$ Low-level output voltage</td>
<td>$V_{ID} = −0.2$ V, $I_O = 20$ mA</td>
<td>0.35</td>
<td>0.5</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$I_I$ Input current</td>
<td>$V_CC = 0$ to 5.5$ V$, $V_I = 10$ V, $V_{ID} = −10$ V</td>
<td>1.1</td>
<td>3.25</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>$I_{OS}$ Short-circuit output current§</td>
<td>$V_O = 0$, $V_{ID} = 0.2$ V</td>
<td>−40</td>
<td>−75</td>
<td>−100</td>
<td>mA</td>
</tr>
<tr>
<td>$I_{CC}$ Supply current</td>
<td>$V_{ID} = −0.5$ V, No load</td>
<td>35</td>
<td>50</td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°C$.
‡ The algebraic convention, in which the less positive (more negative) limit is designated as minimum, is used in this data sheet for threshold levels only.
§ Only one output should be shorted at a time, and duration of the short circuit should not exceed one second.

**NOTES:**

3. The expanded threshold parameter is tested with a 500-Ω resistor in series with each input.
4. The input not under test is grounded.

**switching characteristics, $V_{CC} = 5$ V, $T_A = 0°C$ to 70°C**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{PLH}$ Propagation delay time, low- to high-level output</td>
<td>$C_L = 50$ pF, See Figure 1</td>
<td>85</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>$I_{PHL}$ Propagation delay time, high- to low-level output</td>
<td></td>
<td>85</td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>
PARAMETER MEASUREMENT INFORMATION

TEST CIRCUIT

VCC+
Input
51 Ω

C_L
(see Note A)

392 Ω

VCC+
Output

3.92 kΩ

NOTES:
A. C_L includes probe and jig capacitance.
B. The input pulse is supplied by a generator having the following characteristics: t_r ≤ 5 ns, t_f ≤ 5 ns, PRR ≤ 5 MHz, duty cycle = 50%.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

OUTPUT VOLTAGE
V_O – Output Voltage – V
V CC = 4.75 V
T A = 25°C

V ID – Differential Input Voltage – mV
0
100
0
1
2
3
4

V IC = 0
V IC = ±7 V

OUTPUT VOLTAGE
V_O – Output Voltage – V
V CC = 5.25 V
T A = 25°C

V ID – Differential Input Voltage – mV
0
100
0
1
2
3
4

V IC = 0
V IC = ±7 V

Figure 2

Figure 3
TYPICAL CHARACTERISTICS

HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT

\[ V_{OH} = 5 \text{ V} \]
\[ V_{ID} = 0.2 \text{ V} \]
\[ T_A = 25^\circ \text{C} \]

Figure 4

LOW-LEVEL OUTPUT VOLTAGE vs LOW-LEVEL OUTPUT CURRENT

\[ V_{OL} = 5 \text{ V} \]
\[ V_{ID} = -0.2 \text{ V} \]
\[ T_A = 25^\circ \text{C} \]

Figure 5

SUPPLY CURRENT vs SUPPLY VOLTAGE

\[ I_{CC} = \text{Supply Current} = \text{mA} \]
\[ V_{CC} = \text{Supply Voltage} = \text{V} \]

No Load
Inputs Open
\[ T_A = 25^\circ \text{C} \]

Figure 6
APPLICATION INFORMATION

Figure 7. EIA/TIA-422-B System Applications
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