9-BIT PARITY GENERATOR/CHECKER

- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- QUIESCENT CURRENT SPECIFIED AT 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TEN-TATIVE STANDARD N° 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

DESCRIPTION

The HCC40101B (extended temperature range) and HCF40101B (intermediate temperature range) are monolithic integrated circuits, available in 14-lead dual in-line plastic or ceramic package and plastic micro package.

The HCC/HCF40101B is a 9-bit (8 data bits plus 1 parity bit) parity generator/checker. It may be used to detect errors in data transmission or data retrieval. Odd and even outputs facilitate odd or even parity generation and checking. When used as a parity generator, a parity bit is supplied along with the data to generate an even or odd parity output. When used as a parity checker, the received data bits and parity bits are compared for correct parity. The even or odd outputs are used to indicate an error in the received data. Word-length capability is expandable by cascading. The HCC/HCF40101B is also provided with an inhibit control. If the inhibit control is set at logical "1", the even and odd outputs go to a logical "0".
### ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter Description</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{DD}^* )</td>
<td>Supply Voltage: <strong>HCC</strong> Types</td>
<td>– 0.5 to + 20</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Supply Voltage: <strong>HCF</strong> Types</td>
<td>– 0.5 to + 18</td>
<td>V</td>
</tr>
<tr>
<td>( V_i )</td>
<td>Input Voltage</td>
<td>– 0.5 to ( V_{DD} ) + 0.5</td>
<td>V</td>
</tr>
<tr>
<td>( I_i )</td>
<td>DC Input Current (any one input)</td>
<td>± 10</td>
<td>mA</td>
</tr>
<tr>
<td>( P_{tot} )</td>
<td>Total Power Dissipation (per package)</td>
<td>200</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>Dissipation per Output Transistor</td>
<td>100</td>
<td>mW</td>
</tr>
<tr>
<td></td>
<td>for ( T_{op} ): Full Package-temperature Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( T_{op} )</td>
<td>Operating Temperature: <strong>HCC</strong> Types</td>
<td>– 55 to + 125</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Operating Temperature: <strong>HCF</strong> Types</td>
<td>– 40 to + 85</td>
<td>°C</td>
</tr>
<tr>
<td>( T_{stg} )</td>
<td>Storage Temperature</td>
<td>– 65 to + 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for external periods may affect device reliability.

* All voltages are with respect to \( V_{SS} \) (GND).

### RECOMMENDED OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter Description</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{DD} )</td>
<td>Supply Voltage: <strong>HCC</strong> Types</td>
<td>3 to 18</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Supply Voltage: <strong>HCF</strong> Types</td>
<td>3 to 15</td>
<td>V</td>
</tr>
<tr>
<td>( V_i )</td>
<td>Input Voltage</td>
<td>0 to ( V_{DD} )</td>
<td>V</td>
</tr>
<tr>
<td>( T_{op} )</td>
<td>Operating Temperature: <strong>HCC</strong> Types</td>
<td>– 55 to + 125</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Operating Temperature: <strong>HCF</strong> Types</td>
<td>– 40 to + 85</td>
<td>°C</td>
</tr>
</tbody>
</table>
LOGIC DIAGRAM

TRUTH TABLE

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
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<tbody>
<tr>
<td>D1-D9</td>
<td>Inhibit</td>
</tr>
<tr>
<td>Σ 1's = Even</td>
<td>0</td>
</tr>
<tr>
<td>Σ 1's = Odd</td>
<td>0</td>
</tr>
<tr>
<td>X</td>
<td>1</td>
</tr>
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</table>

X = Don't Care
Logic 1 = High
Logic 0 = Low.
## STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$V_I$ (V)</td>
<td>$V_O$ (V)</td>
<td>$I_O$ (µA)</td>
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<tr>
<td>$I_L$</td>
<td>Quiescent Current</td>
<td>HCC Types</td>
<td>0/5</td>
<td>5</td>
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<td></td>
<td></td>
<td>0/10</td>
<td>10</td>
<td>10</td>
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<td></td>
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<td>0/15</td>
<td>15</td>
<td>20</td>
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<td></td>
<td>0/20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HCF Types</td>
<td>0/5</td>
<td>5</td>
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<td>0/10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>15</td>
<td>80</td>
</tr>
<tr>
<td>$V_{OH}$</td>
<td>Output High Voltage</td>
<td>0/5</td>
<td>&lt;1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/10</td>
<td>&lt;1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>&lt;1</td>
<td>15</td>
</tr>
<tr>
<td>$V_{OL}$</td>
<td>Output Low Voltage</td>
<td>5/0</td>
<td>&lt;1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10/0</td>
<td>&lt;1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15/0</td>
<td>&lt;1</td>
<td>15</td>
</tr>
<tr>
<td>$V_{IH}$</td>
<td>Input High Voltage</td>
<td>0.5/4.5</td>
<td>&lt;1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/9</td>
<td>&lt;1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5/13.5</td>
<td>&lt;1</td>
<td>15</td>
</tr>
<tr>
<td>$V_{IL}$</td>
<td>Input Low Voltage</td>
<td>4.5/0.5</td>
<td>&lt;1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9/1</td>
<td>&lt;1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.5/1.5</td>
<td>&lt;1</td>
<td>15</td>
</tr>
<tr>
<td>$I_{OH}$</td>
<td>Output Drive Current</td>
<td>HCC Types</td>
<td>0/5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/10</td>
<td>4.6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>9.5</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td>HCF Types</td>
<td>0/5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/10</td>
<td>4.6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>9.5</td>
<td>10</td>
</tr>
<tr>
<td>$I_{OL}$</td>
<td>Output Sink Current</td>
<td>HCC Types</td>
<td>0/5</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/10</td>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>1.5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HCF Types</td>
<td>0/5</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
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<td>0/10</td>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>1.5</td>
<td>15</td>
</tr>
<tr>
<td>$I_{IH}$, $I_{IL}$</td>
<td>Input Leakage Current</td>
<td>HCC Types</td>
<td>0/18</td>
<td>Any Input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0/15</td>
<td>15</td>
<td>±0.3</td>
</tr>
<tr>
<td>$C_I$</td>
<td>Input Capacitance</td>
<td>Any Input</td>
<td>5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

* $T_{Low} = -55^\circ$C for HCC device : -40$^\circ$C for HCF device.

* $T_{High} = +125^\circ$C for HCC device : +85$^\circ$C for HCF device.

The Noise Margin for both "1" and "0" level is : 1V min. with $V_{DD} = 5V$, 2V min. with $V_{DD} = 10V$, 2.5V min. with $V_{DD} = 15V$. 

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4/11
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50pF, R_L = 200kΩ, typical temperature coefficient for all V_{DD} values is 0.3%/°C, all input rise and fall time = 20ns)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>V_{DD} (V)</td>
<td>Min.</td>
<td>Typ.</td>
</tr>
<tr>
<td>t_{PLH},</td>
<td>Propagation Delay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_{PHL}</td>
<td>Time</td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td></td>
<td>5</td>
<td>350</td>
<td>700</td>
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<td>10</td>
<td>150</td>
<td>300</td>
</tr>
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<td></td>
<td></td>
<td>15</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>t_{PHL},</td>
<td>Propagation Delay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t_{PHL}</td>
<td>Time, Inhibit to</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>140</td>
<td>280</td>
</tr>
<tr>
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<td>140</td>
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<tr>
<td></td>
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<td>15</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>t_{THL},</td>
<td>Transition Time</td>
<td></td>
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<td>t_{THL}</td>
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<td>5</td>
<td>100</td>
<td>200</td>
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<td></td>
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<td>100</td>
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<td></td>
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<td>15</td>
<td>40</td>
<td>80</td>
</tr>
</tbody>
</table>

Output Low (sink) Current Characteristics.

Output High (source) Current Characteristics.

Typical Propagation Delay Time vs. Load Capacitance.

Typical Transition Time vs. Load Capacitance.
Typical Dynamic power Dissipation vs. Input Frequency.

TEST CIRCUITS

Quiescent Device Current

Input Voltage.

Input Leakage Current.

Dynamic Power Dissipation.
## Plastic DIP14 MECHANICAL DATA

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<th>mm</th>
<th>inch</th>
</tr>
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<tbody>
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<td>MIN.</td>
<td>TYP.</td>
</tr>
<tr>
<td>a1</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1.39</td>
<td>1.65</td>
</tr>
<tr>
<td>b</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>b1</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>E</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>2.54</td>
<td></td>
</tr>
<tr>
<td>e3</td>
<td>15.24</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>7.1</td>
</tr>
<tr>
<td>I</td>
<td>5.1</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>3.3</td>
<td></td>
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<td>Z</td>
<td>1.27</td>
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# Ceramic DIP14/1 MECHANICAL DATA

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<td>MIN.</td>
<td>TYP.</td>
</tr>
<tr>
<td>A</td>
<td>20</td>
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<tr>
<td>B</td>
<td>7.0</td>
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<tr>
<td>D</td>
<td>3.3</td>
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<td>e3</td>
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<td>2.79</td>
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<tr>
<td>G</td>
<td>0.4</td>
<td>0.55</td>
</tr>
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<td>H</td>
<td>1.17</td>
<td>1.52</td>
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<td>L</td>
<td>0.22</td>
<td>0.31</td>
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<td>M</td>
<td>1.52</td>
<td>2.54</td>
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<tr>
<td>N</td>
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<td>10.3</td>
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<td>P</td>
<td>7.8</td>
<td>8.05</td>
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### SO14 MECHANICAL DATA

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<tbody>
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<td>TYP.</td>
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<td>1.75</td>
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<tr>
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<tr>
<td>C</td>
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</tr>
<tr>
<td>c1</td>
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<td>45° (typ.)</td>
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<td>6.2</td>
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<tr>
<td>e</td>
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<tr>
<td>e3</td>
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<td>G</td>
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<td>5.3</td>
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<tr>
<td>L</td>
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<td>1.27</td>
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<tr>
<td>M</td>
<td>0.68</td>
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<tr>
<td>S</td>
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<td>8° (max.)</td>
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![Diagram of SO14 package](P013G)
### PLCC20 MECHANICAL DATA

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<tbody>
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<td><strong>MIN.</strong></td>
<td><strong>TYP.</strong></td>
<td><strong>MAX.</strong></td>
<td><strong>MIN.</strong></td>
<td><strong>TYP.</strong></td>
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<td>0.395</td>
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<td>9.04</td>
<td>0.350</td>
<td>0.356</td>
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<td>0.165</td>
<td>0.180</td>
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<td>d1</td>
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<td>2.54</td>
<td>0.100</td>
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<tr>
<td>d2</td>
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<td>G</td>
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<td>0.004</td>
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<tr>
<td>M1</td>
<td>1.14</td>
<td>0.045</td>
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</tbody>
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---

**Diagram:**

- A
- B
- D
- d1
- d2
- e
- e3
- F
- G (Seating Plane Coplanarity)
- M
- M1

---

*SGS-THOMSON Microelectronics*