SINGLE-CHANNEL HIGH-SPEED MOSFET DRIVER

■ DESCRIPTION

The UTC US2829 is a single-channel high-speed MOS-FET driver. The device is fabricated by use of BICMOS outputs to achieve high switching speed. The outputs are capable of delivering peak currents up to 2A into capacitive loads.

■ FEATURES

* Low-cost single-channel high-speed MOSFET driver
* 2A peak output current
* 25ns max rise/fall times and 40ns max propagation delay, 1nF load
* Low power dissipation: ICC=15μA(Max) @ Ta=25°C
* Broad VCC operating range: 4V to 14V

■ ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Ordering Number</th>
<th>Package</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Free</td>
<td>Halogen Free</td>
<td></td>
</tr>
<tr>
<td>US2829L-AF5-R</td>
<td>US2829G-AF5-R</td>
<td>SOT-25</td>
</tr>
</tbody>
</table>

US2829L-AF5-R

(1) Packing Type
(2) Package Type
(3) Lead Free

(1) R: Tape Reel
(2) AF5: SOT-25
(3) H: Halogen Free, L: Lead Free

■ MARKING

US2829

1 2 3 4 5

L: Lead Free
G: Halogen Free
### PIN CONFIGURATION

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>PIN NAME</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
<td>Not connected</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>Ground Connection</td>
</tr>
<tr>
<td>3</td>
<td>IN</td>
<td>Driver input</td>
</tr>
<tr>
<td>4</td>
<td>OUT</td>
<td>Driver output, OUT = IN</td>
</tr>
<tr>
<td>5</td>
<td>Vcc</td>
<td>Driver supply voltage/regulator output voltage</td>
</tr>
</tbody>
</table>

### FUNCTION TABLE

<table>
<thead>
<tr>
<th>INPUT(IN)</th>
<th>OUTPUT(OUT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

H: High Level  
L: Low Level

### LOGIC DIAGRAM

![Logic Diagram](attachment:logic_diagram.png)
### ABSOLUTE MAXIMUM RATING

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>RATINGS</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>( V_{CC} )</td>
<td>-0.3 ~ +15 V</td>
<td>V</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>( V_{IN} )</td>
<td>-0.3 ~ ( V_{CC} ) +0.5 V</td>
<td>V</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>( V_{OUT} )</td>
<td>-0.5 ~ ( V_{CC} ) +0.5 V</td>
<td>V</td>
</tr>
<tr>
<td>Continuous Output Current</td>
<td>( I_{OUT} )</td>
<td>±100 mA</td>
<td>mA</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>( P_D )</td>
<td>437 mW</td>
<td>mW</td>
</tr>
<tr>
<td>Derated Above 25°C</td>
<td></td>
<td>3.5 mW/°C</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>( T_{OPR} )</td>
<td>-40 ~ +125 °C</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>( T_{STG} )</td>
<td>-65 ~ +150 °C</td>
<td>°C</td>
</tr>
</tbody>
</table>

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### RECOMMENDED OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>( V_{CC} )</td>
<td>4</td>
<td>14</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input Voltage</td>
<td>( V_{IN} )</td>
<td>-0.3</td>
<td>( V_{CC} )</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>( T_{OPR} )</td>
<td>-40</td>
<td>125</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

### ELECTRICAL CHARACTERISTICS (\( Ta=25°C \), unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Level Output Voltage</td>
<td>( V_{OH} )</td>
<td>( V_{CC}=10\text{V}, I_{OH}=-1\text{mA} )</td>
<td>9.75</td>
<td>9.9</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=10\text{V}, I_{OH}=-100\text{mA} )</td>
<td>8</td>
<td>9.1</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Low-Level Output Voltage</td>
<td>( V_{OL} )</td>
<td>( V_{CC}=10\text{V}, I_{OL}=1\text{mA} )</td>
<td>0.18</td>
<td>0.25</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=10\text{V}, I_{OL}=100\text{mA} )</td>
<td>1</td>
<td>2</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Positive-going input threshold voltage</td>
<td>( V_{T+} )</td>
<td>( V_{CC}=5\text{V} )</td>
<td>3.3</td>
<td>4</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=10\text{V} )</td>
<td>6.6</td>
<td>7</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=14\text{V} )</td>
<td>9.3</td>
<td>10</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Negative-going input threshold voltage</td>
<td>( V_{T-} )</td>
<td>( V_{CC}=5\text{V} )</td>
<td>1</td>
<td>1.7</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=10\text{V} )</td>
<td>2</td>
<td>3.3</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=14\text{V} )</td>
<td>2.5</td>
<td>4.6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input voltage hysteresis</td>
<td>( V_{T+}-V_{T-} )</td>
<td></td>
<td>1.3</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>( I_{(LEAK)} )</td>
<td>( V_{CC}=10\text{V}, V_{IN}=0 \text{ or } V_{CC} )</td>
<td>0.2</td>
<td>μA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Current</td>
<td>( I_{CC} )</td>
<td>( V_{CC}=10\text{V}, V_{IN}=V_{CC} \text{ or } \text{GND}, I_{OUT}=0 )</td>
<td>0.1</td>
<td>15</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>( C_{IN} )</td>
<td>( V_{CC}=10\text{V} )</td>
<td>5</td>
<td>10</td>
<td>pF</td>
<td></td>
</tr>
</tbody>
</table>

### SWITCHING CHARACTERISTICS (see TEST CIRCUIT AND WAVEFORMS)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propagation delay from input (IN) to output(OUT)</td>
<td>( t_{PLH} )</td>
<td>( V_{CC}=14\text{V}, C_{L}=1\text{nF} )</td>
<td>40</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( t_{PHL} )</td>
<td>( V_{CC}=10\text{V}, C_{L}=1\text{nF} )</td>
<td>24</td>
<td>45</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=5\text{V}, C_{L}=1\text{nF} )</td>
<td>25</td>
<td>50</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Output transition time</td>
<td>( t_{tr} )</td>
<td>( V_{CC}=14\text{V}, C_{L}=1\text{nF} )</td>
<td>14</td>
<td>30</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=10\text{V}, C_{L}=1\text{nF} )</td>
<td>14</td>
<td>30</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( V_{CC}=5\text{V}, C_{L}=1\text{nF} )</td>
<td>14</td>
<td>30</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>
**TEST CIRCUIT AND WAVEFORMS**

![Test Circuit Diagram]

**From Output**

$CL = 1nF$

**IN**

50%

$tr$ % 10ns

$tf$ % 6ns

$VCC$

0V

**OUT**

50% 90% 10%

$VOL$

$VOH$

**TEST CIRCUIT**

**PROPAGATION DELAY TIMES**

Note: $C_L$ includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 1MHz$, $Z_0 = 50\Omega$, $t_R \leq 6ns$, $t_F \leq 6ns$.

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