Automotive Electronics

Product Information

CR665 – Alternator Regulator with LIN-Interface

Features
- Precise voltage control of 14V automotive synchronous alternators
- High-side DMOS regulates dynamo field (DF) by fixed frequency PWM
- Full DF duty cycle range 0% to 100%, no compromise
- Integrated active freewheeling MOSFET on DF
- Applicable for any pole pair count. 6, 7 and 8 as default
- Voltage set point trimmed in production
- Examples for LIN communication in operation:
  - Write: Set voltage, excitation current limitation, speed thresholds, load response parameters, behavior at high temperature
  - Read: Filtered duty cycle, excitation current, various internal measurement values and status flags
- Examples for customer end of line programming:
  - ID, defaults for functions like load response, offsets
- Active handling of load dump and over-voltage
- Very low stand-by current
- No data loss down to 4V
- Accepts jump start with 28V
- ±8kV ESD handling robustness on all pins (HBM)

Communication features:
- LIN2.1 conformant physical interface to MCU
- LIN2.1 and LIN 1.3 compatible data link layer
- Customer end of line programming via COM pin

TO220-5 package pin list

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DF+</td>
</tr>
<tr>
<td>2</td>
<td>B+</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>COM</td>
</tr>
<tr>
<td>5</td>
<td>V</td>
</tr>
</tbody>
</table>

Customer benefits:
- Fully integrated alternator regulator
- LIN single wire bi-directional interface to motor control unit
- Advanced load response behavior
- Small TO220-5 package or tiny bare die
- TO220-5 ready for welding
- Compliant to VDA (German Car Makers Association) alternator regulator standard
- Customer end of line programming options exceed VDA, ready for worldwide application

Functions to protect alternator and battery:
- Emergency start via V pin and default operation if COM (LIN) pin is disconnected or shorted to B+ or GND
- Continuous B+ measurement and appropriate response
- Power stage shutdown at extreme temperature
- Short circuit protection on COM and DF power stage
TO220-5 package from top

Key parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter</th>
<th>min</th>
<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage set range by LIN V_SET</td>
<td>V</td>
<td>10.6</td>
<td>16</td>
</tr>
<tr>
<td>Voltage set 4 step default V_SET</td>
<td>V</td>
<td>13.7</td>
<td>14.6</td>
</tr>
<tr>
<td>Operating supply voltage V_B+</td>
<td>V</td>
<td>6.5</td>
<td>18</td>
</tr>
<tr>
<td>Supply with no data loss V_B+</td>
<td>V</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>Transient over-voltage V_B+ t&lt;0.5s</td>
<td>V</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Field driver on-resistance R_on typ. at 25°C / 8A</td>
<td>mΩ</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Standby current I_STB typ. incl. power stages</td>
<td>µA</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Load resp. cut-off range n_LR rpm</td>
<td></td>
<td>2400</td>
<td>8000</td>
</tr>
<tr>
<td>DF duty cycle range %</td>
<td></td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Application Diagram

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