Automotive power supply ICs

Product overview

www.infineon.com/automotivepower
In automotive ECUs, microcontrollers and other electronic system components have to be supplied by a stable and reliable voltage that is lower than the battery voltage (e.g. 3.3 V or 5 V) and works over the entire temperature range (from -40°C to 150°C). Depending on the application – i.e. the output current and the requested system efficiency – linear voltage regulators or DC-DC converters are ideal for use in the automotive world.

**Power Supply ICs**

**Linear voltage regulators and DC-DC converters**

<table>
<thead>
<tr>
<th>Linear regulators</th>
<th>DC-DC converters</th>
</tr>
</thead>
<tbody>
<tr>
<td>› Cost optimized for current &lt; 500 mA</td>
<td>› Higher power density</td>
</tr>
<tr>
<td>› Lower design outlay</td>
<td>› Better system efficiency</td>
</tr>
<tr>
<td>› Less noise, less filtering</td>
<td>› Cost optimized for current &gt; 500 mA</td>
</tr>
<tr>
<td>› Large portfolio</td>
<td></td>
</tr>
</tbody>
</table>
Linear voltage regulators

Linear voltage regulator families

- **General Purpose**
  Standard solution of linear voltage regulators, suitable for almost all automotive applications due to a wide range portfolio

- **High Performance**
  Best-in-class linear voltage regulators in relation to energy savings and stop-and-start systems (e.g. for cold cranking conditions)

- **Drivers**
  Supply ICs for sensor applications: robust and accurate voltage distribution

- **Linear Post Regulators**
  Linear voltage regulators not directly connected to the battery line (e.g. used after a DC-DC converter)

- **Application Specific**
  Linear voltage regulators for application-specific solutions (e.g. active antenna)

Main features

- **Enable**
  Enable function for main output. Low current consumption in stand-by.

- **Power-on reset**
  Power-on reset sensing output voltage

- **Watchdog**
  Standard and window watchdog

- **Early Warning**
  Early warning comparator for sensing input undervoltage

www.infineon.com/voltage-regulators
Selection table for 12 V and 24 V battery applications

<table>
<thead>
<tr>
<th>Output current</th>
<th>30 mA</th>
<th>100 mA</th>
<th>150 mA</th>
<th>180/200 mA</th>
<th>300 mA ultra low power</th>
<th>400/450 mA</th>
<th>&gt; 500 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>No feature</td>
<td>TLE4294 (5 V)</td>
<td>TLE42644 (5 V)</td>
<td>TLE42344 (5 V)</td>
<td>TLE7274-2 (5 V)</td>
<td>TLE42744 (5 V, 3.3 V)</td>
<td>TLE4284 (adj., 1.5 V, 1.8 V, 2.6 V, 3.3 V, 5 V)</td>
<td></td>
</tr>
<tr>
<td>EN</td>
<td>TLE4296-2 (5 V, 3.3 V)</td>
<td>TLS710B (5 V)</td>
<td>TLE42364 (5 V)</td>
<td>TLE7276-2 (5 V)</td>
<td>TLE42764 (adj., 5 V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RES</td>
<td>TLE4295 (5 V, 3.3 V)</td>
<td>TLF4949 (5 V)</td>
<td>TLE42694 (5 V)</td>
<td>TLE7270-2 (5 V)</td>
<td>TLE42754 (5 V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN, RES</td>
<td>TLE42994E (5 V, 3.3 V)</td>
<td>TLE4699 (5 V)</td>
<td>TLE4672-2 (5 V)</td>
<td>TLE4267-2 (5 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RES, WD</td>
<td>TLE4263-2 (5 V)</td>
<td>TLE7278-2 (5 V)</td>
<td>TLE7273-2 (2.6 V, 3.3 V, 5 V)</td>
<td>TLE4291 (5 V)</td>
<td>TLE4271-2 (5 V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN, RES, WD</td>
<td>TLE4678(-2) (5 V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For 12 V battery applications
For 24 V battery applications

Key features
› Standard features
– Wide operation range up to 45 V
– Low dropout voltage
– Wide temperature range: -40°C up to +150°C
› Standard protection
– Short-circuit protection
– Reverse polarity protection as option
– Overload protection
– Overtemperature protection

Key benefits
› Broad portfolio: devices available for all types of applications
› Best-in-class quality
› Full 150°C automotive qualification
› Long-term availability

www.infineon.com/voltage-regulators
## Selection table for 12 V battery applications

<table>
<thead>
<tr>
<th>Product name</th>
<th>Iq [mA]</th>
<th>Ir [µA]</th>
<th>Vr range [V]</th>
<th>Vq [V]</th>
<th>Drop voltage [V]</th>
<th>Accuracy [%]</th>
<th>Output capacitance (min) [µF]</th>
<th>Reset</th>
<th>Adjustable reset threshold</th>
<th>Enable</th>
<th>Watchdog</th>
<th>Early warning</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLE4294</td>
<td>30</td>
<td>120</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>4</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT595</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4295</td>
<td>30</td>
<td>120</td>
<td>3.50–45.00</td>
<td>3.30; 5.00</td>
<td>0.25</td>
<td>4</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT595</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4296-2</td>
<td>30</td>
<td>130</td>
<td>4.00–45.00</td>
<td>3.30; 5.00</td>
<td>0.25</td>
<td>4</td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT595</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4297</td>
<td>100</td>
<td>180</td>
<td>3.50–45.00</td>
<td>5.00</td>
<td>0.30</td>
<td>2</td>
<td>4.70</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-8 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42344</td>
<td>120</td>
<td>300</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT223</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42364</td>
<td>120</td>
<td>300</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT223</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLES710</td>
<td>150</td>
<td>36</td>
<td>4.00–45.00</td>
<td>5.00</td>
<td>0.20</td>
<td>2</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLES715</td>
<td>150</td>
<td>40</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.22</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>SOT223</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42644</td>
<td>150</td>
<td>40</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42694</td>
<td>150</td>
<td>210</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-14, SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42694-2</td>
<td>150</td>
<td>210</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>4.70</td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42794</td>
<td>150</td>
<td>150</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-14, SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42994</td>
<td>150</td>
<td>65</td>
<td>4.40–45.00</td>
<td>3.30; 5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-14, SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4268</td>
<td>180</td>
<td>300</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE2733-2</td>
<td>180</td>
<td>28</td>
<td>4.20–45.00</td>
<td>2.60; 3.30; 5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE2778-2</td>
<td>180</td>
<td>28</td>
<td>4.20–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td>DSO-14, SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE2779-2</td>
<td>180</td>
<td>28</td>
<td>4.20–45.00</td>
<td>2.60; 3.30; 5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4263/-2</td>
<td>200</td>
<td>900</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.35</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8, DSO-14, SSOP-14 EP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4278</td>
<td>200</td>
<td>180</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4678/-2</td>
<td>200</td>
<td>60</td>
<td>3.30–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-14, SSOP-14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4699</td>
<td>200</td>
<td>70</td>
<td>3.30–45.00</td>
<td>5.00</td>
<td>0.16</td>
<td>2</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>DSO-14, SSOP-14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE7270-2</td>
<td>300</td>
<td>20</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.20</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP, TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE7272-2</td>
<td>300</td>
<td>20</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP, TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE7274-2</td>
<td>300</td>
<td>20</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP, TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE7276-2</td>
<td>300</td>
<td>20</td>
<td>5.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP, TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE4267/-2</td>
<td>400</td>
<td>1300</td>
<td>5.50–40.00</td>
<td>(60.00)</td>
<td>5.00</td>
<td>0.30</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42744</td>
<td>400</td>
<td>100</td>
<td>3.30–45.00</td>
<td>3.30; 5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE42754</td>
<td>400</td>
<td>150</td>
<td>5.50–45.00</td>
<td>3.30; 5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

www.infineon.com/voltage-regulators
### Selection table for 12 V battery applications (cont’d)

<table>
<thead>
<tr>
<th>Product name</th>
<th>$I_{Q1}$</th>
<th>$I_{Q2}$</th>
<th>$V_{IN}$ range</th>
<th>$V_{OUT1}$</th>
<th>Drop voltage</th>
<th>Accuracy</th>
<th>Output capacitance (min)</th>
<th>Reset</th>
<th>Adjustable reset threshold</th>
<th>Enable</th>
<th>Watchdog</th>
<th>Early warning</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLE42764</td>
<td>400</td>
<td>100</td>
<td>4.50–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP, TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
</tr>
<tr>
<td>TLE4675</td>
<td>400</td>
<td>65</td>
<td>3.30–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TO252-5 (DPAK 5-leg), TO263-5-1 (TO220-5 (SMD))</td>
</tr>
<tr>
<td>TLE4291</td>
<td>450</td>
<td>220</td>
<td>3.30–45.00</td>
<td>5.00</td>
<td>0.25</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLE4284</td>
<td>1000</td>
<td>1000</td>
<td>2.90–40.00</td>
<td>Adjust.; 5.00, 1.80; 2.60; 3.30; 5.00</td>
<td>1.00</td>
<td>3</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Selection table for 24 V battery applications

<table>
<thead>
<tr>
<th>Product name</th>
<th>$I_{Q1}$</th>
<th>$I_{Q2}$</th>
<th>$V_{IN}$ range</th>
<th>$V_{OUT1}$</th>
<th>Drop voltage</th>
<th>Accuracy</th>
<th>Output capacitance (min)</th>
<th>Reset</th>
<th>Adjustable reset threshold</th>
<th>Enable</th>
<th>Watchdog</th>
<th>Early warning</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLE4267-2</td>
<td>400</td>
<td>1300</td>
<td>5.50–40.00</td>
<td>5.00</td>
<td>0.30</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TO263-7-1 (TO220-7 (SMD))</td>
</tr>
<tr>
<td>TLE4476</td>
<td>430</td>
<td>300 mA</td>
<td>5.70–42.00</td>
<td>3.30 or 5.00</td>
<td>0.30</td>
<td>4</td>
<td>10/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TO252-5 (DPAK 5-leg)</td>
<td></td>
</tr>
<tr>
<td>TLE4471</td>
<td>450</td>
<td>1100 mA</td>
<td>5.50–40.00</td>
<td>3x 5.00</td>
<td>0.25</td>
<td>2</td>
<td>22/10/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-20 (Power-SO)</td>
<td></td>
</tr>
<tr>
<td>TLE4271-2</td>
<td>550</td>
<td>800</td>
<td>6.00–42.00</td>
<td>5.00</td>
<td>0.35</td>
<td>2</td>
<td>22.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TO263-7-1 (TO220-7 (SMD)), TO220-7-11, TO220-7-12</td>
<td></td>
</tr>
</tbody>
</table>

### Power supply multiple output regulators

<table>
<thead>
<tr>
<th>Product name</th>
<th>$I_{Q1}$</th>
<th>$I_{Q2/3}$</th>
<th>$I_{Q3}$</th>
<th>$V_{IN}$ range</th>
<th>$V_{OUT1}$</th>
<th>Drop voltage</th>
<th>Accuracy</th>
<th>Output capacitance (min)</th>
<th>Overvoltage protection</th>
<th>Reset</th>
<th>Adjustable reset threshold</th>
<th>Watchdog</th>
<th>Early warning</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLE4769G</td>
<td>215</td>
<td>200</td>
<td>55</td>
<td>4.20–45.00</td>
<td>5.00</td>
<td>2.60 or 3.30</td>
<td>0.30</td>
<td>3</td>
<td>1/1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-12</td>
</tr>
<tr>
<td>TLE4473/-2</td>
<td>300</td>
<td>180</td>
<td>200</td>
<td>5.60–45.00</td>
<td>5.00</td>
<td>3.30 or 5.00</td>
<td>0.30</td>
<td>2</td>
<td>10/22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-12</td>
</tr>
<tr>
<td>TLE4470</td>
<td>350</td>
<td>180</td>
<td>180</td>
<td>5.60–45.00</td>
<td>5.00</td>
<td>Adj.</td>
<td>0.30</td>
<td>2</td>
<td>6/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-14, DSO-20</td>
</tr>
<tr>
<td>TLE4476</td>
<td>350</td>
<td>430</td>
<td>300</td>
<td>5.70–42.00</td>
<td>5.00</td>
<td>3.30</td>
<td>0.30</td>
<td>4</td>
<td>10/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TO252-5 (DPAK 5-leg)</td>
</tr>
<tr>
<td>TLE4471</td>
<td>450</td>
<td>50</td>
<td>1100</td>
<td>5.50–40.00</td>
<td>5.00</td>
<td>2x 5.00</td>
<td>0.25</td>
<td>2</td>
<td>22/10/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-20 (Power-SO)</td>
</tr>
</tbody>
</table>

1) Power good
2) Power fail
3) Window watchdog
High-performance linear voltage regulators

Selection table

<table>
<thead>
<tr>
<th>Output current</th>
<th>50 mA</th>
<th>100 mA</th>
<th>200 mA</th>
<th>400 mA</th>
<th>500 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>No feature</td>
<td>TLF80511 (5 V, 3.3 V)</td>
<td>TLS805B1 (5 V, 3.3 V, adj.)</td>
<td>TLS810B1 (5 V, 3.3 V)</td>
<td>TLS810C1 (3.3 V)</td>
<td>EN, RES, WD</td>
</tr>
<tr>
<td>EN</td>
<td>TLS805D1 (5 V)</td>
<td>TLS810D1 (5 V, 3.3 V)</td>
<td>TLS820D0 (5 V, 3.3 V)</td>
<td>TLS820F0 (5 V, 3.3 V)</td>
<td>TLS850F0 (5 V, 3.3 V)</td>
</tr>
<tr>
<td>RES</td>
<td>EN, RES TLS805B1 (5 V, 3.3 V)</td>
<td>TLS810B1 (5 V, 3.3 V)</td>
<td>EN, RES TLS810B1 (5 V, 3.3 V)</td>
<td>TLS810C1 (3.3 V)</td>
<td>TLS850D0 (5 V, 3.3 V)</td>
</tr>
<tr>
<td>EN, RES</td>
<td>TLS805B1 (5 V, 3.3 V, adj.)</td>
<td>TLS810B1 (5 V, 3.3 V)</td>
<td>TLS820D0 (5 V, 3.3 V)</td>
<td>TLS820F0 (5 V, 3.3 V)</td>
<td>TLS850F0 (5 V, 3.3 V)</td>
</tr>
<tr>
<td>EN, RES, WD</td>
<td>TLS805B1 (5 V, 3.3 V, adj.)</td>
<td>TLS810B1 (5 V, 3.3 V)</td>
<td>TLS820D0 (5 V, 3.3 V)</td>
<td>TLS820F0 (5 V, 3.3 V)</td>
<td>TLS850F0 (5 V, 3.3 V)</td>
</tr>
</tbody>
</table>

Two classes

Energy efficient:
- Ultra-low quiescent
- Battery power saving
- Down to 5 µA
- 250 mV
- Down to 2.7 V
- TLS805
- TLS810

Robust:
- Ultra-low quiescent
- Battery power saving
- Down to 40 µA
- 70 mV
- Down to 3.3 V
- TLS820
- TLS850

Energy efficient
Robust
Key features and benefits

- Extended operating range starting at 3.0 V
- Very low drop < 70 mV @ 100 mA
- Ultra-low quiescent current
- Ultra-low quiescent current
- LV124 severe cranking
- 3.0 V
- 5–30 µA
- 85 °C
- Small packages
- 3.3 x 3.3 mm
- 50% board space savings as compared to DSO-8 package
- TSON-10
- Small output capacitor for stability 1 µF
- Energy efficiency: save battery in on-state
- Ultra-low quiescent current
- Energy efficiency: save battery in on-state
- 0 defect target and no quality events
- Excellent line transient robustness
- No overshoot
- Output voltage soft start
- Design for harsh automotive environment
- Board space savings
- Low drop out
- Very low drop < 70 mV @ 100 mA

www.infineon.com/voltage-regulators
High-performance linear voltage regulators

Applications

Energy efficient family

- Battery line
- Current limitation
- Temperature shutdown
- Enable
- Reset
- Microcontroller

Robust family

- Battery line
- Current limitation
- Temperature shutdown
- Enable
- Watchdog
- Digital timing selection

Applications

- Application with direct battery connection
  - RKE, immobilizer, gateway
  - Infotainment, alarm, dashboard
- General automotive ECUs

Applications

- BCM, RKE, trunk, dashboard, HVAC
- Brake, EPS, TPMS, BMS
- Transmission
- General automotive ECUs

High-performance voltage regulators by output current

<table>
<thead>
<tr>
<th>Product name</th>
<th>Iq</th>
<th>Iq</th>
<th>Vr range [V]</th>
<th>Vq [V]</th>
<th>DRop voltage [mV]</th>
<th>Accuracy [%]</th>
<th>Cq [µF]</th>
<th>Reset</th>
<th>Enable (n Inhibit)</th>
<th>Watchdog</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLS805B1</td>
<td>50</td>
<td>5.0</td>
<td>2.75–42.0</td>
<td>3.3, 5.0, Adj</td>
<td>100</td>
<td>2.0</td>
<td>1</td>
<td></td>
<td>●</td>
<td></td>
<td>TSON-10 DSO-8</td>
</tr>
<tr>
<td>TLS805D1</td>
<td>50</td>
<td>9.5</td>
<td>2.75–42.0</td>
<td>5.0</td>
<td>100</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>●</td>
<td></td>
<td>TSON-10</td>
</tr>
<tr>
<td>TLS810A1</td>
<td>100</td>
<td>5.0</td>
<td>2.75–42.0</td>
<td>3.3, 5.0</td>
<td>250</td>
<td>2.0</td>
<td>1</td>
<td></td>
<td>●</td>
<td></td>
<td>TSON-10</td>
</tr>
<tr>
<td>TLS810B1</td>
<td>100</td>
<td>5.5</td>
<td>2.75–42.0</td>
<td>3.3, 5.0</td>
<td>250</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>●</td>
<td></td>
<td>TSON-10 DSO-8 EP</td>
</tr>
<tr>
<td>TLS810C1</td>
<td>100</td>
<td>9.0</td>
<td>2.75–42.0</td>
<td>3.3</td>
<td>250</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
</tr>
<tr>
<td>TLS810D1</td>
<td>100</td>
<td>9.5</td>
<td>2.75–42.0</td>
<td>3.3, 5.0</td>
<td>250</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>●</td>
<td></td>
<td>TSON-10 DSO-8 EP</td>
</tr>
<tr>
<td>TLS820D0</td>
<td>200</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>3.3, 5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>●</td>
<td></td>
<td>SSOP-14</td>
</tr>
<tr>
<td>TLS820F0</td>
<td>200</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>3.3, 5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>● ●</td>
<td></td>
<td>SSOP-14</td>
</tr>
<tr>
<td>TLS820F1</td>
<td>200</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>● ●</td>
<td></td>
<td>SSOP-14</td>
</tr>
<tr>
<td>TLS85011</td>
<td>400</td>
<td>38.0</td>
<td>3.3–40.0</td>
<td>3.3, 5.0</td>
<td>100</td>
<td>2.0</td>
<td>1</td>
<td></td>
<td>DSO-8 EP TO263-3-1 (TO220-3 (SMD)) TO252-3 (DPAK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLS850B0</td>
<td>500</td>
<td>23.0</td>
<td>3.0–40.0</td>
<td>3.3, 5.0</td>
<td>100</td>
<td>2.0</td>
<td>1</td>
<td></td>
<td>●</td>
<td></td>
<td>TO263-5-1 (TO220-5 (SMD)) TO252-5</td>
</tr>
<tr>
<td>TLS850D0</td>
<td>500</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>3.3, 5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>●</td>
<td></td>
<td>TO263-7-1 (TO220-7 (SMD)) TO252-5 (DPAK 5-leg)</td>
</tr>
<tr>
<td>TLS850F0</td>
<td>500</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>3.3, 5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>● ●</td>
<td></td>
<td>TO263-7-1 (TO220-7 (SMD))</td>
</tr>
<tr>
<td>TLS850F1</td>
<td>500</td>
<td>40.0</td>
<td>3.0–40.0</td>
<td>5.0</td>
<td>70</td>
<td>2.0</td>
<td>1</td>
<td>●</td>
<td>● ●</td>
<td></td>
<td>TO263-7-1 (TO220-7 (SMD))</td>
</tr>
</tbody>
</table>
### Trackers

**Selection table**

<table>
<thead>
<tr>
<th>Output current</th>
<th>V_{OUT} &gt; V_{REF}</th>
<th>Enable</th>
<th>Small package</th>
<th>1 µF output cap</th>
<th>Overvoltage monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 mA</td>
<td>TLE4251</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250 mA</td>
<td>TLE4252</td>
<td>TLE4253</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 mA</td>
<td></td>
<td></td>
<td>TLS115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 mA</td>
<td>TLE4254</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 mA</td>
<td></td>
<td></td>
<td>TLE4250-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Challenges of powering sensors
- Sensor supply requires various protection features due to the harsh environment
  - Overvoltage (typ. ~26 V)
  - Overcurrent
  - Reverse polarity
  - Supply accuracy

#### Key features
- Designed for automotive @ 150°C
- Short-to-GND and BAT protected
- Accurate current limitation
- High accuracy
- Advanced feature set

#### Key benefits
- Reliable protection for ECU/sensor
- Easy and accurate voltage replication
- High flexibility/scalability
- Lower design outlay → design cost savings

- Enable function to main output
- Low quiescent current consumption in stand-by mode
- Indicates an error condition at the tracker’s output

[www.infineon.com/voltage-regulators](http://www.infineon.com/voltage-regulators)
Trackers by output current

<table>
<thead>
<tr>
<th>Product name</th>
<th>IQ [mA]</th>
<th>Adjust voltage (min) [V]</th>
<th>Accuracy [%]</th>
<th>Independent EN pin</th>
<th>Status pin</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLE4250-2</td>
<td>50</td>
<td>2.5</td>
<td>±0.5</td>
<td></td>
<td></td>
<td>SCT595</td>
</tr>
<tr>
<td>TLE4254</td>
<td>70</td>
<td>2.0</td>
<td>±0.1</td>
<td></td>
<td></td>
<td>DSO-8</td>
</tr>
<tr>
<td><strong>NEW!</strong> TLS11580</td>
<td>150</td>
<td>2.0</td>
<td>±0.1</td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
</tr>
<tr>
<td><strong>NEW!</strong> TLS11500</td>
<td>150</td>
<td>2.0</td>
<td>±0.1</td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
</tr>
<tr>
<td>TLE4252</td>
<td>250</td>
<td>1.5</td>
<td>±0.2</td>
<td></td>
<td></td>
<td>TO252</td>
</tr>
<tr>
<td>TLE4253</td>
<td>250</td>
<td>2.0</td>
<td>±0.2</td>
<td></td>
<td></td>
<td>DSO-8 EP</td>
</tr>
<tr>
<td>TLE4251</td>
<td>400</td>
<td>2.5</td>
<td>±0.2</td>
<td></td>
<td></td>
<td>TO252-5 (DPAK 5-leg) TO263-5-1 (TO220-5 (SMD))</td>
</tr>
</tbody>
</table>
Applications

- ADAS: radars and cameras
- ADAS: MMIC (low noise)
- Infotainment, displays, cluster
- CPU supplies (FPGA, DSP), memory
- Post regulation after DCDC converter
- EMS

Linear solution

- 12 V battery
- 5 V, up to 0.05 A, CAN
- 3.3 V, up to 1 A, μC + DSP
- 1.2 V, up to 0.7 A, Car + RAM
- 1.8 V, up to 0.45 A, Camera digital
- 2.8 V, up to 0.13 A, Camera analog

Post regulation DC-DC and linear

- 12 V battery
- 5 V, up to 0.05 A
- 3.3 V, up to 1 A
- 1.2 V, up to 0.7 A
- 1.8 V, up to 0.45 A
- 2.8 V, up to 0.13 A

Maximum efficiency and optimal flexibility

<table>
<thead>
<tr>
<th>System benefits</th>
<th>TLF51801 controller</th>
<th>Linear post regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>› Higher efficiency</td>
<td>› Adjustable voltage</td>
<td>› Higher V_in range than CMOS (V_in = 20 V max)</td>
</tr>
<tr>
<td>› Higher flexibility</td>
<td>› Max current up to 10 A</td>
<td>› Adjustable voltage</td>
</tr>
<tr>
<td>› Lower system cost</td>
<td>› Current limitation</td>
<td>› Max current up to 1.5 A</td>
</tr>
<tr>
<td>› Higher reliability</td>
<td>› Advanced feature set</td>
<td>› Low noise</td>
</tr>
</tbody>
</table>

Linear post regulators by output current

<table>
<thead>
<tr>
<th>Product name</th>
<th>I_n1 [mA]</th>
<th>I_n2 [µA]</th>
<th>V_i range [V]</th>
<th>V_o [V]</th>
<th>Drop voltage [V]</th>
<th>Accuracy [%]</th>
<th>Output capacitance (min) [µF]</th>
<th>Reset</th>
<th>Adjustable reset threshold</th>
<th>Enable</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLS202B1</td>
<td>150</td>
<td>50</td>
<td>2.70–20.00</td>
<td>3.30</td>
<td>0.50</td>
<td>3</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>SCT595</td>
</tr>
<tr>
<td>TLS202A1</td>
<td>150</td>
<td>50</td>
<td>2.70–20.00</td>
<td>Adj.</td>
<td>0.50</td>
<td>3</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>SCT595</td>
</tr>
<tr>
<td>TLS203B0</td>
<td>300</td>
<td>30</td>
<td>2.30–20.00</td>
<td>Adj.; 3.30 5.00</td>
<td>0.30</td>
<td>3</td>
<td>3.30</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8 EP, TSON-10</td>
</tr>
<tr>
<td>TLS205B0</td>
<td>500</td>
<td>30</td>
<td>2.30–20.00</td>
<td>Adj.; 3.30 5.00</td>
<td>0.30</td>
<td>3</td>
<td>3.30</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8 EP, TSON-10</td>
</tr>
<tr>
<td>TLS208D1</td>
<td>800</td>
<td>90</td>
<td>–</td>
<td>Adj.; 3.30 –</td>
<td>–</td>
<td>2</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
<td>DSO-8 EP, TSON-10</td>
</tr>
<tr>
<td>TLF1963</td>
<td>1500</td>
<td>1100</td>
<td>2.50–20.00</td>
<td>Adj.</td>
<td>0.34</td>
<td>3</td>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
<td>TO263-5-1 (TO220-5 (SMD)), TO252-5 (DPAK 5-leg)</td>
</tr>
</tbody>
</table>

www.infineon.com/voltage-regulators
Application specific

TLF4277

Key applications
› Active antennas
› Battery charger
› Microphones

Key features
› Current monitor functionality
› Adjustable current limitation
› Adjustable output voltage
› Short-circuit detection to GND and battery voltage level
› SSOP-14 EP package
› TSON-10 package, leadless and capable of automatic optical inspection
› Overtemperature detection/protection

Key benefits
› Diagnosis of antenna system status (linear current detection)
› Flexible protection of sensitive components
› Easy adjustment to the application requirements
› Fast identification of short-circuit failures
› Enhances thermal characteristics

Current sense performance

<table>
<thead>
<tr>
<th>LDO</th>
<th>Error [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>150</td>
<td>10</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
</tbody>
</table>

TLF4277-2 is the actual device
TLF4277 is the predecessor

Active antenna family

<table>
<thead>
<tr>
<th>Product name</th>
<th>I_exp, I_mon [mA]</th>
<th>I_quicly [µA]</th>
<th>V_LDO range [V]</th>
<th>V_Q [V]</th>
<th>V_O [V]</th>
<th>Drop voltage [V]</th>
<th>Accuracy [%]</th>
<th>Output capacitance (min) [µF]</th>
<th>Enable</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLF4277</td>
<td>200</td>
<td>140</td>
<td>5.00–45.00</td>
<td>Adj.</td>
<td>0.25</td>
<td>2</td>
<td>10</td>
<td></td>
<td>✔</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF4277-2</td>
<td>300</td>
<td>150</td>
<td>5.00–45.00</td>
<td>Adj.</td>
<td>0.20</td>
<td>2</td>
<td>1</td>
<td></td>
<td>✔</td>
<td>SSOP-14 EP</td>
</tr>
</tbody>
</table>

1) LDO with current monitor and status output
DC-DC converters

Infineon Technologies offers several switching converters serving applications with extended requirements like supply for 32-bit μC and airbag applications.

- Step-up and step-down converters
- High-efficiency regulators
- Wide supply voltage operation range
- Very low current consumption operation
- Suitable for standard 12 V/24 V PowerNets
- Disable function for main output

In our portfolio you can find step-up (boost) and step-down (buck) DC-DC converters as well as DC-DC converters cascaded internally with linear regulators and trackers.

- Output undervoltage reset with delay
- Short-circuit protection
- Overtemperature protection
- Wide ambient operation range: -40°C up to 150°C

Applications

**TLE6365**
- General purpose

**TLE6389-2GV/-3GV**
- Commercial, construction and agricultural vehicles (CAV)
- 24V ECUs

**TLE8366**
- General purpose buck
- BCM, dashboard, cluster
- Telematics

**TLE8386-2**
- Boost, flyback, sepic controller

**TLF51801**
- ADAS, camera, radar ECU’s
- Wireless charger, USB supply for mobile phone charger
- Telematic and eCall applications

**TLF502x1**
- General use DC-DC with low quiescent current
- Body ECUs, decentralized lighting modules
- Sensor cluster, telematics, infotainment, camera

www.infineon.com/dcdc-converter
DC-DC converters

Single-rail DC-DC converters

<table>
<thead>
<tr>
<th>Product name</th>
<th>( V_{\text{in}} ) [V]</th>
<th>( V_{\text{out}} ) [V]</th>
<th>Accuracy 1 [%]</th>
<th>( I_{\text{Q}} ) [mA]</th>
<th>( I_{\text{Q}} ) [mA]</th>
<th>PFM operation</th>
<th>Reset</th>
<th>Watchdog</th>
<th>Enable/disable possibility</th>
<th>Early warning</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE6365</td>
<td>8.00 ... 40.00</td>
<td>5.00</td>
<td>2</td>
<td>400</td>
<td>1.500</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSO-8</td>
</tr>
<tr>
<td>TLE6389-2GV</td>
<td>5.00 ... 60.00</td>
<td>Adj.</td>
<td>3</td>
<td>2300</td>
<td>0.120</td>
<td>250 ... 530</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>DSO-14</td>
</tr>
<tr>
<td>TLE6389-2GV50</td>
<td>5.00 ... 60.00</td>
<td>5.00</td>
<td>3</td>
<td>2300</td>
<td>0.120</td>
<td>250 ... 530</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>DSO-14</td>
</tr>
<tr>
<td>TLE6389-3GV50</td>
<td>5.00 ... 60.00</td>
<td>5.00</td>
<td>3</td>
<td>2300</td>
<td>0.120</td>
<td>250 ... 530</td>
<td>● ●</td>
<td></td>
<td></td>
<td>●</td>
<td>DSO-14</td>
</tr>
<tr>
<td>TLE8366</td>
<td>4.75 ... 45.00</td>
<td>Adj., 3.30, 5.00</td>
<td>2(4)</td>
<td>1800</td>
<td>7.000</td>
<td>200 ... 530</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>DSO-8 EP</td>
</tr>
<tr>
<td>TLF30281</td>
<td>4.75 ... 45.00</td>
<td>5.00</td>
<td>2</td>
<td>500</td>
<td>0.045</td>
<td>800 ... 2200</td>
<td>● ●</td>
<td>STD</td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF30251</td>
<td>4.75 ... 45.00</td>
<td>5.00</td>
<td>2</td>
<td>500</td>
<td>0.045</td>
<td>800 ... 2200</td>
<td>● ●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF30241</td>
<td>4.75 ... 45.00</td>
<td>5.00</td>
<td>2</td>
<td>500</td>
<td>0.045</td>
<td>800 ... 2200</td>
<td>● ●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF30211</td>
<td>4.75 ... 45.00</td>
<td>5.00</td>
<td>2</td>
<td>500</td>
<td>0.045</td>
<td>800 ... 2200</td>
<td>● ●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF50201</td>
<td>4.75 ... 45.00</td>
<td>5.00</td>
<td>2</td>
<td>500</td>
<td>0.045</td>
<td>800 ... 2200</td>
<td>● ●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLF51801</td>
<td>4.75 ... 45.00</td>
<td>1.20-( V_{\text{in}} )</td>
<td>2</td>
<td>Adj. max 10,000</td>
<td>2.000 μA</td>
<td>100 ... 700</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>Boost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLE8386*</td>
<td>4.75 ... 45.00</td>
<td>Adj. (max 9-times of ( V_{\text{in}} ))</td>
<td>4</td>
<td>dep. on ( V_{\text{in}} )</td>
<td>7000</td>
<td>100 ... 500</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
<tr>
<td>TLE8386-2*</td>
<td>4.75 ... 45.00</td>
<td>Adj. (max 9-times of ( V_{\text{in}} ))</td>
<td>4</td>
<td>dep. on ( V_{\text{in}} )</td>
<td>7000</td>
<td>100 ... 500</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td>SSOP-14 EP</td>
</tr>
</tbody>
</table>

1) Different voltage reset hysteresis  
2) HS-sense-booster (preferably as current source) 
3) LS-sense-booster

Featured product: TLF51801 synchronouse 10 A flexible pre-regulator

**Key features**

- Driving FETs for loads up to 10 A
- Adjustable switching frequency can be synchronized to an external clock
- Very low shut-down current
- Internal soft-start
- Protection functions
- SSOP-14EP small thermally enhanced package

**Key benefits**

- Flexibility in current limitation to reduce external components
- Integrated soft-start limits the current peak as well as voltage overshoot at startup

**Key applications**

- ADAS, camera, radar ECU’s
- Wireless charger, USB Supply for mobile phone charger
- Telematic and eCall applications

---

www.infineon.com/dcdc-converter
**Key features**

- High input voltage range up to 45 V
- Output: 500 mA/5 V (±2%)
- Low quiescent current < 45 µA
- High operating frequency: up to 2.2 MHz
- Synch-in and adjust. switching frequency
- Integrated compensation and soft-start
- Family approach with dedicated feature set
  - Enable: ultra-low shutdown current
  - Reset with adjust. RES-thresholds
  - watchdog with adjust. timing
- SSOP-14EP (thermally enhanced)

**Key benefits**

- Suitable for permanently \(V_{\text{Batt}}\)-connected ECUs
- Optimized costs and board space
  - Smaller coils and caps
  - No external components needed for compensation and soft-start
- Flexibility
  - Reset management
  - \(\mu\)C-supervision
- Ultra-low shutdown current
- Reduced design outlay

**Application diagram**

- \(L_{\text{in}}, C_{\text{in}1}\) and \(C_{\text{in}3}\) recommended for suppression of EME
- \(D_{\text{in}}\) depending on application

**Family members**

<table>
<thead>
<tr>
<th></th>
<th>EN</th>
<th>RES</th>
<th>WD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLF50201</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLF50211</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLF50241</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>TLF50251</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>TLF50281</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
System supply

TLF35584 – system supply for safety-relevant applications

Functional block diagram

Power management

- **Pre-regulator**
  - Synchronous buck
  - Optional asynchronous boost
- Control and monitoring of external core-supply
- Enable and wake / INH, timer
- State machine
- **Post-regulator**
  - μC-supply
  - Communication-supply
  - Sensor-supply
  - Voltage-reference
- Standby-supply
- Internal supply, bandgap, clock

Functional safety

- Window-watchdog
- Functional-watchdog
- Error monitoring
- Safe state controller
- Voltage monitoring
- Interrupt-/reset-generator
- Built-in self-test
- Protected area, bandgap

μC-interface

- SPI

Applications

› Safety: EPS, braking, suspension, domain control, ADAS fusion box
› Powertrain: engine management, transmission
› Electrical drive train: battery management, inverter, DC-DC, charger

Pre-/post-regulator architecture for high efficiency

Battery

- Buck or boost/buck converter
  - Pre-regulator
  - Linear regulator block
  - Tracker block
  - Microcontroller
  - Transceiver
  - Off-board sensors
  - On-board sensors

www.infineon.com/voltage-regulators
Key features

- $V_{IN}$: 3 V ... 40 V
- Buck/boost-pre-regulator
  - $I_Q = 1.3 \, A$; $f: 300 \, kHz$ – 2.5 MHz
- Post-regulators
  - $\mu$C-supply: 3.3 V/5 V @ 600 mA
  - Reference-LDO: 5 V @ 150 mA (±1%)
  - 2x tracker: 5 V @ 150 mA
  - Communication-supply: 5 V @ 200 mA
- Standby-LDO: 3.3 V/5 V @ 10 mA
- EN/wake (T15 and CAN/FlexRay)
- Extended state machine
- SPI
- Safety features
  - Development acc. to ISO 26262
  - Multiple bandgap (supply versus V-monitoring)
  - UV/OV-monitoring of all rails
  - ERR-monitoring of $\mu$C’s safety management unit
  - Functional-WD and window-WD with dedicated error-counters
  - Safe state control/secondary safety paths
  - Protected safety area/HV interconnects
  - Built-in self-test
- VQFN-48 EP and LQFP-64 EP (both thermally enhanced)

Key benefits

- Ensures operation during cold cranking
- High efficiency
- ADC-supply regardless of $\mu$C-load
- Precise sensor supply
- Flexible wake-up management
- Usage in applications with ASIL-requirements (up to ASIL-D)
- Avoids common cause failures thanks to independence and protection
- Application adaptable
  - Flexible monitoring concept
  - Flexible watchdog concept
  - Flexible safe state control and safety paths
- All safety features testable on demand
- Small footprint package (VQFN-48)
- Good thermal behavior

www.infineon.com/voltage-regulators
System supply

TLE7368/-2/-3 – optimized system supply for 32-bit µC

Application diagram

Key features
› Input voltage range from 4.5 to 45 V
› DC-DC buck pre-regulator to 5.5 V/2.5 A
   – Integrated slew-rate control
› Post-regulators for µC and on-board
   – LDO1: 5 V (±2%), 700 mA
   – LDO2: 3.3 V or 2.6 V (±2%), 500 mA
   – LDO3: control for ext. NPN
   – LDO3: 1.5 V, 1.2 V and 1.3 V (±2%)
   – 2 trackers for off-board supply: 5 V, 105 mA/50 mA
› Stand-by regulator for lowest current consumption
› 2 enable inputs
› Reset for all LDOs with adj. reset delay time
› Window watchdog with adj. timing
› Monitoring circuit for stand-by supply
› Power sequencing on contributing supplies
› Overcurrent protection for all regulators
› Overtemperature shutdown
› DSO-36 EP (thermally enhanced)

Key benefits
› Maintains operation under sensor short-circuit condition
› EME reduction (high frequency content)
› Power sequencing for proper start-up/ramp-down

Applications
› Powertrain: transmission, engine management
› Safety: EPS
## DC-DC system supplies

| Product name | \(V_{\text{in}}\) [V] | \(V_{\text{o}}\) [V] | \(V_{\text{o}}\) [V] | \(V_{\text{o}}\) additional [V] | Accuracy 1 [%] | Accuracy 2 [%] | Accuracy 3 [%] | Accuracy 4 [%] | Additional output accuracy | \(I_{\text{Q1}}\) [mA] | \(I_{\text{Q2}}\) [mA] | \(I_{\text{Q3}}\) [mA] | \(I_{\text{Q4}}\) additional [mA] | \(f_{\text{sw}}\) [kHz] | Stand-by regulator [V–mA] | PFM operation | Watchdog | Enable/disable possibility | Early warning | Package |
|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| **Buck plus linear** |
| TLE7368 | 4.50 … 45.00 | 5.50 | 5.00 | 2.60 or 3.30 | 1.00 | 2.00 … +9.00 | 2 | 2 | 2 | 1 | 50 | 120 | 280 … 425 | 2.60–30.00 | * | WWD | * | DSO-36 EP, DSO-36 (Power-SO) |
| TLE7368-2 | 4.50 … 45.00 | 5.50 | 5.00 | 2.60 or 3.30 | 1.00 | 2.00 … +9.00 | 2 | 2 | 2 | 1 | 50 | 120 | 280 … 425 | 2.60–30.00 | * | WWD | * | DSO-36 EP |
| TLE7368-3 | 4.50 … 45.00 | 5.50 | 5.00 | 2.60 or 3.30 | 1.00 | 2.00 … +9.00 | 2 | 2 | 2 | 1 | 50 | 120 | 280 … 425 | 2.60–30.00 | * | WWD | * | DSO-36 EP |
| TLE6368 | 5.50 … 60.00 | 5.50 | 5.00 | 2.60 or 3.30 | 6 x 5 | 10.00 | 5 | 5 | 5 | 1.00 | 1500 | 800 | 500 | 350 | 6 x 17 | 30 | 280 … 425 | 2.40–1.00 | * | WWD | * | DSO-36 (Power-SO) |
| TLF35584 | 3.00 … 40.00 | 5.80 | 5.00 | 2.60 or 3.30 | 5.00 | 2.50 | 2 | 2 | 1 | 4 | 1300 | 600 | 200 | 150 | 2 x 150 | 50 | 400 … 2500 | 5.00 or 3.30/10.00 | * | WWD/ FWD | * | LQFP-64, VQFN-48 |
| **Boost plus buck** |
| TLE6711 | 4.50 … 45.00 | 27.50 | 5.00 | - | - | - | 12.00 | 2 | - | - | 1000 | 700 | - | - | - | 4 | 95 | * | WWD | * | DSO-14, DSO-20 |
Service hotline

Infineon offers its toll-free 0800/4001 service hotline as one central number, available 24/7 in English, Mandarin and German.

- Germany .................. 0800 951 951 951 (German/English)
- China, mainland ........ 4001 200 951 (Mandarin/English)
- India ...................... 000 800 4402 951 (English)
- USA ....................... 1-866 951 9519 (English/German)
- Other countries .......... 00* 800 951 951 951 (English/German)
- Direct access ............ +49 89 234-0 (interconnection fee, German/English)

* Please note: Some countries may require you to dial a code other than “00” to access this international number. Please visit www.infineon.com/service for your country!

Mobile product catalog

Mobile app for iOS and Android.