AC/DC Power Conversion
Low-Power Low-Cost Offline Power Conversion Solutions

Summary
Many applications require their low-power controller circuits to operate from an offline power source. An AC/DC converter is also required to provide safety isolation from the application to the AC line and to meet EMI emission requirements.

Microchip provides a broad-range of cost-effective solutions for AC/DC power conversion to help bring a design to market in the shortest time possible.

Applications
■ Smart appliances
■ Smart meters
■ Telecom/network equipment
■ Offline MCU or DSC power supply
■ Offline SMPS start-up circuits

Available Reference Material

Datasheets
■ HV9922 Datasheet
■ HV9910B Datasheet
■ LR8 Datasheet

Application Notes
■ DN-H02
■ DN-H03
■ AN-D17

Examples
Linear Regulator
LR8 is a high-voltage, low-output current, adjustable linear regulator. It has a wide operating input voltage range of 13.2–450 V. The output current limit is typically 20 mA.

Non-Isolated AC/DC Application
An alternative use for the HV9922, originally designed as an LED driver, is an offline, non-isolated, bias power supply for line-side circuitry. An example of an application would be to provide 50 mA bias for a motor drive controller. It will operate from 85 V\textsubscript{AC} to 256 V\textsubscript{AC}, is stable with open and short-circuit loads and since there is no feedback loop, it is unconditionally stable.

This alternative circuit can be modified to provide high-side referenced bias, useful for applications like biasing active current sensing, as shown below.
Example of Products

<table>
<thead>
<tr>
<th>Device</th>
<th>Topology</th>
<th>VIN (V)</th>
<th>Output Voltage (V)</th>
<th>IOUT Max. (mA)</th>
<th>Operation Temperature (°C)</th>
<th>Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR8N8-G</td>
<td>Linear</td>
<td>12–450</td>
<td>1.2–440</td>
<td>10</td>
<td>−40 to 125</td>
<td>3-pin TO-252, 3-pin TO-92, 3-pin SOT-89</td>
</tr>
<tr>
<td>LR12</td>
<td>Linear</td>
<td>12–100</td>
<td>1.2–88</td>
<td>50</td>
<td>−40 to 125</td>
<td>3-pin TO-252, 3-pin TO-92, 8-pin SOIC</td>
</tr>
<tr>
<td>SR086/7</td>
<td>Inductorless</td>
<td>80–285 (Vac)</td>
<td>9–50</td>
<td>100</td>
<td>−40 to 125</td>
<td>8-pin SOIC</td>
</tr>
<tr>
<td>HV9921/2/3N8-G</td>
<td>Buck</td>
<td>20–400</td>
<td>Adj.</td>
<td>20/50/30</td>
<td>−40 to 125</td>
<td>TO-92, SOT-89</td>
</tr>
<tr>
<td>HV9910B</td>
<td>Buck</td>
<td>8–450</td>
<td>Adj.</td>
<td>External FET</td>
<td>−40 to 125</td>
<td>8-pin SOIC, 16-pin SOIC</td>
</tr>
<tr>
<td>HV9120/3NG-G</td>
<td>PWM</td>
<td>10–450</td>
<td>Adj.</td>
<td>External FET</td>
<td>−55 to 125</td>
<td>16-pin SOIC, 16-pin PDIP, 20-pin PLCC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Device</th>
<th>Depletion Mode MOSFETs</th>
<th>BVDSX Min. (V)</th>
<th>RDSon Max.</th>
<th>Min. (mA)</th>
<th>VDSoff Max. (V)</th>
<th>Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN3145N8-G</td>
<td>✓</td>
<td>450</td>
<td>60</td>
<td>120</td>
<td>−3.5</td>
<td>SOT-89</td>
</tr>
</tbody>
</table>

Note: Please refer to Microchip’s Analog and Interface Product Selector Guide (DS20001060) for more options and details.

Development Board

HV9922DB2 Demo Board (HV9922DB2)

[Image of the HV9922DB2 Demo Board]