General Description

The MAX20846 is a feature-rich, smart power-stage IC designed to work with Analog Devices' controllers to implement a high-density multiphase voltage regulator. Multiple smart power-stage ICs plus a controller provide a compact synchronous buck converter that includes accurate individual phase current and temperature reporting through PMBus™. These smart power-stage devices include fault-protection circuits for overtemperature, VX short, I/O open/short, supply undervoltage lockout (UVLO), and main power-supply overvoltage lockout (OVLO). The MAX20846 immediately shuts down on fault detection, communicating the Fault_ID to the controller.

Monolithic integration and advanced packaging technology allow high-switching frequencies with significantly lower losses than conventional implementations. Phase shedding and discontinuous conduction modes (DCM) optimize efficiency over a wide range of load currents. The MAX20846 integrates an internal LDO simplifying bias generation for applications that do not have 1.8V available.

The MAX20846 is available in a 4mm x 6mm, 34-pin FC2QFN package.

Benefits and Features

- Space-Optimized Solution
  - Monolithic, Smart Power Stage
  - Phase-Current Steering for Thermal Balance
  - Small Footprint: 24mm²
- 96.1% Peak Efficiency
  - 6-Phase, 400kHz, 12V VIN, 1.8V VOUT
- 300kHz to 1.3MHz Switching Frequency
- Telemetry and Fault Reporting through Controller IC PMBus
  - Accurate Temperature Monitoring and Reporting
  - Accurate Per-Phase Current Reporting
  - Fault_ID Indicates Parallel Phase Fault Type
- Advanced Self-Protection Features*
  - Supply and Boost UVLO Protection
  - Input Supply OVLO Protection
  - Boost Refresh
  - VX Short and Overtemperature Shutdown
  - VX Open and Short Detection at Power-Up
  - Fast Overcurrent Protection
  - Inductor Saturation Protection
  - Open/Short Pin Detection During Startup
*Protection features vary with different part variants.

Ordering Information appears at the end of data sheet.

PMBus is a trademark of SMIF, Inc.

Electrical and Thermal Ratings

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CURRENT RATING* (A)</th>
<th>INPUT VOLTAGE (V)</th>
<th>OUTPUT VOLTAGE (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Rating**</td>
<td>104.5</td>
<td>4.5 to 16</td>
<td>0.25 to 5.8</td>
</tr>
<tr>
<td>Thermal Rating TA = +55°C, 200LFM</td>
<td>44</td>
<td>12</td>
<td>1.8</td>
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<tr>
<td>47</td>
<td>12</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

*TJ = +125°C.

**Maximum-phase DC current limited by POCP and FASTPOCP_R typical value. Maximum output voltage requires VDDH > VOUT + 2.2V.