

4x6 Smart Power-Stage IC with Integrated LDO, Current, and Temperature Sensors

MAX20846

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.

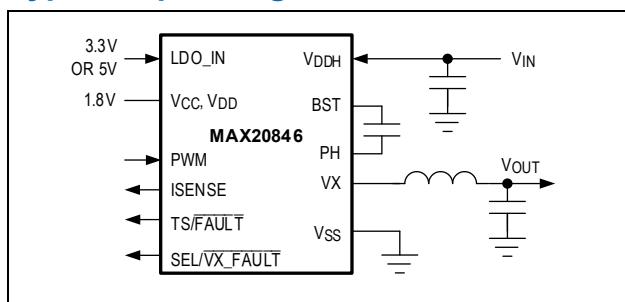
Monolithic integration and advanced packaging technology allow high-switching frequencies with significantly lower losses than conventional implementations. Phase shedding and discontinuous conduction modes (DCM) optimize efficiency over a wide range of load currents. The MAX20846 integrates an internal 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.

Applications

- High-Current Multiphase-Voltage Regulators
 - VR13, VR13.HC, and VR14 CPU and Memory
 - Networking ASICs
 - AI and Machine Learning ASICs
 - Graphics Processors
- Servers, Workstations, and Enterprise Storage
- Communications and Networking Equipment

Typical Operating Circuit



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 V_{IN}, 1.8V V_{OUT}
- 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

DESCRIPTION	CURRENT RATING*	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (V)
Electrical Rating**	104.5	4.5 to 16	0.25 to 5.8
Thermal Rating $T_A = +55^\circ\text{C}$, 200LFM	44	12	1.8
	47	12	1.0

* $T_J = +125^\circ\text{C}$.

**Maximum-phase DC current limited by POCP and FASTPOCP_R typical value. Maximum output voltage requires $V_{DDH} > V_{OUT} + 2.2V$.

