4x5 Smart Power-Stage IC with Integrated Current and Temperature Sensors

MAX20844B/MAX20845B

General Description

The MAX20844B/MAX20845B 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 MAX20844B/MAX20845B immediately shut down on fault detection, communicating the Fault_ID to the controller.

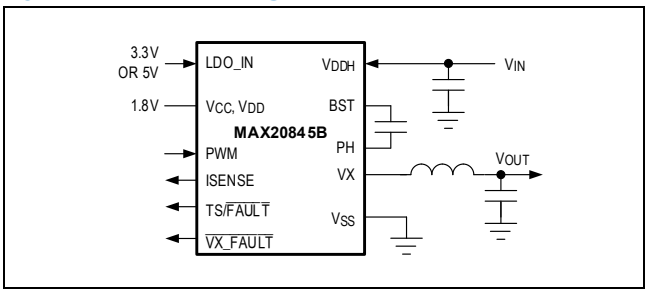
Monolithic integration and advanced packaging technology allow high-switching frequencies with significantly lower losses than conventional implementations. Phase shedding and discontinuous conduction modes (DCM) optimize efficiency over a wide range of load currents. The MAX20845B integrates an internal LDO simplifying bias generation for applications that do not have 1.8V available.

The MAX20844B/MAX20845B are available in a 30-pin FCLGA package thermal pad (4mm x 5mm).

Applications

- Mid-Current Voltage Regulators
  - VR13, VR13.HC, and VR14 CPU Low-Power Rails
  - AI, GPUs Auxiliary Rails
- Servers, Workstations, and Enterprise Storage
- Communications and Networking Equipment

Typical Operating Circuit



Benefits and Features

- Space-Optimized Solution
  - Monolithic, Smart Power Stage
  - Integrated V_{CC} and V_{DD} Capacitors
  - Phase-Current Steering for Thermal Balance
  - Small Footprint: 20mm^2
- Peak Efficiency 1-Phase, 600kHz, 12V V_{IN}
  - 92.4% at 1V V_{OUT}
  - 95% at 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 Type of Fault
- 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 the data sheet.**

Electrical and Thermal Ratings

DESCRIPTON	CURRENT RATING* (A)	INPUT VOLTAGE (V)	OUTPUT VOLTAGE (V)
Electrical Rating**	70	4.5 to 16	0.25 to 5.8
Thermal Rating T_A = +55°C, 200LFM	23	12	1.8
	25	12	1.0

T_J = +125°C

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

Visit Web Support to complete the nondisclosure agreement (NDA) required to receive additional product information.

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