PRODUCT BRIEF

Intel® Enpirion® Power Solutions

ED8401 Digital Multi-Phase Controller and ET6160 70 A Power Stage

Complete Solution for DC/DC Regulation on High Performance FPGAs and ASICs

Features

- Pre-loaded in the Intel® Quartus® Prime software; SmartVID validated
- Input range 4.5 V -16 V
- Output voltage Ripple < 10mVpp
- Easily scalable from 40 A to > 200 A
- PMBus* V 1.3 compliant digital communication for configuration, control, and telemetry
- Fault management of each phase using temperature monitor, current monitor, and status register
- Monolithic die with low thermal impedance, optimized junction-to-case top resistance for use of heat sink
- Meet high-performance Intel Arria® 10 FPGA and Intel Stratix® 10 FPGA tolerance requirements
- ±0.5% DC accuracy
- RoHS compliant with no exceptions

System Benefits

- **High quality**: Solution offers excellent quality and reliability enabling low Failure in Time (FIT) rates
- **Low risk**: Full suite of design tools available enabling fast time-to-market and validated on Intel development kits
- **Simple power on**: Complete power management coverage across all power rails
- **One Intel**: Validated solutions with one-stop-shop to reduce complexity
- **Small footprint**: up to 30% smaller than previous development kit core power solutions†

Applications

- FPGA, ASIC, and ASSP core and transceiver
- Data center acceleration and storage
- 5G wireless base station and remote radio head
- Communications infrastructure

Description

The Intel Enpirion® ED8401 is a digital multi phase step-down controller for non-isolated, high current DC/DC applications. The ET6160 device is a monolithic 70 A power stage with integrated current and temperature monitors.

The ET6160 power stage is optimized to operate with the ED8401 scalable multi-phase controller. The ED8401 device offers a scalable solution by operating in 4, 3, or 2 phase mode. Combined with the ET6160LI 70 A power stage, the system is optimized for a load current range from 40 A to greater than 200 A while offering high efficiency across the load range.

This complete solution has been designed, tested, and validated on Intel development kits to ensure they meet FPGA, ASIC, and SoC requirements.

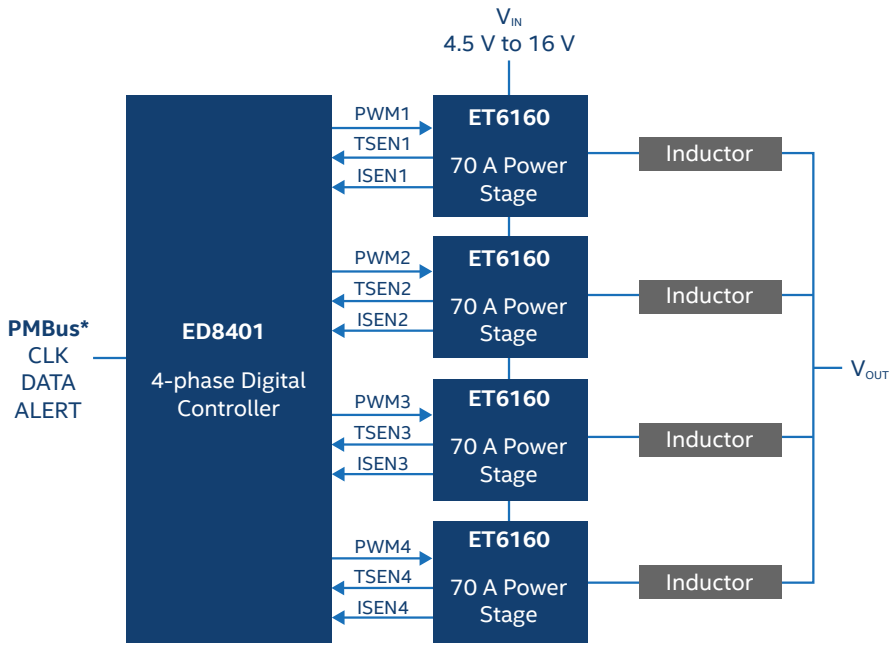
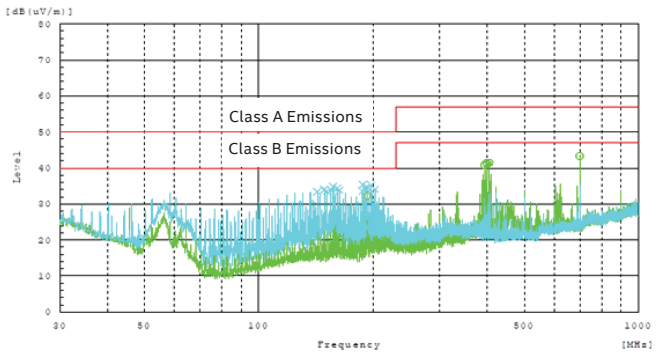


Figure 1: Application Diagram

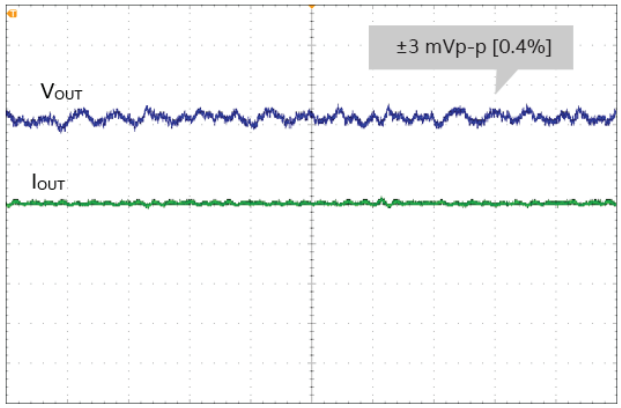
Performance Characteristics

Electromagnetic Interference, 120 A Load



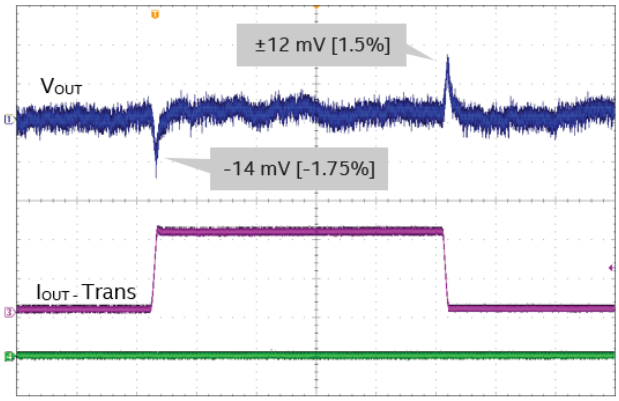
CISPR32 Radiated Emissions Scan
V_{IN} = 12 V, V_{OUT} = 0.9 V

Output Voltage Ripple, 160 A Load



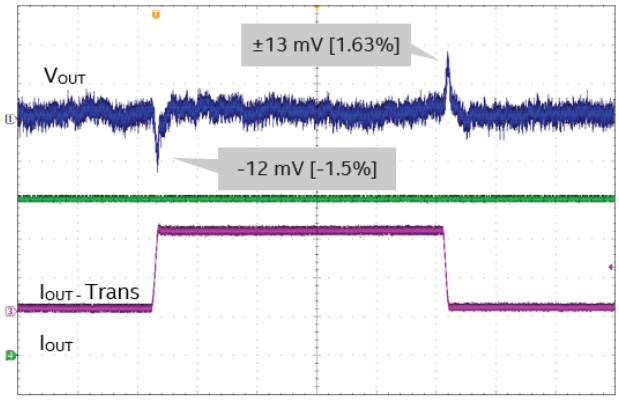
V_{IN} = 12 V, V_{OUT} = 0.8 V
2 µs/div, V_{OUT}: 10 mV/div, 20 MHz bandwidth

Output Voltage Transient Response, Load Step from 0 A to 80 A



V_{IN} = 12 V, V_{OUT} = 0.8 V, 100µs/div
§V_{OUT}: 10 mV/div, I_{OUT}: 33 A/div, 10 A/µs

Output Voltage Transient Response, Load Step from 80 A to 160 A



V_{IN} = 12 V, V_{OUT} = 0.8 V, 100µs/div
§V_{OUT}: 10 mV/div, I_{OUT}: 33 A/div, 10 A/µs

For more information about Intel and Intel Enpirion PowerSoCs, visit www.intel.com/enpirion

§ Using output capacitors of 16 x 470 µF + 16 x 100 µF (Ceramic)

† Tests measure performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.