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New VRPower® Integrated DrMOS Power Stages Deliver High Current, Efficiency, and Power Density

Vishay Intertechnology, Inc. (NYSE: VSH) introduces a new family of VRPower integrated DrMOS power stage solutions in the low-profile, thermally enhanced PowerPAK® MLP 5 mm by 5 mm 31-pin package. Delivering currents in excess of 60 A per phase, Vishay Siliconix SiC620 devices enable high efficiency to 95 % peak and switching frequencies to 1.5 MHz.

Product Benefits:

- Fully compliant with the DrMOS 4.0 specification
- Low-profile, thermally enhanced PowerPAK MLP 5 mm by 5 mm 31-pin package
- Deliver peak current in excess of 60 A
- Achieve 95 % efficiency
- High switching frequencies to 1.5 MHz
- Combine industry benchmark TrenchFET® Gen IV n-channel MOSFETs with integrated driver IC and bootstrap Schottky diode in 25 mm² footprint area
- 5 V and 3.3 V logic levels on the PWM
- Optimized for 12 V input rails
- Operate from an input voltage range of 4.5 V to 16 V
- Provide low PWM propagation delay of < 20 ns
- Offer excellent thermal performance
- Zero Current Detect circuitry
- Adaptive dead time control
- Undervoltage lockout (UVLO)
- Shoot-through protection
- Thermal warning feature



Market Applications:

- High-current, non-isolation point-of-load modules
- High-power, multi-phase buck regulator applications in notebook PCs, servers, game consoles, graphics cards, switch and storage systems, and other high-power CPU-based systems

The Key Specifications:

- Load current: 60 A
- Switching frequency: 1.5 MHz
- Tri-state PWM logic of 5 V and 3.3 V
- Input voltage range: 4.5 V to 16 V
- PWM propagation delay: < 20 ns

Efficiency:

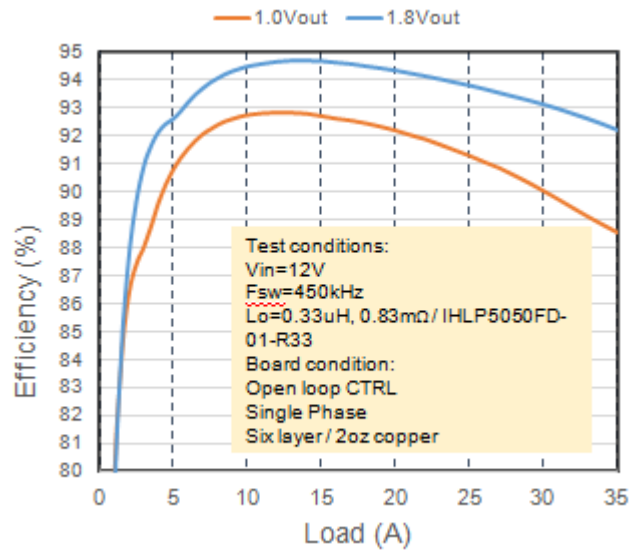


Figure 1: Typical efficiency VOUT

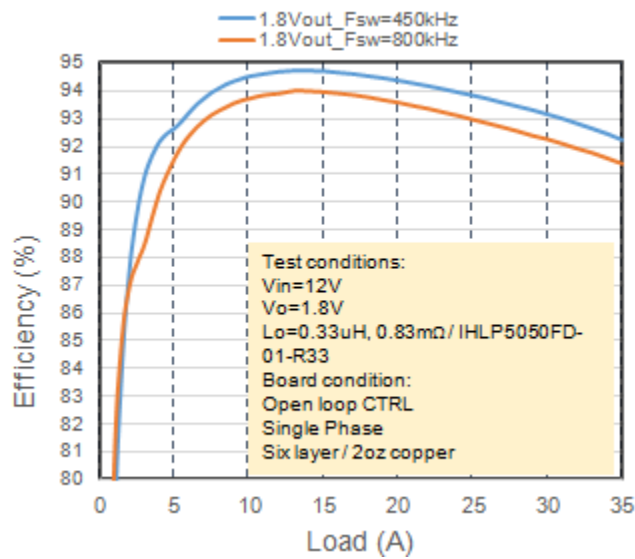


Figure 2: Typical Efficiency Fsw



The Perspective:

With their 5 mm by 5 mm PowerPAK MLP package, SiC620 integrated power stages are 30 % smaller than previous-generation 6 mm by 6 mm devices, while enabling 3 % higher efficiency. With reduced package parasitics compared to discrete solutions, the devices enable high switching frequencies to 1.5 MHz for increased power density and lower overall solution costs. Offering excellent thermal performance, the power stages feature > 50 °C cooler operation than previous-generation solutions.

The devices' gate driver IC is compatible with a wide range of PWM controllers and supports tri-state PWM logic of 5 V and 3.3 V. The power stages' driver IC incorporates Zero Current Detect circuitry to improve light-load efficiency, while an adaptive dead time control helps to further improve efficiency at all load points. Protection features include undervoltage lockout (UVLO), shoot-through protection, and a thermal warning feature that alerts the system in case of an excessive junction temperature.

Availability: Samples and production quantities of the SiC620 family are available now, with lead times of 12 weeks for larger orders.