

## Silicon Carbide Schottky Diodes Improve Data Center Power Supply Designs



Targeting the latest data center power supply requirements, Cree, Inc. announces its new line of Z-Rec 650V Junction Barrier Schottky (JBS) diodes. The new JBS diodes provide blocking voltage to 650V to accommodate recent changes in data center power architecture that industry consultants estimate will result in energy efficiency gains of up to 5 percent. Because data centers account for nearly 10 percent of the world's annual consumption of electrical power, any efficiency gain represents a significant opportunity to reduce overall power consumption.

Conventional switch-mode power supplies typically have an input voltage range of 90V - 264V, supporting various AC input sources worldwide. In existing data center power architectures, 3-phase/480V power is supplied from the local utility. This 3 phase/480V power is converted to 3 phase/208V by means of a power transformer and then further conditioned to provide input power to the server power supply. This conversion step reduces overall efficiency due to transformer losses.

Recent trends in data center power architecture call for the elimination of the 480V to 208V conversion to boost overall data center efficiency. Instead of providing 120V AC from the 3 phase/208V line to neutral, server power supplies will now be expected to accept a broader universal line voltage range of 90V - 305V (277V plus a 10 percent guard band) directly from the 3 phase/480V line to neutral. This architecture eliminates the need for the step-down power transformer, along with the related energy losses and expense.

Optimal operation of server power supplies with a higher input voltage range of 90V - 305V requires power components such as Schottky diodes that have an extended

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maximum blocking voltage of 650V. Cree's new 650V-rated devices provide an ideal solution for designers of state of the art power supplies for data center servers and communications equipment. Cree's new Z-Rec silicon carbide diodes not only feature the 650V blocking voltage needed for these advanced power supplies, but they also further reduce energy losses, as compared to silicon devices, by eliminating reverse recovery losses.

"Silicon carbide technology is critical to developing the next generation of advanced, energy-efficient data center power system designs because it virtually eliminates diode switching losses," explained Cengiz Balkas, Cree Vice President and General Manager, Power and RF. "Conventional silicon devices' switching losses are known to be big contributors to energy inefficiency, so replacing them with SiC devices can boost the efficiency of the power factor correction stage of the power supply by up to 2 percent, resulting in even greater overall efficiency improvement than with architectural changes alone."

The initial products in the 650V Z-Rec Schottky diode family, the C3DXX065A Series, include 4, 6, 8, and 10 amp versions in TO-220-2 packages. All devices are rated for operation from -55°C to +175°C.

The C3DXX065A Series devices are fully qualified and released for production use. For samples and more information about Cree's 650V Z-Rec devices or any of Cree's other 600V, 1200V and 1700V diodes, visit [www.cree.com/power](http://www.cree.com/power) [1].

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[1] <http://www.cree.com/power>