



## NXP SiC diode for high efficiency power supply

# NXP's New Generation of SiC Diode

NXP's new generation products take advantage of silicon carbide's superior performance over silicon to deliver market leading efficiency at an attractive cost. Based on a proprietary SiC process technology combined with a very compact cell design and the latest advances in thin wafer technology, NXP's SiC products deliver improved thermal characteristics and lower Figures of Merit ( $Q_r \times V_f$ ). This 650 V SiC family of 4 A to 10 A diodes in TO-220 packages offers great flexibility to designers looking for efficiency and robustness with reduced time to market and system cost.

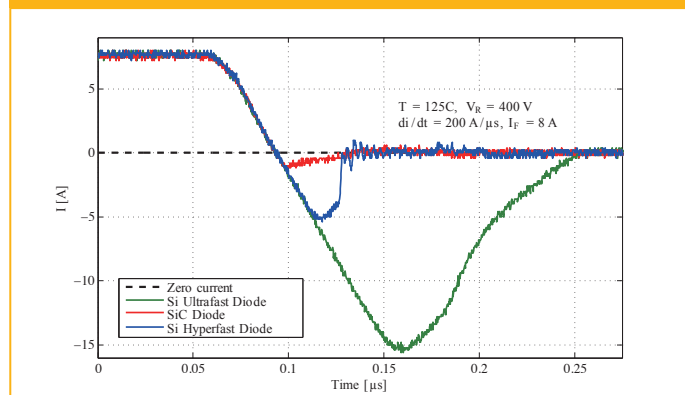
### Key Features and Benefits

- Highly stable switching performance
- High forward surge capability IFSM
- Fastest reverse recovery time
- Temperature independent switching behavior
- di/dt independent reverse recovery charge
- Positive temperature coefficient for diode paralleling
- Improved efficiency compared to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant
- Junction temperature up to 175°C

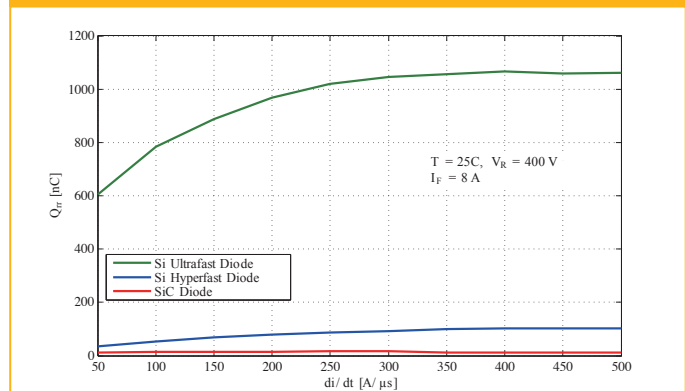
### Key Applications

- Power factor correction
- Telecom/Server SMPS
- UPS
- PV inverter
- PC Silverbox
- LED/OLED TV
- Motor Drives

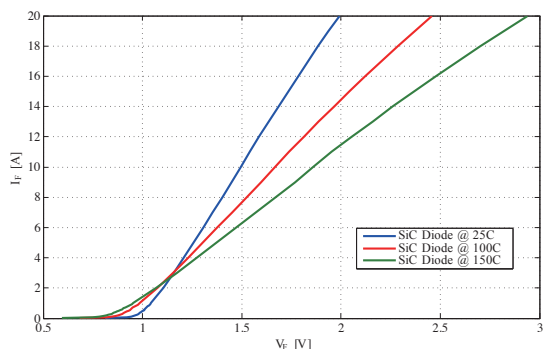
Lowest Reverse Recovery Current  
--SiC Versus Silicon Diodes



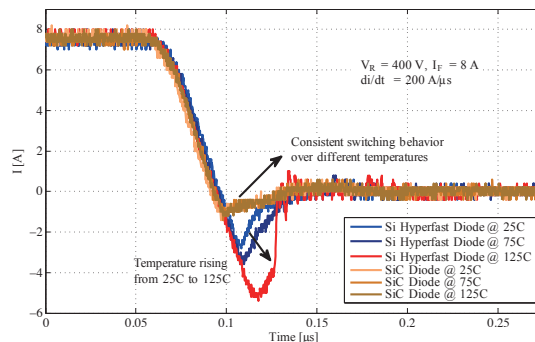
di/dt Independent Reverse Recovery Charge  $Q_{rr}$   
--SiC versus Silicon Diodes



### Positive Temperature Coefficient --Suitable for Diode Paralleling

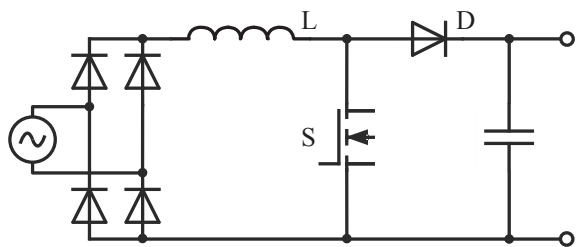


### Temperature Independent Switching Behavior

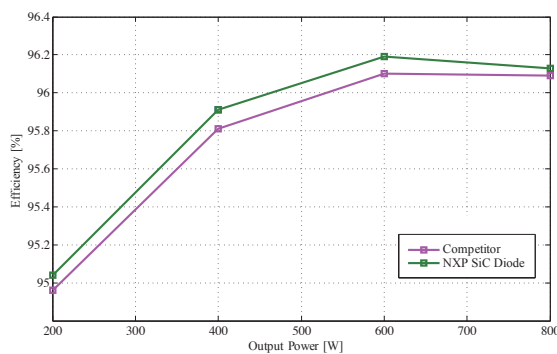


- More efficiency advance in higher temperature applications or conditions, e.g. down-hole drilling, power converter at full load.
- Heatsink size reduction with a higher operation temperature.

### Typical Application Circuit: Boost Type PFC



### Efficiency Comparison --NXP (GREEN) versus Competitor



- Efficiency benchmark results on an 800W commercial server power supply.

### SiC Diode Parameters

$V_{RRM}$ (V)	$I_{F(AV)}$ (A)	$V_F$ (typ) @25C, @rated current (V)	$I_{FSM}$ (A) @10 $\mu$ s	$Q_r$ (typ) @25C(nC)	SOD59 (TO220AC)
650V	4	1.7	235 (max)	7	NXPSC04650
	6	1.7	310 (max)	10	NXPSC06650
	8	1.7	385 (max)	13	NXPSC08650
	10	1.7	450 (max)	15	NXPSC10650