Ultrafast Reverse Recovery Power Silicon Diodes

Rapid Diodes – The Perfect Partner to CoolMOS™ and TRENCHSTOP™ 5

With the new 650V Rapid 1 and Rapid 2 Diode families, Infineon enters the high voltage hyper-fast silicon diode market. They represent a perfect balance between cost and performance and target high efficiency applications switching between 18kHz and 100kHz. The new diodes are optimized to work in harmony with CoolMOS™ and TRENCHSTOP™ 5 in PFC topologies.

The Rapid 1 family is optimized with low $V_f$ and soft recovery and is perfect for applications switching between 18kHz and 40kHz, where conduction losses and EMI emissions are critical design parameters.

The Rapid 2 family meanwhile is designed for applications switching between 40kHz and 100kHz. In this switching range, the main loss component comes from the switching losses, therefore the Rapid 2 has been optimized to provide low $Q_{rr}$ and $t_{rr}$. The Rapid 2 also provides super soft recovery behavior with an $S$-factor >>1.

### Features
- Temperature stable conduction losses ($V_f$)
- Rapid 1 offers 250mV lower conduction losses ($V_f$) than best competitor
- Rapid 2 offers lowest $Q_{rr}; V_f$ ratio
- 10% lower $I_{rms}$ than best competitor
- High level of softness

### Benefits
- Rapid 2 offers Best-in-Class (BiC) efficiency for hyperfast Si diodes at 70kHz
- Lowest $I_{rms}$ improves the $E_{on}$ of the switch in the PFC by 10%
- High level of softness provides BiC EMI behavior

### Applications
- Room and Commercial Airconditioners
- PFC Server
- PFC Telecom Rectifier
- PC Power (>90W)
- UPS
- TV PFC (>90W)
- Welding Machines

www.infineon.com/rapiddiodes
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Rapid 1 with optimized $V_F$
- 1.35V temperature-stable forward voltage ($V_F$)
- Highest $S$-factor for ultimate softness and low EMI filtering needed
- Lowest $I_{rrm}$ to provide lowest turn-on losses on the boost switch
- Designed for applications switching between 18kHz and 40kHz
- $t_F < 100ns$

The Rapid 2 diode family
- Lowest reverse recovery charge ($Q_{rr}$): $V_F$ ratio for BiC performance
- Low reverse recovery time ($t_F$)
- Lowest $I_{rrm}$ to provide lowest turn-on losses on the boost switch
- Designed for applications switching between 40kHz and 100kHz
- $t_F < 50ns$

Common Cathode and Dual Anode Rapid Diode

Rapid 2 Best-in-Class Performance
- Optimization of the layout for more compact design and easier assembly
- Nominal current $I_{nom}$ up to 75A Rapid 1 in Dual Anode
- 2 times 40A Rapid 1 and Rapid 2 in Common Cathode

The New Rapid Diode Families

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<th>TO-220 real 2pin</th>
<th>TO-220 FullPAK real 2pin</th>
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