United Silicon Carbide, Inc. offers the 3rd generation of high performance SiC Merged-PIN-Schottky (MPS) diodes. With zero reverse recovery charge and 175°C maximum junction temperature, these diodes are ideally suited for high frequency and high efficiency power systems with minimum cooling requirements.

**Features**
- 175°C maximum operating junction temperature
- Easy paralleling
- Extremely fast switching not dependent on temperature
- No reverse or forward recovery
- Enhanced surge current capability, MPS structure
- Excellent thermal performance, Ag sintered
- 100% UIS tested
- AEC-Q101 qualified

**Typical Applications**
- Power converters
- Industrial motor drives
- Switching-mode power supplies
- Power factor correction modules

**Maximum Ratings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC blocking voltage</td>
<td>$V_B$</td>
<td></td>
<td>650</td>
<td>V</td>
</tr>
<tr>
<td>Repetitive peak reverse voltage, $T_J=25°C$</td>
<td>$V_{FRM}$</td>
<td></td>
<td>650</td>
<td>V</td>
</tr>
<tr>
<td>Surge peak reverse voltage</td>
<td>$V_{RSM}$</td>
<td></td>
<td>650</td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC forward current</td>
<td>$I_F$</td>
<td>$T_C = 152°C$</td>
<td>10</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive forward surge current sine halfwave</td>
<td>$I_{FSM}$</td>
<td>$T_C = 25°C, t_p = 10ms$</td>
<td>70</td>
<td>A</td>
</tr>
<tr>
<td>Repetitive forward surge current sine halfwave, $D=0.1$</td>
<td>$I_{FRM}$</td>
<td>$T_C = 110°C, t_p = 10ms$</td>
<td>60</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive peak forward current</td>
<td>$I_{F,max}$</td>
<td>$T_C = 25°C, t_p = 10µs$</td>
<td>455</td>
<td>A</td>
</tr>
<tr>
<td>$i^2t$ value</td>
<td>$\int i^2 dt$</td>
<td>$T_C = 25°C, t_p = 10ms$</td>
<td>24.5</td>
<td>$A^2s$</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>$P_{Tot}$</td>
<td>$T_C = 25°C$</td>
<td>136.4</td>
<td>W</td>
</tr>
<tr>
<td>Maximum junction temperature</td>
<td>$T_{J,max}$</td>
<td></td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>Operating and storage temperature</td>
<td>$T_{J,STG}$</td>
<td></td>
<td>20.9</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperatures, wavesoldering only allowed at leads</td>
<td>$T_{sold}$</td>
<td>1.6mm from case for 10s</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

For more information go to [www.unitedsic.com](http://www.unitedsic.com).
Electrical Characteristics

$T_J = +25°C$ unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage</td>
<td>$V_F$</td>
<td>$I_F = 10A, T_J = 25°C$</td>
<td>-</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10A, T_J = 150°C$</td>
<td>-</td>
<td>1.68</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_R$</td>
<td>$V_R = 650V, T_J = 25°C$</td>
<td>-</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 650V, T_J = 175°C$</td>
<td>-</td>
<td>150</td>
</tr>
<tr>
<td>Total capacitive charge</td>
<td>$Q_C$</td>
<td>$V_R = 400V$</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Total capacitance</td>
<td>$C$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacitance stored energy</td>
<td>$E_C$</td>
<td>$V_R = 400V$</td>
<td>3.4</td>
<td></td>
</tr>
</tbody>
</table>

$Q_C$ is independent on $T_J$, $di/dt$, and $I_F$ as shown in the application note USCi_AN0011.

Thermal characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance, junction-case</td>
<td>$R_{thJC}$</td>
<td></td>
<td>0.82</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Typical Performance

**Figure 1** Typical forward characteristics

**Figure 2** Typical forward characteristics in surge current

For more information go to www.unitedsic.com
Figure 3 Typical reverse characteristics

Figure 4 Power dissipation

Figure 5 Diode forward current

Figure 6 Maximum transient thermal impedance
Figure 7 Capacitance vs. reverse voltage at 1MHz

Figure 8 Typical capacitive charge vs. reverse voltage

Figure 9 Typical capacitance stored energy vs. reverse voltage
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