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_R )</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Repetitive peak reverse voltage, ( T_J = 25°C )</td>
<td>( V_{RRM} )</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Surge peak reverse voltage</td>
<td>( V_{RSM} )</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Maximum DC forward current</td>
<td>( I_F )</td>
<td>( T_C = 160.7°C )</td>
<td>5</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></td>
<td></td>
<td>( T_C = 110°C, t_p = 10ms )</td>
<td>63</td>
<td>A</td>
</tr>
<tr>
<td>Repetitive forward surge current sine halfwave, ( D = 0.1 )</td>
<td>( I_{FRM} )</td>
<td>( T_C = 25°C, t_p = 10ms )</td>
<td>31.8</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10ms )</td>
<td>18.6</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 = 10\mu s )</td>
<td>525</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10\mu s )</td>
<td>525</td>
<td>A</td>
</tr>
<tr>
<td>( i^2t ) value</td>
<td>( \int i^2dt )</td>
<td>( T_C = 25°C, t_p = 10ms )</td>
<td>24.5</td>
<td>A²s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10ms )</td>
<td>19.5</td>
<td>A²s</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>( P_{tot} )</td>
<td>( T_C = 25°C )</td>
<td>136</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 160.7°C )</td>
<td>13</td>
<td>W</td>
</tr>
<tr>
<td>Maximum junction temperature</td>
<td>( T_{J,max} )</td>
<td>( T_C = 25°C )</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 160.7°C )</td>
<td>13</td>
<td>°C</td>
</tr>
<tr>
<td>Operating and storage temperature</td>
<td>( T_{J}, T_{STG} )</td>
<td></td>
<td>-55 to 175</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>

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For more information go to 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>$I_F = 5A, T_J = 25°C$</td>
<td>-</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5A, T_J = 150°C$</td>
<td>-</td>
<td>1.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 5A, T_J = 175°C$</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_R$</td>
<td>$V_R = 1200V, T_P = 25°C$</td>
<td>-</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 1200V, T_J = 175°C$</td>
<td>-</td>
<td>210</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>400</td>
</tr>
<tr>
<td>Total capacitive charge</td>
<td>$Q_C$</td>
<td>$V_R = 800V$</td>
<td>27</td>
<td>nC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>250</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Capacitance stored energy</td>
<td>$E_C$</td>
<td>$V_R = 800V$</td>
<td>8</td>
<td>μJ</td>
</tr>
</tbody>
</table>

(1) $Q_C$ 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>$R_{juc}$</td>
<td></td>
<td>0.85</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Typical Performance

![Figure 1 Typical forward characteristics](image1)

![Figure 2 Typical forward characteristics in surge current](image2)

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**Figure 3** Typical reverse characteristics

**Figure 4** Power dissipation

**Figure 5** Diode forward current

**Figure 6** Maximum transient thermal impedance

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Gen-III | 5A - 1200V SiC Schottky Diode | UJ3D1205TS

Datasheet

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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