Description

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

Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Value (Leg/Device)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC blocking voltage</td>
<td>( V_B )</td>
<td></td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>Repetitive peak reverse voltage, ( T_J = 25°C )</td>
<td>( V_{BRM} )</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 = 158°C )</td>
<td>10/20</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>120/240</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10ms )</td>
<td>110/220</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>56.7/113.4</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10ms )</td>
<td>33.6/67.2</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive peak forward current</td>
<td>( I_{FSM} )</td>
<td>( T_C = 25°C, t_p = 10\mu s )</td>
<td>720/1440</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( T_C = 110°C, t_p = 10\mu s )</td>
<td>720/1440</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>72/288</td>
<td>A^2s</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>( P_{tot} )</td>
<td>( T_C = 25°C, t_p = 10ms )</td>
<td>234.4/468.8</td>
<td>W</td>
</tr>
<tr>
<td>Maxium junction temperature</td>
<td>( T_{J, max} )</td>
<td>( T_C = 158°C )</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>Operating and storage temperature</td>
<td>( T_J, T_{STG} )</td>
<td>( T_C = 158°C )</td>
<td>-55 to 175</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperatures, wavesoldering only allowed at leads</td>
<td>( T_{solder} )</td>
<td>1.6mm from case for 10s</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

Rev. B, January 2018

For more information go to www.unitedsic.com
Electrical Characteristics

\(T_J = +25^\circ C\) unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Value (Leg/Device)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage</td>
<td>(V_F)</td>
<td>(I_F=10A/20A, T_J = 25^\circ C)</td>
<td>- 1.4 1.6</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(I_F=10A/20A, T_J = 150^\circ C)</td>
<td>- 1.85 2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(I_F=10A/20A, T_J = 175^\circ C)</td>
<td>- 2 2.6</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>(I_R)</td>
<td>(V_R=1200V, T_J \geq 25^\circ C)</td>
<td>- 100/200 640/1280</td>
<td>(\mu A)</td>
</tr>
<tr>
<td>Total capacitive charge (^{[1]})</td>
<td>(Q_C)</td>
<td>(V_R=1200V, T_J = 175^\circ C)</td>
<td>- 1000/2000</td>
<td></td>
</tr>
<tr>
<td>Total capacitance</td>
<td>(C)</td>
<td>(V_R=1V, f=1MHz)</td>
<td>510/1020</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(V_R=400V, f=1MHz)</td>
<td>48/96</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(V_R=800V, f=1MHz)</td>
<td>41/82</td>
<td></td>
</tr>
<tr>
<td>Capacitance stored energy</td>
<td>(E_C)</td>
<td>(V_R=800V)</td>
<td>15/30</td>
<td>(\mu \text{J})</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 (Leg/Device)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance, junction - case</td>
<td>(R_{JUC})</td>
<td></td>
<td>0.49/0.245 0.64/0.32</td>
<td>(^{\circ}\text{C/W})</td>
</tr>
</tbody>
</table>

Typical Performance (Per Leg)

![Figure 1 Typical forward characteristics](image1)

![Figure 2 Typical forward characteristics in surge current](image2)
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
t at 1MHz

Figure 8 Typical capacitive charge vs. reverse voltage

Figure 9 Typical capacitance stored energy
 vs. reverse voltage

Qc = \int_{0}^{V_R} C(V) \, dV
Disclaimer

United Silicon Carbide, Inc. reserves the right to change or modify any of the products and their inherent physical and technical specifications without prior notice. United Silicon Carbide, Inc. assumes no responsibility or liability for any errors or inaccuracies within.

Information on all products and contained herein is intended for description only. No license, express or implied, to any intellectual property rights is granted within this document.

United Silicon Carbide, Inc. assumes no liability whatsoever relating to the choice, selection or use of the United Silicon Carbide, Inc. products and services described herein.
We are here for you. Addresses and Contacts.

Sales Germany & Austria

Geometrical sensors

Kurt Stritzelberger
Phone: +49 89 374 288 87 22
kurt.stritzelberger@pewatron.com

Pressure sensors

Gerhard Vetter
Phone: +49 89 374 288 87 26
gerhard.vetter@pewatron.com

Gas sensors and modules

Peter Felder
Phone: +41 44 877 35 05
peter.felder@pewatron.com

Sales Switzerland & Liechtenstein

Basil Frei
Phone: +41 44 877 35 18
basil.frei@pewatron.com

Postcode 3000 – 9999

Christian Mohrenstecher
Phone: +41 76 444 57 93
christian.mohrenstecher@pewatron.com

Postcode 1000 – 2999

Sales International Key Accounts

Peter Felder
Phone: +41 44 877 35 05
peter.felder@pewatron.com

Sales Other Countries / Product Management

Pressure Sensors

Philipp Kistler
Phone: +41 44 877 35 03
philipp.kistler@pewatron.com

Power supplies

Sebastiano Leggio
Phone: +41 44 877 35 06
sebastiano.leggio@pewatron.com

Accelerometers

Christoph Kleye
Phone: +49 89 374 288 87 61
christoph.kleye@pewatron.com

Current sensors / Power solutions & Turkey

Osman Coban
Phone: +49 89 374 288 87 65
osman.coban@pewatron.com

Flow / Level / Medical products

Dr. Adriano Pittarelli
Phone: +49 89 374 288 87 67
adriano.pittarelli@pewatron.com

Drive technology

CH Postcode 5000 – 9999 / DE

Roman Homa
Phone: +41 76 444 00 86
roman.homa@pewatron.com

Drive technology

CH Postcode 1000 – 4999 / AT / IT / FR

Christian Mohrenstecher
Phone: +41 76 444 57 93
christian.mohrenstecher@pewatron.com