650V SiC diodes for industrial applications

SiC diodes are high-performance power Schottky rectifiers that feature a silicon-carbide substrate. This wide bandgap material enables the design of high-voltage Schottky diodes, and ST offers 650 V Rectifiers. They present negligible reverse recovery at turn-off and minimal capacitive turn-off behavior which is independent of temperature. The very low $V_f$ series of 650 V Rectifiers offers the lowest forward voltage drop for optimal efficiency.

KEY FEATURES
- Very low forward conduction losses
- Low switching losses
- Soft switching behavior
- High forward surge capability
- Contribute to save energy
- Allow high switching frequency
- Reduced EMI
- High $T_j$ capability $T_{j,MAX} = 175 \, ^\circ C$
- 650 V guaranteed from -40 °C to +175 °C

KEY BENEFITS
- High efficiency adding value to the power converter
- Reducing size and cost of the power converter
- Low EMI impact, simplifying certification and reducing time to market
- Natural high robustness ensuring very high reliability
**IMPROVED EFFICIENCY**

The very high efficiency behavior of SiC diodes coupled with ST’s high level of quality ensures the best results for your designs and applications.

ST’s SiC diodes take advantage of silicon carbide’s superior physical characteristics over Si only, with 4 times better dynamic characteristics and 15% less forward voltage ($V_f$) versus the fastest 600V silicon diode.

In hard-switching applications, SiC Schottky diodes show a significant power-loss reduction.

Today, they are also widely used in the industry for AC/DC converters.

---

**SiC DIODES REDUCE SWITCHING POWER LOSSES**

Reverse characteristics

![SiC 650V diode graph](image)

Capacitive current independent of $T_j$

Ultrafast diode

**Power losses**

![Power losses graph](image)

$\Lambda \eta = +1.4\%$

---

**DEVICE SUMMARY**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Current rating (A)</th>
<th>Voltage rating (V)</th>
<th>Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>STPSC8065D</td>
<td>8</td>
<td>650</td>
<td>TO-220AC</td>
</tr>
<tr>
<td>STPSC10065D</td>
<td>10</td>
<td>650</td>
<td>TO-220AC</td>
</tr>
<tr>
<td>STPSC12065D</td>
<td>12</td>
<td>650</td>
<td>TO-220AC</td>
</tr>
<tr>
<td>STPSC20065DI</td>
<td>20</td>
<td>650</td>
<td>TO-220I</td>
</tr>
<tr>
<td>STPSC20065W</td>
<td>20</td>
<td>650</td>
<td>DO-247</td>
</tr>
<tr>
<td>STPSC40065CW</td>
<td>40 (2x20)</td>
<td>650</td>
<td>TO-247</td>
</tr>
</tbody>
</table>

© STMicroelectronics - December 2017 - Printed in United Kingdom - All rights reserved

The STMicroelectronics corporate logo is a registered trademark of the STMicroelectronics group of companies.

All other names are the property of their respective owners.

Order code: FLINDSIC1217

For more information on ST products and solutions, visit www.st.com