Dual High Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low $V_F = 0.54$ V at $I_F = 5$ A

**FEATURES**

- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Low thermal resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C (for TO-263AB package)
- Solder bath temperature 275 °C maximum, 10 s, per JESD 22-B106 (for TO-220AB, ITO-220AB, and TO-262AA package)

**TYPICAL APPLICATIONS**

For use in high frequency converters, switching power supplies, freewheeling diodes, OR-ing diode, DC/DC converters and reverse battery protection.

**MECHANICAL DATA**

Case: TO-220AB, ITO-220AB, D²PAK (TO-263AB), and TO-262AA

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

Polarity: as marked

Mounting Torque: 10 in-lbs maximum

**PRIMARY CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>V20120C</th>
<th>VF20120C</th>
<th>VB20120C</th>
<th>VI20120C</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_F$ (AV)</td>
<td>$I_{F(AV)}$</td>
<td>2 x 10 A</td>
<td>2 x 10 A</td>
<td>2 x 10 A</td>
<td>2 x 10 A</td>
<td>A</td>
</tr>
<tr>
<td>$V_{RRM}$</td>
<td>$V_{RRM}$</td>
<td>120 V</td>
<td>120 V</td>
<td>120 V</td>
<td>120 V</td>
<td>V</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>$I_{FSM}$</td>
<td>120 A</td>
<td>120 A</td>
<td>120 A</td>
<td>120 A</td>
<td>A</td>
</tr>
<tr>
<td>$V_F$ at $I_F = 10$ A</td>
<td>$V_F$</td>
<td>0.64 V</td>
<td>0.64 V</td>
<td>0.64 V</td>
<td>0.64 V</td>
<td>V</td>
</tr>
<tr>
<td>$T_J$ max.</td>
<td>$T_J$</td>
<td>150 °C</td>
<td>150 °C</td>
<td>150 °C</td>
<td>150 °C</td>
<td>°C</td>
</tr>
<tr>
<td>Package</td>
<td>Package</td>
<td>TO-220AB, ITO-220AB, D²PAK (TO-263AB), TO-262AA</td>
<td>Common cathode</td>
<td>Common cathode</td>
<td>Common cathode</td>
<td></td>
</tr>
</tbody>
</table>

**MAXIMUM RATINGS** ($T_A = 25$ °C unless otherwise noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>V20120C</th>
<th>VF20120C</th>
<th>VB20120C</th>
<th>VI20120C</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum repetitive peak reverse voltage</td>
<td>$V_{RRM}$</td>
<td>120 V</td>
<td>120 V</td>
<td>120 V</td>
<td>120 V</td>
<td>V</td>
</tr>
<tr>
<td>Maximum average forward rectified current (fig. 1) per device</td>
<td>$I_{F(AV)}$</td>
<td>20 A</td>
<td>20 A</td>
<td>20 A</td>
<td>20 A</td>
<td>A</td>
</tr>
<tr>
<td>Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode</td>
<td>$I_{FSM}$</td>
<td>120 A</td>
<td>120 A</td>
<td>120 A</td>
<td>120 A</td>
<td>A</td>
</tr>
<tr>
<td>Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 60$ mH per diode</td>
<td>$E_{AS}$</td>
<td>80 mJ</td>
<td>80 mJ</td>
<td>80 mJ</td>
<td>80 mJ</td>
<td>mJ</td>
</tr>
<tr>
<td>Peak repetitive reverse current at $t_p = 2$ μs, 1 kHz, $T_J = 38$ °C ± 2 °C per diode</td>
<td>$I_{RRM}$</td>
<td>0.5 A</td>
<td>0.5 A</td>
<td>0.5 A</td>
<td>0.5 A</td>
<td>A</td>
</tr>
<tr>
<td>Voltage rate of change (rated $V_F$)</td>
<td>$dV/dt$</td>
<td>10 000 V/μs</td>
<td>10 000 V/μs</td>
<td>10 000 V/μs</td>
<td>10 000 V/μs</td>
<td>V/μs</td>
</tr>
<tr>
<td>Isolation voltage (ITO-220AB only) from terminal to heatsink $t = 1$ min</td>
<td>$V_{AC}$</td>
<td>1500 V</td>
<td>1500 V</td>
<td>1500 V</td>
<td>1500 V</td>
<td>V</td>
</tr>
<tr>
<td>Operating junction and storage temperature range</td>
<td>$T_J$, $T_{STG}$</td>
<td>-40 to +150 °C</td>
<td>-40 to +150 °C</td>
<td>-40 to +150 °C</td>
<td>-40 to +150 °C</td>
<td>°C</td>
</tr>
</tbody>
</table>

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For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsiq@vishay.com, DiodesEurope@vishay.com

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**ELECTRICAL CHARACTERISTICS** (TA = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITIONS</th>
<th>SYMBOL</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown voltage</td>
<td>IR = 1.0 mA</td>
<td>VBR</td>
<td>120</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Instantaneous forward voltage per diode</td>
<td>IF = 5 A</td>
<td>VF (1)</td>
<td>0.62</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>IF = 10 A</td>
<td></td>
<td>0.81</td>
<td>0.90</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>IF = 5 A</td>
<td></td>
<td>0.54</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>IF = 10 A</td>
<td></td>
<td>0.64</td>
<td>0.72</td>
<td>V</td>
</tr>
<tr>
<td>Reverse current per diode</td>
<td>VR = 90 V</td>
<td>IR (2)</td>
<td>8</td>
<td>-</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td>VR = 120 V</td>
<td></td>
<td>6</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>VR = 90 V</td>
<td></td>
<td>-</td>
<td>700</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td>VR = 120 V</td>
<td></td>
<td>14</td>
<td>45</td>
<td>mA</td>
</tr>
</tbody>
</table>

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle
(2) Pulse test: Pulse width ≤ 40 ms

**THERMAL CHARACTERISTICS** (TA = 25 °C unless otherwise noted)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>V20120C</th>
<th>VF20120C</th>
<th>VB20120C</th>
<th>VI20120C</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical thermal resistance per diode</td>
<td>RθJC</td>
<td>2.8</td>
<td>5.0</td>
<td>2.8</td>
<td>2.8</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION** (Example)

<table>
<thead>
<tr>
<th>PACKAGE</th>
<th>PREFERRED P/N</th>
<th>UNIT WEIGHT (g)</th>
<th>PACKAGE CODE</th>
<th>BASE QUANTITY</th>
<th>DELIVERY MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-220AB</td>
<td>V20120C-E3/4W</td>
<td>1.88</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>ITO-220AB</td>
<td>VF20120C-E3/4W</td>
<td>1.75</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>TO-263AB</td>
<td>VB20120C-E3/4W</td>
<td>1.37</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
<tr>
<td>TO-263AB</td>
<td>VB20120C-E3/8W</td>
<td>1.37</td>
<td>8W</td>
<td>800/reel</td>
<td>Tape and reel</td>
</tr>
<tr>
<td>TO-262AA</td>
<td>V20120C-E3/4W</td>
<td>1.45</td>
<td>4W</td>
<td>50/tube</td>
<td>Tube</td>
</tr>
</tbody>
</table>

**RATINGS AND CHARACTERISTICS CURVES** (TA = 25 °C unless otherwise noted)

![Fig. 1 - Maximum Forward Current Derating Curve](image1)

![Fig. 2 - Forward Power Loss Characteristics Per Diode](image2)
Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

Fig. 4 - Typical Reverse Characteristics Per Diode

Fig. 5 - Typical Junction Capacitance Per Diode

Fig. 6 - Typical Transient Thermal Impedance Per Diode

Fig. 7 - Typical Transient Thermal Impedance Per Diode
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

TO-220AB

ITO-220AB
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