SHINDENGEN

Schottky Rectifiers (SBD)

D20SC9M

90V 20A

FEATURES
- Tj150°C
- P_{RMS} avalanche guaranteed
- High current capacity
- Fully Isolated Molding

APPLICATION
- Switching power supply
- DC/DC converter
- Home Appliances, Office Equipment
- Telecommunication

OUTLINE DIMENSIONS

Case : ITO-3P

RATINGS

Absolute Maximum Ratings (If not specified T_{c}=25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>T_{stg}</td>
<td>~-40 ~ 150°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Junction Temperature</td>
<td>T_{j}</td>
<td></td>
<td>150°C</td>
<td></td>
</tr>
<tr>
<td>Maximum Reverse Voltage</td>
<td>V_{rm}</td>
<td></td>
<td>90 V</td>
<td></td>
</tr>
<tr>
<td>Repetitive Peak Surge Reverse Voltage</td>
<td>V_{RMS}</td>
<td>Pulse width 0.5ms, duty 1/40</td>
<td>100 V</td>
<td></td>
</tr>
<tr>
<td>Average Rectified Forward Current</td>
<td>I_{o}</td>
<td>50Hz sine wave, R-load, Rating for each diode I_{o}/2, T_{c}=111°C</td>
<td>20 A</td>
<td></td>
</tr>
<tr>
<td>Peak Surge Forward Current</td>
<td>I_{FSM}</td>
<td>50Hz sine wave, Non-repetitive 1 cycle peak value, T_{j}=125°C</td>
<td>200 A</td>
<td></td>
</tr>
<tr>
<td>Repetitive Peak Surge Reverse Power</td>
<td>P_{RMS}</td>
<td>Pulse width 10 μs, Rating of per diode, T_{j}=25°C</td>
<td>660 W</td>
<td></td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>V_{dis}</td>
<td>Terminals to case, AC 1 minute</td>
<td>1.5 kV</td>
<td></td>
</tr>
<tr>
<td>Mounting Torque</td>
<td>TOR</td>
<td>Recommended torque (0.5N-m)</td>
<td>0.8 N-m</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Characteristics (If not specified T_{c}=25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Voltage</td>
<td>V_{F}</td>
<td>I=10A, Pulse measurement, Rating of per diode</td>
<td>Max 0.75 V</td>
<td></td>
</tr>
<tr>
<td>Reverse Current</td>
<td>I_{R}</td>
<td>V_{F}=V_{F}, Pulse measurement, Rating of per diode</td>
<td>Max 10 mA</td>
<td></td>
</tr>
<tr>
<td>Junction Capacitance</td>
<td>C_{J}</td>
<td>I=1μA, V_{F}=10V, Rating of per diode</td>
<td>Typ 370 pF</td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>θ_{jc}</td>
<td>junction to case</td>
<td>Max 1.6 °C/W</td>
<td></td>
</tr>
</tbody>
</table>

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D20SC9M  Forward Voltage

Forward Voltage  $V_F$ [V]

Forward Current  $I_F$ [A]

Pulse measurement per diode

$T_c=150°C$ [MAX]
$T_c=150°C$ [TYP]
$T_c=25°C$ [MAX]
$T_c=25°C$ [TYP]
Reverse Voltage $V_R$ [V]

Junction Capacitance $C_J$ [pF]

$T_c=25^\circ C$

Typical per diode
Reverse Current

D20SC9M

Reverse Voltage $V_R$ [V]

Reverse Current $I_R$ [mA]

$T_c=75^\circ C$ [TYP]

$T_c=100^\circ C$ [TYP]

$T_c=125^\circ C$ [TYP]

$T_c=150^\circ C$ [TYP] [MAX]

Pulse measurement per diode
D20SC9M Reverse Power Dissipation

**Reverse Power Dissipation**

![Graph showing reverse power dissipation vs. reverse voltage for different duty cycles and waveforms.]

- **Reverse Voltage** $V_R$ [V]
- **Reverse Power Dissipation** $P_R$ [W]

**Equation:**

$$D = \frac{t_p}{T}$$

**Conditions:**
- $T_j = 150^\circ C$
- Waveforms: DC, D=0.05, 0.1, 0.2, 0.3, 0.5, SIN, 0.8
D20SC9M Forward Power Dissipation

Average Rectified Forward Current $I_0$ [A]

Forward Power Dissipation $P_F$ [W]

$T_j = 150°C$

$D = \frac{t_p}{T}$

$D = 0.8$

$D = 0.5$

$D = 0.3$

$D = 0.1$

$D = 0.05$
VR = 45V

Case Temperature Tc [°C]

Average Rectified Forward Current Io [A]

D20SC9M Derating Curve

DC
D=0.8
0.5
0.3
0.2
0.1
0.05
D20SC9M  Peak Surge Forward Capability

Non-repetitive, sine wave, T_j=125°C before surge current is applied.

Peak Surge Forward Current $I_{FSM}$ [A]

Number of Cycles [cycles]
SBD Repetitive Surge Reverse Power Derating Curve

Junction Temperature \( T_j \) \([\degree C]\)

\[ P_{RRSM} = I_{RP} \times V_{RP} \]
SBD Repetitive Surge Reverse Power Capability

\[ \frac{P_{RRSM}(t_p)}{P_{RRSM}(t_p=10\,\mu s)} \text{ Ratio} \]

\[ P_{RRSM} = I_{RP} \times V_{RP} \]