# Gallium Arsenide Schottky Rectifier

<table>
<thead>
<tr>
<th>Type</th>
<th>Marking on product</th>
<th>Circuit</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGS 9-025AS</td>
<td>9A250AS</td>
<td>Single</td>
<td>TO-252 AA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A = Anode, C = Cathode, TAB = Cathode</td>
</tr>
<tr>
<td>DGS 10-025A</td>
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<td>Single</td>
<td>TO-220 AC</td>
</tr>
<tr>
<td>DGS 10-025AS</td>
<td>DGS 10-025AS</td>
<td></td>
<td>TO-263 AB</td>
</tr>
<tr>
<td>DGSK20-025A</td>
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<td>Common cathode</td>
<td>TO-220 AB</td>
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</table>

### Features
- Low forward voltage
- Very high switching speed
- Low junction capacity of GaAs
- Low reverse current peak at turn off
- Soft turn off
- Temperature independent switching behaviour
- High temperature operation capability
- Epoxy meets UL 94V-0

### Applications
- MHz switched mode power supplies (SMPs)
- Small size SMPs
- High frequency converters
- Resonant converters

### Symbol | Conditions | Maximum Ratings
---|---|---
\( V_{\text{RRM/RSM}} \) | | 250 V
\( I_{\text{FV}} \) | \( T_c = 25^\circ\text{C}; DC \) | 12 A
\( I_{\text{FV}} \) | \( T_c = 90^\circ\text{C}; DC \) | 9 A
\( I_{\text{FSM}} \) | \( T_u = 45^\circ\text{C}; t_p = 10 \text{ ms} (50 \text{ Hz}), \text{sine} \) | 20 A
\( T_{\text{VJ}} \) | | -55...+175 \( ^\circ\text{C} \)
\( T_{\text{slip}} \) | | -55...+150 \( ^\circ\text{C} \)
\( P_{\text{tot}} \) | \( T_c = 25^\circ\text{C} \) | 34 W
\( M_d \) | mounting torque (TO-220) | 0.4...0.6 Nm

### Symbol | Conditions | Characteristic Values
---|---|---
\( I_{\text{R}} \) | \( V_R = V_{\text{RRM}}; T_u = 25^\circ\text{C} \) \( V_H = V_{\text{RRM}}; T_u = 125^\circ\text{C} \) | 1.3 mA
\( V_F \) | \( I_F = 5 \text{ A} \); \( T_u = 125^\circ\text{C} \) \( I_F = 5 \text{ A} \); \( T_u = 25^\circ\text{C} \) | 1.3 V
\( C_J \) | \( V_h = 100 \text{ V}; T_u = 125^\circ\text{C} \) | 18 pF
\( R_{\text{NJC}} \) | TO-220 | 4.4 K/W
\( R_{\text{NCH}} \) | TO-220 | 0.5 K/W
\( \text{Weight} \) | TO-252 | 0.3 g
| TO-220/263 | 2 g

Pulse test: \( \text{\textcircled{1}} \) Pulse Width = 5 ms, Duty Cycle < 2.0 %

Data according to IEC 60747 and per diode unless otherwise specified

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Fig. 1 typ. forward characteristics

Fig. 2 typ. junction capacity versus blocking voltage

Fig. 3 typ. thermal impedance junction to case

Note:
explanatory comparison of the basic operational behaviour of rectifier diodes and Gallium Arsenide Schottky diodes:

<table>
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<tr>
<th>Conduction</th>
<th>Rectifier Diode</th>
<th>GaAs Schottky Diode</th>
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<tbody>
<tr>
<td>forward characteristics</td>
<td>by majority + minority carriers $V_F(I_F)$</td>
<td>by majority carriers only $V_F(I_F)$, see Fig. 1</td>
</tr>
<tr>
<td>turn off characteristics</td>
<td>extraction of excess carriers causes temperature dependent reverse recovery ($t_{rr}$, $i_{rr}$, $Q_{rr}$) delayed saturation leads to $V_{FR}$</td>
<td>reverse current charges junction capacity $C_J$, see Fig. 2; not temperature dependant no turn on overvoltage peak</td>
</tr>
</tbody>
</table>
Outlines TO-220

Outlines TO-252

Outline TO-263

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