Description

The CTNS-4603S is a 300 V, 60 A, fast recovery diode. The maximum $V_F$ of 1.2 V and the maximum $t_{rr}$ of 100 ns ($I_F : I_RP = 1 : 1$) are realized by optimizing the trade-off relationship between $V_F$ and $t_{rr}$. The low thermal resistance package achieves high performance in terms of heat dissipation.

Features

- $V_{RM} = 300$ V
- $I_{(AV)} = 60$ A
- $V_F = 1.2$ V
- $t_{rr} = 100$ ns
- Bare lead frame: Pb-free (RoHS compliant)

Applications

- Secondary Side Rectifier Diode
  (Flyback Converter, LLC Converter, etc.)
- Freewheel Diode
  (Offline Buck and Buck-boost Converter)
Absolute Maximum Ratings

Unless otherwise specified, $T_A = 25 \, ^\circ C$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Repetitive Reverse Voltage</td>
<td>$V_{RSM}$</td>
<td>300</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Repetitive Reverse Voltage</td>
<td>$V_{RM}$</td>
<td>300</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Average Forward Current</td>
<td>$I_{F(AV)}$</td>
<td>60</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Surge Forward Current</td>
<td>$I_{FSM}$</td>
<td>400</td>
<td>A</td>
<td>Half cycle sine wave, positive side, 10 ms, 1 shot</td>
</tr>
<tr>
<td>$I^2t$ Limiting Value</td>
<td>$I^2t$</td>
<td>800</td>
<td>A$^2$s</td>
<td>1 ms $\leq t \leq$ 10 ms</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>$-40$ to $150$</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>$-40$ to $150$</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Characteristics

Unless otherwise specified, $T_A = 25 \, ^\circ C$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Voltage Drop</td>
<td>$V_F$</td>
<td>$T_J = 25 , ^\circ C, I_F = 30 , A$</td>
<td>—</td>
<td>—</td>
<td>1.2</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_J = 100 , ^\circ C, I_F = 30 , A$</td>
<td>—</td>
<td>0.85</td>
<td>—</td>
<td>V</td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>$I_R$</td>
<td>$V_R = V_{RM}$</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>μA</td>
</tr>
<tr>
<td>Reverse Leakage Current Under High Temperature</td>
<td>$I_{H}, R$</td>
<td>$V_R = V_{RM}, T_J = 150 , ^\circ C$</td>
<td>—</td>
<td>—</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>Reverse Recovery Time</td>
<td>$t_{rr}$</td>
<td>$I_F = I_{RG} = 500 , mA$ 90% recovery point, $T_J = 25 , ^\circ C$</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>ns</td>
</tr>
<tr>
<td>Thermal Resistance$^{(1)}$</td>
<td>$R_{sh(L-C)}$</td>
<td>—</td>
<td>—</td>
<td>1.0</td>
<td>°C/W</td>
<td></td>
</tr>
</tbody>
</table>

$^{(1)}$ $R_{sh(L-C)}$ is thermal resistance between junction and the case. The case temperature is measured at the back side near the screw hole.
Rating and Characteristic Curves

Figure 1. $I_{F(AV)}$ vs. $T_C$ Typical Characteristics ($V_R = 0$ V)

Figure 2. $I_{F(AV)}$ vs. $T_C$ Typical Characteristics ($V_R = 300$ V)

Figure 3. $V_F$ vs. $I_F$ Typical Characteristics

Figure 4. $V_R$ vs. $I_R$ Typical Characteristics
Physical Dimensions

- **TO3P-3L**

![Physical Dimensions Diagram]

**NOTES:**
- Dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the products, it is required to minimize the working time, within the following limits:
  - Flow: 260 ± 5 °C / 10 ± 1 s, 2 times
  - Soldering Iron: 380 ± 10 °C / 3.5 ± 0.5 s, 1 time
  - Soldering should be at a distance of at least 1.5 mm from the body of the product.
- The recommended screw torque for TO3P: 0.686 to 0.882 N·m (7 to 9 kgf·cm)

**Marking Diagram**

![Marking Diagram]

- Specific Device Code (See Table 1)
- Lot Number:
  - Y is the last digit of the year of manufacture (0 to 9)
  - M is the month of the year (1 to 9, O, N, or D)
  - DD is the day of the month (01 to 31)
  - XX is the control number

**Table 1. Specific Device Code**

<table>
<thead>
<tr>
<th>Specific Device Code</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS4603</td>
<td>CTNS-4603S</td>
</tr>
</tbody>
</table>
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