Description

The FML-4202S is a fast recovery diode of 200 V / 20 A. The maximum $t_r$ of 40 ns is realized by optimizing a life-time control.

Features

- $V_{RM} =$ 200 V
- $I_{(AV)} =$ 20 A
- $V_F =$ 0.98 V
- $t_{rr} =$ 40 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)

Package

TO3PF-3L

Not to scale

(1) Anode
(2) Cathode
(3) Anode
## Absolute Maximum Ratings

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

<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$^{(1)}$</td>
<td>$V_{\text{RSM}}$</td>
<td>200</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Repetitive Reverse Voltage$^{(1)}$</td>
<td>$V_{\text{RM}}$</td>
<td>200</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Average Forward Current</td>
<td>$I_{\text{F(AV)}}$</td>
<td>20</td>
<td>A</td>
<td>See Figure 1 and Figure 2</td>
</tr>
<tr>
<td>Surge Forward Current$^{(1)}$</td>
<td>$I_{\text{FSM}}$</td>
<td>150</td>
<td>A</td>
<td>Half cycle sine wave, positive side, 10 ms, 1 shot</td>
</tr>
<tr>
<td>$t^2$ Limiting Value$^{(1)}$</td>
<td>$t^2$</td>
<td>112.5</td>
<td>A$^2$</td>
<td>$1 , \text{ms} \leq t \leq 10 , \text{ms}$</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>$T_{\text{STG}}$</td>
<td>$-40$ to $150$</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

## Electrical Characteristics

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

<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$^{(1)}$</td>
<td>$V_F$</td>
<td>$T_J = 25 , ^\circ\text{C}, I_F = 10 , \text{A}$</td>
<td>—</td>
<td>—</td>
<td>0.98</td>
<td>V</td>
</tr>
<tr>
<td>Reverse Leakage Current$^{(1)}$</td>
<td>$I_R$</td>
<td>$V_R = V_{\text{RM}}$</td>
<td>—</td>
<td>—</td>
<td>10</td>
<td>µA</td>
</tr>
<tr>
<td>Reverse Leakage Current Under High Temperature$^{(1)}$</td>
<td>$H\cdot I_R$</td>
<td>$V_R = V_{\text{RM}}, T_J = 150 , ^\circ\text{C}$</td>
<td>—</td>
<td>—</td>
<td>400</td>
<td>µA</td>
</tr>
<tr>
<td>Reverse Recovery Time$^{(1)}$</td>
<td>$t_{\text{rr}}$</td>
<td>$I_F = I_{\text{RP}} = 500 , \text{mA}$</td>
<td>90% recovery point, $T_J = 25 , ^\circ\text{C}$</td>
<td>—</td>
<td>—</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>$t_{\text{rr}}$</td>
<td>$I_F = 500 , \text{mA}, I_{\text{RP}} = 1 , \text{A}$</td>
<td>75% recovery point, $T_J = 25 , ^\circ\text{C}$</td>
<td>—</td>
<td>—</td>
<td>30</td>
</tr>
<tr>
<td>Thermal Resistance$^{(2)}$</td>
<td>$R_{\text{th(J-C)}}$</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>°C/W</td>
<td></td>
</tr>
</tbody>
</table>

$^{(1)}$ Specifies a value per chip; the FML-4202S consists of two chips.

$^{(2)}$ $R_{\text{th(J-C)}}$ 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 
($V_R = 200$ V)

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

Figure 4. $V_R$ vs. $I_R$ Typical Characteristics
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.
- Recommended screw torque for TO3PF: 0.686 N·m to 0.882 N·m (7 kgf·cm to 9 kgf·cm)
FML-4202S

Marking Diagram

![Diagram](image)

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)

Table 1. Specific Device Code

<table>
<thead>
<tr>
<th>Specific Device Code</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4202S</td>
<td>FML-4202S</td>
</tr>
</tbody>
</table>
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