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FFH60UP40S, FFH60UP40S3
60 A, 400 V, Ultrafast Diode

Features
• Ultrafast Recovery, $T_r = 85$ ns (@ $I_r = 60$ A)
• Max Forward Voltage, $V_f = 1.3$ V (@ $T_c = 25^\circ$C)
• Avalanche Energy Rated
• RoHS compliant

Applications
• General Purpose
• SMPS, Welder, UPS
• Free-wheeling Diode for motor application
• Power switching circuits

Description
The FFH60UP40S, FFH60UP40S3 is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial applications as welder and UPS application.

Pin Assignments

Absolute Maximum Ratings $T_c = 25^\circ$C unless otherwise noted

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<th>Symbol</th>
<th>Parameter</th>
<th>Rating</th>
<th>Unit</th>
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<tr>
<td>$V_{RRM}$</td>
<td>Peak Repetitive Reverse Voltage</td>
<td>400</td>
<td>V</td>
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<tr>
<td>$V_{RWM}$</td>
<td>Working Peak Reverse Voltage</td>
<td>400</td>
<td>V</td>
</tr>
<tr>
<td>$V_R$</td>
<td>DC Blocking Voltage</td>
<td>400</td>
<td>V</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>Average Rectified Forward Current</td>
<td>60</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>Non-repetitive Peak Surge Current</td>
<td>600</td>
<td>A</td>
</tr>
<tr>
<td>$T_J, T_{STG}$</td>
<td>Operating and Storage Temperature Range</td>
<td>-65 to +150</td>
<td>°C</td>
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Thermal Characteristics

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<th>Parameter</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
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<tr>
<td>$R_{JUC}$</td>
<td>Maximum Thermal Resistance, Junction to Case</td>
<td>0.2</td>
<td>°C/W</td>
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Package Marking and Ordering Information

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<td>FFH60UP40S3</td>
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## Electrical Characteristics

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<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
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<tr>
<td>$V_F$</td>
<td>$I_F = 60, \text{A}$</td>
<td>$T_C = 25^\circ\text{C}$</td>
<td>-</td>
<td>1.06</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_C = 100^\circ\text{C}$</td>
<td>-</td>
<td>0.99</td>
<td>-</td>
</tr>
<tr>
<td>$I_R$</td>
<td>$V_R = 400, \text{V}$</td>
<td>$T_C = 25^\circ\text{C}$</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_C = 100^\circ\text{C}$</td>
<td>-</td>
<td>-</td>
<td>500</td>
</tr>
<tr>
<td>$t_{rr}$</td>
<td>$I_F = 60, \text{A}$, $\frac{dl_F}{dt} = 200, \text{A/\mu s}$, $V_R = 260, \text{V}$</td>
<td>$T_C = 25^\circ\text{C}$</td>
<td>-</td>
<td>59</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$T_C = 100^\circ\text{C}$</td>
<td>-</td>
<td>96</td>
<td>-</td>
</tr>
<tr>
<td>$W_{AVL}$</td>
<td>Avalanche Energy ($L = 40, \text{mH}$)</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>$\text{mJ}$</td>
</tr>
</tbody>
</table>

Notes:
1. Pulse: Test Pulse width = 300 $\mu\text{s}$, Duty Cycle = 2%

### Test Circuit and Waveform

**Figure 1. Diode Reverse Recovery Test Circuit & Waveform**

- $L = 40\, \text{mH}$
- $R < 0.12$
- $V_{DD} = 50\, \text{V}$
- $E_{AVL} = \frac{1}{2}\frac{L}{2}(V_{R4AVL} - (V_{DD} - V_{0D}))$
- $Q1 = \text{IGBT} \left( V_{\text{CEB}} = \text{DUT} \cdot V_{R4AVL} \right)$

**Figure 2. Unclamped Inductive Switching Test Circuit & Waveform**
Typical Performance Characteristics

Figure 3. Typical Forward Voltage Drop vs. Forward Current

Figure 4. Typical Reverse Current vs. Reverse Voltage

Figure 5. Typical Junction Capacitance

Figure 6. Typical Reverse Recovery Time vs. \( \frac{di}{dt} \)

Figure 7. Typical Reverse Recovery Current vs. \( \frac{di}{dt} \)

Figure 8. Forward Current Derating Curve
Mechanical Dimensions

TO247-2L

Figure 9. TO-247, Molded, 2LD, Jede Option AB

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Figure 10. TO-247, Molded, 3LD, Jede Option AB

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- SuperSOT™-6
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- UniFET™
- VCX™
- VisualMax™
- VoltagePlus™
- XS™
- Xeens™
- 芯片™
- Awinda®
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