Maximize efficiency in single-switch quasi-resonant converters for induction heating systems

Specifically designed for induction heating applications, the 1350 V IH2 series in trench gate field-stop IGBT technology offers higher breakdown voltage, lower $V_{\text{CEsat}}$, and lower thermal resistance.

Moreover, thanks to the low drop diode and optimized turn-off energy, this series is ideal for maximizing efficiency in single-switch quasi-resonant converters over a wide switching frequency range from 16 to 60 kHz.

Finally, the higher breakdown voltage enhances reliability and robustness, providing suitable margin under all operating conditions.

**KEY FEATURES & BENEFITS**
- 1350 V trench gate field-stop IGBT
- Current capability: 25-35 A
- Low conduction losses
- Optimized turn-off energy for soft-switching commutation
- Low drop copacked diode
- Higher reliability and robustness thanks to:
  - Higher breakdown voltage
  - Maximum junction temperature $T_j$ of 175 °C
- Available in TO-247 Long leads

**KEY APPLICATIONS**
- Induction cookers
- Inverterized microwave ovens
- Rice cookers
Application benchmark

Figure 1 shows a comparison between STGWA35IH135DF2 and competitor products. The test was performed in a single-switch quasi-resonant converter (a typical induction cooker topology) from 1.5 to 2.5 kW power at 25 °C ambient temperature. The columns show the total power loss, while the values on top shows the measured case temperature.

The STGWA35IH135DF2 clearly demonstrates better performance than the main competitors in terms of power losses and case temperature over the entire input power range, with 8-11% less power loss at 2 kW input power, as shown in figure below:

The new ST 1350V IH2 series IGBT therefore represents the best solution for single-switch quasi-resonant converters.

Product portfolio

<table>
<thead>
<tr>
<th>Part Number</th>
<th>BV_{CES} (V)</th>
<th>I_{rr} (A)</th>
<th>V_{case} (V)</th>
<th>E_{eff} (mJ)</th>
<th>V_{f} (V)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>STGWA25IH135DF2</td>
<td>1350</td>
<td>25</td>
<td>1.7</td>
<td>0.39</td>
<td>1.15</td>
<td>TO-247</td>
</tr>
<tr>
<td>STGWA25IH135DF2</td>
<td>1350</td>
<td>35</td>
<td>1.7</td>
<td>0.58</td>
<td>1.2</td>
<td>Long leads</td>
</tr>
</tbody>
</table>

Note: 1. @ V_{GE} = 15 V, I_{rr}, T_{J} = 25 °C
2. Switching characteristics on capacitive load