650V HB2 series IGBTs
Best performance in high-speed applications

Outstanding performance and power density to address high efficiency demand

Combining both lower saturation voltage (1.55 V typ.) and lower total gate charge, the improved medium/high-speed 650 V IGBTs ensure minimal overshoot voltages during turn-off and lower turn-off energy in applications.

Thanks to an extended current capability up to 100 A, and an optimized co-packaged diode with three different options (protection, half-rated and full-rated), our new 650 V IGBT HB2 series ensures higher efficiency in applications working at medium to high frequencies such as welding machines, PFC converters, UPS and solar inverters.

The 40 A in TO-247 Long lead package with three different diode options is already available.

A complete product portfolio covering a current range from 15 to 100 A is in development in several power packages including D²PAK, TO-220, and TO-220FP as well as long-lead and 4-lead TO-247 packages.

KEY FEATURES
- Wide frequency ranges from 16 to 60 kHz
- Very low $V_{CE(sat)}$ (1.55 V typ.)
- Low thermal resistance
- Lower gate charge
- Maximum operating $T_1$ of 175 °C
- Automotive eligible (AEC-Q101)
- Different diode options

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The 650 V IGBT HB2 series, based on trench field-stop (TFS) technology and optimized for applications working at a switching frequency between 16 and 60 kHz and automotive eligible (AEC-Q101 Rev. D), ensures lower $V_{CE(sat)}$ and gate charge values than the previous HB IGBT series. Figure 1 compares the performance between two products belonging to each of the two technologies (HB2 (in blue) and HB (in red)).

**APPLICATION BENCHMARK**

In a generic DC/AC converter in full bridge topology with a maximum output power of 3.6 kW, the power losses and case temperature have been evaluated.

The results of the STGWA40H65DFB2 high-speed HB2 series IGBT compared to main competitors’ devices are shown in the figure below.

**PRODUCT PORTFOLIO**

<table>
<thead>
<tr>
<th>IGBT PINs</th>
<th>BVces [V]</th>
<th>$I_D$ [A]</th>
<th>$V_{CE(sat)}$ [V]</th>
<th>$E_{OFF}$ [μJ]</th>
<th>Diode option</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>STGWA40H65DFB2</td>
<td>650</td>
<td>40</td>
<td>1.55</td>
<td>410</td>
<td>Protection</td>
<td>TO-247 long leads</td>
</tr>
<tr>
<td>STGWA40H65DFB2*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Half-rated</td>
<td>WA</td>
</tr>
<tr>
<td>STGWA40H65DFB2*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Full-rated</td>
<td></td>
</tr>
</tbody>
</table>

Additional high-speed HB2 series IGBTs with a current range from 15 to 100 A are currently in development and will be available soon. Check our website for availability.

To explore the complete HB2 series IGBTs product portfolio, visit [www.st.com](http://www.st.com) or use our [ST-IGBT-Finder mobile app](http://www.st.com) for Android and iOS.