650V HB series IGBTs
Innovative 4-lead package

Boosts application efficiency with faster switching events and improved turn-on switching energy

ST’s HB series of high-speed 650V IGBTs offers increased ruggedness and enhanced reliability for applications working at switching frequencies between 16 and 60 kHz. In addition to maintaining a wide safe operating area (SOA), the maximum junction temperature of 175 °C and the extremely good $V_{CE(sat)}$ vs $E_{off}$ trade-off, the new 4-lead package significantly decreases turn-on switching energy and ensures a very good impact on system efficiency.

**KEY FEATURES**
- Maximum junction temperature of 175 °C
- Very low and minimized tail current when switching off
- Very good thermal resistance
- $V_{CE(sat)} = 1.6$ V @ ICN
- Very tight parameter distribution
- Positive derating of $V_{CE(sat)}$ with temperature for safer paralleling

**TARGET APPLICATIONS**
- Telecom & cloud server
- High power SMPS
- Photovoltaic Inverters
- UPS
- Welding Machines

**ADVANTAGES OF 4-LEAD PACKAGE**
- Co-packaged diode tailored for final application
- Switching frequency range 16 – 60 kHz
- Product portfolio comprehending 40A, 60A and 80A devices.
Developed using an advanced proprietary trench gate field-stop structure, the new HB series of IGBTs represents an optimum compromise between conduction and switching loss to maximize the efficiency of any frequency converter. Reducing the turn-on switching energy by 50% at 25 °C with an increasing spread at higher temperatures (see graphs below), this innovative 4-lead package ensures the same results in 60 and 80 A devices as well. Thanks to the IGBT’s positive temperature coefficient, this innovative ST package solution can cover all high-speed IGBT-based applications in an extremely wide power range.

### COMPARISON OF TURN-ON SWITCHING ENERGY BETWEEN 3- AND 4-LEAD DEVICES

![Graph: Comparison of turn-on switching energy between 3- and 4-lead devices](image)

#### 650V “HB” SERIES IGBT DEVICES IN TO247-4 PACKAGE

<table>
<thead>
<tr>
<th>IGBT P/N</th>
<th>BV_{CES}</th>
<th>I_{ON} \textsuperscript{(1)}</th>
<th>V_{CE(sat)} \textsuperscript{(2)}</th>
<th>E_{on} \textsuperscript{(3)}</th>
<th>E_{off} \textsuperscript{(3)}</th>
<th>Free-wheeling diode</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>STGW40H65DFB-4</td>
<td>650</td>
<td>40</td>
<td>1.6</td>
<td>0.2</td>
<td>0.41</td>
<td>Very Fast</td>
<td>TO247-4</td>
</tr>
<tr>
<td>STGW60H65DFB-4</td>
<td>60</td>
<td>60</td>
<td>1.16</td>
<td>0.35</td>
<td>1.16</td>
<td>Very Fast</td>
<td></td>
</tr>
<tr>
<td>STGW80H65DFB-4</td>
<td>80</td>
<td>80</td>
<td>1.6</td>
<td>1</td>
<td>1.7</td>
<td>Very Fast</td>
<td></td>
</tr>
<tr>
<td>STGW80H65FB-4</td>
<td>80</td>
<td>-</td>
<td>1.7</td>
<td>-</td>
<td>1.7</td>
<td>Very Fast</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{(1)} Nominal collector current \( T_j = 100 \) °C

\textsuperscript{(2)} \( V_{CE(sat)} \) @ \( I_{ON} \), \( T_j = 25 \) °C

\textsuperscript{(3)} Refer to datasheet for characterization conditions

To explore the complete HB series IGBTs product portfolio, visit www.st.com or use our ST-IGBT-Finder mobile app for Android and iOS.

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