

High-Speed 600-V IGBTs Feature Very Low Saturation Voltage

Taiwanese manufacturer Advanced Power Electronics Corp. (USA) has released a new family of high-speed 600-V discrete n-channel IGBTs for use in ac and dc motor control and home appliances such as air conditioners, refrigerators, microwave ovens, UPSs, solar inverters, and induction cookers. All members of the AP20GT60 IGBT family feature a collector/emitter voltage rating (V_{CE}) of 600 V, a ± 20 -V peak gate-emitter voltage rating (V_{GE}), and a very low saturation voltage.

Presently, there are six members in this family. These include the AP20GT60P-HF-3, AP20GT60ASP-HF-3 (with internal diode), AP20GT60I-HF-3, AP20GT60ASI-HF-3, AP20GT60W-HF-3, and AP20GT60SW-HF-3. While typical saturation voltage for the 600-V IGBTs is 1.8 V at $I_c=20$ A, the transistors with internal diode offer slightly lower saturation voltage. The IGBTs come in fully RoHS-compliant and halogen-free packages, which include the TO-220, TO-220CFM and TO-3P (Fig.1.)

According to APEC USA's CEO Ralph Waggitt, very low saturation voltage translates to low conduction losses. Also, since these IGBTs are rated for faster switching, the switching losses are minimized. As a result, the IGBTs deliver high efficiencies in power supply designs.

While the AP20GT60P-HF-3 offers a typical saturation voltage, $V_{CE(sat)}$, of 1.8 V at $I_c=20$ A with a maximum power dissipation of 104 W at 25 °C, the AP20GT60ASP-HF-3 (with internal diode) has a typical saturation voltage of 1.7 V at $I_c = 19$ A (Fig. 2) with a maximum power dissipation of 78 W at 25 °C. The diode forward current rating is 8 A, and the diode pulse forward current rating is 40 A.

Likewise, the AP20GT60I-HF-3 features a saturation voltage of 1.8 V at $I_c = 20$ A with a maximum power dissipation of 25 W at 25 °C. The corresponding AP20GT60ASI-HF-3 IGBT with internal diode has a typical saturation voltage of 1.7 V at $I_c = 12$ A, and a maximum power dissipation of 33 W at 25 °C. Also, the diode forward current rating is 8 A, and the diode pulse forward current rating is 40 A.

Typical saturation voltage for the last two members, the AP20GT60W-HF-3 and the AP20GT60SW-HF-3, is 1.8 V at $I_c = 20$ A. Both the IGBTs come in the fully RoHS-compliant halogen-free TO-3P packages, allowing maximum power dissipation of 125 W at 25 °C. The equivalent AP20GT60SW-HF-3 IGBT offers built-in fast recovery diode with a diode forward current rating of 40 A.

In 1000-piece quantities, pricing starts at \$0.96 each for the AP20GT60ASI-HF-3TB and goes up to \$1.25 for the AP20GT60SW-HF-3TB.



Fig. 1. Featuring very low saturation voltage and a ± 20 -V peak gate-emitter voltage rating, members of the AP20GT60 600-V n-channel IGBT family target a wide range of applications including ac and dc motor control, home appliances, UPSs, and solar inverters.

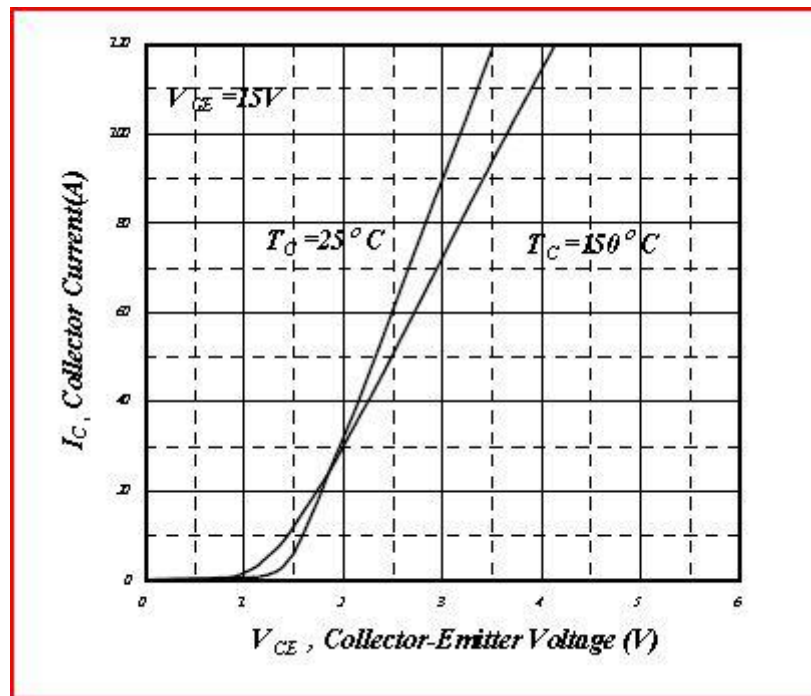


Fig. 2. . While typical saturation voltage for these 600-V IGBTs is 1.8 V at $I_C=20$ A, transistors with an internal diode offer slightly lower saturation voltage.