GaN Power Transistors Target High-End Audio And SMPSs

Infineon Technologies has expanded its CoolGaN series of enhancement-mode GaN power HEMTs with two new devices, the 400-V IGT40R070D1 E8220 transistor, which is tailored for premium Hi-Fi audio systems, and the 600-V IGLD60R190D1 industrial-grade transistor, which enables performance and cost optimization for low- and mid-power applications, such as switched-mode power supplies (SMPSs) and telecom rectifiers (see the figure). Every product within the CoolGaN family meets JEDEC standards.

In the case of the 400-V IGT40R070D1 E8220, the intended audio applications are those where end users demand every detail of their high resolution sound tracks. Typically, these have been addressed by bulky linear or tube amplifiers. However, with the CoolGaN 400-V power transistor employed in a class D amplifier output stage, audio designers are able to deliver excellent listening experience to their prospective audio fans while obtaining the benefits of a Class D switching solution—high efficiency and small size.

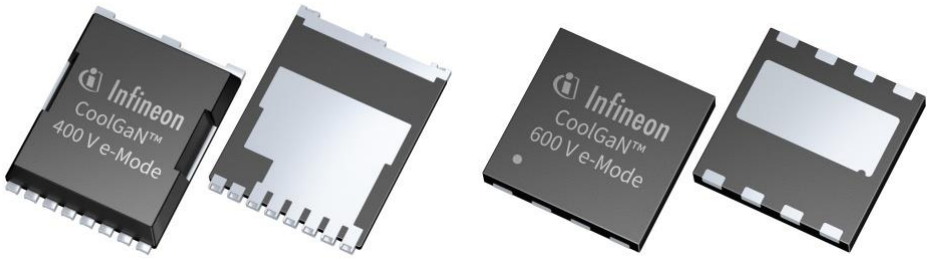
The CoolGaN 400-V switch enables smoother switching and a more linear class D output stage by offering low/linear C_{oss}, zero Q_{rr}, and a normally-off switch. Ideal class D audio amplifiers offer zero distortion and 100% efficiency. But in practice, the switching characteristics of the switching device impair the linearity and introduce power loss.

Infineon's CoolGaN breaks through the technology barrier by introducing zero reverse-recovery charge in the body diode and very small, linear input and output capacitances. The resulting benefit to the end users is a more natural and wider soundstage audio experience. To further simplify the design, Infineon pairs the CoolGaN 400-V device in an HSOF-8-3 (TO-leadless) package with a popular class D controller (the IRS20957STRPBF) on an evaluation board.

Meanwhile, the IGLD60R190D1 extends the CoolGaN 600-V portfolio by adding a 190-mΩ, industrial-grade HEMT. The IGLD60R190D1 offers fast turn-on and turn-off speed, minimum switching losses and enables use of simple half-bridge topologies with the highest efficiency.

The cost of this product has been optimized (reduced) to fit any consumer or industrial application, lowering the barrier of entry for GaN in such applications. The specific cost reduction methods included use of standard (lower cost) packages and selection of suitable $R_{DS(ON)}$ levels that still meet the highest reliability requirements for mid-power-level applications. Easy design-in is supported with a standardized DFN 8 x 8 package and the matching driver ICs from the GaN EiceDRIVER series.

The IGT40R070D1 E8220 and IGLD60R190D1 can be ordered now. The EVAL_AUDAMP24 evaluation board will be available for order in February 2020. For more information, see the IGT40R070D1 E8220 product page and the IGLD60R190D1 product page. Or see the main GaN products page .



(a) *(b)*

Figure. Targeting high end audio equipment, the IGT40R070D1 E8220 400-V GaN power transistor (a), enables smoother switching and a more linear class D output stage by offering low/linear C_{oss}, zero Q_{rr}, and a normally-off switch. The IGLD60R190D1, a 600-V 190-mΩ, industrial-grade GaN HEMT (b) has been cost reduced for consumer and industrial applications.

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