

Demos Showcase GaN Devices In Range Of Topologies And Power Levels

At the recent APEC 2022 conference, [Tagore Technology](#) demonstrated a number of power converter demo boards showcasing their GaN FETs and ICs in a variety of topologies covering a power range from 65 W to 800 W. These demos include a 65-W quasi-resonant flyback, a 240-W totem-pole PFC + LLC demo, a half-bridge GaN evaluation board (a building block for buck, boost, LLC and full-bridge converters), and an 800-W phase-shifted full-bridge reference design demo.

Two of Tagore's demo boards appear to highlight performance of the company's GaN devices in USB adapter applications. The 65-W quasi-resonant flyback demo board operates from a universal input of 90 to 265 Vac, and produces an output voltage of 20 V, 15 V, 9 V or 5 V at 3.25 A, while measuring 1.98 in. x 1.94 in. x 0.85 in. That corresponds to a 19.9 W/in³ and would be an adapter in the USB standard power range. Efficiency and conducted EMI of this demo board are shown in Figs. 1 and 2, respectively.

Meanwhile, the 240-W totem-pole PFC + LLC demo, which highlights the performance of the company's GaN devices in an adapter design for the USB Extended Power Range, also operates from a universal input while producing 20-V output at 12 A. That converter features 115-kHz switching in the PFC stage and 270 kHz in the LLC dc-dc stage. The measured efficiency of the individual stages and the two stages combined is shown in Fig. 3.

The half-bridge GaN evaluation board contains a GaN power stage with integrated drivers, digital isolators for the PWM inputs, an isolated dc-dc converter plus fan and heatsink. It handles switch currents up to 10 A (soft switching) or 8 A (hard switching). The board measures 2.6 x 1.5 x 1.7 in.

The phase-shifted full-bridge reference design demo board operates from an input of 375 V and produces an output of 55 V to 70 V, with power output up to 800 W average, while switching at 300 kHz. This demo board measures 5.75 x 2.85 x 1.4 in. which corresponds to a power density of 35 W/in.³.

For more information, see the [website](#).

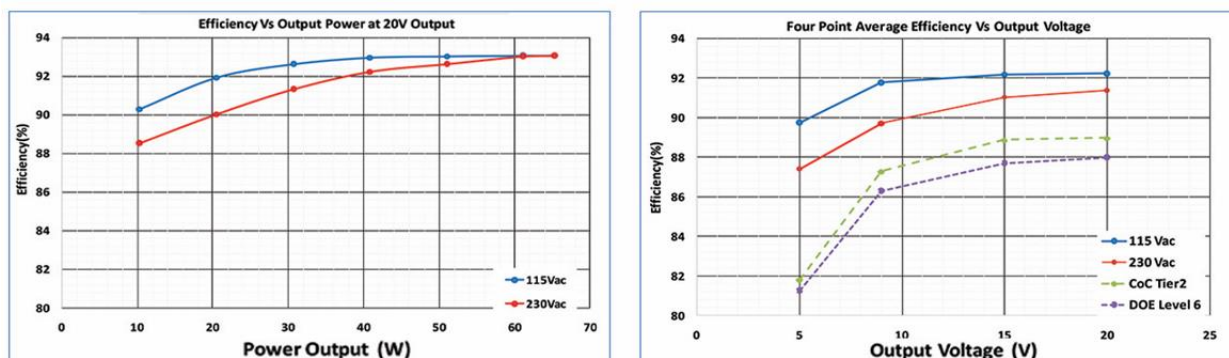


Fig. 1. Efficiency of Tagore Tech's 65-W quasi-resonant flyback demo board measured over the load range (left) and four-point average efficiency versus output voltage (right), both measured at 115 Vac and 230 ac input.

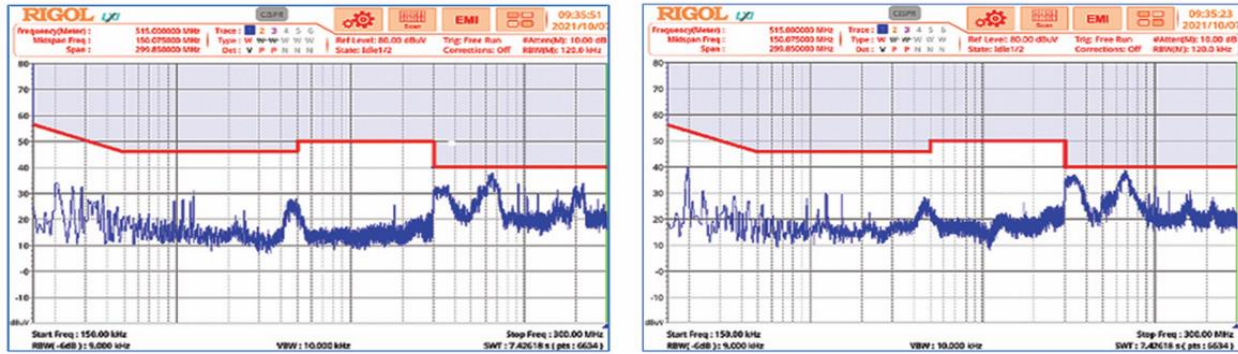


Fig. 2. Conducted EMI of Tagore Tech's 65-W quasi-resonant flyback demo board measured at 115 Vac input (left) and 230 Vac input (right) with CISPR 22 Class B conducted average EMI limit shown.

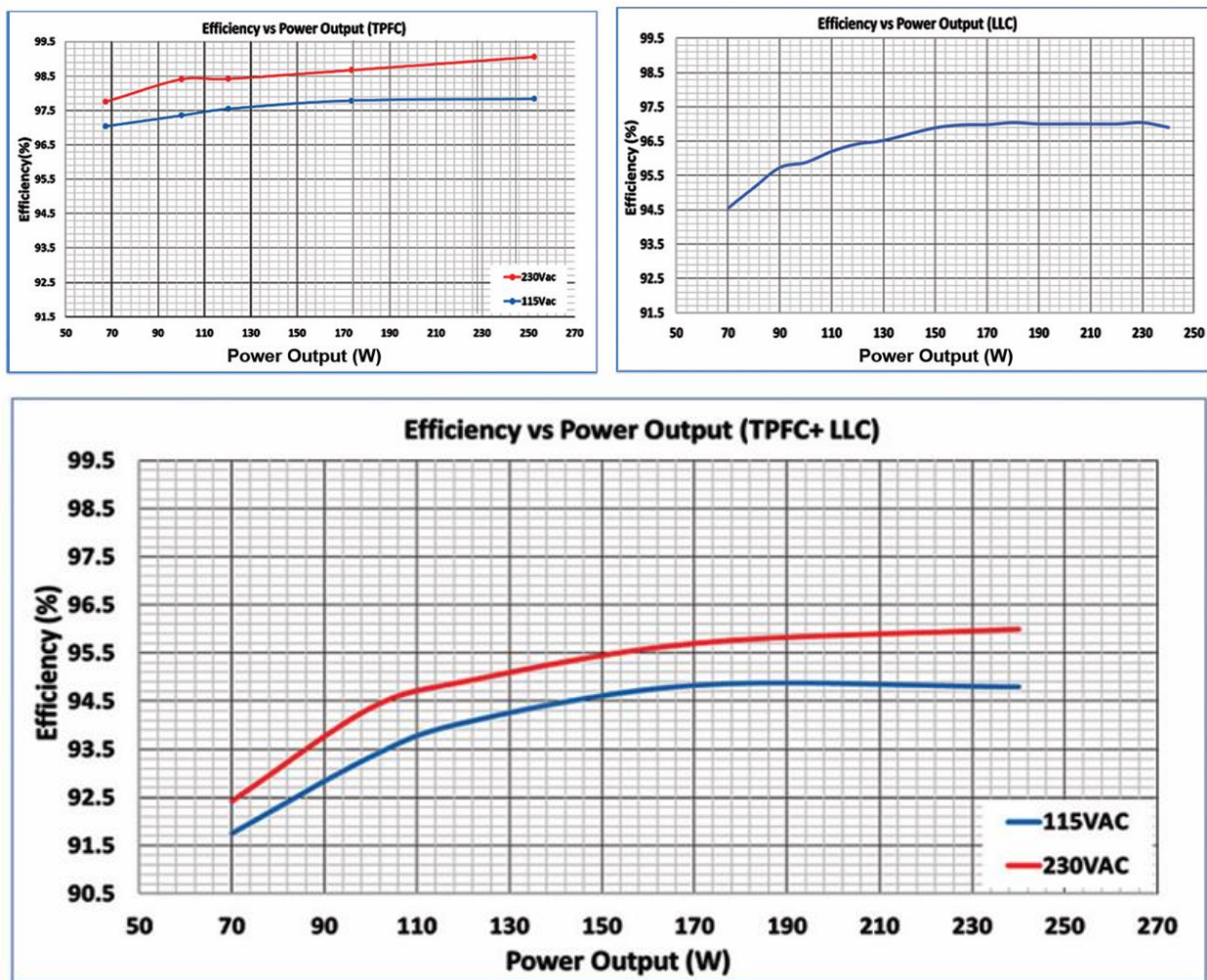


Fig. 3. Measured efficiency versus load of the 240-W totem-pole PFC + LLC demo board. Efficiency of the totem-pole PFC stage is shown in the upper left graph, followed by efficiency of the LLC dc-dc stage in the upper right graph and the efficiency of the two stages combined in the bottom graph.