

What follows are answers to commonly asked questions regarding Transphorm's 4 kW TDTP4000W065AN Evaluation Board. For more information visit the board's [webpage](#). For quick reference, the board uses the bridgeless totem-pole power factor correction topology with analog control. Further, it employs Transphorm's SuperGaN™ Gen IV FETs for high power efficiency and performance.



What are the board's main applications?

The applications vary to include any application that requires a power factor correction (PFC). Typically, any power supply unit from the low 000's of watts at lowline to 4 kW at highline can employ this type of high voltage GaN solution using the totem pole topology.

What types of applications benefit more from digital control with firmware customization?

There are many variables when considering this question—the answer is not black and white. As stated above, any application requiring a PFC can and might use Transphorm's analog controlled GaN solution. Similarly, any application seeking to leverage high voltage GaN can and might use our digitally controlled GaN solution (the TDTP4000W066C evaluation board). It has more to do with the design engineer's objectives, comfort levels, preferences, and product development timelines.

This board offers limited customization like the digital design. It gives the designer a direct replacement for the standard Silicon boost PFC with higher efficiency. That efficiency is due to a combination of Transphorm's GaN platform and the analog control. Maintenance or auxiliary power is basically constant no matter the system's power level. Since the analog board does not use a digital signal processor (DSP), its auxiliary power usage could be less depending on the board's circuitry design. This could result in a slightly improved efficiency at lower powers where the auxiliary power draw becomes a higher percentage of the overall loss of the solution. In turn, that benefit could be an advantage for the designer in determining whether our analog control solution is the preferred design choice. But, as stated—there are other variables to consider, as well.

Are there advantages to using a PFC topology with a traditional analog control instead of a digital control?

Power electronic engineers have always used analog control standard CCM/CRM boost PFC converters. To use the digital totem-pole, firmware development is required. Often, power supply companies do not have this capability or skillset internally nor the resource(s) to obtain it. By offering the analog controlled solution, Transphorm is supplying them with an alternative design option that gives them access to the high performing totem-pole PFC without any firmware requirements. The key takeaways are threefold. First, the analog solution helps designs get to market faster. Second, it serves as a great steppingstone to the digital solution if there is a desire to ultimately move in that direction. Lastly, this solution serves as a direct competitor to the traditional boost PFC that uses Silicon.

What performance levels should be expected from the analog board?

The analog board will hit more than 99% efficiency with a highline input (230 Vac) similar to the digital TDTP4000W066C solution. Additional information can be found in the TDTP4000W065AN's [user guide](#), which includes efficiency plots for both low- and highline along with other performance data.