

App Note Describes Multiphase Interleaving Of Rad-Hard Power Modules

[EPC Space’s](#) AN005 application note focuses on enhancing the power capability of the FBS-GAM02 and GAM02-PSE modules for POL applications through multiphase interleaving of the modules. These modules offer designers a high-density, radiation-hard solution, yet they have inherent limitations in output current.

The GAM02 is rated for 10 A, while the GAM02-PSE can drive up to four power HEMTs with individual ratings of up to 50 A each. Despite this, practical constraints such as thermal limitations and derating reduce the effective current ratings, leading to a maximum load current for GAM02-PSE of around 100 A, which can be challenging to achieve.

However, this application note unveils a design implementation—multiphase interleaving. Using this technique, the FBS-GAM02 can handle currents beyond 10 A, while the GAM02-PSE, when combined with appropriately rated power HEMTs, can satisfy load current requirements of 200 A and above (see Figs. 1 and 2).

This application note delves into practical implementations and considerations, including hardware and firmware options. Also, performance results from LTspice simulations demonstrate the efficiency and effectiveness of a four-phase interleaved POL converter, showcasing high efficiency even at increased load currents. For more information, see the [application note](#).

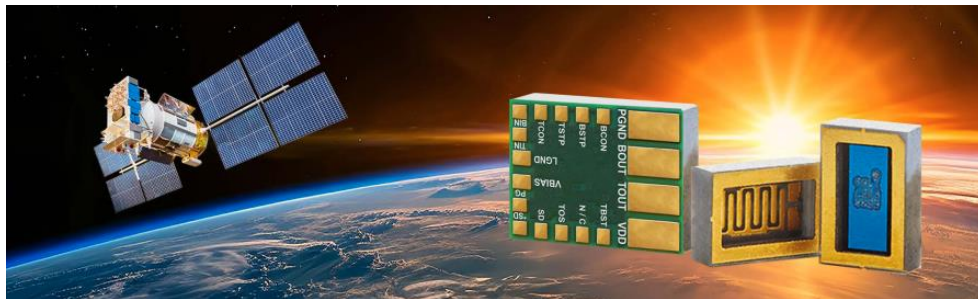
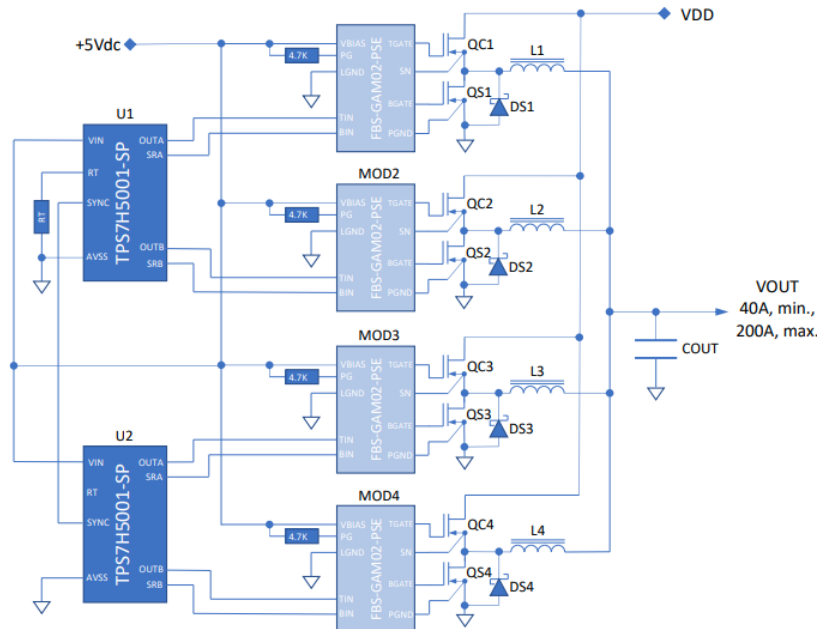
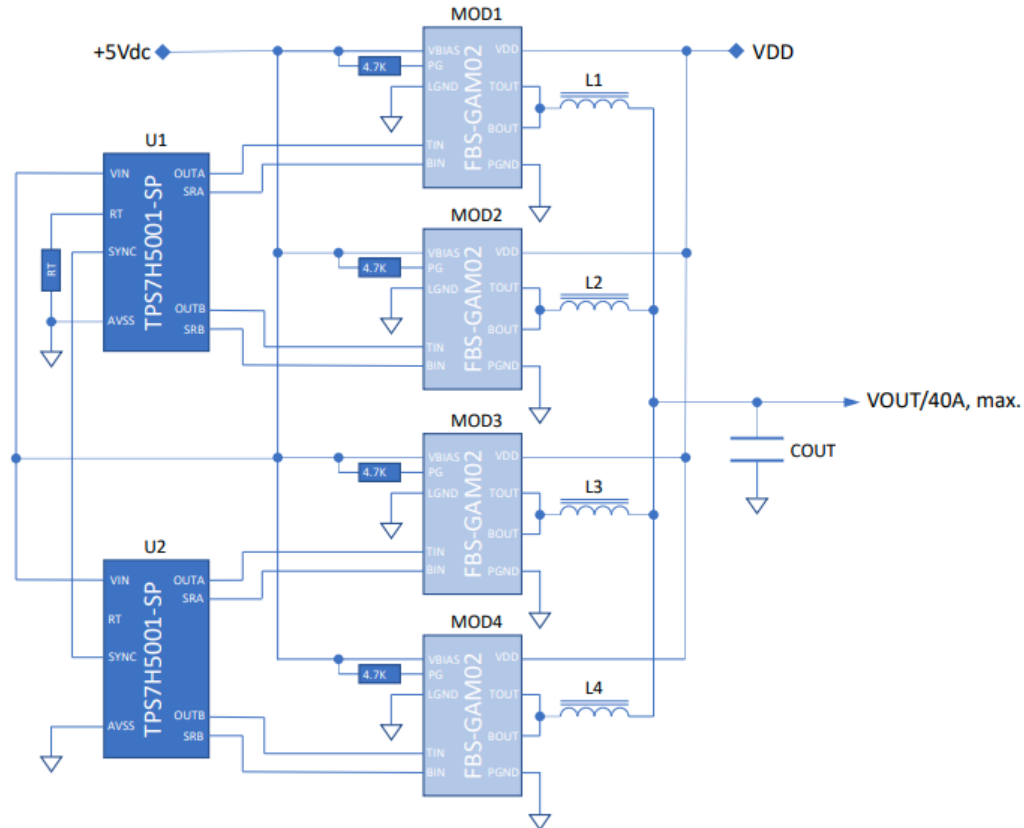


Fig. 1. EPC Space’s AN005 application describes how multiphase interleaving can be applied in point-of-load converter solutions to extend the power output capability of the company’s rad hard power modules, the FBS-GAM02 and the FBS-GAM02-PSE. The FBS-GAM02 integrates gate drivers and eGaN FETs, while the FBS-GAM02-PSE drives external eGaN FETs.



(a) FBS-GAM02-PSE four-phase interleaved POL example.



b) BS-GAM02 four-phase interleaved POL example.

Fig. 2. The interleaved POL converter topology along with the FBS-GAM02-PSE module offers the power designer the flexibility to "mix-and-match" properly-rated HEMTs alone or in parallel to suit the exact design requirements (a). However, at load currents up to 40 A, the FBS-GAM02 offers the designer the lowest parts-count solution (b).