DC-DC Converters Increase Efficiency for DDR Memory Applications

Enpirion has introduced the first two members of a family of PowerSoC dc-dc converters for DDR2/DDR3 VTT applications: the 8-A EV1380 and the 4-A EV1340. These dc-dc converters combine a monolithic buck converter, compensation components, and an inductor in small QFN packages. The 8-A converter is housed in an 8- mm x 11-mm x 3-mm QFN, while the 4-A converter is housed in a 10-mm x 5.5-mm x 3-mm QFN (Fig 1). These converters achieve up to 94% efficiency, which together with their small size, makes them a viable power-saving alternative to LDOs and other switching regulators currently used in DDR memory applications.

According to Enpirion, its family of PowerSoC products has been designed specifically for VTT applications to provide the best-in-class combination of solution size and efficiency. The trend to increase the number of memory modules and their capacity in enterprise products such as servers is creating the need for high-efficiency VTT solutions to minimize power loss. This needs to be achieved within a smaller PCB footprint, while still meeting the DDR2/DDR3 requirements for tracking accuracy and ac + dc regulation.

Most VTT applications today use inefficient low dropout regulator (LDO) solutions. In a typical high-end server application, the Enpirion EV1380 can reduce the power loss by more than 13 W over an LDO. This power savings comes with only a modest increase in board-space requirements.

According to Joe Borak, Enpirion's director of marketing, the 4-A EV1340 has a total solution size of 125 mm^2 when you count the converter and the required external passives (see the figure). Borak compares this against a 3-A LDO (TI's TPS51200), which requires about 90 mm^2 of board space. Meanwhile, the 8-A EV13801 is expected to compete against other switching regulators rather than LDOs. The solution size for the EV13801 is at least 60% smaller than competing solutions, says Borak.

The EV1340 and EV1380 employ a monolithic buck converter with a copackaged inductor and type III compensation components. The inductor and converter die sit side-by-side in the package. Samples of Enpirion's 8-A EV1380 PowerSoC are available now, with production release planned for August. Samples of the 4-A EV1340 will be available in August, and the production release is planned for October. Additional information about these products, including data sheets and images, is available at www.enpirion.com/products-step-down-regulators-ddr-termination-power.htm.

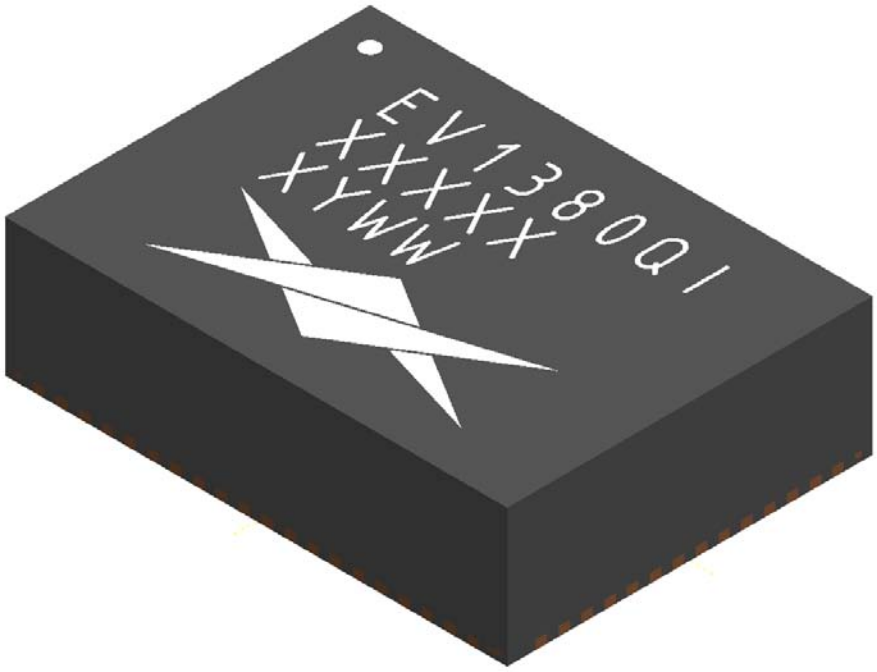

Fig. 1. The EV1380 is an 8-A buck converter with built-in inductor and compensation circuitry, all housed in an 8-mm x 11-mm x 3-mm QFN.

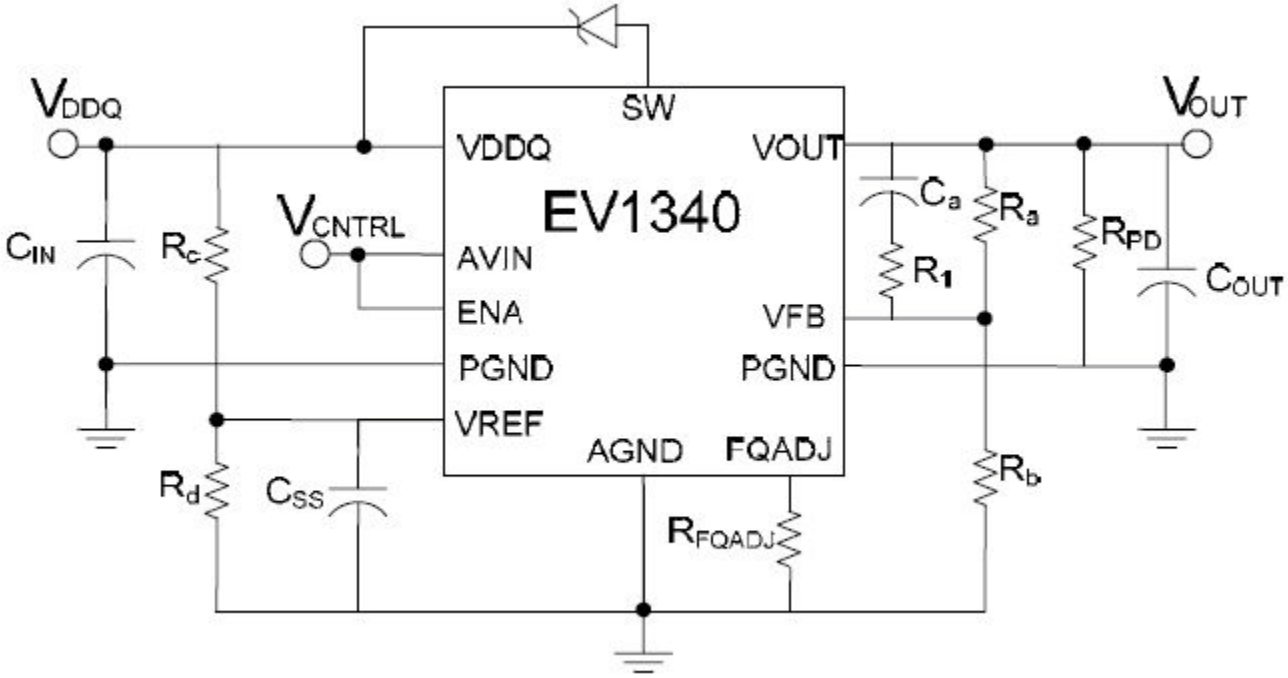

Fig. 2. The EV1340 and EV1380 require few external components to complete 4-A and 8-A buck converter designs. Note that the inductor and most of the converter's Type III compensation circuitry are contained within the converter's QFN package.