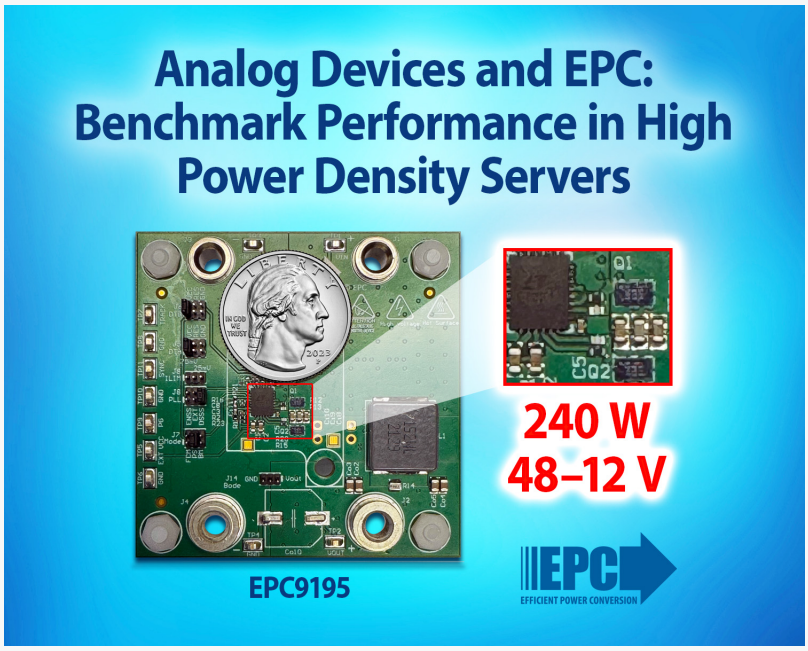
EPC GaN FETs Deliver Benchmark Power Density and Efficiency for DC/DC Conversion

EPC Gallium Nitride-based FETs use Analog Devices tech for simpler, more efficient design, reducing cooling costs and boosting power density in converters.



"EPC GaN FETs Deliver Benchmark Power Density and Efficiency for DC/DC Conversion"

EL SEGUNDO, CA, UNITED STATES, February 13, 2024 /EINPresswire.com/ -- The newly released EPC9195 synchronous buck converter reference design board, operating at 750 kHz switching frequency, converts an input voltage of 36 V - 48 V to a regulated 13.5 V output. It delivers up to 16 A in a very small footprint of 28 mm x 14 mm and with a profile lower than 5 mm (3.5 mm inductor height). This type of high-density DC/DC converter is used to convert the 48 V DC input from batteries or chargers to a regulated typical 12 V load. 48 V input is getting popular due to USB PD 3.1 efforts to increase power and to reduce cabling for up to 240W. The combination of ADI's new LTC7891 100V synchronous GaN buck controller with ultra-efficient EPC2619 GaN FETs from EPC helps enable a super small and highly efficient solution with 96.4% efficiency at 48 V to 13.5 V and 16 A continuous current.

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>
> *Alex Lidow, CEO, and co-founder of EPC.*

Alex Lidow, CEO of EPC commented, "GaN FETs are required to achieve the maximum power density for DC-DC converters. We are delighted to work with ADI to combine the benefits of their advanced controllers with the performance of GaN to provide customers with the highest power density and low component count solution that increases efficiency, increases power density, and reduces system cost."

"ADI's LTC7890, LTC7891, LT8418, and LT8390A are designed to pair with the high performance of

EPC's eGaN FETs for high power density solutions," said Keith Szolusha, System and Application Director at ADI. "They offer higher switching frequency and optimized deadtime that competes well above the current solution in the market while operating in very low power consumption. With these new ICs, customers can take advantage of the very fast switching of GaN for the highest power density."

The reference design features EPC Generation 6 GaN FET EPC2619, rated for 100V and 3.3 mOhm typical RDS(on) in a tiny 1.5 mm x 2.5 mm footprint (3.8 mm2), while offering a 40% RDS(on)*Area improvement versus EPC Generation 5 devices and a better Tempco. For upgrades, the footprint is the same as Generation 5 EPC2204.

The EPC9158, a dual output synchronous buck converter reference design board operating at 500 kHz switching frequency, converts an input voltage of 48 V - 54 V to a regulated 12 V output and delivers up to 25 A per phase or 50 A total continuous current. The combination of ADI's new LTC7890 100V dual, 2-phase synchronous buck controller for driving GaN with ultra-efficient EPC2218/EPC2088 GaN FETs from EPC enables a highly efficient solution in a small footprint for high power density applications. The solution achieves 96.5% efficiency at 48 V to 12 V and 50 A continuous current.

The EPC9160, a dual output synchronous buck converter reference design board operating at 2 MHz switching frequency per phase, converts an input voltage of 9 V to 24 V to a 3.3 V or 5 V output voltage and delivers up to 15 A continuous current for both outputs. Thanks to the high switching frequency, the solution size is very small (only 23 mm x 22 mm for both outputs) and the inductor height is only 3 mm. This, coupled with the LTC7890, makes this solution ideal for automotive console applications, where 2 MHz switching frequency is preferred. In addition, computing, industrial, consumer, and telecom power systems require small size as well as a very thin profile.

ADI's LTC7890 and LTC7891 integrate a half bridge driver and smart bootstrap diode. They offer low Iq, optimized near-zero deadtime or programmable deadtime and programmable switching frequency up to 3 MHz. The quiescent current of 5 uA (VIN = 48 V, VOUT = 5 V, CH1 only) enables very low standby power consumption and excellent light load efficiency. ADI's EVAL-LTC7890-AZ evaluation board features EPC2088 and EPC2204 EPC FETs, and delivers 20 A current for each 5 V and 12 V outputs with input voltage 30 V – 72 V. The EVAL-LTC7891-AZ evaluation board features EPC2088 EPC FET and delivers 20 A output current with output voltage 12 V and input voltage 36 V – 72 V.

ADI's LT8418 100 V Half Bridge gate driver with smart integrated bootstrap switch is well-suited to drive EPC GaN FETs due to the high switching frequency capability (up to 10 MHz), fast propagation delay (10 ns typical), and propagation delay matching (1.5 ns typical) for shorter deadtime, short minimum pulse width (11 ns), and very low resistance gate drive. It also offers accurate undervoltage and overvoltage lockout protections. ADI's evaluation board, EVAL-LT8418-BZ, features EPC EPC2204 GaN FETs in a half-bridge configuration and supports 80V max

input, 100kHz – 10 MHz fsw, 10A max current. The application note includes results at 500KHz and 1MHz with and without a heatsink.

ADI's LT8390A is a 60V high-frequency 4-switch buck-boost controller with an integrated 5V gate driver and up to 2 MHz switching frequency. It offers current and voltage control loops for optimizers and battery charging and discharging. ADI's reference design, EVAL-LT8390A-AZ, operates from an input voltage of 8-60Vin to an output voltage of 24V and delivers 5A continuous current at 2 MHz switching frequency with high efficiency. The size is only 2x3 cm (half of the current 100 W Si MOSFET solution size) with a small 6 x 6 x 6 mm inductor.

Price and Availability

The EPC9158, EPC9160, and EPC9195 demonstration boards from EPC are priced at $480 each and available for immediate delivery from Digi-Key at https://www.digikey.com/en/supplier-centers/epc.

For more information on ADI's EVAL-LTC7890-AZ, EVAL-LTC7891-AZ, EVAL-LT8418-BZ, and EVAL-LT8390A-AZ GaN-based evaluation board applications, please contact Keith Szolusha, Applications Director at ADI (Keith.Szolusha@analog.com). For more information on the availability and pricing of ADI's LTC7890, LTC7891, LT8418, and LT8390A, please contact Tae Han (Tae.Han@analog.com).

About EPC
The leader in enhancement mode gallium nitride (eGaN®) based power management. eGaN FETs and circuits provide performance many times greater than the best silicon power MOSFETs in applications such as DC-DC converters, remote sensing technology (lidar), motor drives for eMobility, robotics, drones, and low-cost satellites. www.epc-co.com

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