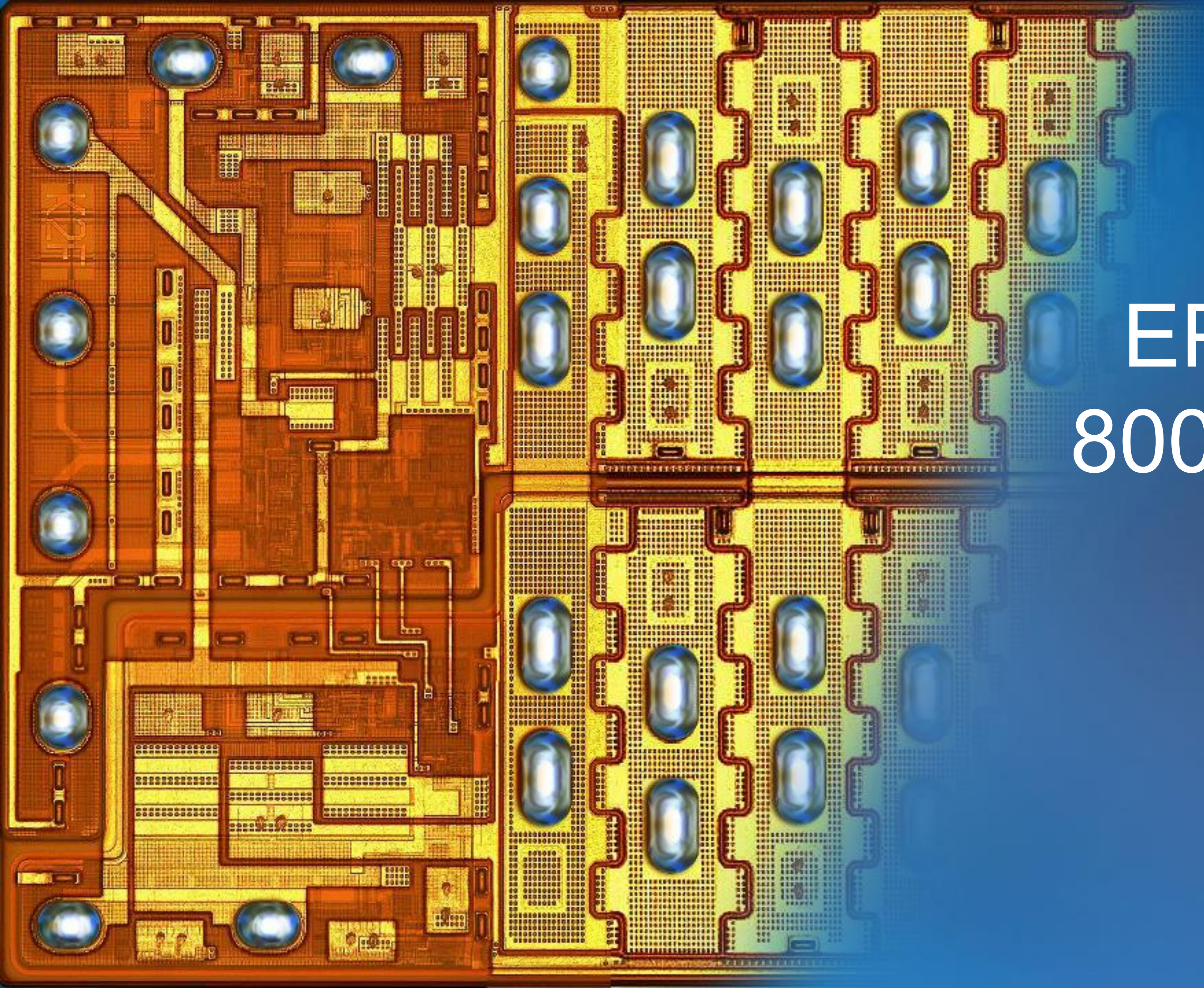
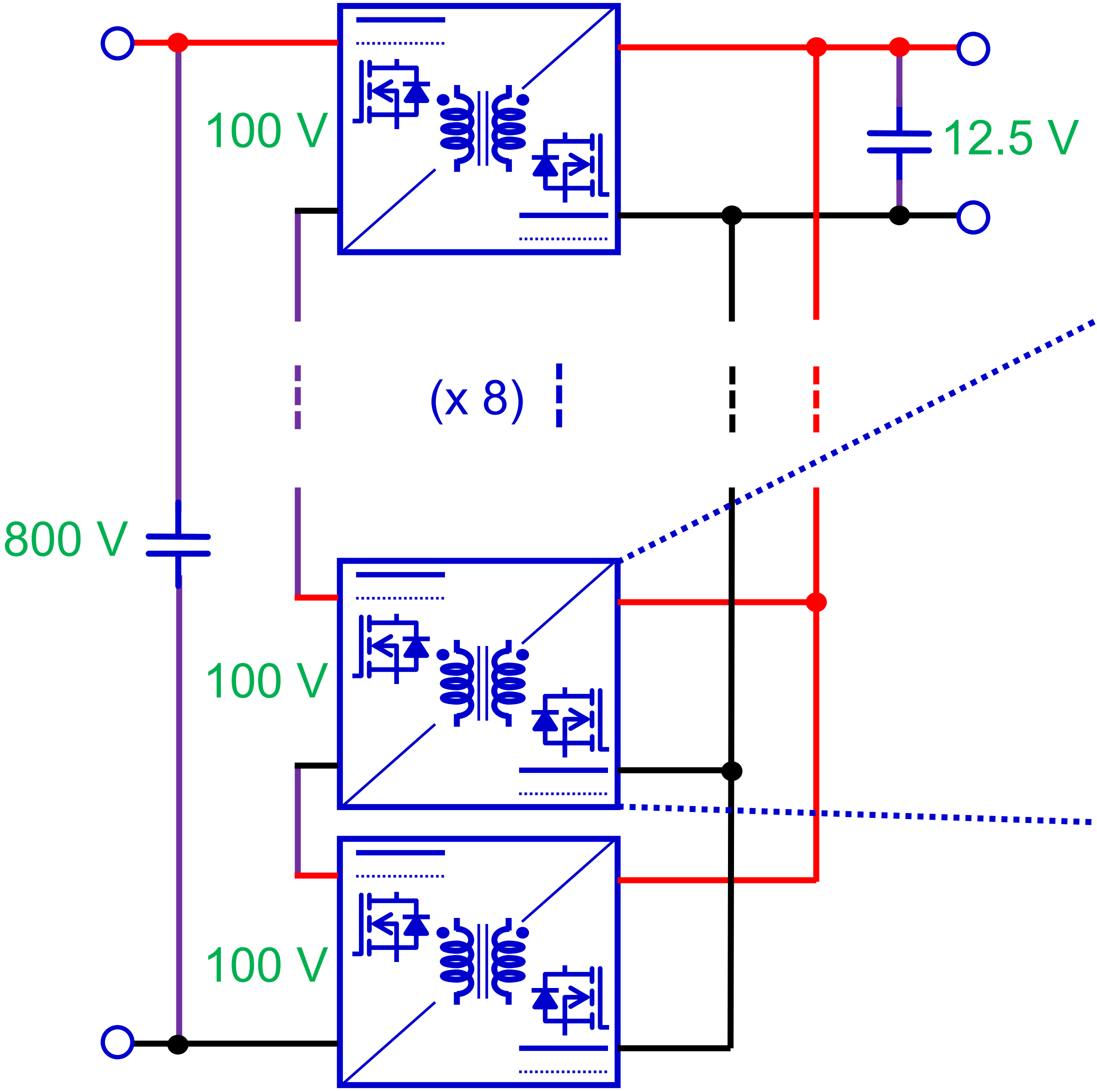


EPC91123KIT
800 V to 12.5 V
6 kW

May 2026

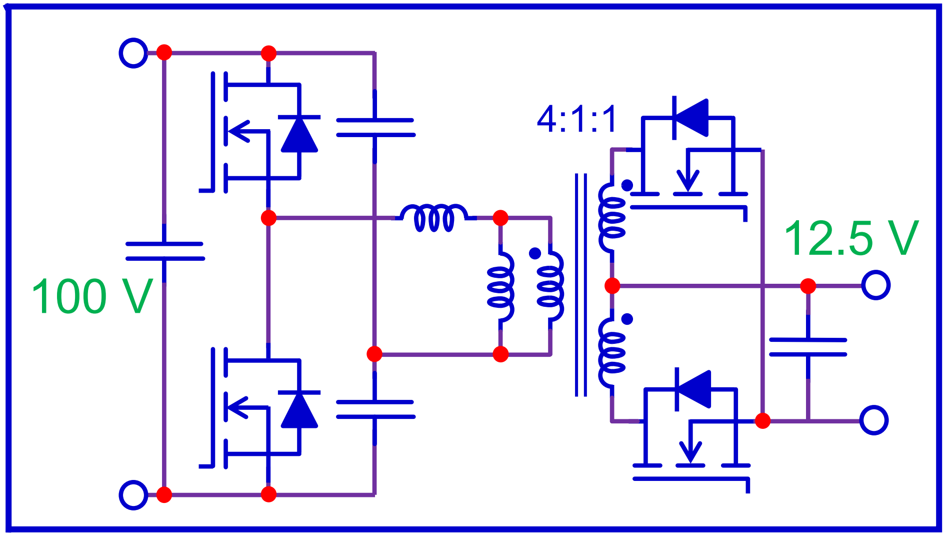
EFFICIENT POWER CONVERSION

EPC91123KIT Circuit Diagram

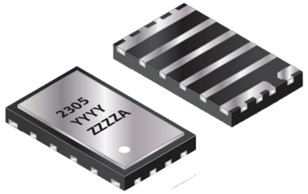


ISOP (Input-Series-Output-Parallel) of 8 LLC modules:

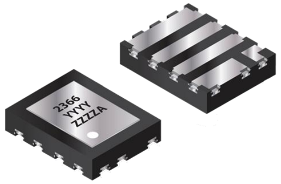
- Self Balancing
- Each LLC module: V_{IN} = 100 V and P_{OUT} = 750 W



2 x EPC2305

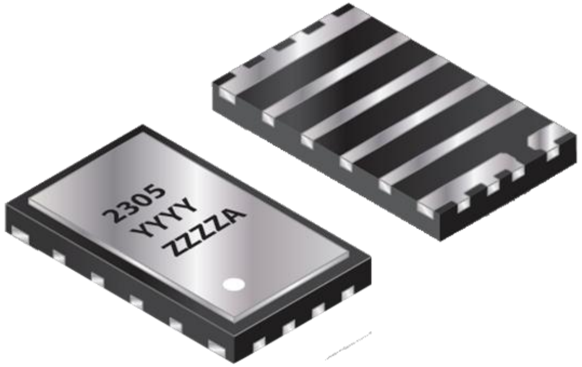


4 x EPC2366

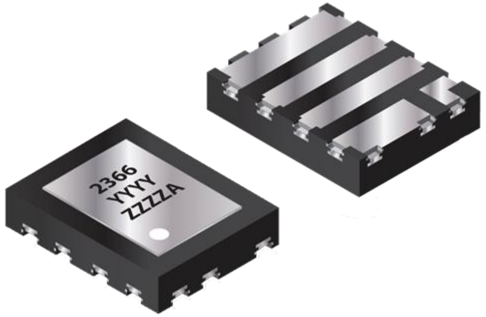


Featured GaN FETs

EPC2305



EPC2366



Package: QFN (double-sided cooling)	3 mm x 5 mm	2.6 mm x 3.3 mm
Voltage rating	150 V	40 V
Typical $R_{DS(on)}$ (V_{GS} = 5 V)	2.2 mΩ	0.84 mΩ
Gate Charge Q_G (V_{GS} = 5 V)	22 nC	15 nC
Output Charge Q_{OSS}	122 nC (V_{DS} = 100 V)	18 nC (V_{DS} = 12.5 V)
Reverse Recovery Q_{RR}	0 nC	0 nC

Benefits of the ISOP Topology

1. Superior GaN devices in primary side:
    - 150 V-GaN → better FOM and smaller size than 650 V-GaN
2. Simpler transformer design. For 800 V to 12.5 V, 6 kW:
    - ISOP with 650 V-GaN: 16:1:1, 3 kW transformer
    - ISOP with 150 V-GaN: 4:1:1, 750 W transformer
3. Fewer bus capacitors with interleaving LLC modules
4. Distributed losses on primary side devices → no hotspots
5. Lower EMI
6. Ideal topology for high step-down ratio (800 V to 12 V or 6 V)

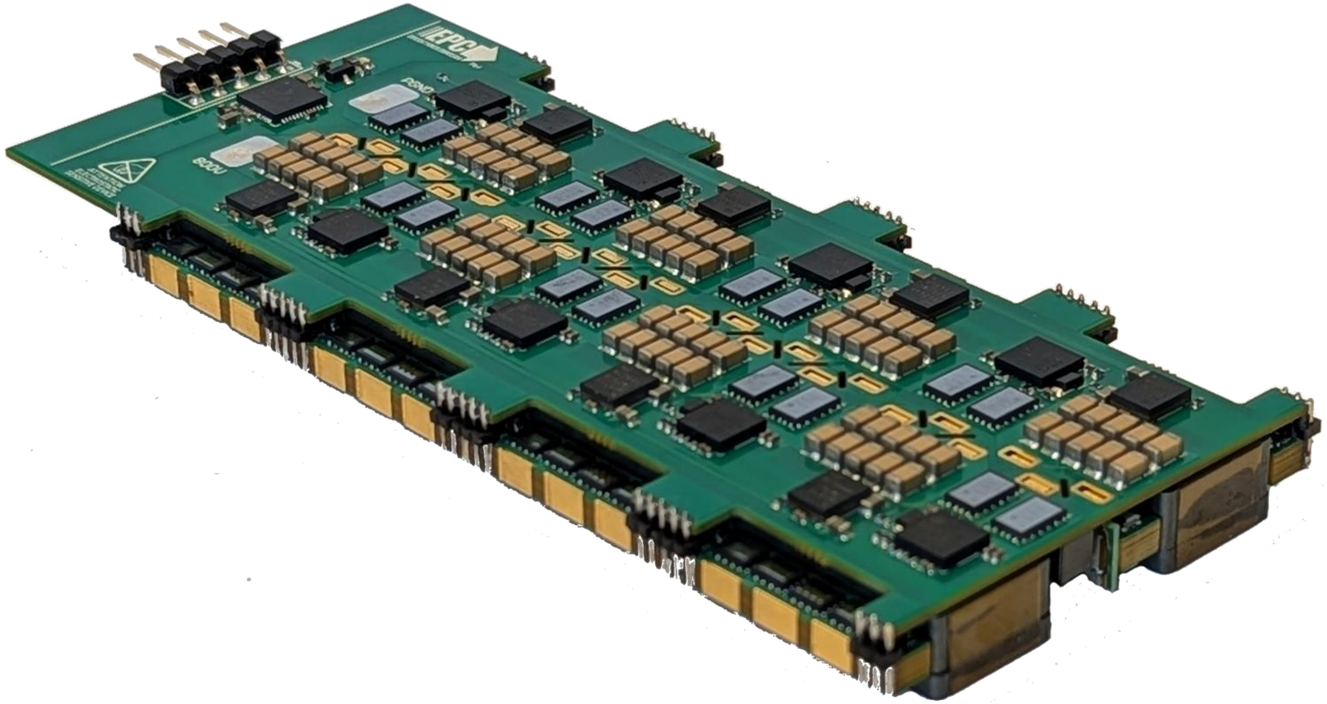
Converter Specifications

Converter details:

- Voltage ratio: 800 V to 12.5 V (fixed)
- P_{OUT} = 6 kW
- Area: 4982 mm^2 (830 mm^2/kW)
- Height: 8 mm

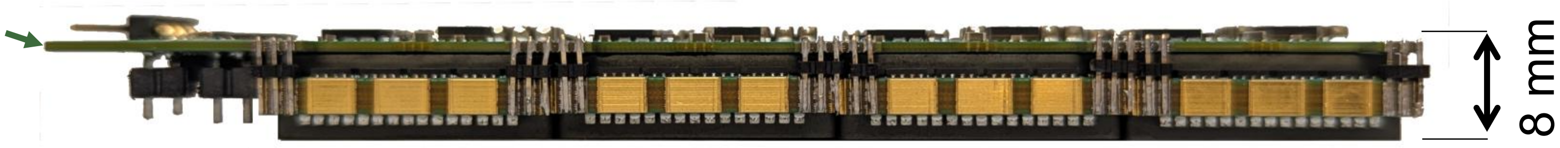
LLC module details:

- 100 V to 12.5 V, 750 W
- Primary: Half-bridge using EPC2305
- Center-tap rectifier using 2 x EPC2366
- Resonant frequency ~ 1 MHz



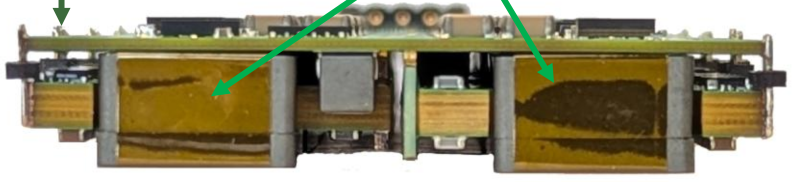
Converter Construction

Front view



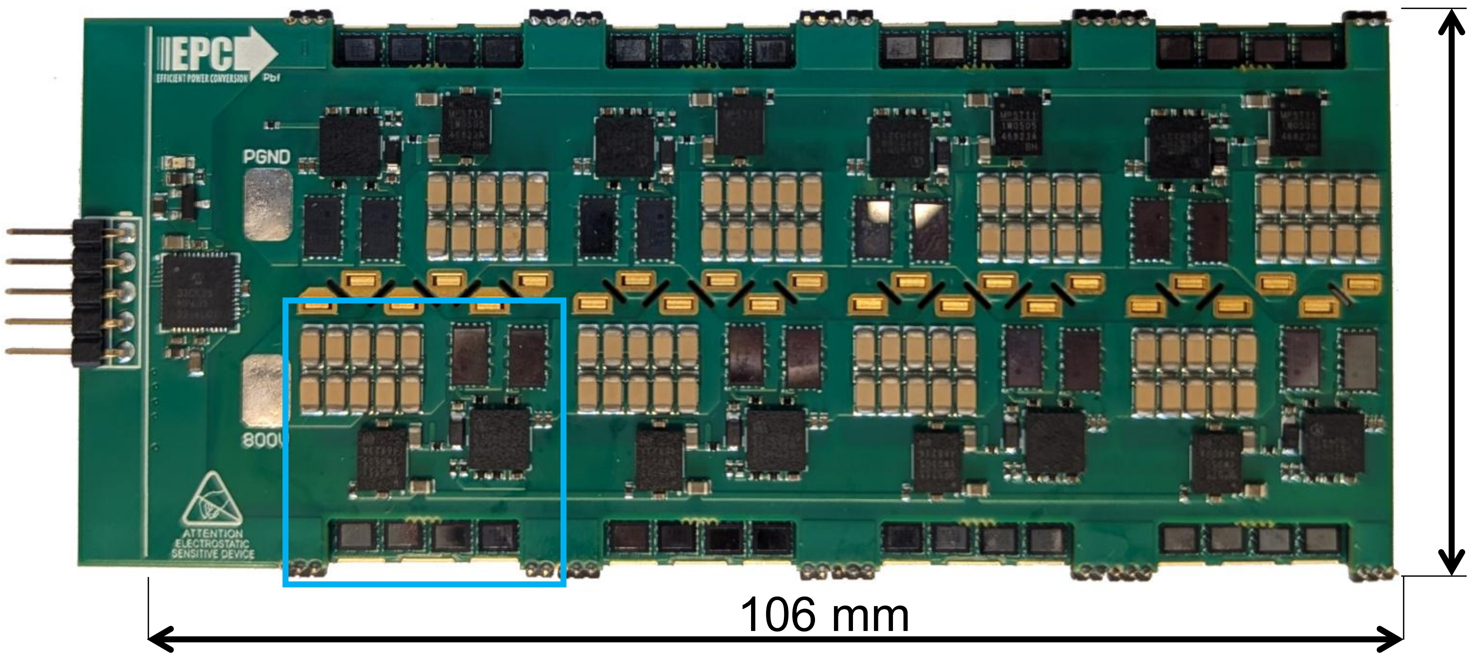
Power board (Primary FETs and drivers)

Transformer + Rectifier



Right-side view

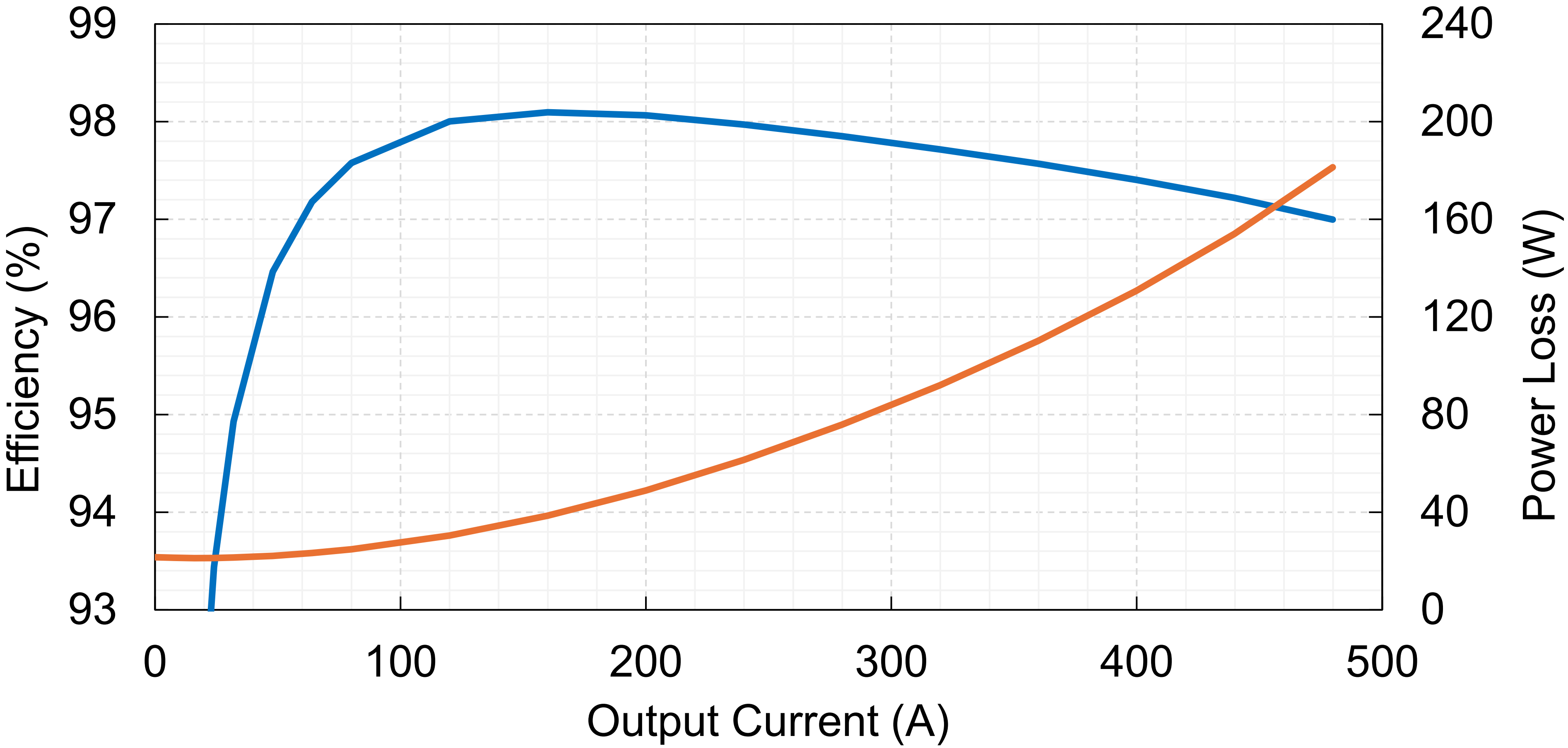
Transformer core



Top view

Power board and Motherboard: 6 layers
Transformer board: 14 layers

Converter Performance



Additional ~7.5 W of housekeeping power (~1.45 A @ 5V) for the ISOP converter, (~0.94 W per module)

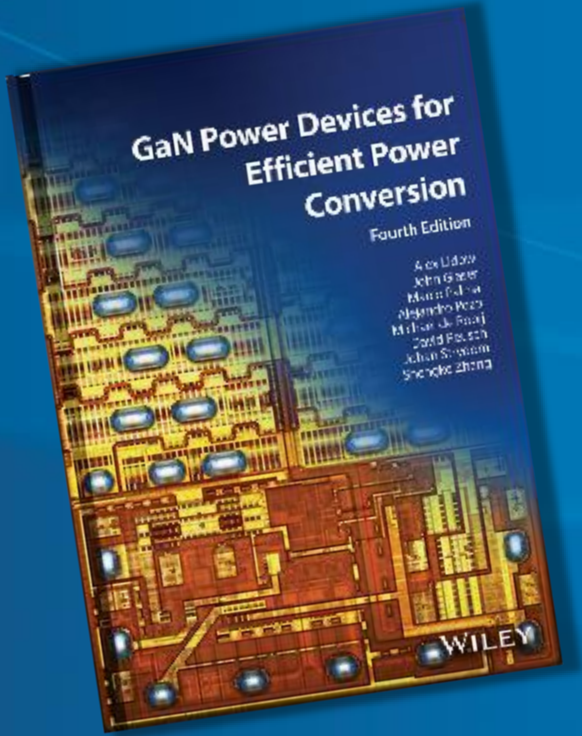
Bill of Materials

Key components:

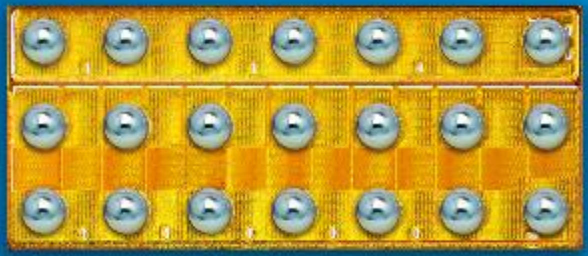
Component	**Part Number**	**Description**	**Quantity**	
			Per LLC	**Total**
Primary FETs	EPC2305	150V GaN FETs, 2.2mΩ, 3x5 QFN	2	16
Secondary FETs	EPC2366	40V GaN FETs, 0.84mΩ, 2.6x3.3 QFN	4	32
Primary Gate Driver	MP18831-4A	Isolated Gate Drive 2-ch	1	8
Secondary Gate Driver	LMG1020	Low-Side Gate Driver	2	16
Transformer Core	Proterial ER23/7.2/13*	ML95S material, size ER23/7.2/13*	2	16
Isolated 5V Power Supply	MIE1W0505BGLVH	5V/5V 1W Isolated DC-DC	1	8
Isolators	ISO7740DWR	Dig. Isolator 4-ch	-	2
Controller	DSPIC33CK256MP605	100MHz 16-bit Microcontroller	-	1

Click on images to learn more

How To GaN Video Series

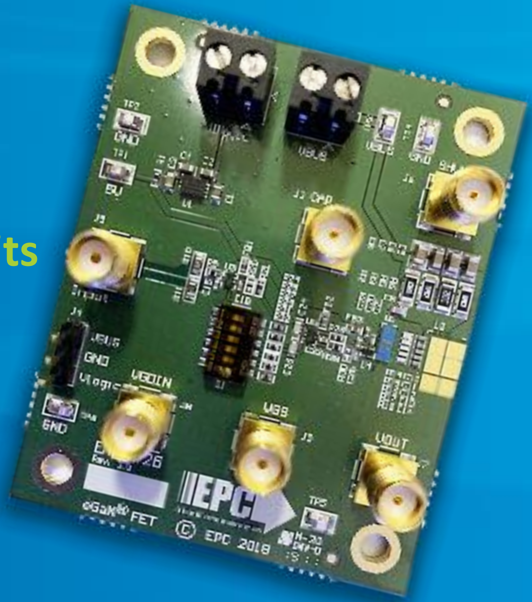


4th Edition Textbook



eGaN® FETs and ICs

Evaluation Kits



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