

# eGaN® FETs and ICs for Synchronous Rectification



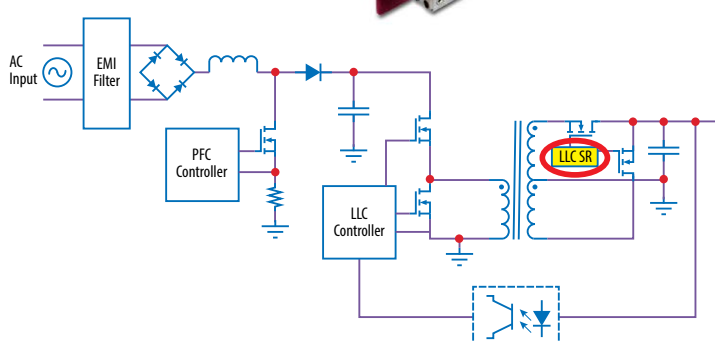
## Applications

- Synchronous Rectification in 100 W – 6 kW DC-DC from 400 V to 12 V, 19 V, 48 V, 54 V, 56 V
- AC/DC for multi-kW Servers, Netcom and Telecom systems
- Adaptors and SMPS for LED and OLED TV, home theater systems, gaming & graphic PCs, Computing, LED lighting

## Why GaN for Synchronous Rectification

- Lower gate driver & conduction losses
- Up to 1/15th of size & higher switching frequency
- No reverse recovery
- Ideal for paralleling
- Outstanding thermal performance & lower EMI
- GaN devices enable secondary 2 FET topologies vs. 4 FET silicon full bridge which increases power density and reduces system cost

## LLC Synchronous Rectification



## eGaN® SR Family

	2 mm x 3.5 mm	1.4 mm x 2.8 mm	1.6 mm x 4.6 mm
Parameter	EPC2218	EPC2059	EPC2215
$V_{DS}$	100 V	170 V	200 V
$R_{DS(on)}$	2.5 m $\Omega$	7 m $\Omega$	6 m $\Omega$
$Q_G$	11.8 nC	5.9 nC	10 nC
$Q_{GD}$	1.6 nC	0.9 nC	1.6 nC
$Q_{OSS}$	46 nC	37 nC	68 nC
$Q_{RR}$	0 nC	0 nC	0 nC
Device Size	7 mm <sup>2</sup>	3.9 mm <sup>2</sup>	7.4 mm <sup>2</sup>

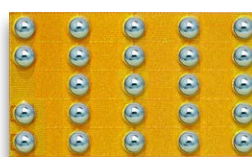
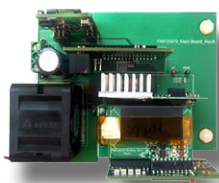
Output Voltage:

19 V – 24 V

48 V – 60 V

Part Number	Configuration	V <sub>DS</sub>	Max R <sub>DS(on)</sub> (mΩ) @ 5V <sub>GS</sub>	Q <sub>G</sub> typ (nC)	Q <sub>GS</sub> typ (nC)	Q <sub>GD</sub> typ (nC)	Q <sub>OSS</sub> typ (nC)	Q <sub>RR</sub> (nC)	I <sub>D</sub> (A)	Pulsed I <sub>D</sub> (A)	Package (mm)	Half Bridge Development Board
EPC2015C	Single	40	4	8.7	2.7	1.2	19	0	53	235	LGA 4.1 x 1.6	EPC9001C
EPC2057	Single	50	8.5	3	1.2	0.5	8	0	9.6	66	LGA 1.5 x 1.2	EPC90155
EPC2031	Single	60	3	16	5	3	48	0	48	450	BGA 4.6 x 2.6	EPC9061
EPC2020	Single	60	2.2	16	3.9	2.3	50	0	90	470	LGA 6.05 x 2.3	EPC9033
EPC2203	Single – AEC-Q101	80	80	0.67	0.22	0.12	3.6	0	1.7	17	BGA 0.9 x 0.9	n/a
EPC2214	Single – AEC-Q101	80	20	1.8	0.5	0.3	8	0	10	47	BGA 1.35 x 1.35	n/a
EPC2202	Single – AEC-Q101	80	17	3.2	1	0.55	18	0	18	75	LGA 2.1 x 1.6	n/a
EPC2029	Single	80	3.2	13	3.4	1.9	53	0	48	360	BGA 4.6 x 2.6	EPC9046
EPC2021	Single	80	2.2	15	4.1	3	72	0	90	390	LGA 6.05 x 2.3	EPC9034
EPC2206	Single – AEC-Q101	80	2.2	15	4.1	3	72	0	90	390	LGA 6.05 x 2.3	EPC90122
EPC2036	Single	100	73	0.7	0.17	0.14	3.9	0	1.7	18	BGA 0.9 x 0.9	EPC9050
EPC2007C	Single	100	30	1.6	0.6	0.3	8.3	0	6	40	LGA 1.7 x 1.1	EPC9006C
EPC2051	Single	100	25	1.8	0.6	0.3	7.3	0	1.7	37	BGA 1.3 x 0.85	EPC9091
EPC2016C	Single	100	16	3.4	1.1	0.55	16	0	18	75	LGA 2.1 x 1.6	EPC9010C
EPC2212	Single – AEC-Q101	100	13.5	3.2	0.9	0.6	18	0	18	75	LGA 2.1 x 1.6	n/a
EPC2052	Single	100	13.5	3.5	1.5	0.5	13	0	8.2	74	BGA 1.5 x 1.5	EPC9092
EPC2045	Single	100	7	6	1.9	0.8	25	0	16	130	BGA 2.5 x 1.5	EPC9078
EPC2204	Single	100	6	5.7	1.8	0.8	25	0	29	125	LGA 2.5 x 1.5	EPC9097
EPC2032	Single	100	4	12	3	2	66	0	48	340	BGA 4.6 x 2.6	EPC9062
EPC2053	Single	100	3.8	11.4	4.1	1.5	45	0	48	246	BGA 3.5 x 2	EPC9093
EPC2218	Single	100	3.2	10.5	3.2	1.5	46	0	231	150	LGA 3.5 x 1.95	EPC90123
EPC2022	Single	100	3.2	13.2	3.4	2.4	71	0	90	390	LGA 6.05 x 2.3	EPC9035
EPC2033	Single	150	7	12	3.8	3.2	90	0	48	260	BGA 4.6 x 2.6	EPC9047
EPC2059	Single	170	9	5.9	1.7	0.9	37	0	25	102	LGA 2.8 x 1.4	EPC9098
EPC2019	Single	200	50	1.8	0.6	0.35	18	0	8.5	42	LGA 2.77 x 0.95	EPC9014
EPC2010C	Single	200	25	3.7	1.3	0.7	40	0	22	90	LGA 3.6 x 1.6	EPC9003C
EPC2207	Single	200	22	4.5	1.3	0.7	23	0	14	54	LGA 2.9 x 0.9	EPC90124
EPC2215	Single	200	8	13.6	3.3	2.1	69	0	32	162	LGA 4.6 x 1.6	EPC9099
EPC2034C	Single	200	8	11.4	3.8	2.1	95	0	48	213	BGA 4.6 x 2.6	EPC9048C

Table data subject to change. Please refer to the Product section on [www.epc.com](http://www.epc.com)



**EPC2033**  
150V, 7 mΩ, 12 mm<sup>2</sup>

**AC/DC Reference Design**

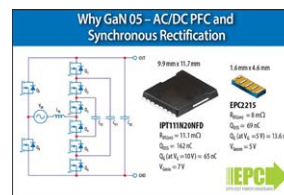
Reference Design	V <sub>IN</sub>	V <sub>OUT</sub>	Power Level	Featured Product
All-GaN 1 kW DC-DC for 48 V datacenter	390	48	1 kW	EPC2033

The most common topology for power supply and server and telecom systems is resonant LLC half bridge with secondary synchronous rectification and center tap transformer. It is **simple, low cost**, and allows the **highest efficiency**.

**Design Support Materials @ [www.epc-co.com](http://www.epc-co.com)**



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**Why GaN for AC/DC PFC and Synchronous Rectification**



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