

# eGaN® FETs and ICs for Brushless DC (BLDC) Motors



## Key Features

- 1/5 the size of silicon MOSFETs for the same  $R_{DS(on)}$
- Zero reverse recovery
- Lower switching losses
- Ruggedness for short circuit stress high  $dV/dt$  and small deadtime
- Integration simplifies design

## Key Benefits

- Miniaturization & low weight
- Higher battery efficiency
- Higher precision
- Reduced EMI
- Reliability
- High Frequency operation (100 kHz+)
  - Higher position accuracy
  - Lower current & torque ripple
  - Lower audible noise

## Applications



Robots & cobots



Medical robotics



e-scooter



Industrial drones



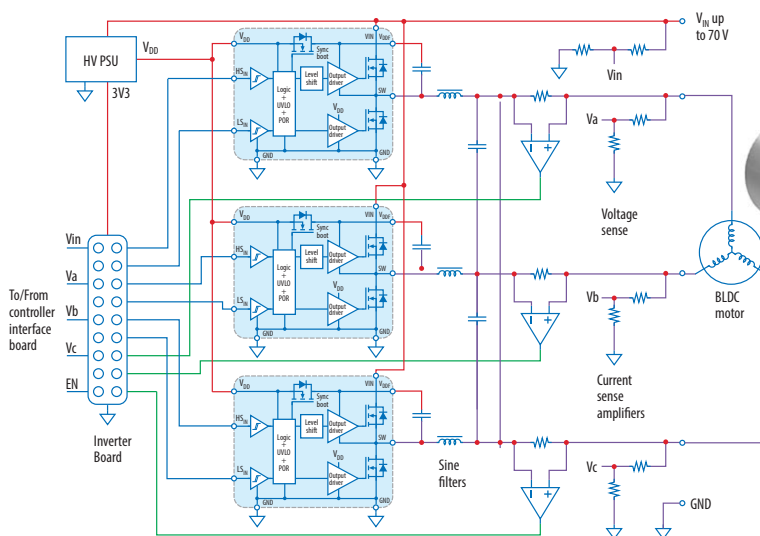
e-bike



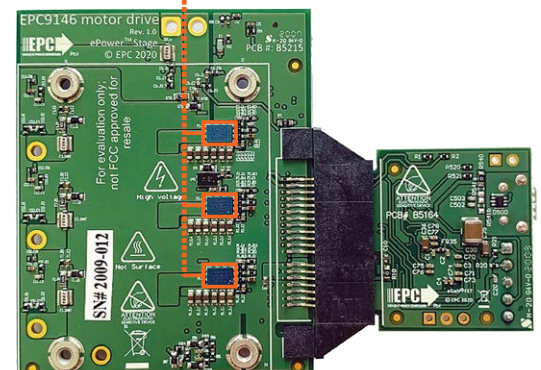
Servo drives

## 400 W Motor Drive Solution

- 48 V<sub>IN</sub>
- 15 Apk/phase
- 3 phases
- 98.5% efficiency @ 100 kHz



EPC21521



EPC9146 motor drive

## Recommended Devices for Brushless DC (BLDC) Motors

Part Number	Configuration	V <sub>DS</sub> (V)	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)	C <sub>ISS</sub> (pF)	C <sub>OSS</sub> (pF)	C <sub>RSS</sub> (pF)	I <sub>D</sub> (A)	Pulsed I <sub>D</sub> (A)	Max T <sub>J</sub> (°C)	Package (mm)	Development Board
EPC2102	Half Bridge	60	4.9	8	2.5	1.5	26 31	0	850	500 610	11	30	220	150	BGA 6.05 x 2.3	EPC9038
EPC2101	Half Bridge	60	11.5 2.8	3.3 13	1.1 3.9	0.5 2.2	9.3 45	0	300 1200	200 1000	5 25	10 40	80 350	150	BGA 6.05 x 2.3	EPC9037
EPC2039	Single	80	25	1.91	0.76	0.42	7.64	0	210	115	2	6.8	50	150	BGA 1.35 x 1.35	EPC9057
EPC2103	Half Bridge	80	5.5	6.5	2.2	1.1	30 34	0	730	445 525	7	30	195	150	BGA 6.05 x 2.3	EPC9039
EPC2105	Half Bridge	80	14.5 3.6	2.7 11	0.9 3	0.5 2.1	11 51	0	300 1170	170 780	3 12	10 40	70 300	150	BGA 6.05 x 2.3	EPC9034
EPC2021	Single	80	2.2	15	4.1	3	72	0	1610	1100	15	90	390	150	LGA 6.05 x 2.3	EPC9034
EPC2106	Half Bridge	100	70	0.73	0.24	0.140	3.96 4.68	0	79	52 61	0.5	1.7	18	150	BGA 1.35 x 1.35	EPC9055
EPC2212	Single	100	13.5	3.2	0.9	0.6	18	0	339	238	3	18	75	150	LGA 2.1 x 1.6	n/a
EPC2045	Single	100	7	6	1.9	0.8	25	0	767	295	3	16	130	150	BGA 2.5 x 1.5	EPC9078
EPC2001C	Single	100	7	7.5	2.4	1.2	31	0	770	430	10	36	150	150	LGA 4.1 x 1.6	EPC9002C
EPC2104	Half Bridge	100	6.8	6.8	2.3	1.4	35 41	0	730	430 500	5	30	180	150	BGA 6.05 x 2.3	EPC9040
EPC2053	Single	100	3.8	11.4	4.1	1.5	45	0	1453	642	10.4	48	246	150	BGA 3.5 x 2	EPC9093
EPC2022	Single	100	3.2	13.2	3.4	2.4	71	0	1400	840	7	90	390	150	LGA 6.05 x 2.3	EPC9035
EPC2207	Single	200	22	4.5	1.3	0.7	23	0	1400	130	0.7	14	54	150	LGA 2.9 x 0.9	EPC90124
EPC2215	Single	200	8	13.6	3.3	2.1	69	0	0	390	2	32	162	150	4.6 x 1.6	EPC9099
EPC2034C	Single	200	8	11.4	3.8	2.1	95	0	1166	630	2.8	48	213	150	BGA 4.6 x 2.6	EPC9048C

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

## ePower™ Stage

Part Number	Configuration	Nominal Logic Supply Voltage (V)	Maximum Input Voltage (V)	Typ R <sub>DS(on)</sub> (mΩ)	Rated Output Current (A)	Features	Fault Protection	Max T <sub>J</sub> (°C)	Package (mm)	Development Board
EPC21521	Half-Bridge ePower™ Stage	12	70	10	12.5	Level shifting, bootstrap circuits	UVLO	150	LGA 3.65 x 2.59	EPC90120

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

## Books

1. GaN Transistors for Efficient Power Conversion
2. DC-DC Conversion Handbook
3. Wireless Power Handbook, 2nd Edition

## Design Support

eGaN FET Reliability  
 Chip-Scale Packaging  
 DC-DC Power Conversion  
 GaN Talk Blog - "ePower™ Stage – Redefining Power Conversion"  
 Video: ePower Stage – Integrated Half-Bridge ePower Stage IC  
 Motor Drive landing page  
 Compact Low-voltage BLDC Motor Drive



eGaN FETs offer significantly higher performance switching than silicon-based MOSFETs in brushless DC motor designs.



## For More Information

Please contact [info@epc-co.com](mailto:info@epc-co.com)  
 or your local sales representative  
 Visit our website: [epc-co.com](http://epc-co.com)  
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[bit.ly/EPCCupdates](http://bit.ly/EPCCupdates) or text "EPC" to 22828



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