

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



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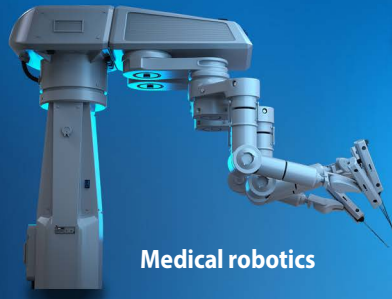
Key Features

- 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

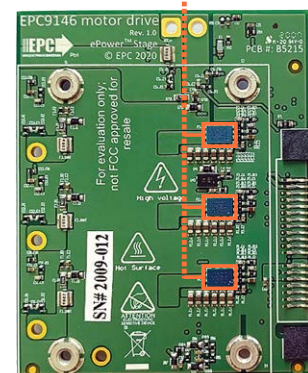
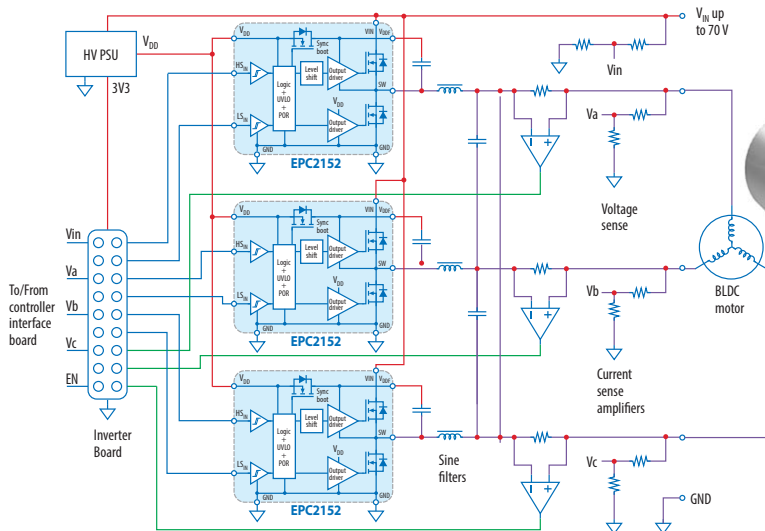


Robotics and cobots



400 W Motor Drive Solution

- 48 V_{IN}
- 3 phases
- 15 Apk/phase
- 98.5% efficiency @ 100 kHz



Interface board to microcontroller

- EPC9147A
- EPC9147B
- EPC9147C

Motor Drive

Part Number	Description	V _{IN}	I _{Phase} (A _{RMS})	f _{SW} (kHz)	Featured Product
EPC91104	14 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–80	14	20–250	EPC23104
EPC9176	20 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–65	20	20–250	EPC23102
EPC9193	20 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–65	20	50–250	EPC2619
EPC9193HC	40 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–65	40	50–250	EPC2619
EPC9194	40 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–65	40	20–250	EPC2302
EPC91200	40 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	30–130	40	20–150	EPC2305
EPC9173	35 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	20–85	35	20–250	EPC23101
EPC9186	150 A _{RMS} 3-Phase BLDC Motor Drive Reference Design Board	14–60	150	20–120	EPC2302

ePower™ Stage

Part Number	Configuration	Function	V	I _{OUT}	I _{OUT} Peak	V _{DD}	Input Logic	F (Max)	UVLO	Package (mm)	Development Board
EPC2152	Half-Bridge ePower™ Stage	ePower™ Stage	80	12.5	90	12	3.3V	3 MHz	7.5	LGA 3.9 x 2.6	EPC90120
EPC23101	HS FET + Driver + Level Shift	ePower™ Stage	100	65	240	6	5.5V	3 MHz	0.5–4	QFN 3.5 x 5	EPC90142
EPC23102	HS FET + Driver + Level Shift	ePower™ Stage	100	35	140	6	5.5V	3 MHz	0.5–4	QFN 3.5 x 5	EPC90147
EPC23104	HS FET + Driver + Level Shift	ePower™ Stage	100	15	44	6	3.3V or 5V	3 MHz		QFN 3.5 x 5	EPC90152

Recommended Devices for Brushless DC (BLDC) Motors

Part Number	Configuration	V _{DS} (V)	Max R _{DS(on)} (mΩ) @ 5V _{GS}	Q _G typ (nC)	Q _{GS} typ (nC)	Q _{GD} typ (nC)	Q _{OSS} typ (nC)	Q _{RR} (nC)	C _{ISS} (pF)	C _{OSS} (pF)	C _{RSS} (pF)	I _D (A)	Pulsed I _D (A)	Max T _J (°C)	Package (mm)	Development Board
EPC2057	Single	50	8.5	3	1.2	0.5	8	0	383	172	3	9.6	66	150	LGA 1.5 x 1.2	EPC90155
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
EPC2252	Single-AEC-Q101	80	11	3.5	1	0.5	15	0	440	190	1.3	8.2	75	150	BGA 1.5 x 1.5	EPC9179
EPC2065	Single	80	3.6	9.4	2.6	1.7	33	0	1097	534	8.9	60	215	150	LGA 3.5 x 2	EPC90137
EPC2206	Single-AEC-Q101	80	2.2	15	4.1	3	72	0	1610	1100	15	90	390	150	LGA 6.05 x 2.3	EPC90122
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
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
EPC2204	Single	100	6	5.7	1.8	0.8	25	0	644	304	2.3	29	125	150	LGA 2.5 x 1.5	EPC9097
EPC2306	Single	100	3.8	11.0		1.1	41	0	1544	482	3.4	48	197	150	QFN 3 x 5	EPC90145
EPC2619	Single	100	3.3	8.3	2.1	1	27	0	1180	310	3	29	164	150	LGA 2.5 x 1.5	EPC90153
EPC2088	Single	100	3.2	12.5	4.4	1.4	47	0	1864	557	3.6	60	231	150	LGA 3.5 x 1.95	EPC90123
EPC2071	Single	100	2.2	18	6	1.8	71	0	2664	878	5.4	64	350	150	LGA 4.45 x 2.3	EPC90146
EPC2302	Single	100	1.8	23	8	2.3	85	0	3200	1000	7	101	408	150	QFN 3 x 5	EPC90142
EPC2367	Single	100	1.2 (typ)	17	5.3	2.4	54	0	2170	590	8	78	309	150	QFN 3.3 x 3.3	EPC90164
EPC2361	Single	100	1.0 (typ)	28	7.2	2.5	86	0	4094	1147	12	101	519	150	QFN 3 x 5	EPC90156
EPC2308	Single	150	6	11	3.8	1.3	50	0	1454	405	2.6	48	157	150	QFN 3 x 5	EPC90148
EPC2305	Single	150	4	21	6.3	2.6	105	0	2900	920	7	80	329	150	QFN 3 x 5	EPC90143
EPC2234	Single - AEC Q101	160	8	11	3.8	2.0	96	0	1155	641	3.1	63	213	150	BGA 4.6 x 2.6	n/a
EPC2059	Single	170	9	5.7	1.3	0.9	35	0	633	267	1.6	24	102	150	LGA 2.8 x 1.4	EPC9098
EPC2207	Single	200	22	4.5	1.3	0.7	23	0	1400	130	0.7	14	54	150	LGA 2.8 x 0.9	EPC90124
EPC2307	Single	200	10	10.6		1.3	58	0	1401	326	1.2	62	130	150	QFN 3 x 5	EPC90150
EPC2215	Single	200	8	13.6	3.3	2.1	69	0	0	390	2	32	162	150	LGA 4.6 x 1.6	EPC9099
EPC2304	Single	200	5	21	0.0	2.6	115	0	2786	649	2.4	133	260	150	QFN 3 x 5	EPC90140



For More Information

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