eGaN® FETs and ICs for Lidar (Light Distancing and Ranging) Applications

EFFICIENT POWER CONVERSION

	Lidar Application	Application Description
Autonomous Vehicles		Lidar is used as the "eyes" for self-driving cars. It is critical that the highest resolution is obtained. With MOSFETs images are fuzzy, however due to the speed of eGaN FETs and ICs high resolution is achieved.
Unmanned Aerial Vehicles (UAV)		Lidar carried aloft with UAVs (drones) provide 3-D mapping that can be used in agriculture, mining and even under water topography. eGaN FETs and ICs provide better resolution, small size and weight make them ideal for airborne use.
Robotics		Lidar provides the ability for robots to obtain images of their environments, which increases their autonomy. With the superior clarity provided by the superior performance of eGaN FETs and ICs, the robot has a clear view of its surroundings.
Augmented Reality (AR)		Lidar enables the expansion of a viewer's environment with AR used in gaming, medical technology and in the classroom. eGan FETs and ICs small size and thermal efficiency minimize the size of AR headsets.
Military		Within the military environment, Lidar has many applications. For example, images from a Lidar-equipped drone can provide troops wearing an augmented reality headset a view of the battlefield.

GaN's Contribution to Lidar

Using the speed of light as a reference, Lidar is an active method for remotely sensing objects. Simply put, it records the time it takes for a laser pulse to be sent and received after striking a distant object. The distance and image of the object is calculated from this information. By directing the laser around 360 degrees allows the system to identify objects in the entire 3-D environment surrounding the Lidar unit.

Knowing the precise time the light pulses are triggered, and when they return to the sensor, contributes significantly to the accuracy of the image the Lidar system creates. GaN FETs' and ICs' fast switching capability enables more accurate determination of the distance measurements between the time the light pulses are fired and the time they are received.

Also, since only a small amount of the light will be reflected back to the sensors, the ability of GaN components to deliver more power to the laser results in a more intense laser beam output, enabling the Lidar system to "see" at a greater distance, or in less than perfect atmospheric conditions.

Generating a series of laser pulses that take snapshots of the entire surroundings, one pulse at a time, creates the full three-dimensional Lidar image.

Recommended Devices for Lidar Designs

Part Number	Configuration	V_{DS}	Max $R_{DS(on)}$ (mΩ) @ 5 V_{GS}	Q_G typ (nC)	Q_{GS} typ (nC)	Q_{GD} typ (nC)	Q_{OSS} typ (nC)	Max. Peak Pulsed I_D(A) (25°C, Tpulse = 300 µs)	Package (mm)	Development Board
EPC2040	Single	15	30	0.745	0.23	0.14	0.42	28	BGA 0.85 x 1.2	n/a
EPC2216	Single - AEC-Q101	15	26	0.87	0.21	0.13	0.53	28	BGA 0.85 x 1.2	EPC9144
EPC2014C	Single	40	16	2	0.7	0.3	4	60	LGA 1.7 x 1.1	EPC9005C
EPC2055	Single	40	3.6	6.6	2.3	0.7	13	161	LGA 2.5 x 1.5	EPC90132
EPC2035	Single	60	45	0.88	0.25	0.16	2.6	24	BGA 0.9 x 0.9	EPC9049
EPC2219	Single with Gate Diode – AEC-Q101	65	3300	0.044	0.02	0.004	0.104	0.5	BGA 0.9 x 0.9	n/a
EPC2203	Single - AEC-Q101	80	80	0.67	0.22	0.12	3.6	17	BGA 0.9 x 0.9	n/a
EPC2039	Single	80	25	1.91	0.76	0.42	7.64	50	BGA 1.35 x 1.35	EPC9057
EPC2214	Single – AEC-Q101	80	20	1.8	0.5	0.3	8	47	BGA 1.35 x 1.35	n/a
EPC2038	Single with Gate Diode	100	3300	0.044	0.02	0.004	0.134	0.5	BGA 0.9 x 0.9	EPC9507
EPC2037	Single	100	550	0.115	0.032	0.025	0.6	2.4	BGA 0.9 x 0.9	EPC9061
EPC2036	Single	100	73	0.7	0.17	0.14	3.9	18	BGA 0.9 x 0.9	EPC9050
EPC2051	Single	100	25	1.8	0.6	0.3	7.3	37	BGA 1.3 x 0.85	EPC9091
EPC2212	Single – AEC-Q101	100	13.5	3.2	0.9	0.6	18	75	LGA 2.1 x 1.6	n/a
EPC2052	Single	100	13.5	3.5	1.5	0.5	13	74	BGA 1.5 x 1.5	EPC9092
EPC2204	Single	100	6	5.7	1.8	0.8	25	125	LGA 2.5 x 1.5	EPC9097
EPC2088	Single	100	3.2	12.5	4.4	1.4	47	231	LGA 3.5 x 1.95	EPC90123
EPC2054	Single	200	43	2.9	0.9	0.30	15	32	BGA 1.3 x 1.3	EPC9094

eGaN® Integrated Circuits

eToF™ Laser Driver IC

Part Number	Configuration	Function	V	I_{OUT}	I_{OUT} Peak	V_{DD}	Input Logic	F (Max)	UVLO	Package (mm)	Development Board
EPC21601	Single	eToF™ Laser Driver	40	3.7	10	5	3.3 V	200 MHz	0	BGA 1 x 1.5	EPC9154
EPC21603	Single	eToF™ Laser Driver	40	3.7	10	5	LVDS	200 MHz	0	BGA 1 x 1.5	EPC9156
EPC21701	Single	eToF™ Laser Driver	80	7.2	15	5	3.3 V	50 MHz	0	BGA 1.7 x 1	EPC9172
EPC21702	Single	eToF™ Laser Driver	100	7.2	30	5 and 10	3.3 V	10 MHz	0	BGA 1.66 x 1.46	n/a

Table data subject to change. Please visit: epc-co.com/epc/Products/gan-fets-and-ics

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