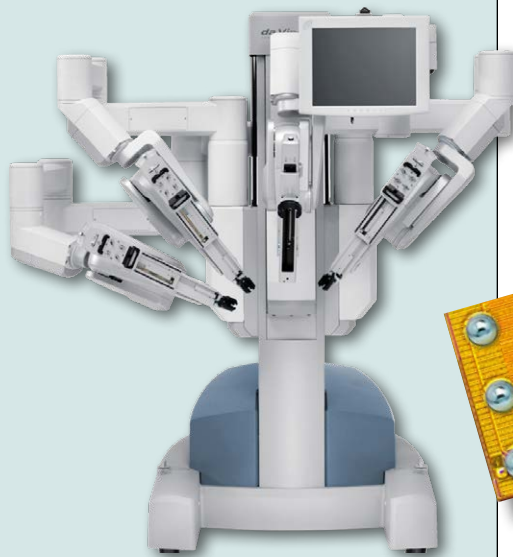


eGaN® FETs and ICs for Medical Technology



Benefits of eGaN FETs and ICs for Medical Technology

- **Imaging** - increased scanning speed by having more imaging coils while reducing power consumption *enabled by eGaN FET's high frequency capability and the need for less bias current*
- **Diagnostic Methods** - higher performance with high energy density *enabled by switching speed of GaN in a extremely small chip-scale package*
- **Implantable Devices** - eliminate need for through-skin cables using wireless power to charge devices while patient undertakes everyday activities, resulting in quality of life improvement *made possible by GaN enabled wireless power transfer*
- **Medical Robotics** – accurate control of high-resolution motors required for precision surgery is *enabled by GaN's small size, thermal efficiency, and fast switching speed*



GaN Technology – Contributing to Medicine in No Small Way

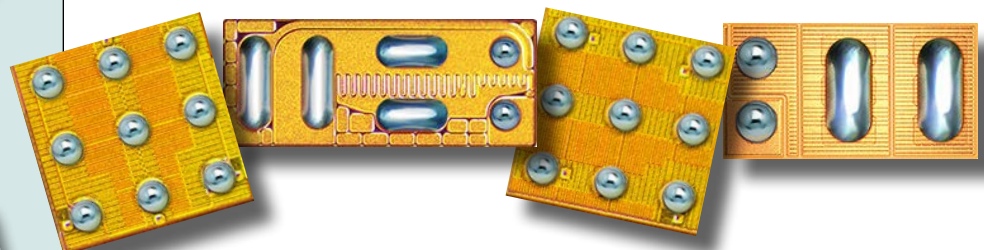
Advances in semiconductor technology are resulting in advances in the field of medicine. The high frequency switching and small size of GaN are enabling applications such as wireless power transfer.

Resolution is a critical attribute of all **medical imaging** devices, such as sonograms, CAT scans, and MRI. eGaN® FETs and ICs increase the speed and precision with which imaging equipment can conduct scanning measurements. The small size and efficiency of eGaN® FETs improves resolution of data collected, while lowering operating power resulting in faster imagery.

In the world of **diagnostic technology**, traditional methods such as those used in colonoscopies, are about to become a thing of the past. As an alternative, due to the small size of the eGaN FET, a micro-imaging system can fit inside an ingestible tablet. This non-invasive breakthrough of a “scanner within a pill” not only makes it more comfortable for the patient, but also significantly reduces the cost of health care through early warning and more comprehensive and higher resolution diagnostics.

Many wireless power enabled **implantable devices** today require repeated charging, exposing patients to infections risks when using wires that penetrate the skin. With wireless power using GaN, exposed wires are no longer needed, reducing infection risk and improving quality of life for the patient.

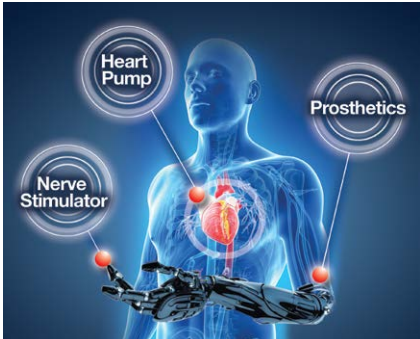




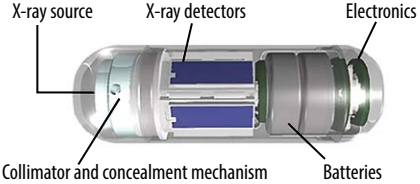


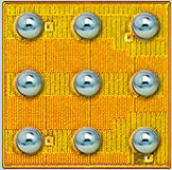
Medical robotics are being used where extreme precision is needed. Overall, robotic surgery improves the clinical effectiveness of conventional modes of surgery. GaN technology is ideal for medical robots due to their small size, thermal efficiency, and most importantly, their high switching frequency, which results in higher resolution for the more than 50 extremely small motors often used in these robots.



Note: Die images are not to scale

[EPC Chip-scale packaging information](#)

eGaN FETs and ICs for Medical Technology

	MedTech Application	eGaN Technology	Benefits
<p>Wireless Power for Implantable Devices</p>	 <p>On-patient wireless power applications</p>	 <p>EPC2107 100 V, 0.5 A Die size: 1.35 mm x 1.35 mm</p>	<p>eGaN FET's switching speed enables wireless power transfer for implanted devices which eliminates the need for through-skin cables, reducing the mortality rate while making it possible for patients to maintain a quality of life</p>
<p>Imaging Equipment and Diagnostics</p>	 <p>Image resolution is critical to MRI scanners</p>	 <p>MRI Receive coil using EPC8004 courtesy of Case Western University</p>  <p>EPC8004 40 V, 7.5 A Die size: 2.1 mm x 0.8 mm</p>	<p>eGaN FETs provide improved scanning speed allowing more coils to be employed, thus reducing distortion of the magnetic field and decreasing overall power consumption for imaging equipment</p>
	 <p>Non-invasive "colonoscopy pill" from Check-Cap Ltd</p>	 <p>EPC2012C 200 V, 22 A Die size: 1.7 mm x 0.9 mm</p>	<p>eGaN FET's high frequency switching increases performance of X-Ray based diagnostic systems and the FET's extremely small chip-scale packaging enables high energy density</p>
<p>Robotics</p>		 <p>EPC2039 80 V, 50 A Die size: 1.35 mm x 1.35 mm</p>	<p>GaN's small size, thermal efficiency, and high frequency switching contribute to high-resolution motor control for medical robotics</p>

Recommended Devices for Medical Technology

Part Number	Configuration	V _{DS} (V)	Max R _{DS(on)} (mΩ) @5 V _{GS}	Q _G typ (nC)	Q _{GS} typ (nC)	Q _{GD} typ (nC)	Q _{OSS} typ (nC)	Q _{RR} (nC)	I _D (A)	Pulsed I _D (A)	Package (mm)	Development Board	Recommended Devices by Application			
													Implantable		Medical Imaging and Diagnostics	Robotics
													PSU*	WiPo**		
EPC8004	Single	40	110	0.37	0.12	0.047	0.63	0	4	7.5	LGA 2.05 x 0.85	EPC9024				
EPC2014C	Single	40	16	2	0.7	0.3	4	0	10	60	LGA 1.7 x 1.1	EPC9005C				
EPC2015C	Single	40	4	8.7	2.7	1.2	19	0	53	235	LGA 4.1 x 1.6	EPC9001C				
EPC2108	Dual	60	240	0.24	0.106	0.047	0.17 0.93	0	1.7	5.5	BGA 1.35 x 1.35	EPC9064				
	Integrated Bootstrap	100	3300	0.044	0.02	0.004	0.134		0.5	0.5						
EPC2035	Single	60	45	0.88	0.25	0.16	2.6	0	1.7	24	BGA 0.9 x 0.9	EPC9049				
EPC8002	Single	65	480	0.133	0.057	0.015	0.344	0	2	2	LGA 2.05 x 0.85	EPC9022				
EPC8009	Single	65	130	0.37	0.12	0.055	0.94	0	4	7.5	LGA 2.05 x 0.85	EPC9029				
EPC2039	Single	80	25	1.91	0.76	0.42	7.64	0	6.8	50	BGA 1.35 x 1.35	EPC9057				
EPC2107	Dual	100	390	0.19	0.077	0.041	0.9 1.25	0	1.7	3.8	BGA 1.35 x 1.35	EPC9063				
	Integrated Bootstrap		3300	0.044	0.02	0.004	0.134		0.5	0.5						
EPC2037	Single	100	550	0.115	0.032	0.025	0.6	0	1.7	2.4	BGA 0.9 x 0.9	EPC9087				
EPC8010	Single	100	160	0.36	0.13	0.06	2.2	0	4	7.5	LGA 2.05 x 0.85	EPC9030				
EPC2106	Half Bridge	100	70	0.73	0.24	0.140	3.96 4.68	0	1.7	18	BGA 1.35 x 1.35	EPC9055				
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				
EPC2016C	Single	100	16	3.4	1.1	0.55	16	0	18	75	LGA 2.1 x 1.6	EPC9010C				
EPC2110	Dual, Common Source	120	110	0.8	0.25	0.18	4	0	3.4	20	BGA 1.35 x 1.35	EPC9058				
EPC2012C	Single	200	100	1	0.3	0.2	10	0	5	22	LGA 1.7 x 0.9	EPC9004C				
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	54	150	LGA 2.9 x 0.9	EPC90124				
EPC2215	Single	200	8	13.6	3.3	2.1	69	0	162	150	LGA 4.6 x 1.6	EPC9099				

Note: Table data subject to change. Please refer to the Product section on www.epc-co.com.

*PSU = Power Supply Unit

**WiPo = Wireless Power

Design Support Materials @ www.epc-co.com

Books

GaN Transistors for Efficient Power Conversion Textbook
Wireless Power Handbook – Second Edition
DC-DC Converter Handbook

Design Support

MedTech
DC-DC Power Conversion
Wireless Power
Chip-Scale Packaging
Videos

Evaluation Kits

EPC9111 – 35 W, Wireless Power Demo Kit
EPC9112 – 50 W, Wireless Power Demo Kit
EPC9113 – 16 W, Class 3, ZVS Class-D Wireless Power System
EPC9114 – 10 W, Class 2, ZVZ Class-D Wireless Power System
EPC9003C – 200 V, 5 A Development Board
EPC9024 – 40 V, 4.4 A Development Board
Demo Boards



For More Information

Please contact info@epc-co.com or your local sales representative

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