



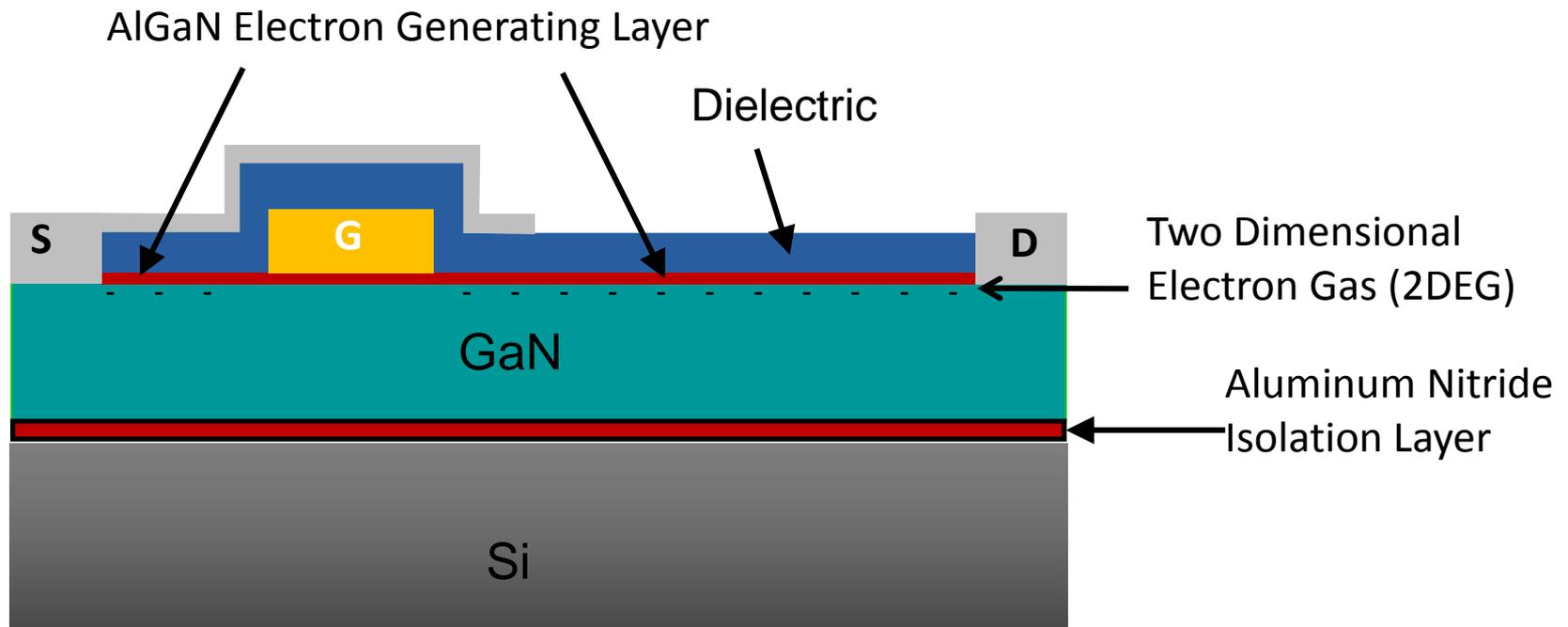
The eGaN[®] FET Journey Continues in Space

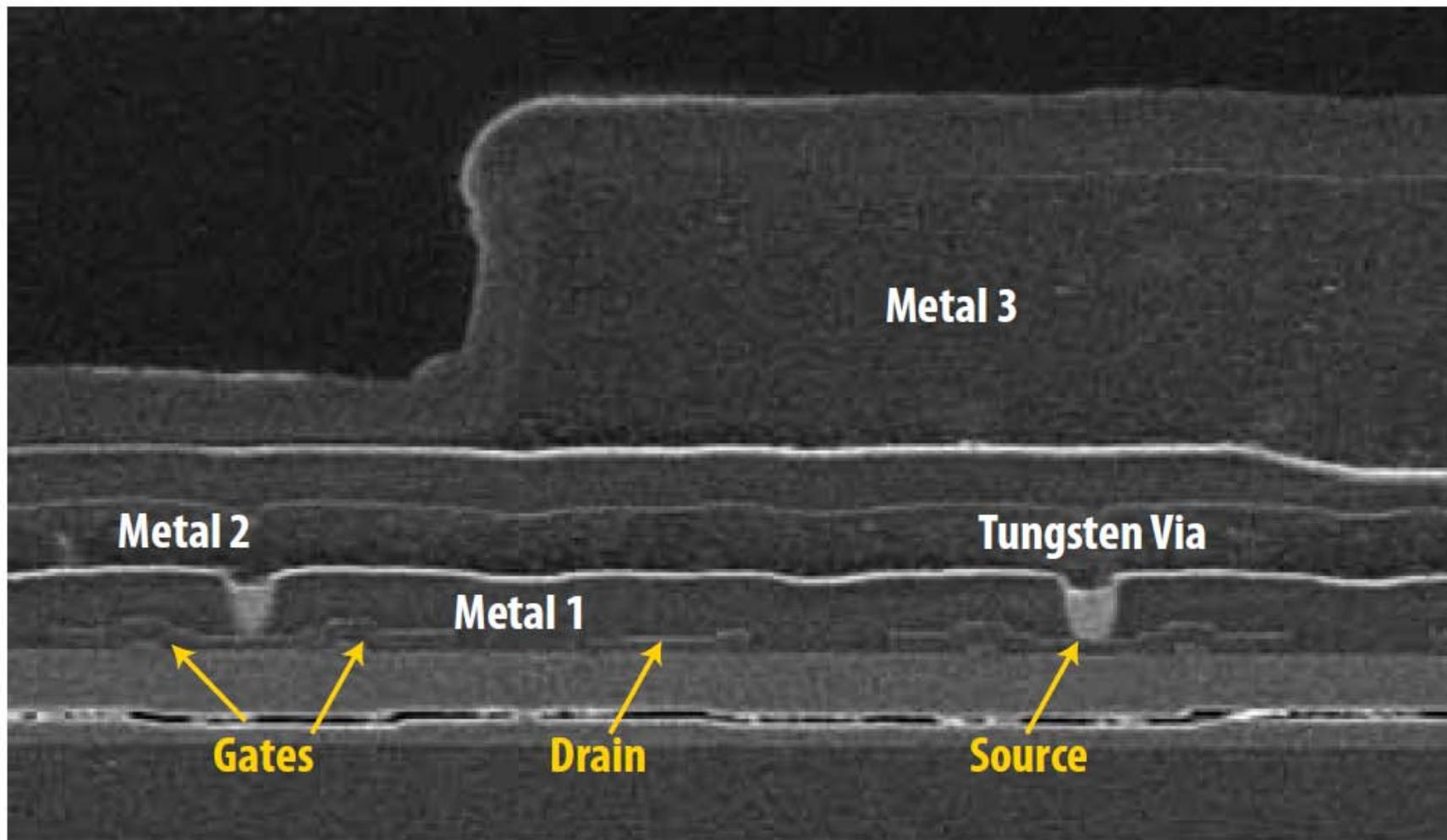
Radiation Tolerant Enhancement Mode Gallium Nitride (eGaN[®]) FET Characteristics



Alexander Lidow
Chief Executive Officer
Efficient Power Conversion

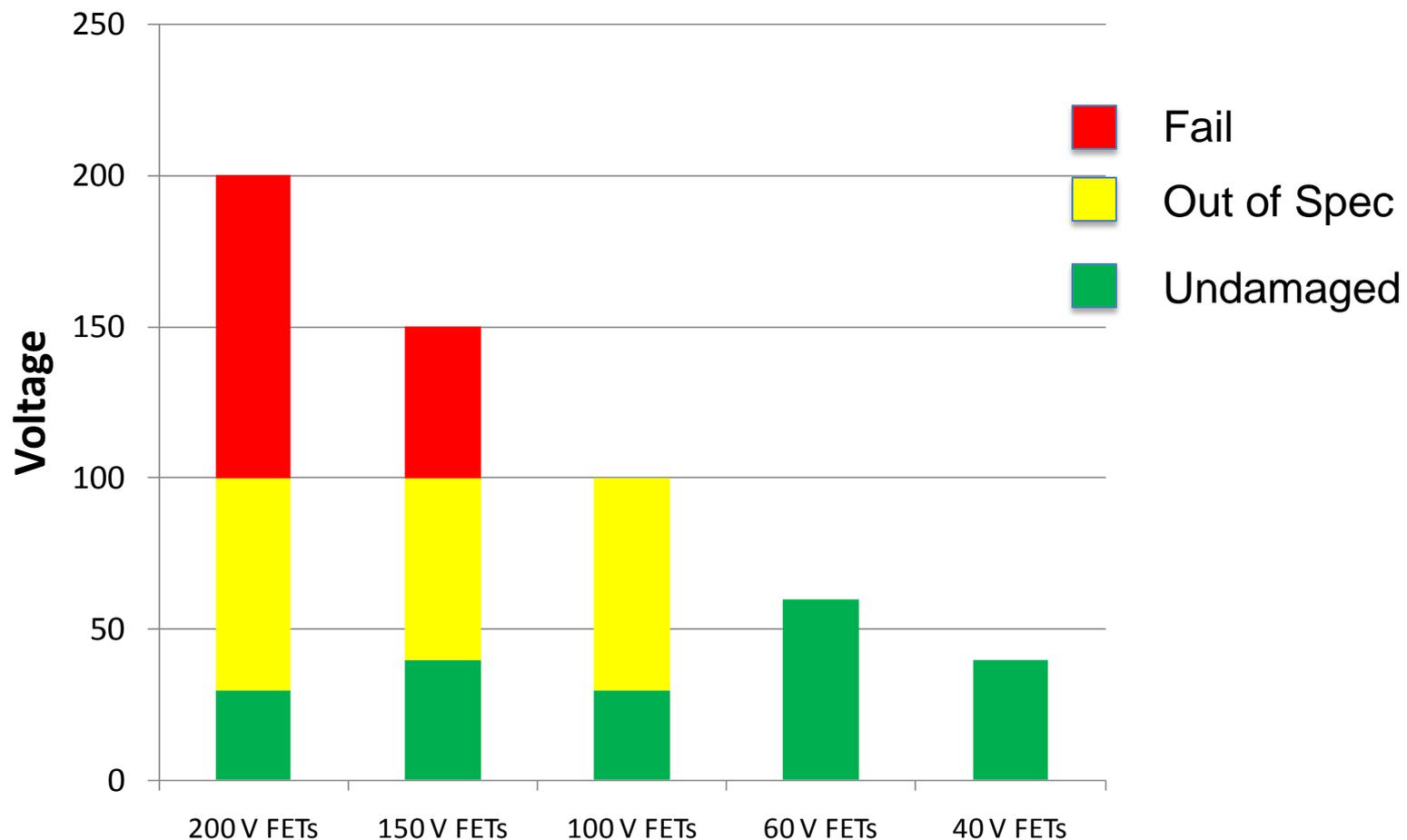
- Device Structure
- SEE Results
- Total Dose Results
- In Circuit Results
- What's in the Future?
- Conclusions



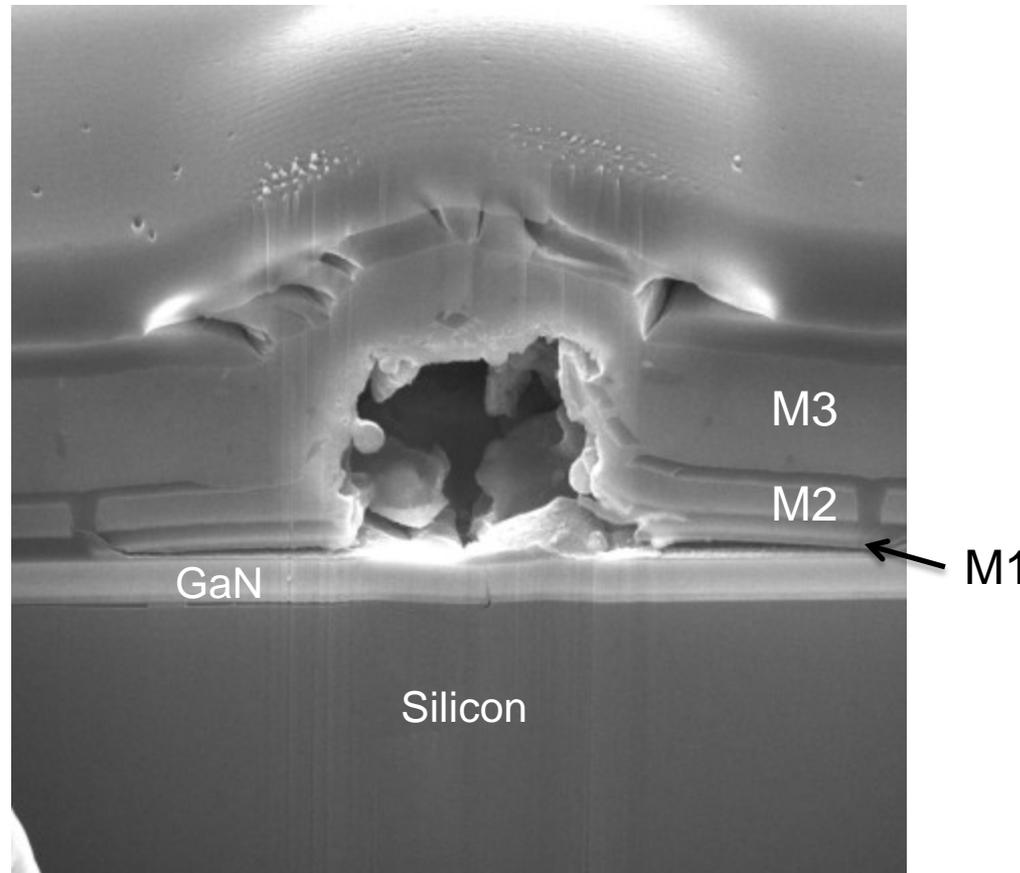


SEE Results

SEE Heavy Ion Testing - Au

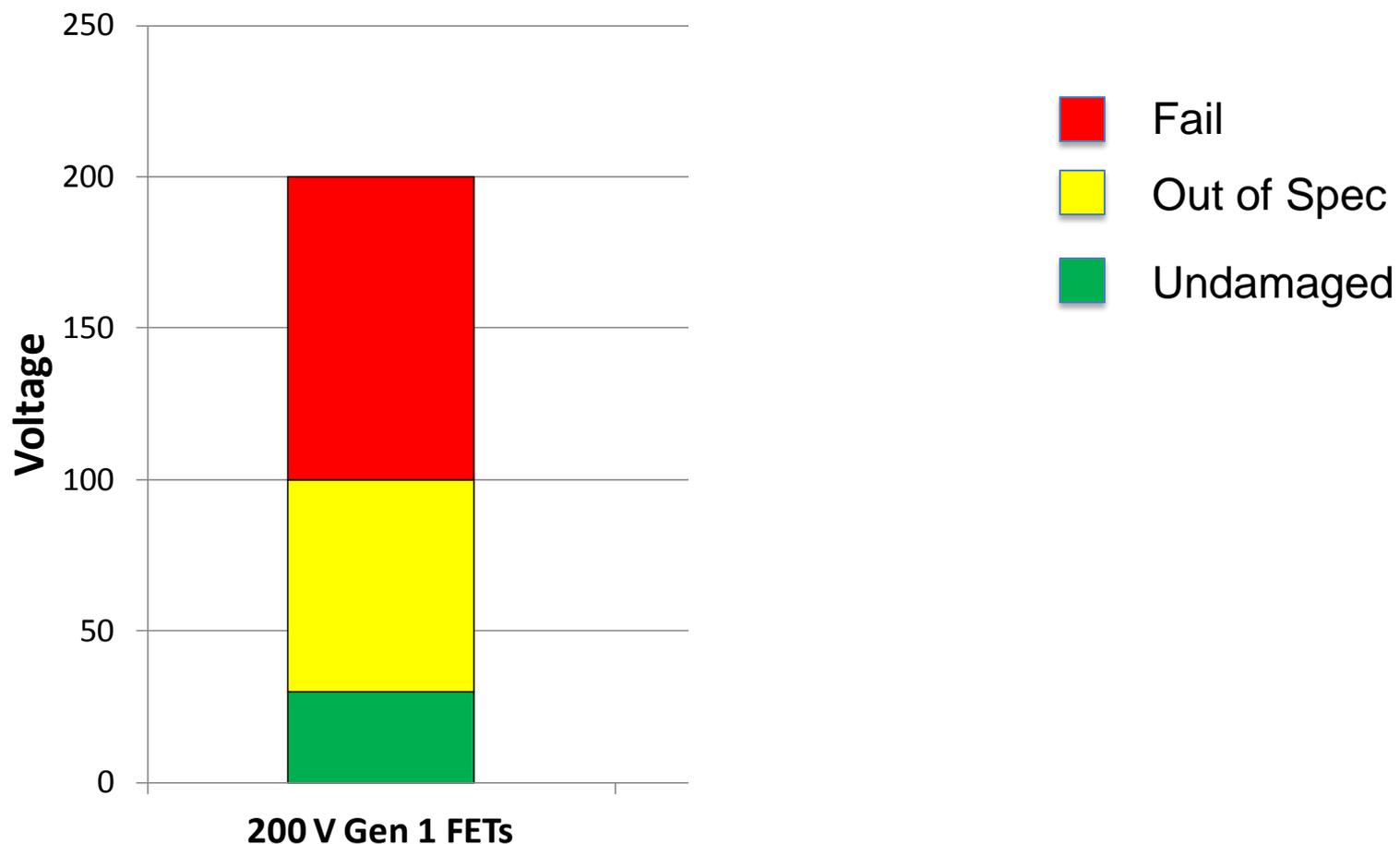


MIL-STD-750E, METHOD 1080



The SEGR failure site of a first-generation 200 V eGaN FET occurred between metal layers and was caused by the inductance of long gate and source leads that allowed the gate-source voltage to exceed maximum limits.

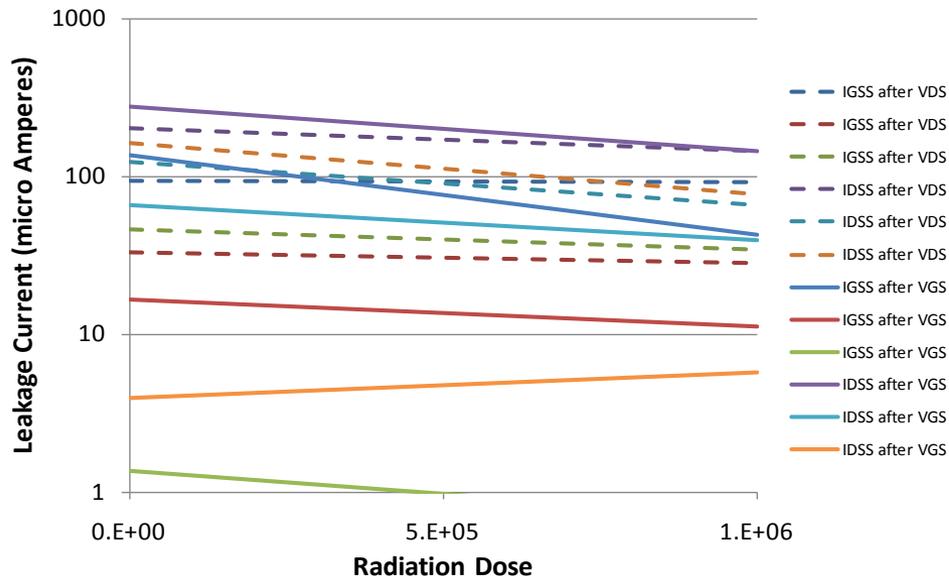
SEE Heavy Ion Testing - Au



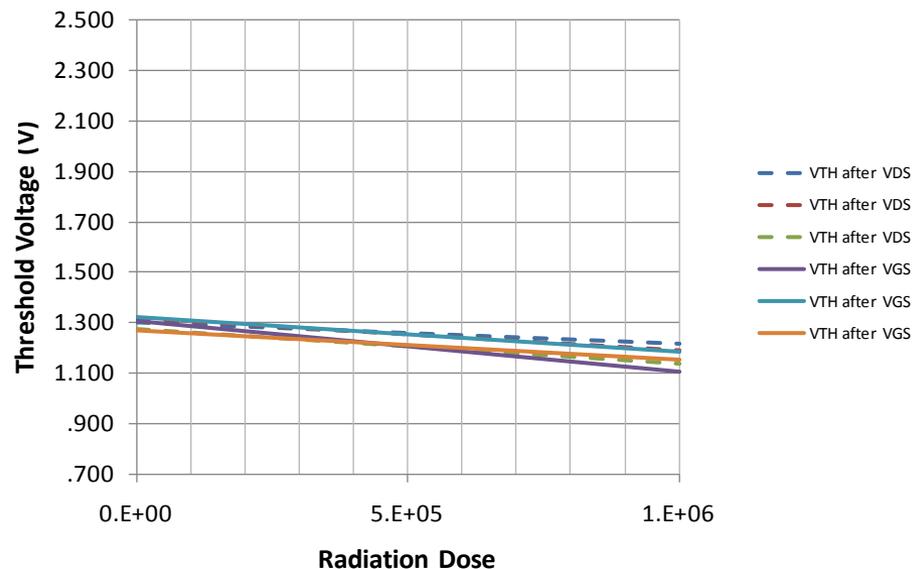
MIL-STD-750E, METHOD 1080

Total Dose Results

EPC1015 Gate and Drain-Source Leakage Current

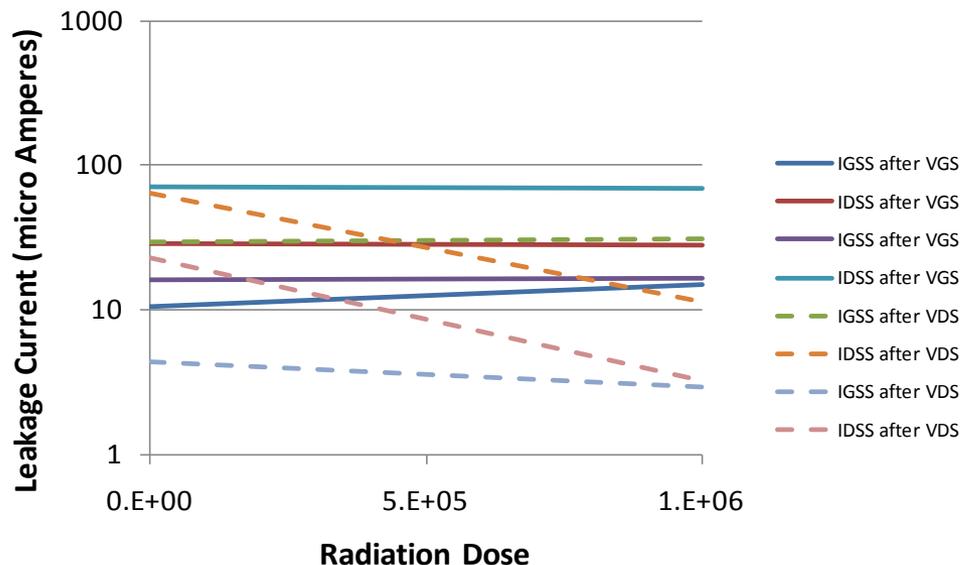


EPC1015 Threshold Voltage

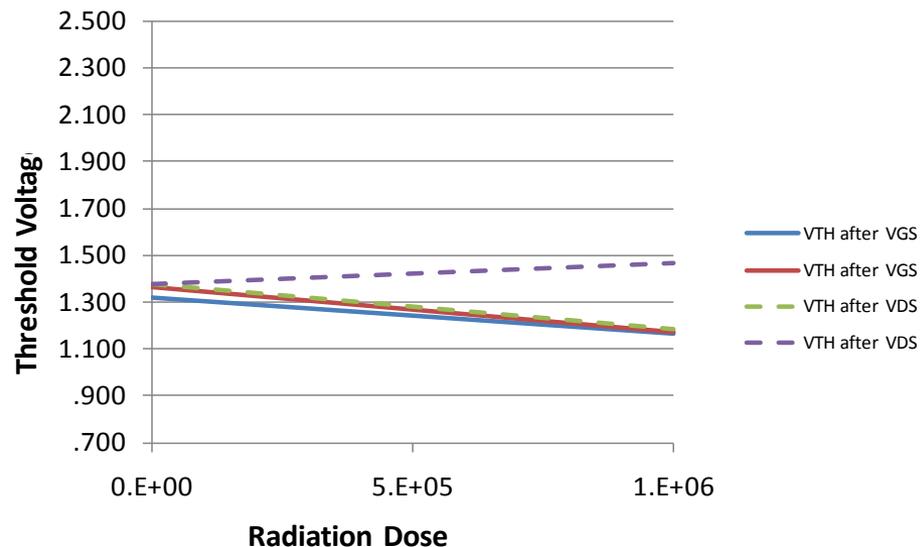


MIL-STD-750E, METHOD 1019

EPC1001 Gate and Drain-Source Leakage Current

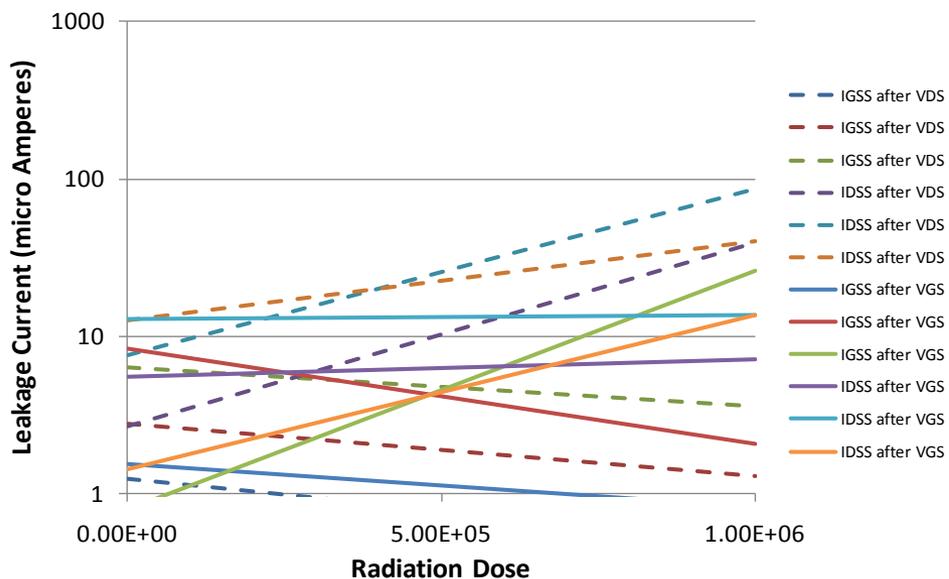


EPC1001 Threshold Voltage

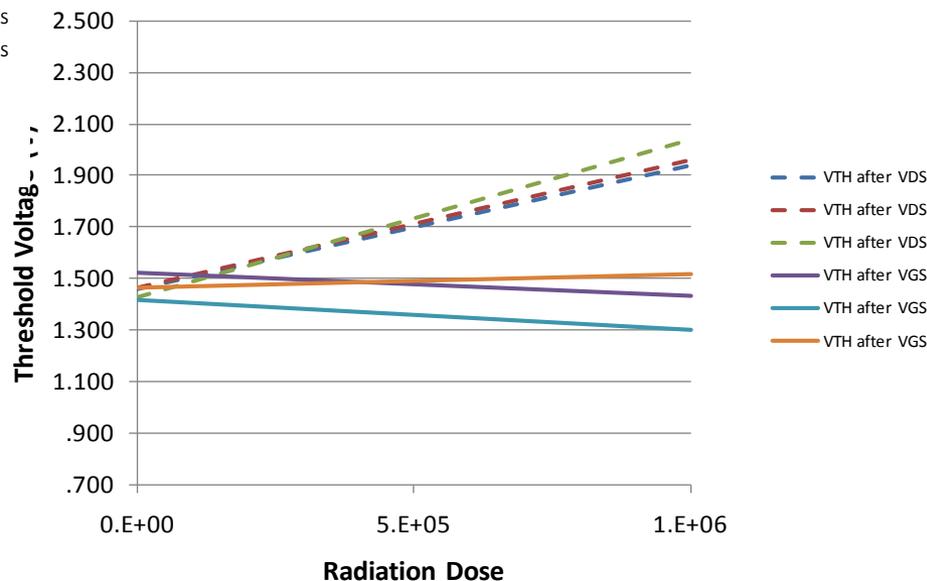


MIL-STD-750E, METHOD 1019

EPC1010 Gate and Drain-Source Leakage Current

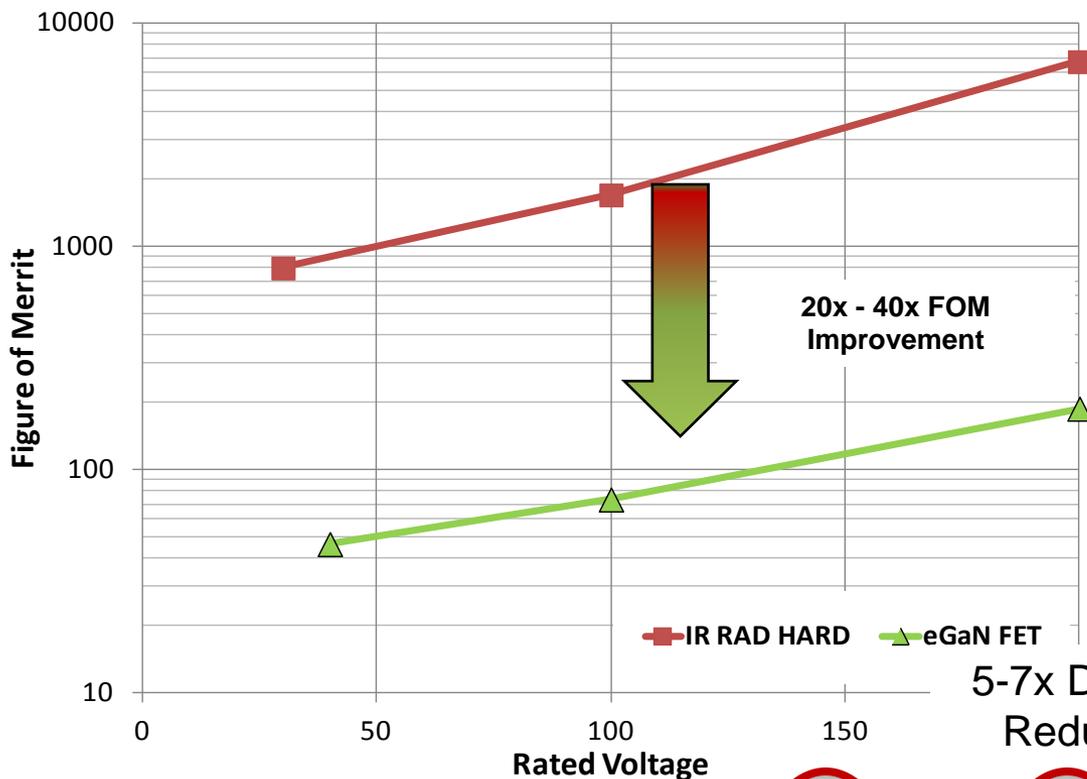


EPC1010 Threshold Voltage

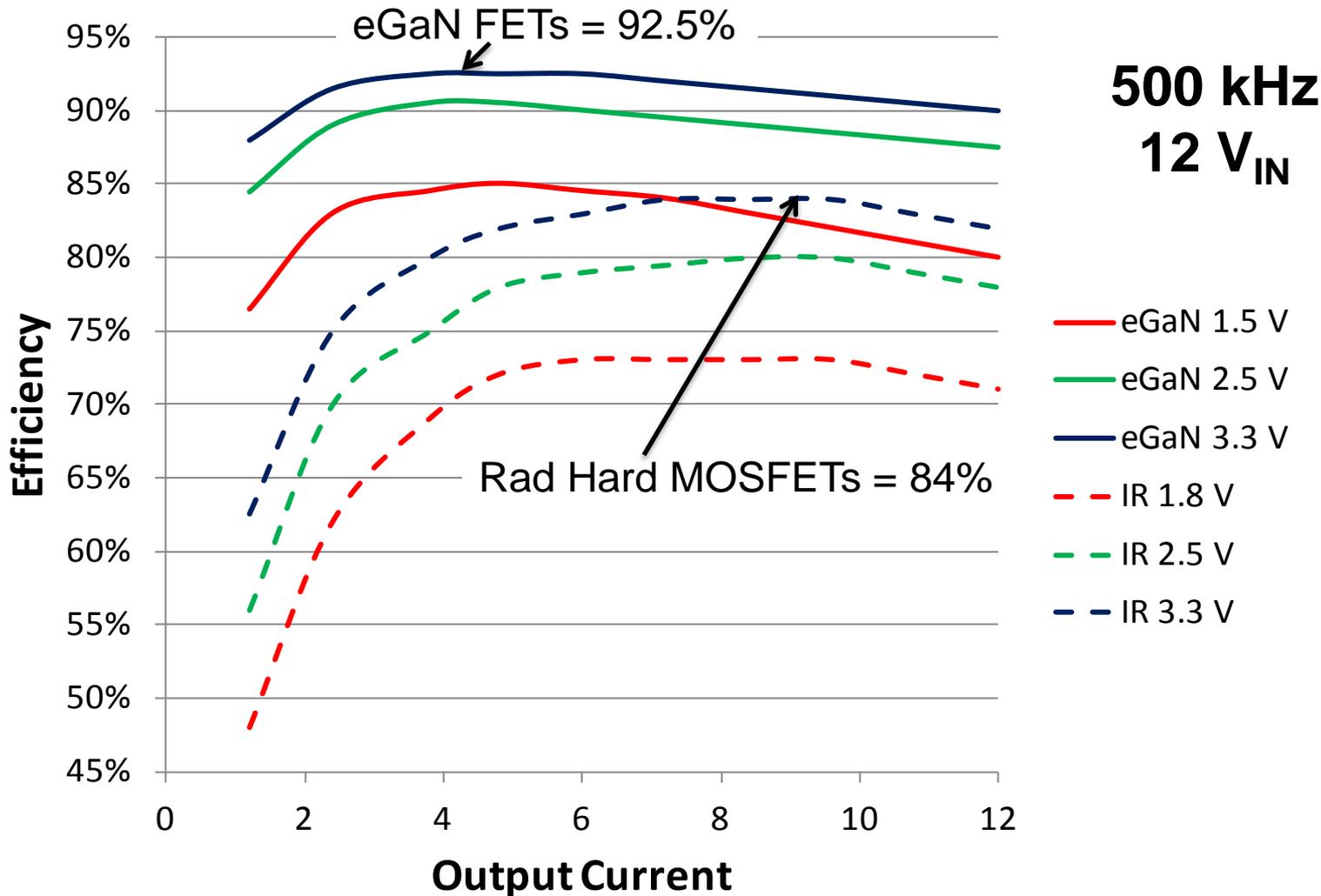


MIL-STD-750E, METHOD 1019

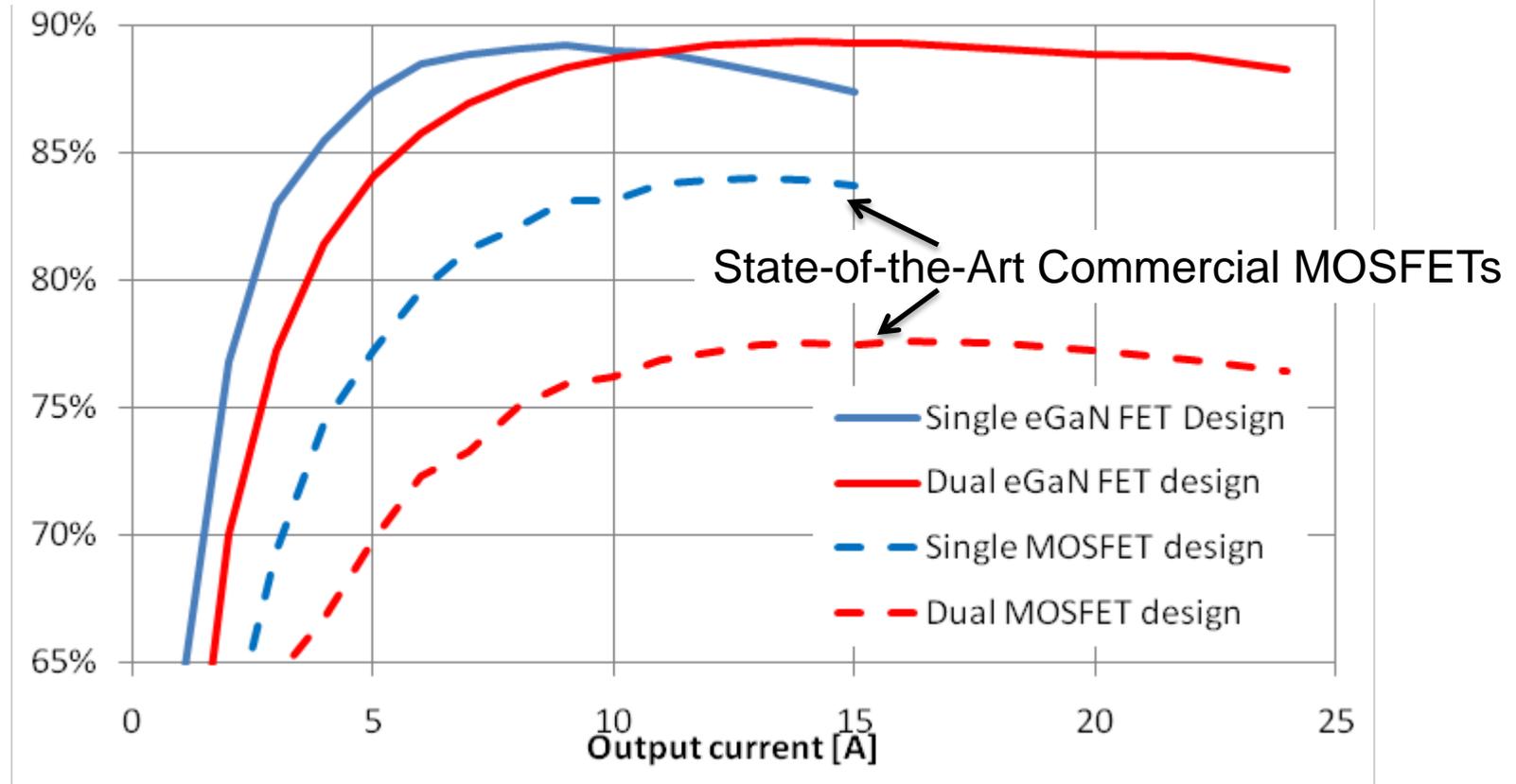
In-Circuit Testing



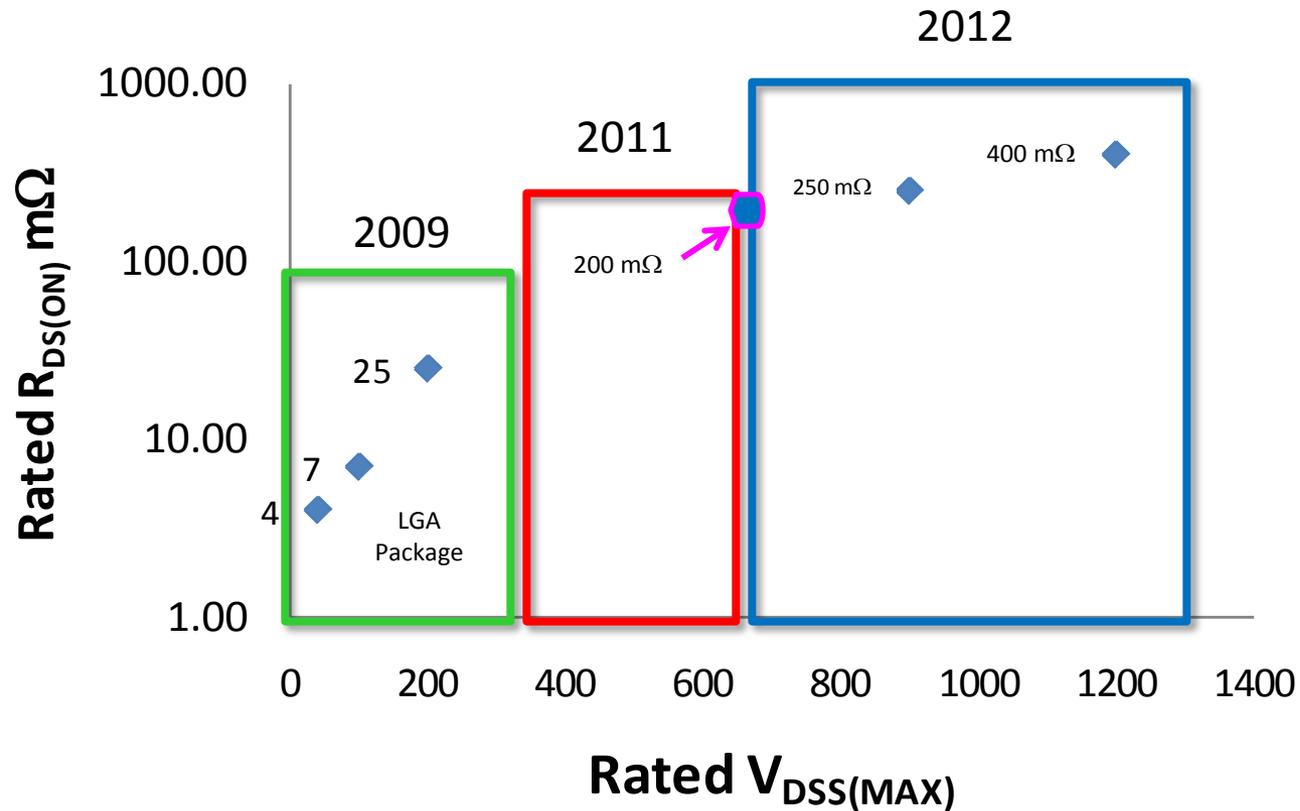
	Rated Voltage	DC Current	Peak Current	$R_{DS(ON)}$ (m Ω)	Q_G	FOM ($Q_G \times R_{DS(ON)}$)	Die DIM (mils ²)	Package DIM (mils ²)
MGN 2915	40	33	150	4	11.6	2.7	10,530	10,530
IRHNA57Z60	30	45	300	4	200	40	66,049	362,250
MGN2901	100	25	100	7	10.5	2.7	10,530	10,530
IRHNA67160	100	56	224	10	170	80	66,049	362,250
MGN2910	200	12	40	25	7.5	2.6	9,165	9,165
IRHNA67260	200	56	224	28	240	60	66,049	362,250



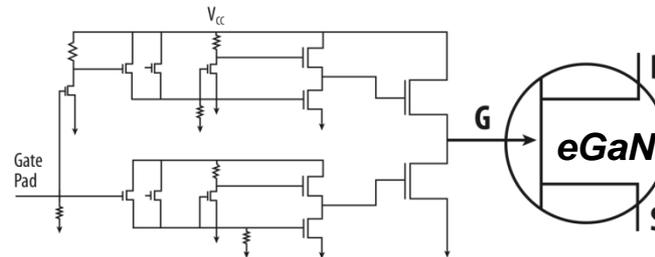
Efficiency at 1 MHz $12 V_{IN} - 1.2 V_{OUT}$



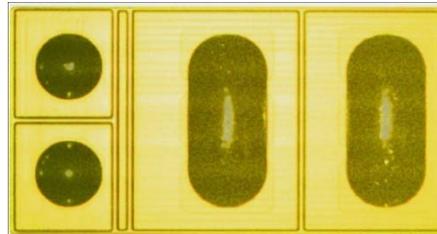
What's in the Future?



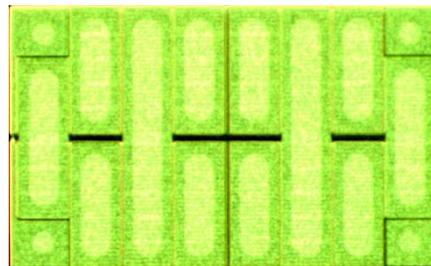
Driver On Board



Discrete eGaN FET with Driver



Full-Bridge with Driver and Level Shift



- eGaN FETs have exceptional Heavy Ion hardness
- eGaN FETs have performed exceptionally well when submitted for Total Ionizing Dose (^{60}Co) up to 1MRad and beyond
- eGaN FETs have demonstrated extraordinary efficiency in a high frequency point-of-load converter
- Future integration of driver and control functions can significantly improve system radiation tolerance.



*The end of the road for
silicon.....*

*...is the beginning of the
eGaN FET journey!*

