The eGaN® FET Journey Continues

Efficient Power Conversion Corporation
Background for Strategy

• Power Management is a large and growing market

• Silicon has reached performance limits

• EPC has developed proprietary enhancement-mode GaN technology (eGaN®) that allows EPC’s FETs to broadly replace power MOSFETs

• Manufacturing platform is inherently cost effective, and will quickly be less expensive to produce per area than silicon
Why Gallium Nitride?
eGaN® FETs are Smaller

200V Silicon Device (30 milli Ohms)

200V GaN Device (25 milli Ohms)
eGaN® FETs are Faster

FOM = \( \text{Rdson} \times Qg \) (100V)

Source: Infineon, International Rectifier, Siliconix, and Fairchild data sheets
eGaN® FETs are More Efficient

Efficiency comparison @ 12 V_{OUT}

Source: EPC and Ericsson
# eGaN® FETs Can Be Cheaper

<table>
<thead>
<tr>
<th>Process</th>
<th>2011</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Material</td>
<td>same</td>
<td>same</td>
</tr>
<tr>
<td>Epi Growth</td>
<td>higher</td>
<td>~same</td>
</tr>
<tr>
<td>Wafer Fab</td>
<td>same</td>
<td>lower</td>
</tr>
<tr>
<td>Test</td>
<td>same</td>
<td>same</td>
</tr>
<tr>
<td>Assembly</td>
<td>lower</td>
<td>lower</td>
</tr>
<tr>
<td><strong>OVERALL</strong></td>
<td>higher</td>
<td>lower</td>
</tr>
</tbody>
</table>

*Source: EPC*
Market Forecasts
Served Available Market (SAM)

Source: IC Insights

2010-2015 CAGR
Total = $12B in 2015

- Power FET (up to 200V) $4.6B
- Power FET (over 200V) $1.7B
- IGBT modules $2.3B
- IGBTs $878M
- RF/Microwave $1.3B
- Bipolar $970M
- Bipolar Modules $49M
- FET Modules $232M

Total Served Available Market (SAM) = $12B in 2015

Source: IC Insights

50%
40%
30%
20%
10%
0%

Percent Share of 2010 Power Transistor Market

Credit Suisse May 2012

www.epc-co.com
Power ICs Add to the SAM

Source: Yole Development

Total = $18B in 2015
GaN Market Projection

Total = $350M for GaN in 2015

Source: Yole Development
Key Applications 2011-2013

- Wireless Power Transmission
- RF DC-DC “Envelope Tracking”
- Power Over Ethernet
- RF Transmission
- Network and Server Power Supplies
- Power Factor Correction
- Point of Load Modules
- Solar Microinverters
- Energy Efficient Lighting
- UPS Systems
- Class D Audio
- RadHard
Key Applications 2013-2016

- PC and Notebook Power Supply
- Appliance and Industrial Motor Drive
- Cell Phones
- Electric Bicycle
- Hybrid and Electric Vehicles
Efficient Power Conversion
EPC Leadership Team

**Alexander Lidow Ph.D:**
PhD Stanford 1977
Co-Inventor of HEXFET Transistor
CEO of International Rectifier 1995-2007

**Joe Cao Ph.D:**
PhD Berkeley 1996
Power MOSFET and GaN Experience at International Rectifier

**Robert A. Beach Ph.D:**
PhD Caltech 2001
Co-Founded GaNRose to produce gallium nitride transistors
Sold GaNRose to International Rectifier in 2003

EPC has a total of 20 full time employees, 10 of whom have PhDs in closely related fields
EPC Supply Chain

EPC has designed a supply chain that is mature, efficient, responsive, and can ramp quickly.
Strategic Partners

Texas Instruments
– Driver ICs

Microsemi
– Hi Rel and Radiation Hard Transistors
## Competitive Strategy

<table>
<thead>
<tr>
<th>Silicon Power MOSFETs</th>
<th>GaN Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infineon</td>
<td>IR</td>
</tr>
<tr>
<td>Vishay</td>
<td>Transphorm</td>
</tr>
<tr>
<td>International Rectifier (IR)</td>
<td>MicroGaN</td>
</tr>
<tr>
<td>Fairchild</td>
<td>GaN Systems</td>
</tr>
<tr>
<td>Renasas</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Ciclon/TI</td>
<td></td>
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</tbody>
</table>
Selected Awards

- EE Times 2010 Green Technology ACE Award
- LM5113
Summary

• EPC is privately funded and just concluded a D-Round of financing
• eGaN® technology is disruptive
• Management is the most experienced in the power industry
• EPC’s supply chain is mature
• TI and Microsemi are helping to establish EPC’s eGaN FETs as industry standards
• EPC is now shipping eGaN FETs to > 500 customers worldwide
The end of the road for silicon.....

is the beginning of the eGaN FET journey!