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Alpha and Omega Semiconductor Demonstrates Breakthrough 1200V UniSiC™ Stack-Cascode MOSFETs

Ultra-high performance 1200V MOSFETs far superior to Si IGBTs and Superjunction MOSFETs

SUNNYVALE, Calif., Jan. 16, 2012 – [Alpha and Omega Semiconductor Limited](http://www.aosmd.com) (AOS) (Nasdaq: AOSL), a designer, developer and global supplier of a broad range of power semiconductors, and SemiSouth Laboratories jointly demonstrated UniSiC™, a revolutionary 1200V, 90mΩ MOSFET in a TO262 package, to meet the growing need for energy efficient switching devices for high performance power conversion applications in the alternative energy, industrial and consumer segments. The dramatic reduction in form factor and figures-of-merit put this 1200V MOSFET device in a class by itself.

AOS continues to execute its strategy to be a full service power solution provider by extending its portfolio of AlphaMOS™ MOSFETs and AlphaIGBT, devices with the revolutionary 1200V MOSFET solution described in this brief.

The UniSiC™ MOSFET provides unprecedented low $R_{ds(on)}$ and gate charge Q_g , an excellent body diode with virtually no stored charge and a low diode forward voltage drop. The device may be used similar to a conventional MOSFET or IGBT, with standard gate drives and is engineered so it can be switched over a wide speed range – as fast as a Superjunction MOSFET, or as slow as an IGBT. The device has far superior characteristics compared to existing IGBTs, Silicon power MOSFETs or even the best competitive SiC 1200V MOSFET. Key data is summarized in Table 1 and Figure 1 shows the die sizes of a 1200V IGBT with co-packaged diode, the 1200V competitor SiC MOSFET and the AOS UniSiC™ stack-cascode device. The small die size shows the tremendous potential this device creates for future miniaturization of power circuits given how much it cuts conduction and switching losses.

The UniSiC™ device is formed by stacking a specially designed low voltage Silicon MOSFET atop a normally-on SiC JFET. The SiC JFET has excellent characteristics and is provided by SemiSouth, the leading supplier of SiC JFET technology. The low voltage MOSFET is specially engineered to allow optimal operation of the composite device with clean switching, low $R_{ds(on)}$, gate charge and superb diode characteristics. It is intended to provide great ease of use, working with standard drive circuitry, and drastically improving circuit efficiencies over the whole range of load current.

“Using the superb characteristics of SiC JFETs for high voltage applications, and solving the switching problems that have plagued cascode devices in the past, AOS is in a position to offer the power electronics community a dream switch,” said Dr. Anup Bhalla, Vice President of High-Voltage Discretes at AOS. “The devices can be used like conventional discrete IGBTs and FETs using the same gate drives, allowing the user to realize huge efficiency gains without too much re-engineering.”

“We are very pleased with the introduction of this new high voltage technology, which, in partnership with SemiSouth laboratories, allows AOS to bring a truly revolutionary device to the world of power conversion,” commented Dr. Mike Chang, President and CEO of AOS. “Products like these will set AOS apart as the high voltage supplier of choice, facilitating our twin goals of product diversification and rapid growth.”

“SemiSouth is excited to see the performance achieved by AOS using our SiC power JFET die. First released in 2008, we have seen our JFET products gain rapid adoption in the market, and this first-ever stack-cascode demonstration from AOS really takes the performance and ease of use to the next level. We are pleased to have this relationship with AOS as a valued customer.” said Dr. Jeff Casady, President and CTO of SemiSouth Laboratories.

Technical Highlights

Parameters	Test Conditions	CMF20120 (Cree)	Cascode (AOS+SemiSouth)	1200V Si Superjunction FET
Size		4.4 x 4.4mm	2 x 2.25mm	7 x 11mm
BVdss	$I_d = 100\mu A$	1200V	1200V	1200V
Vth	$I_d = 1mA$	2.5V	3.6V	3.0V
Rdson	Vgs = 20V	80mΩ	80mΩ	100mΩ
Rdson	Vgs = 10V	>200Ω	80mΩ	100mΩ
Qgs	Vds = 400V, Id = 20A	26nC	4.4nC	70nC
Qgd	Vds = 400V, Id = 20A	29nC	3.6nC	125nC
Qg(19V)	Vds = 400V, Id = 20A	80nC	22.6nC	350nC
Rds(20V)*Qg(19V)		6.4Ω*nC	1.8Ω*nC	35mΩ*nC
VFSD	IF = 10A	3.5V	1.5V	0.9V
Qrr	Vds = 400V, Id = 20A, di/dt = 500A/μs, Vgs = 0V	163nC	151nC	25000nC

Table 1: Comparison of Competitor SiC MOSFET, the UniSiC™ Stack-Cascode MOSFET and a Projected 1200V Si Superjunction Device.

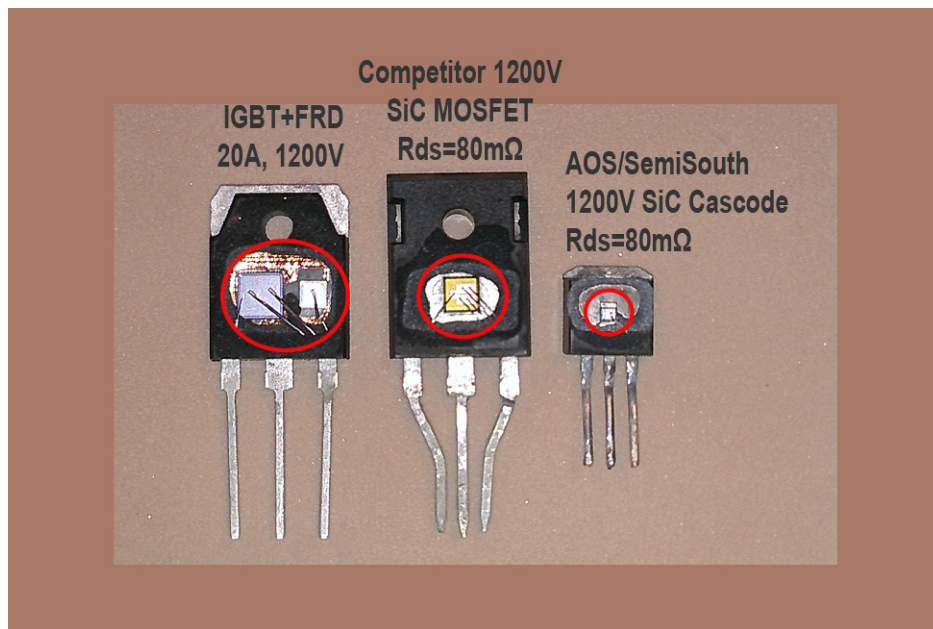


Figure 1: Comparison of Die Sizes

About AOS

Alpha and Omega Semiconductor Limited, or [AOS](http://www.aosmd.com) is a designer, developer and global supplier of a broad range of power semiconductors, including a wide portfolio of [Power MOSFET](#) and [Power IC](#) products. AOS seeks to differentiate itself by integrating its expertise in device physics, process technology, design and advanced packaging to optimize product performance and cost, and its product portfolio is designed to meet the ever increasing power efficiency requirements in high volume applications, including portable computers, flat panel TVs, battery packs, smart phones, portable media players, UPS, motor control and power supplies. For more information, please visit www.aosmd.com.

About SemiSouth

SemiSouth, a privately owned corporation with its main offices and foundry in Starkville, Mississippi, (USA), focuses on silicon carbide (SiC) power devices and electronics, targeting applications such as: solar inverters, power conversion in computing and network power supplies; variable-speed drives for industrial motors and hybrid electric vehicles; and products used in high-power, harsh-environment military and aerospace environments. The company was formed in 2000, has sold products globally through direct sales or distributors since 2005, and received a major growth investment from Power Integrations (NASDAQ: [POWI](#)) in 2010. It introduced the world's first commercial, cost-effective normally-off SiC JFETs in 2008, which have enabled world-record energy efficiencies for its customer's products. More information is available at www.semisouth.com.

Forward Looking Statements

This press release contains forward-looking statements that are based on current expectations, estimates, forecasts and projections of future performance based on management's judgment, beliefs, current trends and anticipated product performance. These forward-looking statements include, without limitation, references to the efficiency and capability of new products, their potential to expand into new markets and the business goals of AOS. Forward looking statements involve risks and uncertainties that may cause actual results to differ materially from those contained in the forward-looking statements. These factors include, but are not limited to, the actual product performance in volume production, the quality and reliability of the product, our ability to achieve design wins, the general business and economic conditions, the state of the semiconductor industry, and other risks as described in the Company's annual report and other filings with the U.S. Securities and Exchange Commission. Although the Company believes that the expectations reflected in the forward looking statements are reasonable, it cannot guarantee future results, level of activity, performance, or achievements. You should not place undue reliance on these forward-looking statements. All information provided in this press release is as of today's date, unless otherwise stated, and AOS undertakes no duty to update such information, except as required under applicable law.

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