



FOR IMMEDIATE RELEASE:

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是什么在推动电力电子产业发展?

摘录自以下报告: 来自 Yole 集团旗下公司 System Plus Consulting 和 Yole Développement 的《电力电子产业态势》- 《汽车功率模块封装比较》- 《1200V 硅 IGBT 与碳化硅 MOS 场效应管对比》- 《采用意法半导体碳化硅功率模块的特斯拉 Model 3 逆变器》- 《功率碳化硅》- 《功率氮化镓》

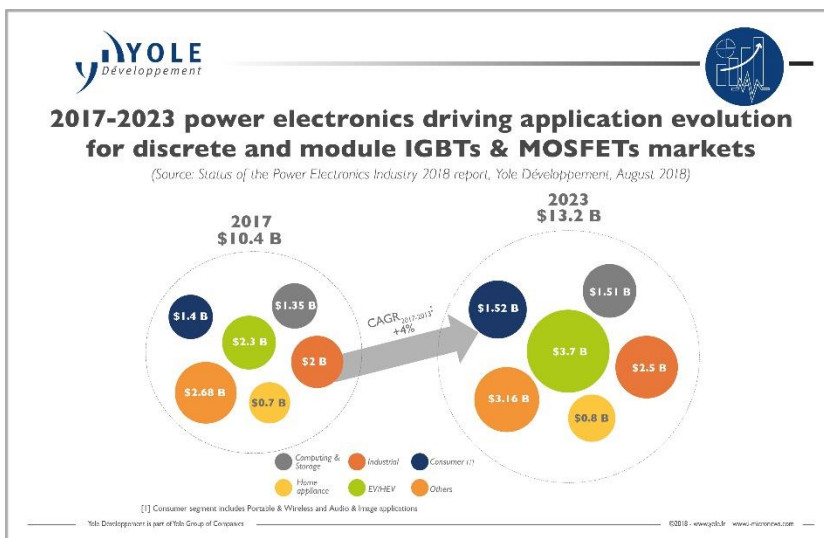
法国里昂讯—2018年11月27日: 电力电子市场去年发展迅猛, 成为一大趋势。Yole Développement (Yole)在其于今夏发布的报告《电力电子产业态势》中宣称, 2017年电力电子市场价值高达327亿美元。

“2017年各种不同应用领域的销量都有所增加, 这主要是因为IGBT在EVIHEV中的应用”, Yole的技术与市场分析师 Ana Villamor 博士肯定了这一趋势并进一步补充说明:

“此外, 我们的分析还特别指出, 接下来五年里, 在包括EVIHEV、电机驱动和UPS在内的各大功率逆变器领域, 电力电子市场的年度增长率将高达8.4%, 令人惊叹。”

Yole 和 System Plus Consulting 结合各自的专业所长, 希望通过一系列关于技术、市场和逆向工程的精彩报告对电力电子产业提出深入见解。

因此, 这两家公司联手合作, 对技术演变、市场趋势、完整的供应链、竞争形势、工艺流程等各方面进行了分析。



《电力电子产业态势》报告是这一电力电子系列报告的一部分, 它视角广博, 从晶圆到逆变器, 无论是设备还是模块, 无不涵盖。

Yole 和 System Plus Consulting 的团队通过一整年的分析调查, 在这个系列报告中展示了他们对该产业的展望、市场动态、预测、供应链分析、M&A、技术创新和存在的问题等内容。有哪些

因素会是关键推手, 成为塑造市场的明日之星? 主要技术挑战是什么, 又开发出了什么解决方案? 分析师们邀请您了解电力电子产业的最新动向, 就在今天。

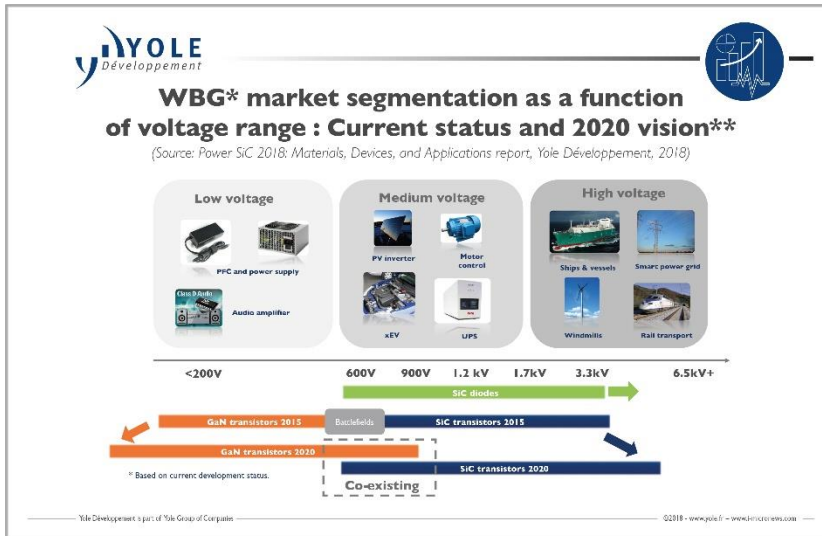
Last year saw a boom in the power electronics semiconductor market, mainly due to the increase in sales in IGBT devices for EV/HEVs and motor drives. EV/HEVs will account for almost US\$1.8 billion worth of MOSFETs and more than US\$1.9 billion in the IGBT market, including both discretely and modules. MOSFET demand will also be driven by EV/HEV and by networking and telecommunications, which is booming with an 8.3% CAGR between 2017 and 2023 due to the installation of 5G network infrastructure. Globally, Yole expects a very positive perspective over the next five years, with a 4% CAGR between 2017 and 2023 for the power device market.

“别忘了，没有一个系统能不靠电力生存，在创新与新技术增加的同时，功率半导体产业的发展也需要保持步调一致，因为电力才是起点”，Yole 分析师 Ana Vollamor 断言道。

要了解这个产业，就要认识到电力电子领域不同于其他“超越摩尔”电子领域，是由应用而非技术驱动的，这点非常重要。近年来这一市场的发展得益于数字时代的来临或环境问题这样的重大趋势。**Yole 的电力电子与电池高级分析师 Milan Rosina 博士**解释道：“我们可以把后者（环境问题）和不同国家用于提高能效的政府资金直接挂钩，这会增加新型电力电子系统的销量。”举例说明，二氧化碳减排目标、更高的能效要求或对石油产业依赖的减少都从技术上推动着 EV/HEV 产业的发展。“无论是从市场和商业角度还是技术创新角度，乘用车电气化都正在电力电子产业掀起一场革命”，Yole 分析师 Milan Rosina 宣称。

在器件层面也有基于半导体的新型材料：即所谓的 WBG^{Erreur ! Signet non défini.}，比如 SiC^{Erreur ! Signet non défini.}或 GaN^{Erreur ! Signet non défini.}。

“与硅相比，这两种材料都具有与生俱来的优势，这是因为它们的禁带更宽、传导损耗更低，电子迁移率也更高”，System Plus Consulting 的器件部门主管 Elena Barbarini 博士解释道：“这样就有可能缩小其元件和无源元件的尺寸，因为在总体损耗降低的同时能增加开关频率，系统能效也随之提升。不仅如此，碳化硅的热导率也比硅要高得多……”



EV/HEV 的到来可望让碳化硅和氮化镓都获益，使其产量增加并最终在功率半导体界占有重要的一席之地。汽车行业需要 WBG 实现大规模量产，WBG 生产商们还需要几年时间才能准备成熟，但目前他们已经十分活跃了，而且大都在与原始设备制造商合作以进行产品测试。碳化硅产品主要用于车载

充电器，但在主逆变器中也有一定程度的应用。自 2017 年起，比亚迪（BYD）在其部分车载充电器产品中就开始使用碳化硅 MOS 场效应管。另一方面，在主流逆变器市场上，特斯拉 **Erreur ! Signet non défini.** 和丰田都刚刚开始现场倾侧。其他汽车制造商预期将从 2020 年完成自己基于碳化硅的首个模块原型。“Yole 预计，截止到 2020 年用于 EV/HEV（包括车载充电器）的碳化硅市场规模将达到 4 亿美元左右 **Erreur ! Signet non défini.**”，Yole 的资深技术与市场分析师 Hong Ling 博士宣称。

2019 年，System Plus Consulting 和 Yole 也将合作分析最先进的创新技术并了解市场的演变，目标是明确电力电子产业的战略性变革、帮助业内人士判定接下来的商业机遇，并为其客户的发展贡献力量。两家合作企业在 2019 年的活动计划很快将在以下网站上公布：www.systemplus.fr 和 www.i-micronews.com，“[报告专区](#)”和“[哪里能见到我们（Where to Meet Us）](#)”专区。如果您有任何问题，欢迎联系我们。

ABOUT THE REPORTS:

- [Status of the Power Electronics Industry](#)

EVI/HEV, motor drives, computing and storage propel power electronics market growth, from devices to passives, packaging and integration. – Produced by Yole Développement (Yole).

Companies cited in the report: ABB, Alpha and Omega Semiconductor (AOS), Amkor, Analog Devices, ASE Group, AT&S, AVX, BMW Group, Bosch, BYD, Continental, Cree, CRRC, Danfoss, Delphi, Denso, Dialog Semiconductor, Diodes Incorporated, DuPont Teijin Films, Dynex, EXAGAN, Fuji Electric, GaN Systems, General Electric ... [Full list](#)

Authors: Ana Villamor PhD, Technology & Market Analyst, Power Electronics - Milan Rosina PhD, Principal Analyst, Power & Wireless / Batteries

- [Power SiC: materials, devices and applications](#)

Automotive is putting SiC on the road. Is the supply chain ready? – Produced by Yole Développement (Yole).

Companies cited in the report:

ABB, Alstom, Ascatron, Aymont, Bombardier, Basic Semiconductor, Brückwell Technology, Caly Technology, Clas-SiC wafer fab, Cree, CRRC, Danfoss, Delphi, DENSO, Dow Corning, Epiworld, Episil, Fraunhofer IISB, Fuji Electric... [Full list](#)

Authors: Hong Ling, PhD, Senior Technology & Market Analyst - Ana Villamor, PhD Technology & Market Analyst, Power Electronics

- [Automotive Power Module Packaging Comparison](#)

A cost-oriented review of power module packaging technologies for the automotive market. – Produced by System Plus Consulting.

Companies cited in the report: Robert Bosch, Infineon Technologies, Mitsubishi, Semikron, STMicroelectronics, Toshiba and Toyota.

Authors: Farid Hamrani, System Cost Engineer - Yvon Le Goff, - Véronique Le Troadec, Laboratory Engineer

- [1200V Silicon IGBT vs SiC MOSFET Comparison](#)

Technology and cost analysis of thirteen silicon IGBTs and eight SiC MOSFETs from eight different manufacturers shows their potential. – Produced by System Plus Consulting.

Companies cited in the report: Infineon Technologies, STMicroelectronics, Fuji, ONSemiconductors, Mitsubishi, Rohm, Wolfspeed and Littelfuse.

Authors: Elena Barbarini PhD, Head of Department Devices - Véronique Le Troadec, Laboratory Engineer

- [Tesla Model 3 Inverter with SiC Power Module from STMicroelectronics](#)

The first SiC power module in commercialized electric vehicles. – Produced by System Plus Consulting.

Authors: Elena Barbarini PhD, Head of Department Devices - Véronique Le Troadec, Laboratory Engineer

**ABOUT SYSTEM PLUS CONSULTING**

System Plus Consulting specializes in the cost analysis of electronics, from semiconductor devices to electronic systems. Created more than 20 years ago, System Plus Consulting has developed a complete range of services, costing tools and reports to deliver in-depth production cost studies and estimate the objective selling price of a product. System Plus Consulting engineers are experts in Integrated Circuits – Power Devices & Modules – MEMS & Sensors – Photonics – LED – Imaging – Display – Packaging – Electronic Boards & Systems. Through hundreds of analyses performed each year, System Plus Consulting offers deep added-value, reports to help its customers understand their production processes and determine production costs. Based on System Plus Consulting's results, manufacturers are able to compare their production costs to those of competitors. System Plus Consulting is a sister company of Yole Développement (Yole). More info. on www.systemplus.fr

**ABOUT YOLE DÉVELOPPEMENT**

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing,

the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS & Sensors - Imaging - Medical Technologies - Compound Semiconductors - RF Electronics - Solid State Lighting - Displays - Photonics - Power Electronics - Batteries & Energy Management - Advanced Packaging - Semiconductor Manufacturing - Software & Computing - Memory and more...

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. . For more information, visit www.yole.fr and follow Yole on [LinkedIn](#) and [Twitter](#).

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