

# IGBT 成长: 供应链正在进行预期的重塑<sup>1</sup>

**EVI/HEV<sup>2</sup>的强劲推动下, IGBT<sup>3</sup> 市场将在 2026 年达到 84 亿美元。**

## 概要:

- 市场预测:  
到 2026 年, IGBT 市场将达到 84 亿美元, 从 2020 年到 2026 年 IGBT 市场将增加 7.5%。  
受 EV/HEV 采用的推动, 2026<sup>4</sup>年同期 IGBT 模组将占市场的 81%。  
到 2026 年, 超过 80%的市场将集中在 600V-1,200V 标称电压范围。
- 技术趋势:  
在系统层面, 新的 IGBT 电压水平涵盖了新的电压范围: 例如 EV<sup>5</sup> 逆变器从 400V 到 800V, PV 逆变器移动到 1,500V。  
分析师们还看到了很多技术革新: 新一代 IGBT 芯片, 更高的效率, 更低的 IGBT 器件成本...  
IGBT 封装寻求高信赖性, 低成本, 低电感的电器互连。同时, IGBT 也在进行 SiC<sup>6</sup> 封装开发。  
在晶圆层面, 分析师们看到了 300mm IGBT 晶圆的制造趋势以及 MCZ 硅材料的转变。  
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- 供应链:  
IGBT 主要制造商分布在世界各地, 但 Yole 看到了中国 IGBT 制造商的重要增长, 包括铸造厂和 IDM。  
所有主要参与者们都在投资 IGBT 制造能力的增加...  
主要 IGBT 供应商的排名几乎保持不变<sup>7</sup>。排名前三的依次是 Infineon Technologies, Mitsubishi Electric 和 onsemi<sup>8</sup>。

<sup>1</sup> 摘取: IGBT 市场 & 技术趋势报告, Yole Développement, 2021

<sup>2</sup> EV/HEV: Electric Vehicle/Hybrid Electric Vehicles 电动汽车/混合动力

<sup>3</sup> IGBT: Insulated Gate Bipolar Transistor 绝缘栅双极晶体管

<sup>4</sup> CAGR: Compound Annual Growth Rate 复合年增长率

<sup>5</sup> EV: Electric Vehicle 电动汽车

<sup>6</sup> SiC: Silicon Carbide 碳化硅

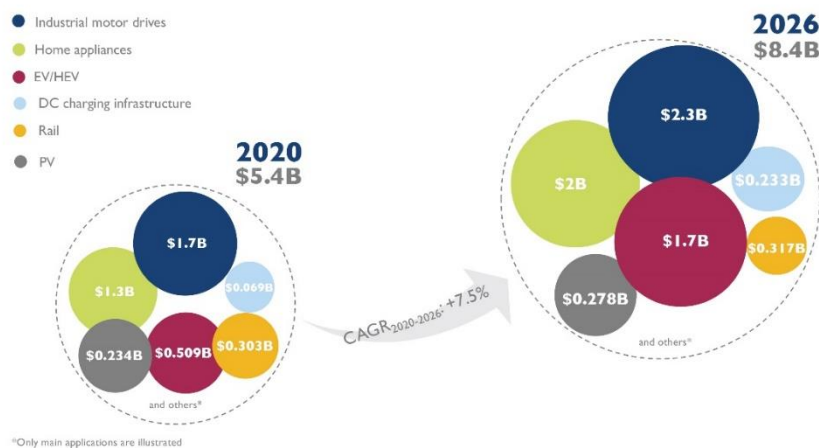
<sup>7</sup> Due to the acquisition of ABB Power Grid business. 由于收购了 ABB 电网业务

<sup>8</sup> Formerly ON Semiconductor. 以前是半导体公司

**Yole Développement (Yole)** 的电力电子和复合半导体技术与市场分析师 **Ana Villamor** 表示“随着主要电动交通的 IGBT 的高增长, 供应链正在调整其战略并进行大规模的投资”, 她还补充道: “IGBT 是众多电力电子应用的核心. 在 EVI/HEV 采用的大力推动下, 在 Yole, 我们宣布从 2020 年到 2026 年将以 7.5% 的 CAGR<sup>9</sup> 增长在此期间结束时将会达到 84 亿美元”。

### IGBT market: 2020 – 2026 revenue breakdown by application

(Source: IGBT Market and Technology Trends 2021 report, Yole Développement, 2021)



除了 EV/HEV 以外, 分立 IGBT 和 IGBT 功率模块可在工业电机驱动, 风力涡轮机, 光伏装置, 火车, UPS<sup>10</sup>, EV 充电基础设施和家用电器等应用上发现。

在 2020 年, 最大的 IGBT 市场部门是工业应用和家用电器. 紧随其后的是代表 2020 年 5 亿 9 千万美元市场的 EV/HEV, 2020 年至 2026 年将以惊人的 23% CAGR 增长。

这是因为从 ICE<sup>11</sup> 车辆到 EV/HEV 的过渡, 这是由政府 CO<sub>2</sub> 排放减少目标强烈推动的. 由于拜登总统为美国制定的行动计划以及 EU<sup>12</sup> 气候倡议, 这一过渡正在进一步加速. 根据该倡议, 自 2035 年起所有在欧洲注册的新车都将实现零排放. 因此, 到 2026 年, EV/HEV 市场占有率将会增长 2 倍以上。

<sup>9</sup> CAGR: Compound Annual Growth Rate 复合年增长率

<sup>10</sup> UPS: Uninterruptible Power Supplies 不断电系统

<sup>11</sup> ICE: Internal Combustion Engine 内燃机

<sup>12</sup> EU: European Union 欧洲联盟

**Yole 的电子电力系统技术与市场分析师 Abdoulaye Ly** 解释说“**充电基础设施也受到政府决策的影响, 因为充电器的部署对于扩大电动汽车的使用至关重要,**” “**尽管 IGBT 的充电基础设施仍然是个小市场, 但预计在未来 5 年将增长 300% 以上.**”

今天发布的,来自 Yole 的 **IGBT 市场 & 技术 趋势报告** 有助于了解整个生态系和对最新创新及领先电力电子公司的战略.

Yole 为了获得电力电子产业的准确和全面视野以及确定最新的创新, 跟其合作伙伴 **System Plus Consulting** 全年合作. **System Plus Consulting** 还提供了与 IGBT 产业相关的贵重报告.

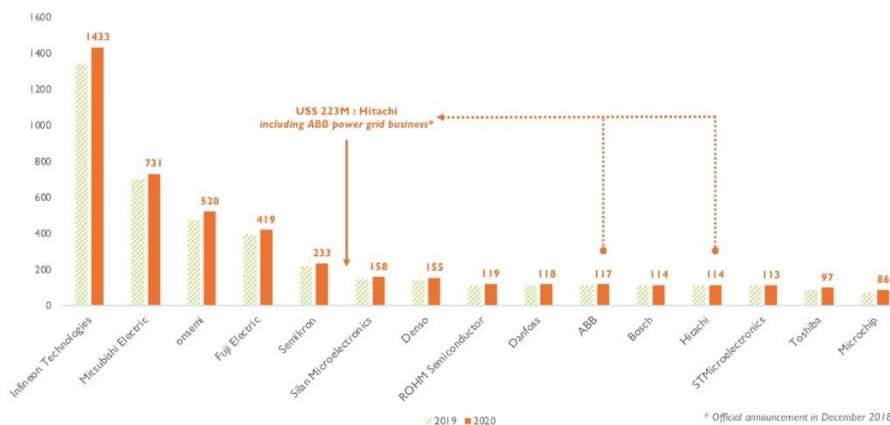
例如, 逆向工程和成本核算公司发布了专注于 **silicon IGBT** 的专用分析: **Si IGBT Comparison 2021**. 此外该公司还发布了对捷豹 **I-Pace** 中嵌入的逆变器的具体分析: **捷豹 I-Pace 逆变器中的 Vitesco Technologies 电源模块**.

Yole 分析师深入分析了 IGBT 供应链及其演变. 即使前三名自上次报告<sup>13</sup>以后没有太大的变化, 但 IGBT 供应链仍在强烈发展. 目标显然是为了适应市场的发展, 特别是推动电动汽车/混合动力汽车的市场.

许多 IGBT 公司是垂直整合的, 尤其是在设备制造及封装方面. 对 IGBT 的需求急速增长正在推动合并和收购. 整个供应链正在被重塑, 尤其是为了在市场上找到最佳的位置努力的供应商.

## 2020 IGBT manufacturers ranking - Top 15, revenues in US\$ million

(Source: IGBT Market & Technology Trends report, Yole Développement, 2021)



<sup>13</sup> Except with Hitachi and ABB due to acquisition of ABB Power Grid business. 由于收购了 ABB 电网业务, Hitachi 和 ABB 不包含.

**Yole** 的首席分析师 **Milan Rosina** 博士 评论道“ *Infineon Technologies, Fuji Electric, Mitsubishi Electric, Hitachi, onsemi 和 Toshiba* 等公司已经从事 IGBT 事业多年, 且许多产品已经商业化, ”. 他还补充道: “不过, 重要的是在开发, 制造和生产方面需要关注急速追赶的中国 IGBT 制造业的成长.”

那么, IGBT 产业的目前状况如何? 特别是通过 电动汽车/混合动力汽车的成长, 我们对未来能期待什么? 技术趋势是什么? 谁是值得关注的公司, 且他们研究哪些创新技术? IGBT 公司做出的令人印象深刻的投资将如何影响该行业及供应链? 今天, 分析师们介绍了 IGBT 行业的现状.

*Yole 和 System Plus Consulting 全年发布众多的电力电子和复合半导体报告. 而且, 每一个季度 Yole 开发专用于复合半导体的监控器, 以便深入了解市场演变, 并遵循领先行业的战略*

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### About our analysts

**Milan Rosina**, PhD, is Principal Analyst, Power Electronics and Batteries, at Yole Développement (Yole), within the Power & Wireless division. He is engaged in the development of the market, technology and strategic analyses dedicated to innovative materials, devices and systems. His main areas of interest are EV/HEV, renewable energy, power electronic packaging and batteries.

He received his PhD degree from Grenoble Institute of Technology (Grenoble INP) in France.

Milan Rosina previously worked for the Institute of Electrical Engineering in Slovakia, Centrotherm in Germany, Fraunhofer IWS in Germany, CEA LETI in France, and utility company ENGIE in France.

**Ana Villamor**, PhD serves as a Technology & Market Analyst, Power Electronics & Compound Semiconductors within the Power & Wireless division at Yole Développement (Yole). She is involved in many custom studies and reports focused on emerging power electronics technologies at Yole Développement, including device technology and reliability analysis (MOSFET, IGBT, HEMT, etc). In addition, Ana is leading the quarterly power management market updates released in 2017.

She holds an Electronics Engineering degree completed by a Master and PhD. in micro and nano electronics from Universitat Autònoma de Barcelona (SP).

**Abdoulaye Ly** is a Technology & Market Analyst specializing in Electronic Power Systems at Yole Développement (Yole). As part of the Power Electronics & Wireless division at Yole, Abdoulaye's expertise is focused on power electronics system design.

Abdoulaye graduated with a technical degree in 2014 from Bethune University Institute of Technology and in 2017 received an electrical engineering degree from Grenoble Institute of Technology.

**Amine Allouche** serves as a Technology & Cost Analyst, Power Electronics, at System Plus Consulting, part of Yole Développement. He collaborates closely with the laboratory team, and together they define the objectives of the analyses and determine the related methodologies... Amine's aim is to determine the technology choices made by the leading companies.

Amine holds a master's degree in Micro & Nanotechnologies with a focus on integrated systems from Grenoble's Polytechnic Institute (France). He also graduated from the Ecole Polytechnique Fédérale de Lausanne (EPFL) (Lausanne, Switzerland) and the Politecnico di Torino (Italy).

**Véronique Le Troadec** is Senior laboratory analyst at System Plus Consulting. Veronique has extensive knowledge in reverse engineering of advanced technologies. She previously worked at Atmel Nantes where she was in charge of failure analysis of devices.

**Peggy Gallois** joined System Plus Consulting's laboratory of microelectronics team in July 2019. She previously worked in the laboratory of metallographic expertise for Dassault Aviation near Paris.

### About the reports

#### **IGBT Market & Technology Trends**

*With high growth expected for IGBTs, driven mainly by e-mobility, the supply chain is adapting its strategy and investing massively. – Performed by Yole Développement*

#### **Companies cited:**

ABB, Alpha&Omega SC, Angstrom, Bosch, BYD, CanSemi, CAS-IGBT, CR Microelectronics, CREE, CRRC, CSR, Danfoss, DEC, Denso, Diodes Inc., Dynex, Eaton, Electroipryamitel, Electrum, Energomodul, Fuji Electric, Global Technologies Group, Hitachi, HHGrace, Infineon Technologies, Ingeteam, Ixys, IR Peri, Keda Semiconductor, Kremny, LS Power Semitech, Littelfuse, Shenzhen Lytran Technology, Macmic, Magnachip, Microchip, Mitsubishi Electric, onsemi ...

#### **Vitesco Technologies Power Module in Jaguar I-Pace Inverter**

*Multiple optimized packaging innovations for this automotive power module from Vitesco Technologies. – Performed by System Plus Consulting.*

### **Si IGBT Comparison 2021**

*Exhaustive technology and cost comparisons of 31 Silicon IGBTs from Infineon, ON Semiconductor, STMicroelectronics, Mitsubishi, Rohm, Toshiba, Fuji Electric, Littelfuse, ABB, Microsemi, and the IGBT in StarPower's module. – Performed by System Plus Consulting.*

### **Related reports:**

- [Status of the Power Electronics Industry](#)
- [Status of the Power Module Packaging Industry](#)
- [Power SiC: Materials, Devices and Applications](#)

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