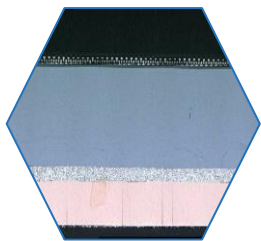
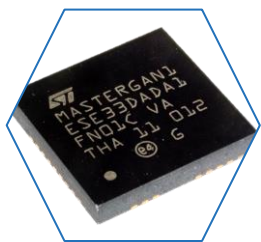


STMicroelectronics MASTERGAN1 Half-Bridge Driver

The first 600V system-in-package half-bridge driver from STMicroelectronics integrating two GaN-based HEMTs.



The promising market outlook for GaN devices is highlighted by a compound annual growth rate (CAGR) of 76% for the period 2019 - 2025, according to Yole Développement. The Power GaN market is expected to reach \$700M in 2025, up from \$24M in 2019, driven by consumer applications. In this context, STMicroelectronics has released its first GaN product: the MASTERGAN1. The company's partnership with TSMC in the beginning of 2020 has greatly accelerated the release of this product.

In this report, System Plus Consulting unveils STMicroelectronics' technical choices, from device design up to packaging.

The GaN-on-Si-based power system-in-package device is a half bridge driver with two enhancement mode GaN HEMTs. The GaN dies are co-packaged with an IC in a QFN package. The HEMT uses a metal-insulator-semiconductor (MIS) structure to achieve E-mode and normally-off operation.

In this report, System Plus Consulting presents a deep teardown analysis of the MASTERGAN1, including detailed optical and SEM pictures as well as cross-sections

with energy-dispersive X-ray analysis from the packaging down to the epitaxial structure. STMicroelectronics' technical choices at the microscopic level of the IC and HEMT designs are unveiled.

This report provides an estimation of the manufacturing costs of the IC, the HEMT, and the package, as well as the estimated selling price of the component. Finally, the report includes a comparison with GaN-on-sapphire and GaN-on silicon-based power ICs from Power Integrations and Navitas, respectively. This comparison highlights the differences in GaN die designs and manufacturing costs.

COMPLETE TEARDOWN WITH

- Detailed optical and SEM photos
- Precise measurements
- Material EDX analysis
- Supply chain evaluation
- Manufacturing cost analysis
- Estimated selling price
- Technology and cost comparisons with GaN ICs from Power Integrations and Navitas

Title:
STMicroelectronics
MASTERGAN1 half-
bridge driver

Pages: 93

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2020

Format:
PDF & Excel file

Price:
EUR 3,990

Reference:
SP20580

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AUTHORS



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Dr. Youssef El Gmili has joined System Plus Consulting's team in 2019 after ten years passed on high level research and development on microelectronics. He holds a Master Degree in Microelectronics, and a PhD in Physics/Materials Science.

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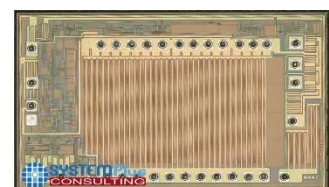
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Comparison of 18 GaN devices from: EPC, GaN Systems, Infineon, Innoscience, Navitas, Nexperia, Panasonic, Power Integrations, Texas Instruments and Transphorm.
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Power IC by Power Integrations

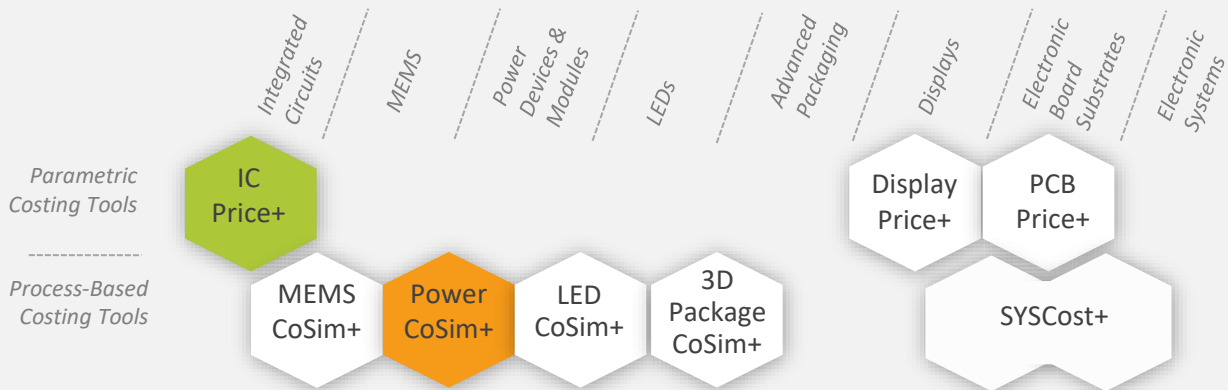
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System Plus Consulting offers powerful costing tools to evaluate the production cost and selling price from single chip to complex structures.

Power CoSim+

Cost simulation tool to evaluate the cost of any Power Electronics process or device: from single chip to complex structures.

IC Price+

The tool performs the necessary cost simulation of any Integrated Circuit: ASICs, microcontrollers, DSP, memories, smartpower...

ABOUT SYSTEM PLUS CONSULTING

WHAT IS A REVERSE COSTING®?

Reverse Costing® is the process of disassembling a device (or a system) in order to identify its technology and calculate its manufacturing cost, using in-house models and tools.



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