After long expectation, the first GaN-on-Sapphire die has been integrated in a commercially available device!

In this report, System Plus Consulting unveils Power Integrations’ technical choices; from the device design up to the packaging.

The first GaN on Sapphire based Power IC die has been found in the Wall-Charger PowerPort Atom PD1: A2017, from Anker. The die is co-packaged with three ICs constituting primary-side and secondary-side controllers, in the device SC1933.

To our great surprise, the power GaN HEMT was processed on a sapphire substrate which is a major breakthrough that we did not observe before in other power GaN HEMTs. The latter being generally processed on Silicon substrates.

In this report, System Plus Consulting presents a deep teardown analysis of the SC1933C. Detailed optical and SEM pictures and cross-sections with EDX analysis are included to reveal Power Integrations’ technical choices till the microscopic level of the ICs and HEMT’s designs.

The report provides an estimation of the production costs of the ICs, the HEMT and the package as well as the estimated selling price of the component.

Finally, the report shows a comparison with the GaN-on-Si HEMT from Navitas. This comparison highlights the differences in GaN dies’ design and manufacturing costs.

A system-oriented analysis of the PowerPort Atom PD1: A2017 from Anker, can be found in our report "GaN Chargers Comparison"; a report which focus on the impact of the GaN dies’ adoption in the latest wall chargers design and performances.

**COMPLETE TEARDOWN WITH**

- Detailed optical and SEM photos
- Precise measurements
- Materials EDX analysis
- Supply chain evaluation
- Manufacturing cost analysis
- Estimated selling price
- Technology and cost comparisons with GaN-on-Si HEMT from Navitas.
### Overview/Introduction
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- Reverse Costing Methodology

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- Power Integrations

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- Estimation of Selling Price

### Price Analysis
- Technology and Cost Comparison Between Power Integrations and Navitas GaN HEMT Dies

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### Related Reports

**GaN-Based Wall Charger Comparison 2019**
The first wall-chargers based on GaN technology from RAVPower, Aukey, Made in Mind, and Anker.
July 2019

**Navitas650V GaNFast PowerIC Family**
The first GaN monolithic devices from Navitas for fast charging.
May 2019

**GaN-on-Silicon Transistor Comparison 2018**
Dive deep into the technology and cost of GaN-on-silicon HEMTs from EPC, Transphorm, GaN Systems, Panasonic and Texas Instruments.
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Our analysis is performed with our costing tools Power CoSim+ and IC Price+.

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