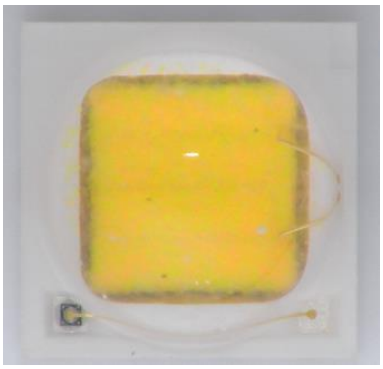
Toshiba TL1L4-WH0
3rd gen GaN on Silicon LED

First high brightness LED GaN-on-Silicon with 160lm per watt, almost equivalent to sapphire LED Base



Toshiba has completely changed its technology to multiply by 2 the brightness of their GaN-on-silicon LEDs. Today the Toshiba white LEDs have characteristics close to the classic sapphire LED with a smaller cost.

The large panel of products and packages available today shows the maturity of Toshiba products and their willing to conquer the white LED market.

Title: TL1L4 GaN on Si LED
Pages: 107
Date: June 2015
Format: pdf + xls

With a footprint of 3.5x3.5mm, the TL1L4-WH0 from Toshiba is tiny and benefits of the last package innovations like the sintering and a SMD leadframe with ceramic substrate and take full benefit of strong innovations.

The TL1L4 LED are produced on a cheap 8" silicon substrate in a standard power silicon facility from Toshiba. The integration in a standard facility has been facilitate by a gold-free smart bonding process.

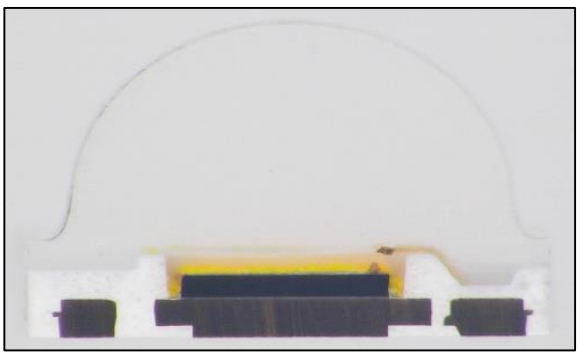
A significant work has been done on the epitaxial layer in GaN to enhance the brightness. In 18 months, the brightness has been multiplied by 2. The optimization of the GaN epitaxy is the core of this amazing improvement.

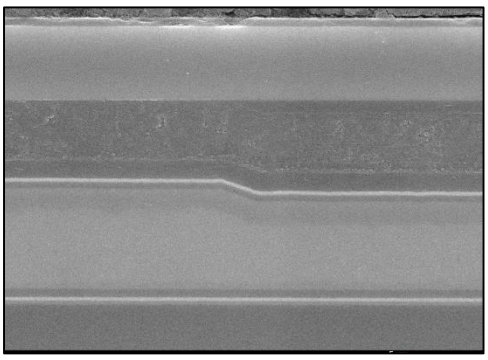
Moreover, all the manufacturing process has been enhanced to reach this brightness. Today the Toshiba white LEDs are similar to the last sapphire LEDs with a vertical thin film with via structure.

The report includes a detailed technology and a cost analysis describing the innovations of Toshiba and a comparison with the first generation Toshiba LED. LED on silicon can now compete against LED on Sapphire.

COMPLETE TEARDOWN WITH:

- Detailed Photos
- Precise Measurements
- Material Analysis
- Manufacturing Process Flow
- Supply Chain Evaluation
- Comparison with Toshiba TL1F1
- Manufacturing Cost Analysis
- Selling Price Estimation





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Sylvain is in charge of costing analyses for IC, Power and LED. He has more than 6 years of experience in the LEDs manufacturing costs analysis and has studied a wide range of technologies.

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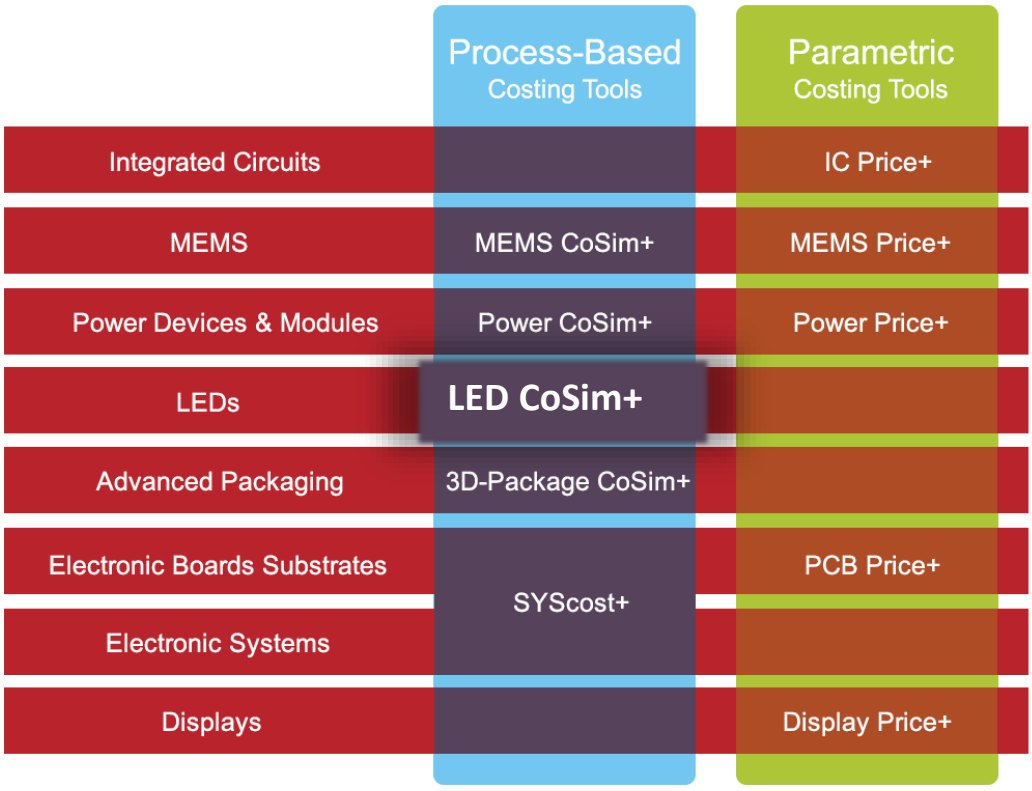
Véronique is in charge of structure analysis of semi-conductors. She has a deep knowledge in chemical & physical technical analyses. She previously worked for 20 years in Atmel Nantes Laboratory.

ANALYSIS PERFORMED WITH OUR COSTING TOOLS LED COSIM+



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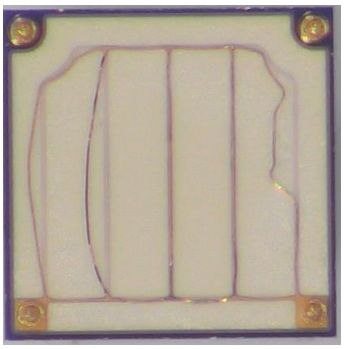

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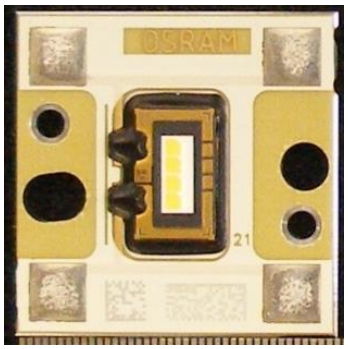

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