

GaN-On-Si Key Patent Analysis

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Abstracts

The size of sapphire substrates is increasing to response to the current trend toward the low LED price, but it is actually hard to grow sapphire single crystals to a large size. For this reason, research on adopting silicon that has commonly used in the semi-conductor process to the LED manufacturing process instead of sapphire wafer has recently boomed in recent years.

Silicon substrates, as low-cost, large-sized substrates, have a lot of advantages over sapphire substrates typically used for nitride-based LEDs in terms of thermal conductivity, electric conductivity, and high processability. Nevertheless, they have not reached the commercialization stage yet, for the reasons that it is hard to control cracks generated by a wide difference in thermal expansion coefficients between silicon and GaN materials, and the energy band of Si substrates is opaque, causing a large optical loss.

There has been considerable progress in its performance, however, as it came possible to control the cracks caused by the difference in thermal expansion coefficients to a certain degree with the recent development of epitaxial technologies. In addition, the light loss issue caused by Si substrates themselves is considerably resolved by using the wafer bonding process using second substrates. Recently Korean companies such as Samsung and LG as well as leading companies such as Phillips, and OSRAM in the LED industry are recently showing aggressive research activities.

In this circumstance, SNE Research has published a report analyzing key parents related to GaN-On-Si (Gallium Nitride on Silicon) technologies. This report covers Korean, U.S., Japanese, European, and PCT patents that have published until March 3, 2012; qualitative in-depth analysis of total 195 effective patents selected is provided.

In relation to the market expansion of GaN devices, technology development on GaN-

On-Si becomes active. The report provides the analysis of patenting trend on the GaN-On-Si related technology by year/technology/assignee and technology flow charts of the key technologies, which is expected to be very helpful to look into the technology development trend and key patents in the field of GaN-On-Si.

The in-depth key patent analysis provided by the report is focused on the U.S. patent, covering the current status of key patents, analysis of key patent trends, and technology flow charts. The conclusion part is composed of the result of the overall patenting trend (summary), and the key technology trend of major companies, patent issues, and implications. In addition, patent summaries of the 97 patents (KR, US, JP, EP, and PCT) are attached.

The report features

Analysis of global major patents (195 cases), and 97 key patent summaries in 109 pages in total

Analysis of the overall patenting trend, key patent trends, and patent issues.

Technology development maps on major GaN on Si technologies

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