UNIVERSITY OF CAMBRIDGE

ADVANCED MATERIALS RESEARCH & INNOVATION

UNDERSTANDING NOVEL TRANSISTOR TECHNOLOGIES TO DELIVER ENERGY EFFICIENCY

Supporting the development of the next generation of small, reliable, and energy-efficient devices through the Royce Industrial Collaboration Programme

The Royce Engineering and Physical Sciences Research Council (EPSRC) funded Industrial Collaboration Programme (ICP) has successfully matched companies that have research, development, and innovation (RD&I) projects with Royce experts in materials science and cutting-edge facilities in a truly collaborative endeavour. This case study illustrates the outcome of an ICP project between Cambridge GaN Devices (CGD) and Royce at the University of Cambridge.

ROYCE

University of Cambridge is a Partner of the Henry Royce Institute for advanced materials

ABOUT THE COLLABORATION

Gallium Nitride (GaN) power transistors and integrated circuits are transforming power conversion. GaN offers the highest efficiency in data centres and consumer power adapters.

This Royce collaboration is helping CGD to support the development of the next generation of small, reliable, and energy-efficient devices by developing new characterisation methods for GaN power transistors and their passivation materials.

The work was carried out at the High Voltage Characterisation Suite of the Henry Royce Institute at the University of Cambridge using its advanced high voltage demi-automatic probestation and source-measure units.

Dr Nishad Udugampola, University of Cambridge, was the Royce representative on the project, supporting CGD to tackle its materials challenges, accelerate innovation and grow market share.

RESULTS

CGD can now characterise both wafers and packaged 650 V power devices in the full temperature range and in semi-automatic mode. Key performance parameters of GaN devices and the impact of passivation materials have been successfully established.

These technical achievements have allowed CGD to deliver fully functional samples to its customers bringing CGD one step closer to achieving a significant share of the GaN market, which is predicted to be in excess of 1BUSD by 2026.

The project's societal impact is also extremely significant as CGD's GaN power devices, being the most easy-to-use and energy-efficient solution, have the potential to enable a reduction of millions of tonnes of CO2 when used in data centres and automotive applications.

CGD have said that use of the Royce High Voltage Characterisation Suite will be essential to its continued growth ambitions.

Visit **www.camgandevices.com** to read more about CGD's work on novel transistor technologies

Visit **www.royce.ac.uk/impact** to read more impact case studies from the Henry Royce Institute

"Access to the Royce High Voltage Characterisation Suite has brought us one step closer to achieving a significant share of the rapidly growing GaN market, which is predicted to be in excess of $1B by 2026.

Bringing to market CGD green technology will help the world's net-zero targets via the deployment of energy-efficient power electronics. The project also allowed the creation of several new roles and enabled the entry of CGD into the scale-up phase."

Dr Giorgia Longobardi | CEO | CGD