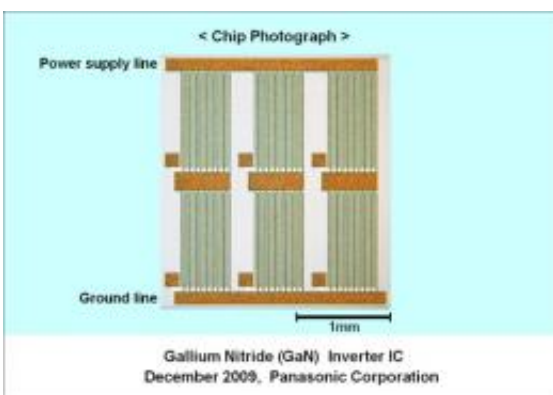


Panasonic Develops A Gallium Nitride (GaN) Inverter IC for Motor Drive with High Efficiency

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Gallium Nitride (GaN) Inverter IC

Panasonic today announced the development of a Gallium Nitride (GaN)-based monolithic inverter integrated circuit (IC) for motor drive. The integrated six GaN-based transistors can be independently driven in a single chip, which enables successful motor drive with high efficiency. The new GaN inverter IC is applicable to motor drive in a variety of consumer electronics.

Panasonic's proprietary Gate Injection [Transistors](#) (GITs) are integrated into a single chip taking advantages of its lateral device configuration. The GIT serves normally-off operation with low on-state resistance and high breakdown voltage. Independent operation of each GIT is possible

by planar isolation using iron (Fe) ion implantation keeping high breakdown voltage around 900V between each transistor which is stable even after high temperature fabrication process over 800°C.

It is also noted that the IC is fabricated on cost effective Si substrate with large diameter. The epitaxial structure is grown by metal organic [chemical vapor deposition](#) (MOCVD) with novel buffer structures which fully relax the strain in the film caused by the lattice and thermal mismatches between GaN and Si.

Successful motor drive is confirmed using the new GaN-based monolithic inverter IC. The conversion loss is effectively reduced by 42% from that by conventional Si-based IGBT (Insulated Gate Bipolar Transistor) at the output power of 20W. On-state loss is reduced by the GIT free from the off-set voltage in the forward bias which is seen in conventional IGBT. The integration reduces the parasitic inductance so that the switching loss is effectively reduced. The inverter IC is the world first demonstration of a single chip GaN-based inverter IC for motor drive.

Applications for 141 domestic and 90 overseas patents have been filed. These research and development results have been presented at International Electron Devices Meeting 2009, held in Baltimore, U.S. from December 7 to 9, 2009.

Source: Panasonic

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