NEW RELEASE

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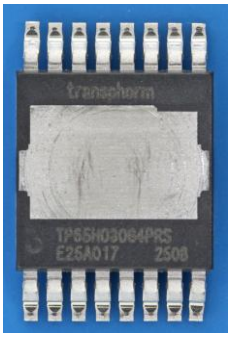
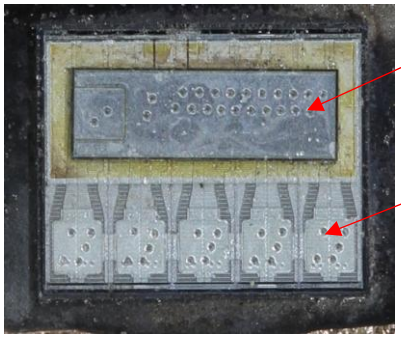
GaN FET (650V): Renesas Electronics TP65H030G4PRS Package and GaN FET structure analysis report



Package



GaN FET + Si MOSFET die

Report Overview

Renesas Electronics has launched and begun mass production of a new 650V high-voltage gallium nitride (GaN) power semiconductor.
The new product adopts a new process called “4th Generation Plus (Gen IV Plus).” Compared to the conventional 4th Generation (Gen IV), it achieves improved power efficiency by reducing the die size by 14% and lowering the on-resistance to 30 mΩ.
The product also features the proven SuperGaN technology* of Transphorm, a company acquired in June 2024.
The product is suitable for 1kW to 10kW power supply systems such as AI servers, EV charging systems, UPS (uninterruptible power supplies), and solar power inverters.
LTEC released reports on the package structure analysis of this product and the GaN FET die structure analysis equipped in it.

SuperGaN：A normally-off GaN FET utilizing a cascode structure that connects a high-voltage D-mode GaN and a low-voltage Si MOSFET in series.

Product Features

Product type: TP65H030G4PRS V_{DS}=650V、I_D=55.7A、$R_{DS(ON)}$=30mΩ
Released data: June 2025

Product Information TP65H030G4PRS

FOM : Qgd・Ron= 198 nC・mΩ （Si SuperJunction：740～868 nC・mΩ）

Report No：25G-0274-1,2 Release day：2025.10.24

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Analysis result summary

1. Package Structure Analysis Report (34 pages)

Analysis of materials such as bonding wires and die attach was conducted, along with measurements of the film thickness of each layer. Si MOSFET is vertically stacked on the GaN FET die, and it also conducted observation and analysis of the connection materials between Si MOSFET and GaN FET die.

2. GaN FET Structure Analysis Report (90 pages)

Metal layout of each layer, thickness of each metal layer and GaN epi layer, and material analysis of GaN FET dies. In particular, this analysis revealed that passive elements not listed in the equivalent circuit on the datasheet are formed on GaN FET die.

Report price

Delivered one week after order placement. Please contact us for report pricing.

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① Package Structure Analysis Report　Table of Contents

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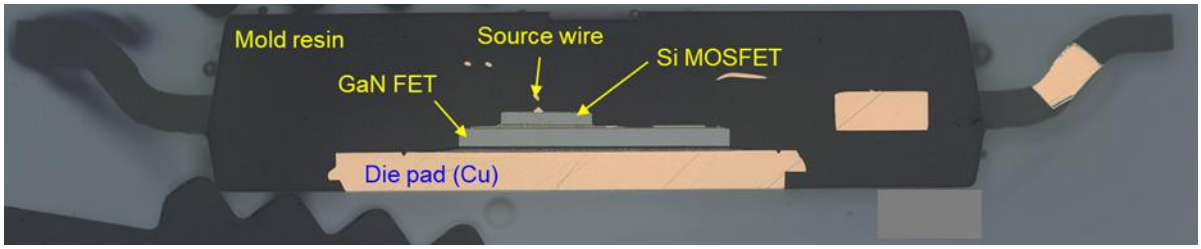
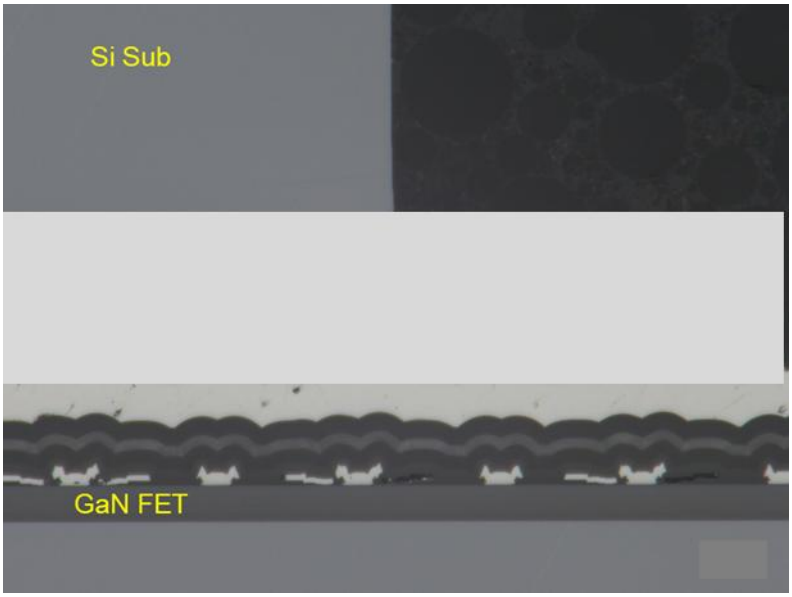
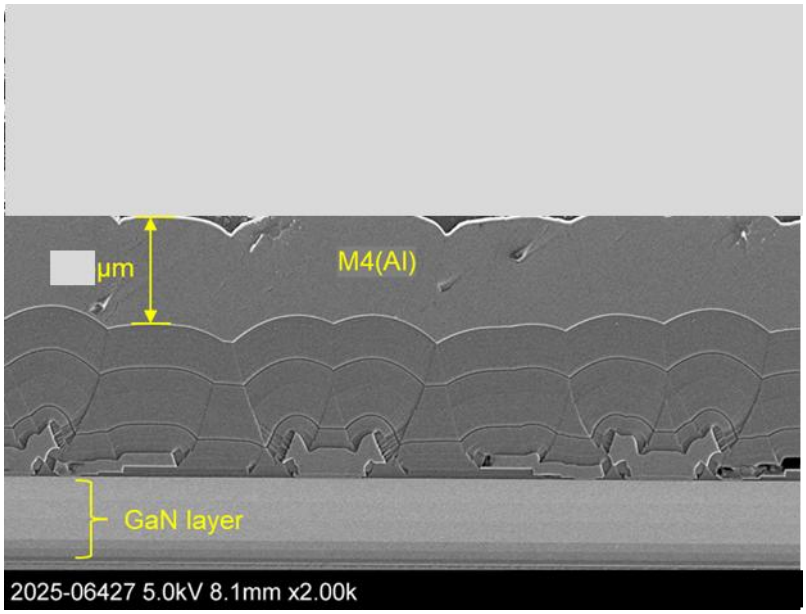
① Excerpt from Package Analysis Report



Package Cross-Section Structure



Si MOSFET-GaN FET Connection Cross-Section



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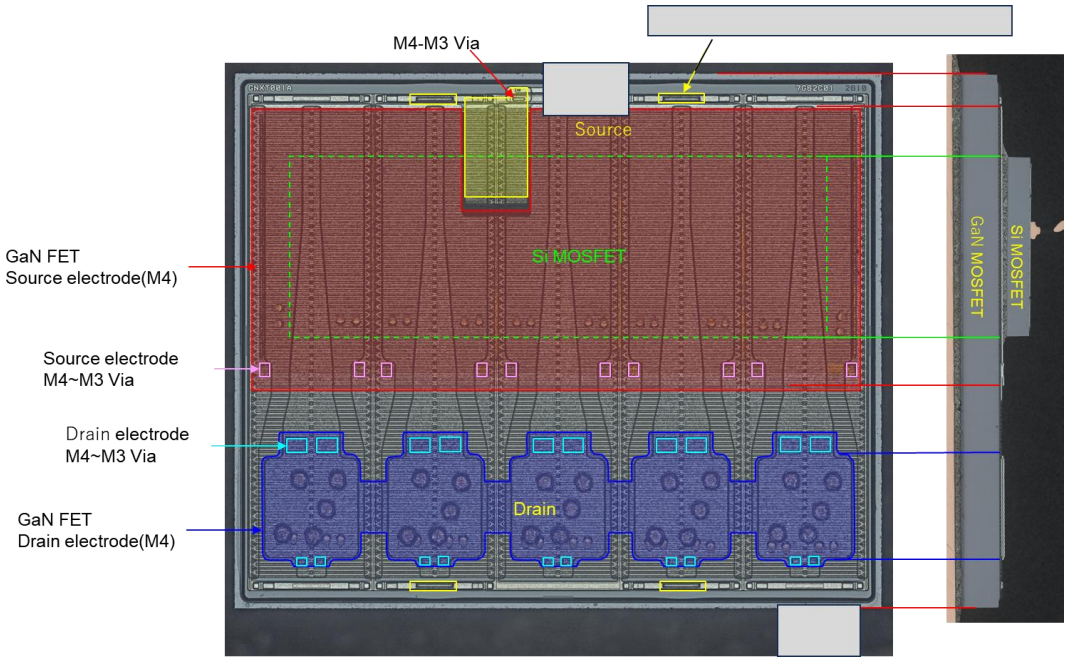
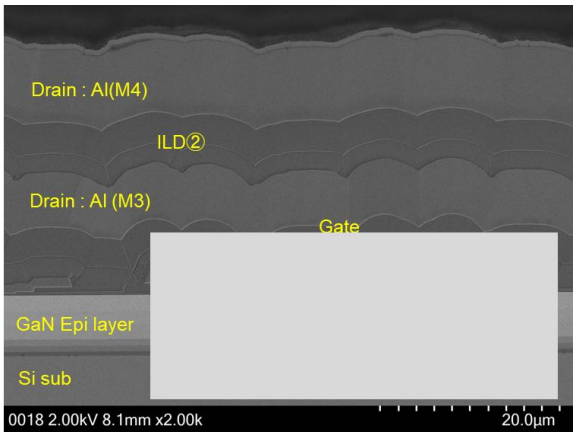
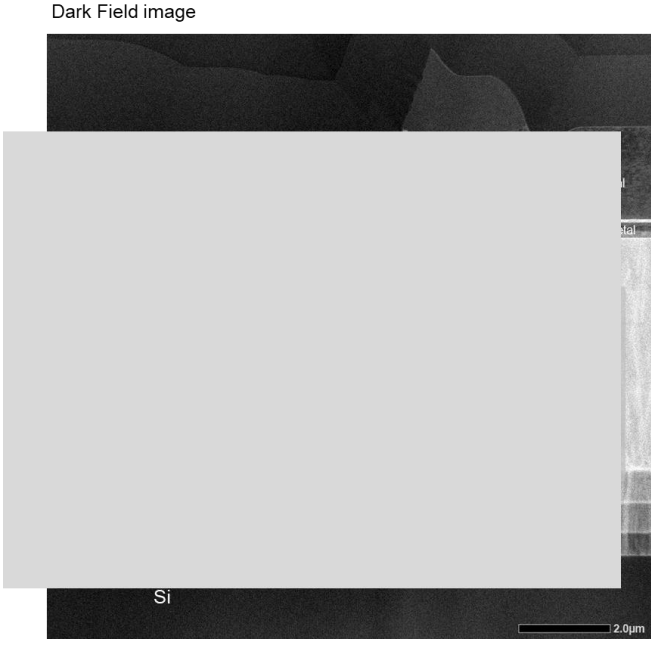


Die layout (Top metal layer)



Cell array cross-section SEM image



Cell array cross-section TEM image
(GaN-Epi layer)

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