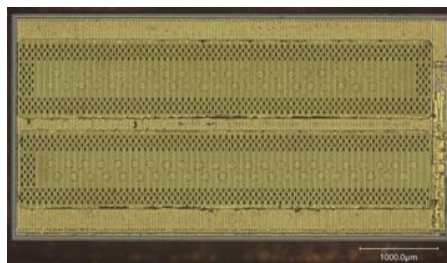


GaN FET(650V) : Navitas NV6514C Package and GaN FET Structure Analysis Report



Package



GaN FET die

Report Overview

Navitas Semiconductor has launched GaN Safe for the data center, solar/energy storage, and EV markets. The GaN Safe series is the fourth generation of Navitas products, integrating control, drive, sensing, and critical protection functions to achieve unprecedented reliability and robustness.

NV6514C is a member of the GaNsafe series, and a structure analysis report released clarifying the features of the package and the integrated GaN FET.

Product Features

Product type: NV6514C $V_{DS}=650V$, $I_D=90A$ $R_{DS(on)}=18m\Omega$

Released data: Jul. 2024

[Datasheet : NV6514C](#)

- Normally-off GaN FET (ESD, high-speed short-circuit protection circuit, Miller clamp)
- AEC-Q100 Grade 1 (ordering option)

Analysis result summary

1. Package Structure Analysis Report (26 pages)

- Analysis of materials such as bonding wires and die attach, and measurement of film thickness of each layer.
- NV6514C uses RDL, and also analyzed of its film thickness and material.

2. GaN FET Structure Analysis Report (85 pages)

- This generation of GaN FETs features a new drain structure design (P-GaN is formed in an island-like pattern).
- This report also performed plane observations of each layer of the die peripheral protection circuit area.
- If the circuit analysis of the peripheral protection circuit is required, please contact us.

Report price

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

1. Package Structure Analysis Report Table of Contents

【Table of Contents】			Page
1	Device Summary		
	Table 1: Device Summary	• • •	3
1-1	Summary of analysis results	• • •	4
2	Package analysis		
2-1	Appearance	• • •	7
2-2	Internal layout	• • •	9
2-2	Die Observation	• • •	10
2-3	Package Cross Section Structure Analysis	• • •	12

2. GaN FET Structure Analysis Report Table of Contents

【Table of Contents】			Page
1	Device Summary		
	Table 1: Device Summary	• • •	3
1-1.	Summary of Analysis Results	• • •	4
	Table.1-1-1:Device Structure (GaN FET)	• • •	5
	Table.1-1-2:Device Structure: Layer Materials and Film Thickness (GaN FET)	• • •	6
2	Plane Structure Analysis	• • •	7
2-1.	Plane OM Structure Analysis	• • •	8
2-2.	Plane SEM Structure Analysis	• • •	28
3	Cross Section SEM Structure Analysis	• • •	40
4	Cross Section TEM Structure Analysis	• • •	52
5	TEM-EDX Analysis	• • •	62
6	Appendix	• • •	82

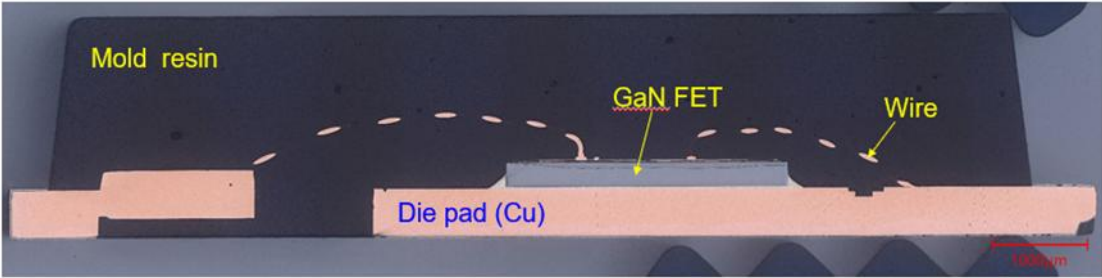
1. Excerpt from Package Analysis Report



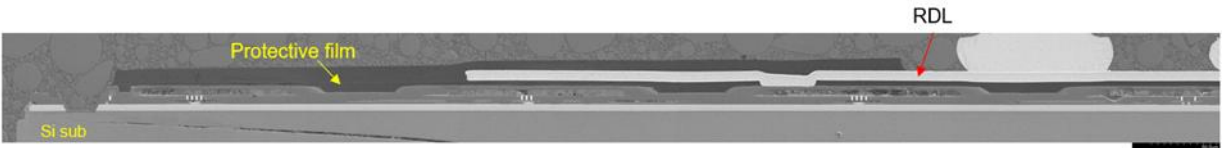
Package

No.	Measurement location/Item	Dimension	Materials
1	Moldi resin		
2	Bonding wire		
2-1	Gate		
2-2	Drain (45 wires)		
2-3	Source (45 wires)		
3	GaN FET		
3-1	Protection film②		
3-2	Protection film①		
3-3	Surface electrode-3		
3-4	Surface electrode-2		
3-5	Surface electrode-1		
3-6	GaN-Epi Layer		
3-7	Substrate		
3-8	Backside metal-1		
3-9	Backside metal-2		
4	Die attach		
5	Die pad		
5-1	Die pad		
5-2	Plating		

Package Structure Overview

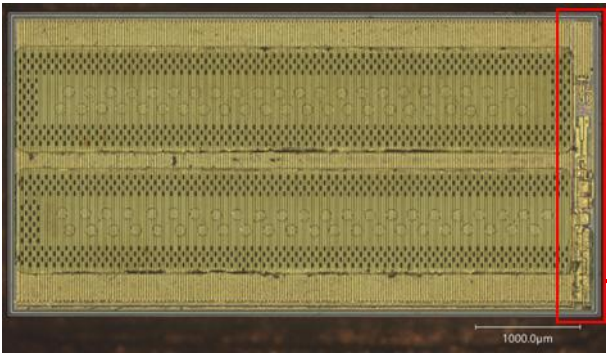


Package Cross Section OM Image

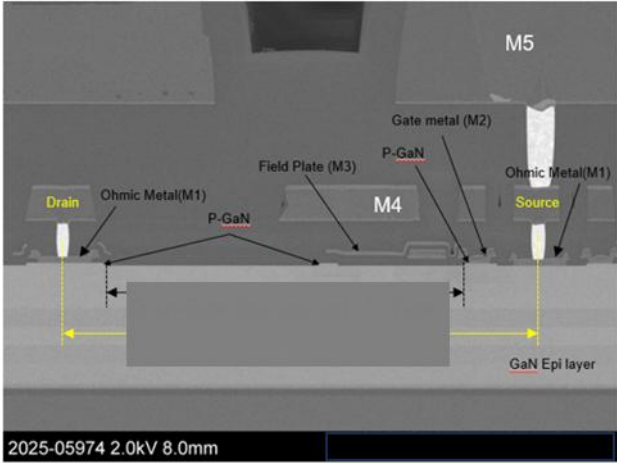


GaN FET Cross Section SEM image

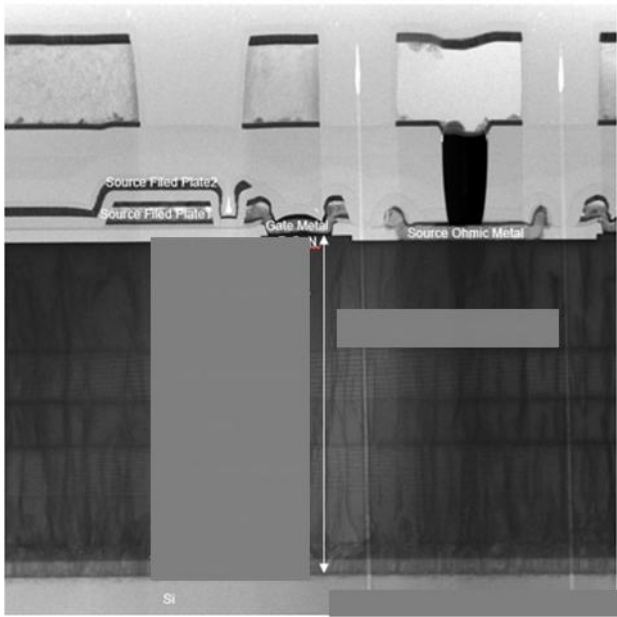
2. Excerpt from GaN FET Structure Analysis Report



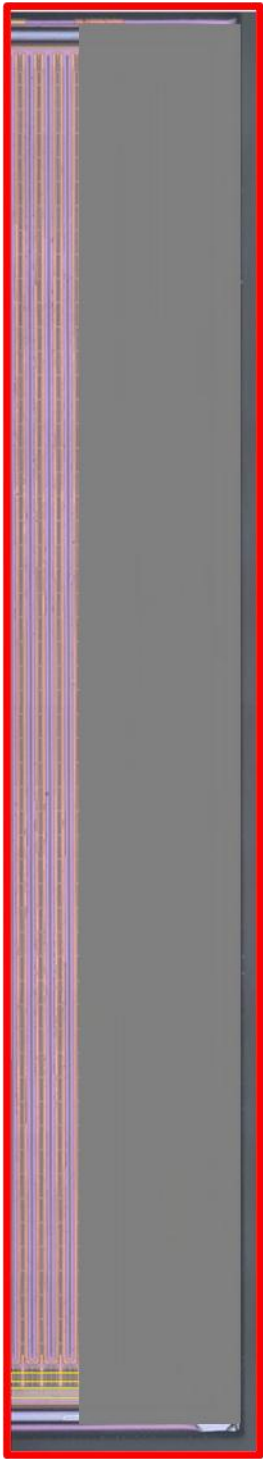
GaN FET die (Top metal layer)



Cell array Cross Section SEM Image



Cell array Cross Section TEM Image



Protection Circuit area
Plane OM Image