New Release

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SiC MOSFET(1200V)： Navitas (GeneSiC) G3F34MT12K Overview Analysis Report

TO-247-4 Package

SiC MOSFET die

Overview

In June 2024, Navitas (GeneSiC, acquired by Navitas in 2022) announced its new Gen3 "high-speed G3F" MOSFET 650V and 1200V families. G3F features include a unique "trench-assisted planar" technology in terms of structure, excellent robustness (achieving 30% longer short circuit withstand time) and switching speeds of up to 600kHz in terms of performance. We have now released an overview analysis report that clarifies the characteristics of the device structure for this new Gen3 1200V SiC MOSFET (※1).

(※1) Please refer to the analysis content below and page 3 for differences in content from the structure analysis report currently being planned.

Product features

- Product type: G3F34MT12K Vdss=1200V, 63A, 34mΩ
- Release date: August 2024
- Automotive AEC-Q101 Qualified
- Applications: AI data center power supply, xEV OBC & DC-DC, energy storage system, etc.

Report Contents

Datasheet: https://navitassemi.com/wp-content/plugins/gb-navitas-stock-checker/product_files/G3F34MT12K.pdf

Overview Analysis Report (16 pages)

- Die observation and length measurement.
- SiC MOSFET cross-section analysis: Die edge, cell array(Epi structure, the film thickness).
- Structure comparison between NAVITAS G3R(※2) and G3F.
- Introduction of related patents regarding “Trench Assist Planar” technology.

Structure Analysis Report (under planning)

(※2) Please contact us regarding the G3R structure analysis report (21G-0018-1).

- Includes overview analysis report contents.
- SiC MOSFET plane structure: Wiring connection and layout check.
- SCM analysis ※We will conduct G3R SCM analysis upon request.

Short circuit withstand time evaluation Report (under planning)

- Short circuit withstand time test measurement results.
- A comparison with G3R will reveal a 30% longer short circuit withstand time.

Report price

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

LTEC Corporation US Representative Office www.ltec-biz.com/en/
2310 Homestead Rd, C1 #231 Los Altos, CA 94024
Phone: +1-(650) 382-1181
Contact2@ltec.biz

Report No : 24R-0694-1
Release day: 2024.11.20

Overview Analysis Report table of contents

Excerpt from Overview Analysis Report

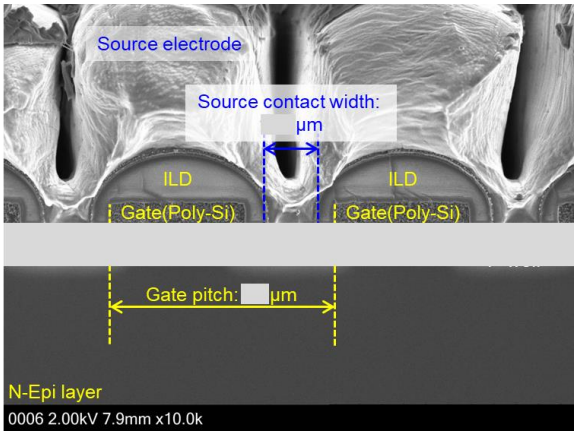
The main purposes of the overview analysis and structure analysis are three as follows:

1)We will clarify the structure of this product.
2)We will compare this product to the company's gen3 product (G3R) that we previously analyzed to see the structure differences.
3) We will investigate related patents to clarify the details, background, and advantages of the "trench-assisted planar" technology used in this product.

The contents of the overview analysis report and the structure analysis report differ with respect to 1) to 3) above (see the table below).

	Overview Analysis Report Contents (24R-0694-1)	Structure Analysis Report Contents (24R-0694-2)
1)	・Die observation ・Package observation ・SiC MOSFET cross-section analysis: Epi layer, Cell array, Die outer periphery(SEM)	In addition to the information on the left, ・Package cross-sectional analysis ・SiC MOSFET plane analysis: Wiring connection and layout check
2)	・Comparison with G3R (Die size and RonAA)	In addition to the information on the left, we will compare the cell cross-sectional structure and die outer periphery structure with G3R.
3)	・We don't research related patents, but present summaries and drawings.	In addition to the information on the left, we will conduct a search for related patents.

Differences between the Overview Analysis Report and the Structure Analysis Report



Cross-sectional SEM image of cell array

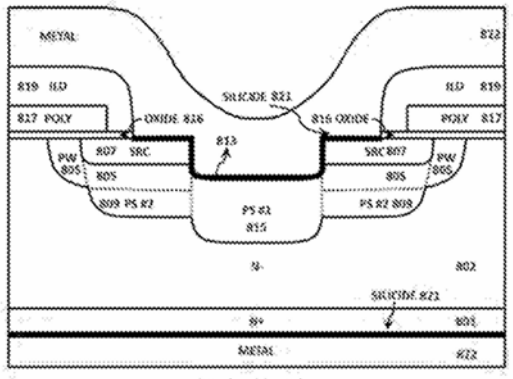


FIG. 8BB

Trench-assisted planar technology related patents (WO2022047349A2) Drawing

		G3R75MT12K	G3F34MT12K
ON resistance: RON	(mΩ) / Vgs (V)	75 / 15	34 / 18
ON resistance per unit area RONxAA	mΩ・mm²		
Die size	mm x mm = mm²		
Transistor active area AA	mm²		
Cell source - source pitch, P	μm		

Comparison with G3R

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