

SiC SBD (2000V): Infineon G5 IDYH25G200C5 Overview and Structure Analysis Report



Package



SiC SBD die

Overview

Infineon, a leading manufacturer of power devices, has expanded its CoolSiC portfolio to the 2kV class, targeting applications using high-voltage power supplies, for which demand is expected to grow in the future, and released the market's first 2000V SiC SBD in October 2024 (until now, 600-1200V products have been the mainstream). The features of this product include high voltage, high speed operation, and improved current density due to high efficiency, which allows for simplified design and reduced system costs. We have now released the following report, which clarifies the structure and features of this product.

Product features

- Product type: IDYH25G200C5 VRRM = 2000V, IF = 77A
- Released date: October 2024
- Application: Solar inverter, EV charging system

Datasheet URL: https://www.infineon.com/dgdl/Infineon-IDYH25G200C5-DataSheet-v01_00-EN.pdf?filed=8ac78c8c914a3ac801917f09d5c23976

Analysis Results (Please refer to pages 2 and 4 for the tables of contents)

(1) Overview Analysis Report (13pages)

(2) Structure Analysis Report (50pages)

- XT technology own by Infineon is used as the die attach material, which reduces the thermal resistance of the device. This technology is also used in Gen2 CoolSiC.
- The diode cell of this product has a hexagonal type MPS (Merged PiN Schottky) structure.
- Comparison with the company's G5 1200V product confirmed that the Epi thickness and die outer periphery structure (outer periphery width, JTE and GR structure) are different.

(3) Electrical characteristics Analysis Report (In planning)

- IF-VF vs. temperature, capacitance(Cj), and breakdown voltage, etc.

Report price

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

(1) Overview Analysis

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Excerpt from (1) Overview Analysis Report

Table1-1 : Device summary

Device	SiC SBD (VRRM=2000V, IF = 77A (Tc=25°C))
Manufacturer	Infineon Technologies AG (Germany)
Product name	IDYH25G200C5
Package type	TO-247-4
Package marking	D2520C5 H 2335
Die configuration	SiC SBD x1
Die size	mm x mm = mm ²
SiC SBD Die manufacturing process	SiC wafer, Schottky metal, top metal anode
Application	- String 3-phase inverter - EV Charging

Device summary

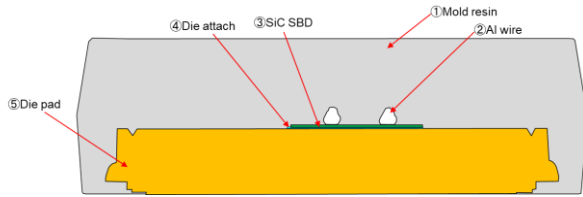
Tc=25°C	1200V IDW30G120C5B	2000V IDYH25G200C5
Die size (mm x mm = mm ²)		
Active array area (mm ²)		
Forward current IF (A)	87	77
Forward voltage VF (Typ.) (V)	1.4 (IF = 30A)	1.5 (IF = 25A)
Forward Resistance: RF (mΩ) / Per Area : RF x AA (mΩ•mm ²)		
Epi layer thickness (μm)		

Comparison with the company's G5 1200V product (Die size, active area, etc.)

(2) Structure Analysis Report

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2	Package analysis	
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2-3.	Package cross-sectional structure analysis	...
3	SiC SBD die structure analysis	
3-1.	Plane structure analysis by Optical Microscope	...
3-2.	Plane structure analysis by SEM	...
3-3.	Cell array cross-sectional structure analysis	...
3-4.	Cross-sectional structure analysis of SBD die outer periphery	...
4	Comparison with the company's G5 1200V SiC SBD	...

Excerpt from (2) Structure Analysis Report

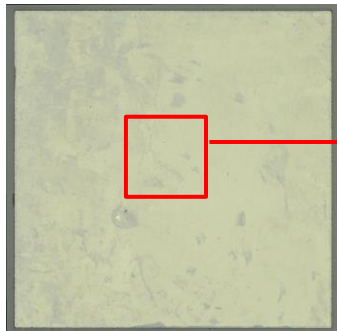


Package cross-sectional structure

Table1-4: Device structure : Package structure summary

No.	Measuring point	Length measurement	Materials
1	Mold resin		
2	Al wire		
2-2	Anode		
3	MOSFET		
3-1	Surface protection film		
3-2	Top metal		
3-3	Substrate		
3-4	Backside metal-1		
3-5	Backside metal-2		
4	Die attach		
5	Die pad		
5-1	Die pad		
5-2	Plating layer		

Package cross-sectional structure overview



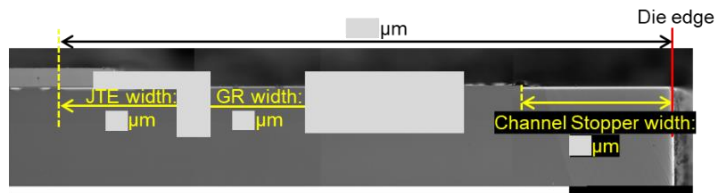
SiC SBD die (SiC sub layer)

A feature of G5 products

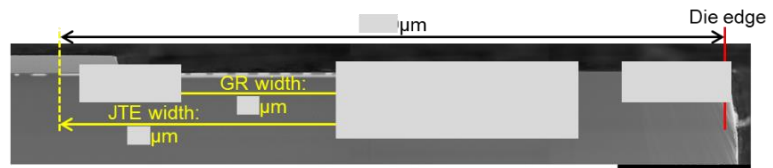


**Plane SEM image of diode cell (Hexagonal type)
(SiC sub layer)**

Infineon G5 1200V SiC SBD
(IDW30G120C5)



Infineon G5 2000V SiC SBD
(IDYH25G200C5)



Comparison with the company's G5 1200V product (Die outer periphery structure)