New Release

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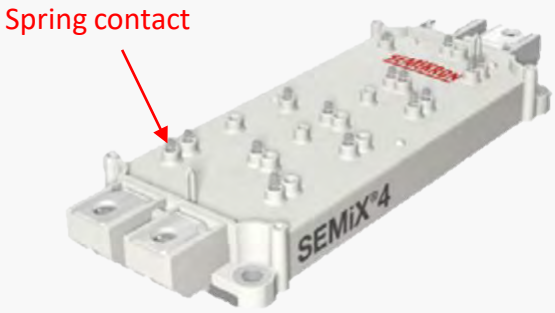
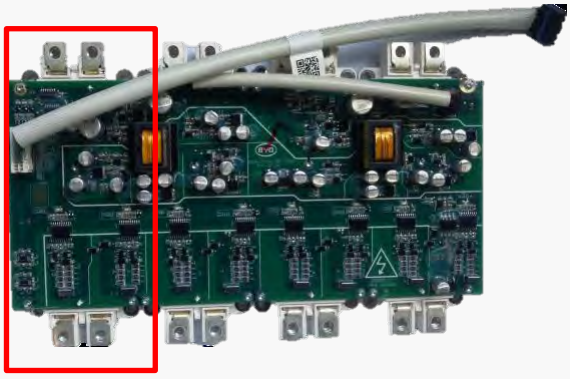
SEMIKRON SEMiX604GB12T4s IGBT POWER MODULE STRUCTURE ANALYSIS REPORT – Product used in BYD's SONG EV500



Power module



Power module after resin removal

Product outline

- The Model Song EV500 SUV has a mileage range od 400km/charge
- **Basic features**
- SEMIKRON's IGBT module is used in the motor control inverter
- Spring contact control terminals create solder-free connection
- The maximum rated voltage is 1,200V and the maximum collector current is 916A
- **Report contents**
- In the module analysis cross-section and EDX analysis of the spring contacts, die attach, and key components are performed.
- Plane and cross-section analysis of the cell area and die edge were performed in order to determine what type of IGBT technology is used by the Chinese manufacturer. The device was analyzed to determine how it was optimized to support the breakdown voltage specification.
- The thermal resistance is estimated from the dimensions of the module and the results of material analysis.

Report price: $6,500

Note: The report price may change over time. For current price contact **info@ltecusa.com**.

19G-0023-3

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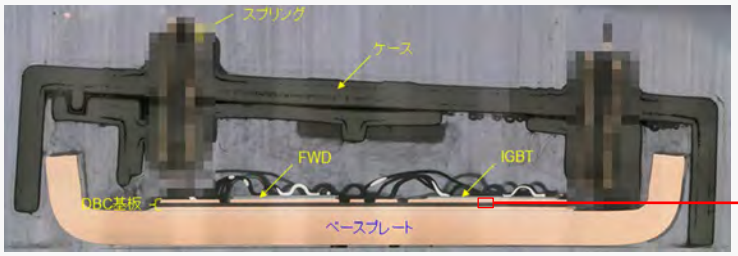
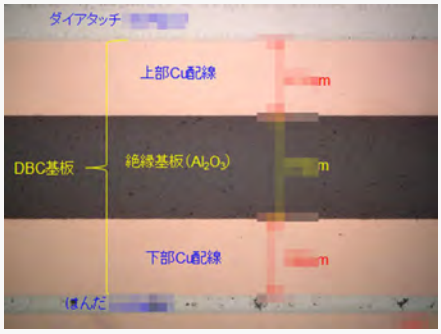
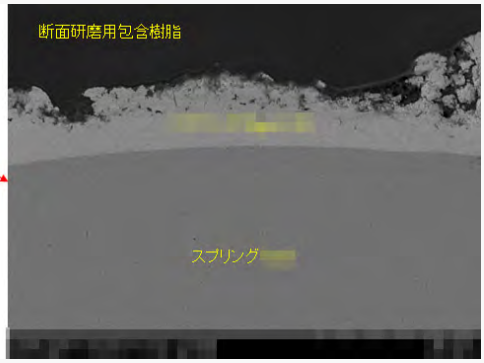
Excerpts from the analysis report

Module cross section





Spring contact cross section



Thermal analysis

IGBT

	Device	SEMIKRON IGBT Half-Bridge Power Module SEMiX 604GB12T4s Power Module		Case 1: Nominal	
Die	Semiconductor Die IGBT	Device		IGBT	
		Material			LTEC評価
		Thickness, d	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Mass density, ρ	[g/cm3]		材料物性
		Number of Transistors			
		Size, X	[mm]		LTEC評価
		Size, Y	[mm]		LTEC評価
		Die size, X*Y	[mm2]		LTEC評価
	Die Attach	Material			LTEC評価
		Thickness	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
DBC	DBC (top)	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
	Insulated substrate	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
	DBC (Bottom)	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
	*Total DBC Thickness		[mm]		
	DBC-Base Plate Solder	Material			LTEC評価
		Thickness	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
Base Plate	Base Plate	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
(1)	Semi Die Thermal Resistance		[°C/W]		モデル計算値
(2)	Die Attach Thermal Resistance		[°C/W]		モデル計算値
?	DBC Thermal resistance		[°C/W]		
?	DBC-BasePlate Solder Thermal resistance		[°C/W]		
(5)	Base Plate Thermal resistance		[°C/W]		
(6)	Bottom Path Thermal resistance per Transistor		[°C/W]		
(7)	Switch Thermal Resistance, Rthjc		[°C/W]		モデル計算値
	Total Thermal Resistance, Rthjc (Datasheet)		[°C/W]	0.049 (MAX)	データシート値

FWD

	Device	SEMIKRON IGBT Half-Bridge Power Module SEMiX 604GB12T4s Power Module		Case 1: Nominal	
Die	Semiconductor Die FWD	Device		Diode	
		Material			LTEC評価
		Thickness, d	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Mass density, ρ	[g/cm3]		材料物性
		Number of Transistors			
		Size, X	[mm]		LTEC評価
		Size, Y	[mm]		LTEC評価
		Die size, X*Y	[mm2]		LTEC評価
	Die Attach	Material			LTEC評価
		Thickness	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
DBC	DBC (top)	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
	Insulated substrate	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
	DBC (Bottom)	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
	*Total DBC Thickness		[mm]		
	DBC-Base Plate Solder	Material			LTEC評価
		Thickness	[um]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
Base Plate	Base Plate	Material			LTEC評価
		Thickness	[mm]		LTEC評価
		Thermal Conductivity	[W/cm*K]		材料物性
		Thermal Diffusivity, D	[cm2/s]		材料物性
(1)	Semi Die Thermal Resistance		[°C/W]		モデル計算値
(2)	Die Attach Thermal Resistance		[°C/W]		モデル計算値
?	DBC Thermal resistance		[°C/W]		
?	DBC-BasePlate Solder Thermal resistance		[°C/W]		
(5)	Base Plate Thermal resistance		[°C/W]		
(6)	Bottom Path Thermal resistance per Transistor		[°C/W]		
(7)	Switch Thermal Resistance, Rthjc		[°C/W]		モデル計算値
	Total Thermal Resistance, Rthjc (Datasheet)		[°C/W]	0.085 (MAX)	データシート値

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