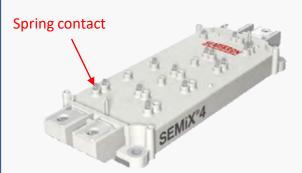


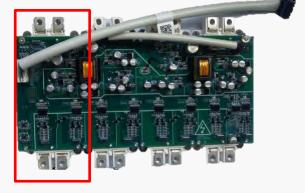
## New Release

## LTEC Corporation

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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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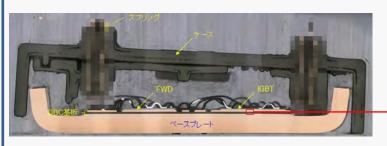
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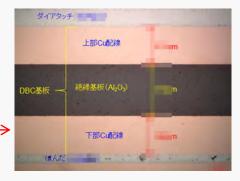
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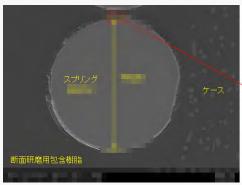
# **Excerpts from the analysis report**

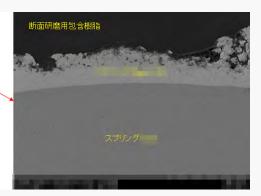
#### **Module cross section**





## **Spring contact cross section**





### Thermal analysis

**IGBT** 

	Devise	rwer Module			
	777	SEMO	604GB12T4		
	Peckage	Pe	rwer Madale		
				Case 1: Naminal	
	Semicanductor Die	Devise		JGBT	
, i	3687	Material			LTECHA
		Thickness, d	fuml		LTECHA
		Thermal Canductivity	IW/cm·Kl		村銀幣中
		Mass density, &	[a/om3]	-	######################################
		Number of Transistors			
		Size X	[mm]		LTECRHI
		Size Y	[mm]		LTECANO
		Die size X•Y	[mm2]		LTECHA
_	Die Attach	Material	- mari		LTECHI
	O P. Attech	Thickness	[um]		LTECHE
		Thermal Canductivity	M/cm·Kl	7	対象特件
_	DBC (top)	Material Canductivity	IM/GM·KI		LTECRHO
	pay (tob)	Thickness	[mm]	The second second	LTECHMI
		Thermal Canductivity	IW/gm·KI		おはは特件
		Thermal Diffusivity, D	[cm2/s]		########
	Insulated substrate	Material	IGHILZ 21		LTECHHI
O	mounted sucounds	Thickness	[mm]		LTECHA
DBG		Thermal Canductivity	M/cm·Kl	1	######################################
	DBC (Battam)	Material	1172 (111-10)		LTECHI
		Thickness	[mm]	1000	LTECANI
		Thermal Canductivity	IW/am·Kl		######################################
		Thermal Diffusivity, D	[cm2/s]		材料特性
	• Total DBC Thickness		[mm]		
	DBC-Base Plate	Material			LTECHA
	Solder	Thickness	fuml		LTEC評価
	77 197 197	Thermal Canductivity	PW/am·Kl		材料特件
3	Base Plate	Material			LTEC評価
ű		Thickness	[mm]		LTECAHI
Base Plate		Thermal Conductivity	IW/cm·Kl		村野特件
		Thermal Diffusivity, D	[cm2/s]		材料特件
m	Semi Die Thermal Re	sistance	Po/wi	1,250	モデル計算値
ළු	Die Attach Thermal F	Resistance	PC/WI		<b>≠≠ル計算債</b>
?	DBC Thermal resistar	ige	Pc/wi	-	
?	DBC-BBlac Polk	r Thermal resistance	Po/wil		
	34-9-3-1-0		29.006.3		
(3)	Base Plate Thermal r	esistance	PC/WI		-
(8)	Battam Path Therma	Lresistange per Transistar	Pc/wil	. mer	
Ø	Switch Thermal Resid	stance, Rth jo	[C/VI]	1000	モデル計算機
	Total Thermal Penist	ange, Rithig (Datasheet)	l'o/wi	0.049 (MAX)	データシート値
	THE MAIN VESTOR	MIGG. MINIST PRINSINGCII	150.00	W NEW CONTRACT	V - 1110



	Device	SEM IX 804GB12T45			
				•	
Pecienc		Pe	ner Hodek		
	3-			Case 1: Naminal	11 190
	Semicanductor Die	Devise		Diade	the second second
	FWD	Material			LTECHTE
		Thickness d	[um]		LTECHTE
		Thermal Canductivity	M/gm·Kl		和郵幣件
2.		Mass density, d	[g/cm3]		材料特件
-		Number of Transistors			
	1	Size, X	[mm]		LTECAHI
		Size. Y	fmml		LTECHI
		Die size, X+Y	[mm2]		LTECHIE
	Die Attach	Meterial			LTECOME
		Thickness	[um]		LTEC評価
		Thermal Canductivity	fW/cm·Kl		新 <b>维特</b>
	DBC (top)	Material			LTEC製作
		Thickness	[mm]		LTECHIE
		Thermal Canductivity	fW/am·Kl		材料特件
		Thermal Diffusivity, D	[cm2/s]		材料特件
	Insulated substrate	Material		1000	LTEC評価
080	AND DESCRIPTION OF THE PARTY OF	Thickness	[mm]		LTECAPITE
6		Thermal Canductivity	fW/cm·Kl		村銀衛性
	DBC (Battam)	Material			LTECHHO
		Thickness	[mm]	100	LTECAME
		Thermal Canductivity	fW/sm·Kl		村銀幣件
		Thermal Diffusivity, D	[cm2/s]		村郵告件
	*Total DBC Thicknes		[mm]		The same of the sa
	DBC-Base Plate Solder Base Plate	Material			LTEC評価
		Thickness	[um]		LTEC部価
		Thermal Canductivity	IW/gm·Kl		和銀幣件
Base Plate		Material	7 1		LTEC評価
		Thickness	[mm] [W/gm+K]		LTEC評価 対象特件
3		Thermal Canductivity Thermal Diffusivity, D	[cm2/s]		対象操作
m.	Semi Die Thermal Re		PC/WI		<b>村本作</b> モデル計算値
317			10/91	-	++1/m12.18
2	Die Attach Thermal F	lesistance	Pc/wi	-	モデル計算値
?	DBC Thermal resistar	ige	Po/wi		
?	DBC-BasePlate Sold	r Thermal resistance	Po/wi		
(5)	Base Plate Thermal resistance		Po/wi	-	
	A CONTRACTOR		Po/wi		
(6)	1.0.2.000	resistance per Transistor		1401	
(Ż)	Switch Thermal Resid	tange Rthic	Po/wi		モデル計算値
	Total Thermal Resists	ance, Rthja (Datasheet)	PC/WI	0.085 (MAX)	=-40-H19G-0023-



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