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(12) **United States Design Patent** (10) **Patent No.:** **US D909,310 S**  
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(54) **POWER MODULE**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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3,598,942	A *	8/1971	Laven .....	G04C 23/02 200/454
D630,198	S *	1/2011	Wilkins .....	D14/240
D641,740	S *	7/2011	Jeon .....	D14/140.6
9,407,251	B1	8/2016	Passmore et al.	
9,426,883	B2 *	8/2016	McPherson .....	H05K 5/0091
9,967,977	B1 *	5/2018	McPherson .....	H05K 1/111
D829,174	S *	9/2018	O'Brien .....	D13/133
D837,152	S *	1/2019	Wegerer .....	D13/110
D845,898	S *	4/2019	Laffon de Mazieres ....	D13/110
D852,738	S *	7/2019	Backett .....	D13/108
10,347,549	B2 *	7/2019	Spann .....	H01L 23/049
10,375,841	B2 *	8/2019	Kaneko .....	B60R 16/0231
D865,666	S *	11/2019	Roberts .....	D13/108
D865,667	S *	11/2019	Roberts .....	D13/108

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(\*\*) Term: **15 Years**

(Continued)

(21) Appl. No.: **29/663,502**

(22) Filed: **Sep. 17, 2018**

OTHER PUBLICATIONS

**Related U.S. Application Data**

Science Direct. Renewable and Sustainable Energy Reviews. Oct. 2017. <https://www.sciencedirect.com/science/article/pii/S1364032117305877> (Year: 2017).\*

(63) Continuation of application No. 15/883,714, filed on Jan. 30, 2018.

(Continued)

(51) **LOC (13) Cl.** ..... **13-03**

*Primary Examiner* — Darcey E Gottschalk

(52) **U.S. Cl.**  
USPC ..... **D13/146**

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(58) **Field of Classification Search**  
USPC ..... D13/123, 133, 146, 147, 152, 154, 156, D13/158, 173, 177, 184, 199, 242, 107, D13/108, 110, 112, 118, 120, 145, 149, D13/150, 151, 153, 155, 157; D14/240, D14/242, 433, 434, 435.1, 438; D26/129  
CPC .. H05K 1/0268; H05K 5/0247; H05K 5/0013; H05K 5/0069; H05K 7/1401; H01L 25/072; H01L 25/115

(57) **CLAIM**

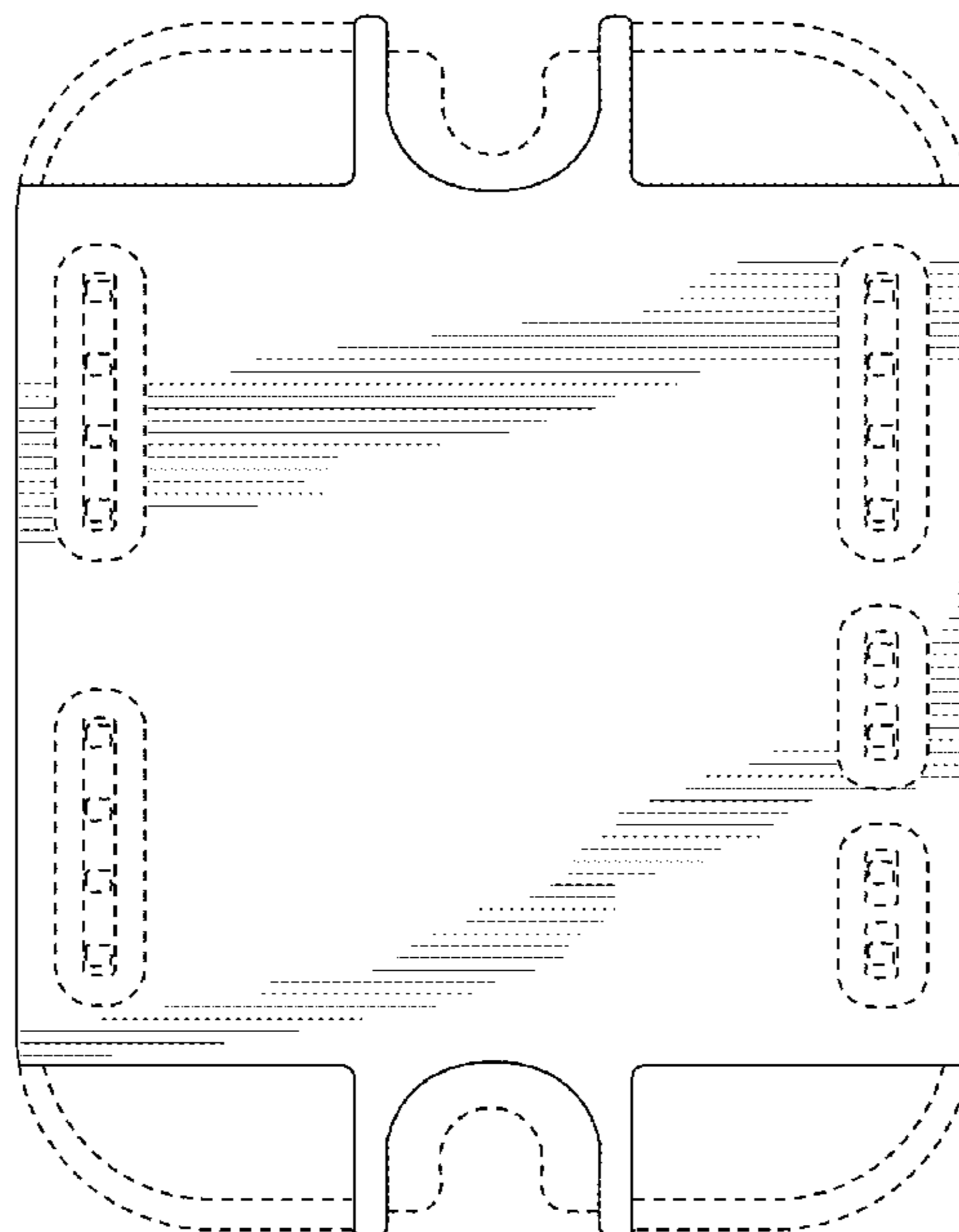
The ornamental design for a power module, as shown and described.

**DESCRIPTION**

The sole FIGURE is a plan view of a power module showing our design. The broken lines shown in the drawings depict portions of the power module that form no part of the claimed design.

See application file for complete search history.

**1 Claim, 1 Drawing Sheet**



(56)

**References Cited**

U.S. PATENT DOCUMENTS

D866,463 S \* 11/2019 Hui ..... D13/110  
10,524,385 B1 \* 12/2019 Lu ..... H05K 7/20172  
2015/0216067 A1 \* 7/2015 McPherson ..... H01L 25/072  
361/747  
2017/0374755 A1 12/2017 Chi et al.  
2019/0237439 A1 \* 8/2019 McPherson ..... H01L 23/49811

OTHER PUBLICATIONS

Evans, T. et al., "Development of SiC Power Devices and Modules for Automotive Motor Drive Use," 2013 International Meeting for Future of Electron Devices, IEEE, pp. 116-117.  
Zhang, Y. et al., "Simulation-driven Development of a Novel SiC Embedded Power Module Design Concept," 2017 18th International Conference on Thermal, Mechanical and Multi-Physics Simu-

lation and Experiments in Microelectronics and Microsystems, IEEE, 7 pages.

Non-Final Office Action for U.S. Appl. No. 15/883,714, dated Dec. 13, 2018, 9 pages.

Non-Final Office Action for U.S. Appl. No. 15/883,714, dated May 3, 2019, 5 pages.

Microsemi Power Products Group, Datasheet for APTGT50A120T1G: Phase leg Fast Trench + Field Stop IGBT3 Power Module, Available online at: <<<https://www.electronicsdatasheets.com/manufacturers/microsemi/parts/aptgt50a120t1g#datasheet>>>, Oct. 2012, 6 pages.

Microsemi Power Products Group, Datasheet for APTGT150SK60T1G: Buck chopper Trench + Field Stop IGBT3 Power Module, Available online at: <<<https://www.electronicsdatasheets.com/manufacturers/microsemi/parts/aptgt150sk60t1g#datasheet>>>, Oct. 2012, 6 pages.

Final Office Action for U.S. Appl. No. 15/883,714, dated Oct. 17, 2019, 8 pages.

Notice of Allowance for U.S. Appl. No. 15/883,714, dated Mar. 2, 2020, 9 pages.

\* cited by examiner

