

**2020 17th China International
Forum on Solid State Lighting &
2020 International Forum on
Wide Bandgap Semiconductors
China (SSLChina: IFWS 2020)**

**Shenzhen, China
23 – 25 November 2020**



**IEEE Catalog Number: CFP20J64-POD
ISBN: 978-1-6654-1964-2**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP20J64-POD
ISBN (Print-On-Demand):	978-1-6654-1964-2
ISBN (Online):	978-0-7381-1188-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

Sr. No.	Title	Page No.
1	Influence of ion implantation and high temperature Ar annealing on carrier lifetime in n-type 4HSiC epilayers Yingxin Cui, Peng Dong, Lin Zhang, Kun Zhou, Juntao Li Paper ID: P201-202008140930	1-3
2	The effect of doping on the hardness of silicon carbide single crystal and its first principles calculations Jindi Guo, Wangyang Zhang, Xianglong Yang, Yan Peng, Xiaobo Hu, Xiangang Xu, Duo Liu Paper ID: P201-202008151034	4-7
3	Suppression the Bipolar Degradation of 4H-SiC PiN Diodes by Growing Recombination-Enhancing Buffer Layers T. Ju, C. Li, L. Zhang, J. Gao, X. Zhang, B. Zhang, and Z. Zhang Paper ID: P201-202008151629	8-11
4	Enhancing the Room Temperature Al Implantation Dose by Double Implantation and Activation Annealing Jiayu GAO, Chuangang LI, Xuan ZHANG, Tao JU, Liguozhang, Yang LI, Baoshun ZHANG, Dan FANG Paper ID: P201-202008151658	12-14
5	Growth of High Quality and Low Resistivity Φ100mm p-type 4H-SiC Single Crystal Guanglei Zhong, Xuejian Xie, Xianglong Yang, Yan Peng, Xiufang Chen, Xiaobo Hu, Xiangang Xu Paper ID: P201-202008151701	15-18
6	Growth of six inches N-type SiC single crystals with low dislocation defects Fusheng Zhang, Kun Yang, Xinhui Liu, Yuanhang Shang, Xiaolong Niu, Yajuan Lu, Tingting Li Paper ID: P201-202010130937	19-22
7	A Novel SiC LDMOS with Electric Field Optimization by Step Doping Technology Hao Yu, Jue Wang, Li Liu and Kuang Sheng Paper ID: P202-202008031841	23-26
8	Threshold voltage increased for p-GaN HEMTs by oxygen plasma treatment Chi Sun, Guohao Yu, Liang Song, Zhongming Zeng, Baoshun Zhang Paper ID: P202-202008141014	27-29
9	Development review and market research of IGBT devices for PV inverter and Wind power Converter Yinghan Liu, Yihui Zhang, Pengfei Wu, Jinyuan Li Paper ID: P202-202008141302	30-33
10	Influence of the Groove Depth on the Electrical Characteristics of the Vertical GaN Trench MOSFETs Chenglang Li, Qiuling Qiu, Jinwei Zhang, Zhenxing Liu, Qianshu Wu, Liuan Li, Liang He, Taotao Que, Yapeng Wang, Qi Zhang, Yunliang Rao, Zhisheng Wu, Zhiyuan He and Yang Liu Paper ID: P202-202008142056	34-39

Sr. No.	Title	Page No.
11	Influence of graphene on AlGaIn/GaN heterostructure as the gate electrode Xiaoyu Ding, Guohao Yu, Liang Song, Tao He, Kai Cheng, Xinping Zhang and Baoshun Zhang Paper ID: P202-202008151200	40-41
12	Low $R_{on,sp,diff}$ and Ultra-high Voltage 4H-SiC n-channel IGBTs with carrier lifetime enhancement process Yang Xiaolei, Li Shiyun, Liu Hao, Liu Ao, Zhao Zhifei, Li Yun, Yang Xianglong, Huang Runhua, Bai Song Paper ID: P202-202008151620	42-44
13	A novel 4H-SiC PiN diode with improved forward conduction ability Jiaming Luo, Yourun Zhang, Hang Chen, Maojiu Luo Paper ID: P202-202008201117	45-48
14	Influence of Distributed Capacitance on Switching Characteristics of 6500V SiC MOSFET DU Yujie, LI Cui, SUN Shuai, TANG Xinling, YANG Fei, WU Junmin Paper ID: P202-202009211543	49-53
15	Analysis of Short-Circuit Behavior for SiC MOSFETs with Various Circuit Characteristics Xu Li, Xiaochuan Deng, Hao Zhu, Yi Wen ^{1,2} , Xuan Li, Yourun Zhang, Zhiqiang Li, Bo Zhang Paper ID: P202-202009291531	54-57
16	Low leakage current and high unipolar current density in a 4H-SiC trench gate MOSFET with integrated Schottky barrier diode Lixin Tian, Fei Yang, Zhanwei Shen, Feng Zhang, Xingfang Liu, Guoguo Yan, Wanshun Zhao, Lei Wang, Guosheng Sun ^{2,3} , Junmin Wu ¹ , and Yiping Zeng Paper ID: P202-202010121054	58-62
17	Theoretical Investigation on the Evolution of 2DEG for Design of E-Mode p-GaN HEMTs Quan Wang, Yeting Jia, Di Niu, Qian Wang, Wei Li, Fengqi Liu, Xiaoliang Wang, Xiangang Xu Paper ID: P202-202010141129	63-66
18	Fabrication and dynamic switching characteristics of 6.5kV400A SiC MOSFET module DU Yujie, LI Cui, TANG Xinling, YANG Fei, WU Junmin, LI Shiyun, JIN Xiaoxing, ZHANG Junming Paper ID: P202-202010141205	67-70
19	The Simulation Research about the Influence of Thermal Capacity of High Voltage IGBT Package in DC Circuit Breaker on Chip Temperature Rise LI Cui, LI Yaosheng, YANG Xiaoliang, CHEN Yanfang, LI Jinyuan Paper ID: P202-202010141707	71-76
20	Experimental Investigation of the Single Pulse Surge Current Ruggedness of the Body Diode of SiC Power MOSFETs Zijian Gao, Qing Guo, Na Ren and Kuang Sheng Paper ID: P202-202011031957	77-80
21	Comparison and Analysis of Short Circuit Performance of 1200V SiC MOSFETs Chaobiao Lin, Jiupeng Wu, Hongyi Xu, Na Ren, Qing Guo and Kuang Sheng Paper ID: P202-202011032057	81-84

Sr. No.	Title	Page No.
22	An investigation of Near-field Radiated Emission for Silicon Carbide Power Module in Buck Converter Maosheng Zhang, Na Ren, Qing Guo, Wenxi Yao and Kuang Sheng Paper ID: P202-202011032129	85-89
23	Single Pulse Avalanche Robustness and Analysis for 1200-V SiC Junction Barrier Schottky Diode Li Liu, Na Ren, Zhengyun Zhu, Hongyi Xu, Qing Guo, Xinhui Gan, Feng Wei, Jiacong Zhu, Lei Chen, Weimin Zhang and Kuang Sheng Paper ID: P202-202011040838	90-93
24	Design of Laminated Busbar for SiC MOSFETs Dynamic Test Platform Wang Yi-fan, Xiangwen Zhu, Zhang Bin, Qing Guo, Jinlong Gong, Zun Wang Paper ID: P202-202011040927	94-97
25	Characteristics of Thermally Nitrided Gate Oxide Grown on N- and P-type 4H-SiC Surface from Commercial SiC MOSFET Perspective Ximing Chen, Xuan Li, Xiaochuan Deng, Bo Zhang Paper ID: P202-202011121008	98-101
26	From Lab to Fab: ZERO defect challenges and practices in GaN RF Power mass production phase Guoqiao Tao Paper ID: P203-202008150625	102-104
27	0.15 μm GaN MMIC PA Based on Advanced i-line Lithography Process Wei Huang, Suyuan Wang, Zhu Liu, Junyun Zhang, Nianning Huang, Xinqiang Wang, Tangsheng Chen Paper ID: P203-202008190011	105-107
28	A Broadband Highly-efficient S-band Hybrid Power Amplifier Wang Yi, Xu Huibo, Yu Ruoqi, Yin Jun, Mo Jianghui, Hu Yansheng, Gao Jiajia, Dong Shiliang, Ni Tao, Wu Hongjiang Paper ID: P203-202010151901	108-111
29	Global Patent Information Analysis of Semiconductor Ultraviolet Devices and Application Technology LYU Tiangang, LYU Henan, Wang Yuefei Paper ID: P204-202008070951	112-116
30	Intelligent Lighting System Design Based on UV LED Technology with the Functions of Air Sterilization, Disinfection, Purification and Mosquito Control LYU Henan, LYU Tiangang, Wang Yuefei Paper ID: P204-202008281233	117-122
31	Optimization and quantification of “mini-LED flip chip on board (COB) package” by self-alignment with anisotropic conductive paste (ACP) and pinhole free wafer direct technology Kazuo Hiraki Paper ID: P205-202007221429	123-126

Sr. No.	Title	Page No.
32	CQD-LEDs with High Colour Rendering Index Yuxian Yan, Doudou Zhang, Luqiao Yin, Jianhua Zhang Paper ID: P205-202009101152	127-130
33	Research on the property of Micro LED with different chip shapes Mengmei Li, Weiling Guo*, Yuxia Feng, Zehua Lu, Jiabin Chen, Hao Guo Paper ID: P205-202010121529	131-133
34	High-Power Flip-Chip Monolithically integrated Light-Emitting diodes: Based on Self-Isolation Technology LinFeng Wu, WenTing Tang, BaoJin Chen, JiaXin Pang, Xiu Zhang, ShuQi Li Paper ID: P205-202010151102	134-136
35	Research on Full spectrum based on multi-band chip combination Liang Chao, Xu Junfeng, He Jinhua, Fu Yibing Paper ID: P205-202010151441	137-139
36	Research and development of intelligent headlight test system based on machine vision Pan Mingqing, Deng Liang, Li Ru, Xue Mengping Paper ID: P205-202010201850	140-143
37	Study on Lighting Technology of Plant Factory Based on Plant Light-harvesting Pigment HUANG Yong-ping, MA Jian-she Paper ID: P206-202007141734	144-147
38	Incubation lighting impact and application design for commercial hatchery WY Tang, Q Tong, ZC Li, BM Li, WC Zheng, JM Pan Paper ID: P206-202008131308	148-151
39	Research Status and Prospect of Energy-saving Technology of LED Light Source in Plant Factory Zhiwei Tian, Wei Ma, Qichang Yang, Famin Duan Paper ID: P206-202008152106	152-158
40	Morphology, biomass and quality variation of Anoctochilus roxburghii under different photoperiods Rui Li, Zhiyu Ma, Yinghui Mu, Hongyu Wei, Lixue Zhu, Wenqi Tang Paper ID: P206-202010162129	159-164
41	Non-Destructive Testing Model of Flavonoids / Polysaccharides in Anoctochilus roxburghii by Hyperspectral Imaging Technology Caihui Cen, Xuan Chu, Yinghui Mu, Hongyu Wei, Zhiyu Ma Paper ID: P206-202010171940	165-170
42	New Calculation Method of Blue Light Hazard of Luminaires ZHOU Shikang, DU Jin, LI Shan, WEN Xing, HE Xiaoliang Paper ID: P207-202008101309	171-173
43	Thoughts and Approaches toward the Guideline of Light Interface of Home Appliances Hyeonju Park and Hyeon-Jeong Suk Paper ID: P207-202008111600	174-179

Sr. No.	Title	Page No.
44	Mechanism study on light induced ocular axial elongation by computational simulation Shanshan Zeng, Ya Guo, Wentao Hao, Xiangyu Qu, Jianqi Cai Paper ID: P207-202008142146	180-183
45	Research on the application of health light environment in classroom Cheng Ruan, Tianyu Xu, Yaowei Huang, Yang Wang Paper ID: P207-202008151928	184-187
46	Effect of Enclosed Lighting Environment on Work Performance and Visual Perception Zixin Weng, Liangzhuang Wei, Jun Song, Xin Wang, Jin Liang, Liang Zhang, Yandan Lin Paper ID: P207-202008192101	188-191
47	Study on human alertness affected by dynamic trend of lighting Sijie He, Shuting Chou, Huaming Chen, Yandan Lin Paper ID: P207-202008222345	192-195
48	The impact and model of CS and CCT on alertness Yu Liu, Zhou Zhixian, Ming Ronnier Luo Paper ID: P207-202008232122	196-198
49	Acquiring and mining the data from light-cell interaction experiments Jianfei Dong, Tianfeng Wang, Yun Zhao and Yunchu Zhang Paper ID: P207-202009291359	199-202
50	Multi-Dimensional Linear Scanning Algorithm for Silicon-based Micro-OLED Zhou Houda, Guo Aiying, Wang Fei, Zhang Jianhua Paper ID: P208-202007170913	203-206
51	Multifunctional GaN-based device for solid state lighting, display, and duplex visible light communication Gufan Zhou, Runze Lin, Zeyuan Qian, Xiaojie Zhou, Xinyi Shan, Xugao Cui, Pengfei Tian Paper ID: P208-202008271142	207-210
52	A New Low-power Pixel Circuit for OLEDs Microdisplay Deng Hao, Guo Aiying, Ran Feng Paper ID: P210-201907290929	211-214
53	Many-body Effects on the High Injection Level Performance for Micro Light Emitting Diode Zhizhong Chen, Jinglin Zhan, Chengcheng Li, Yiyong Chen, Jingxin Nie, Zuojian Pan, Chuhan Deng, Fei Jiao, Xiangning Kang, Shunfeng Li, Qi Wang, Yuzhen Tong, Guoyi Zhang, Bo Shen Paper ID: P208-2020103119540	215-218
54	The effect of Ga-content and target current on transparent conducting InGaSnO thin film by the DC sputtering on different substrates Xinshi Wang, Kei-ichiro Murai, Toshihiro Moriga Paper ID: P209-202008040900	219-223
55	High Performance β-Ga₂O₃ vertical Schottky Barrier Diodes Y. G. Wang, Y. J. Lv, S. B. Dun, X. Y. Zhou, Z. F. Sun, H. Y. Liu, S. X. Liang, H. Feng and S. J. Cai Paper ID: P209-202008151639	224-227

Sr. No.	Title	Page No.
56	Broadband Ultraviolet Photodetector Based on GaN/β-Ga₂O₃ pn Heterojunction with Graphene Chunhong Zeng, Yongjian Ma, Wenkui Lin, Xuan Zhang, Baoshun Zhang, and Mei Kong Paper ID: P209-202008151819	228-231
57	Experimental Research on Accelerated Life of GaN Based CBL-LED Zehua Lu, Weiling Guo*, Mengmei Li, Jie Deng, Jianpeng Tai Paper ID: P210-202008091113	232-237
58	Analysis of Fault Precursor Parameters Under Accelerated Aging Tests for IGBT Modules Yihui Zhang, Yinghan Liu, Cui Li, Jinyuan Li Paper ID: P210-202008120425	238-241
59	Prediction and analysis of IGBT life of power device under multi-field load Dongjing Liu, Haojie Wang, Shaoming Wang, Jingxia Long Paper ID: P210-202008141119	242-246
60	Failure Mechanism of Ti/TiN/Pt Ohmic Contacts to n-type 4H-SiC after High Temperature Annealing Treatment in Air Chengyi Liu, Jiangfeng Du, Limei Rong, Tiancheng Luo, Kun Gao, Yugang Yin and Jiao Xu Paper ID: P210-202008151231	247-250
61	Study on Optimal Optical-Thermal Design of LEDs Applied for Automotive Lighting Ru Li, Shengye Zhou, Zhaohui Li, Liwei Yin, Qian Liu, Meixiang Li Paper ID: P210-202008152039	251-254
62	Optimization of Thermal Design for GaN-based Laser Diodes Junfei Wang, Zhanhong Ma, Shan Lin, Xiaodong Li, Tianguai Hu AND Lixia Zhao Paper ID: P210-202008152355	255-259
63	Dimensionless Correlation between Empirical Modeling and T3ster Measurements for the Dynamic Thermal Characterization of the PWM-mode Current Driving UVLED Fanny Zhao, Yapei Zeng, Guoshuai Dong, Guoming Yang, Brian Shieh, S. W. Ricky Lee Paper ID: P210-202008211315	260-265
64	The Reliability of Press-pack IGBT in MMC Based on Electro-Thermo-Mechanical Simulation Weili Guo, Zhi Liu, Dingkun Ma, Laili Wang Paper ID: P210-202009291322	266-270
65	The effects of Y₂O₃-CaF₂ on the properties of AlN packaging substrate J. H. He, C. Liang, X. Y. Wang, G. L. Chen, X. F. Zhang, W. Xue, K. Li, Y. Zhang, Z. L. Tan Paper ID: P210-202010151621	271-273
66	Reliability Analysis of Printed Circuit Boards Based on a Physics of Failure Simulation Method Changliang Song, Zebo Tang, Zhongchao Sun, Cheng Qian, Bo Sun Paper ID: P210-202010282202	274-279