**PROF. DOUGLAS CHARLES HOPKINS, PH.D.**
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**Director, Laboratory for**
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**Formerly Director,**
**Electronic Power and Energy Research Laboratory**
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**EDUCATION:**

*Ph.D. in Electrical Engineering, 1989*
Virginia Polytechnic Institute and State University (Virginia Tech)
Dissertation "Dev. of a High-Density, Off-Line, Quasi-Resonant Converter Using Hybrid Tech."

*BSEE, MSEE in Electrical Engineering*
State University of New York at Buffalo
Undergraduate: Solid State Physics and Electric Power
MS Thesis "Construction and Energy Loss of a Vacuum-Arc Switched Series Inverter,"

**CITIZENSHIP:** United States

**SOCIETIES:**

Fellow, International Microelectronics and Packaging Society
Senior Member, Institute of Electrical and Electronics Engineers
Electronic Packaging Society (formerly Components, Packaging and Manufacturing Technology Society), Electron Devices Society, Industry Applications Society, Industrial Electronics Society, Power Electronics Society, Power Engineering Society

**EXPERIENCE SUMMARY:**

*Research Full Professor,* Department of Electrical and Computer Engineering Department, College of Engineering, North Carolina State University, August 2011 – present.
*Director,* Laboratory for Packaging Research in Electronic Energy Systems (PREES), North Carolina State University, September 2011 – present

*Research Professor,* Electrical Engineering Department, School of Engineering and Applied Sciences, State University of New York at Buffalo, New York, March 1997 – December 2011.
*Director,* Electronic Power and Energy Research Laboratory, State University of NY at Buffalo

*Assistant Professor*, Dept. of Electrical Engineering, Watson School of Engineering and Applied Sciences, State University of New York at Binghamton, September 1994-August 1998.

*Assistant Professor*, Department of Electrical Engineering, College of Engineering and Applied Sciences, Auburn University, Auburn, Alabama, September 1988 - August 1992

*Instructor (full time),* Department Electrical Engineering, College of Engineering and Applied Sciences, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, September 1983 - August 1988.

*Doctoral Student (Co-advisors: Drs. F. William Stephenson and Fred C. Lee),* Virginia Polytechnic Institute and State University, Blacksburg, Virginia, September 1983 - August 1988

*Senior Engineer,* Research and Development Center, Carrier Corporation, Syracuse, New York, September 1982 - August 1983

*Electrical Engineer*, Corporate Research and Development Center, General Electric Company, Schenectady, New York, May 1977-August 1982

*Cofounder,* DensePower, LLC, Vestal, New York, est. Jun 2008 – Feb 2014
*President and founder*, DCHopkins & Associates, LLC, Vestal, New York, est. DBA-'98, LLC-'08

*Expert Witness*, (see table below)

| ATTORNEYS | CIRCA | SUIT | PARTY | DESCRIPTION | OPN | DEP | TRIAL | STATUS |
|---|---|---|---|---|---|---|---|---|
| Finnegan, Henderson, Farabow, Garrett & Dunner, LLP Arigna Technology Ltd. v. Robert Bosch | Jun'23 - | Patent (IPR) | Defendant | *Inter Partes* Review regarding circuits | | | | Active |
| Troutman Pepper Hamilton Sanders LLP Southern Power Co. v. First Solar Electric, LLC | Mar'22- | Product Liability | Plaintiff | Solar Inverters (Arbitration Panel) | X | X | X | Active |
| Finnegan, Henderson, Farabow, Garrett & Dunner, LLP Arigna Technology Ltd. v. BMW of North America, LLC, Daimler AG, Mercedes-Benz USA, LLC, General Motors LLC, Volkswagen Group of America, Inc., Nissan North America, Inc., American Honda Motor Co., Inc. | Nov'21-Sep'22 | Claims Construction, IPR, EPR | Defendants | Technical interpretation regarding High Voltage ICs | X | X | | Completed |
| Crowell & Moring LLP | Jul'21- | Patent (ITC) | | under NDA | | | | Completed |
| Latham & Watkins LLP Volterra Semiconductor LLC v. Monolithic Power Systems, Inc. | Mar'20-Sep'22 | Patent (IPR) | Defendant | *Inter Partes* Review regarding magnetic components | X | | | Completed |
| Finnegan, Henderson, Farabow, Garrett & Dunner, LLP Volterra Semiconductor LLC v. Monolithic Power Systems, Inc. | Mar'20-Sep'22 | Patent (IPR, EPR, Invalidity) | Defendant | *Inter Partes* Review *Ex Parte* Reexamination Invalidity Report regarding magnetic components | X | X | | Completed |
| Rajah & Tann Singapore LLP | Aug'18 -Dec'18 | Infringement | Defendant | under NDA | | | | Suspended |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Merlin Law Group Houston, TX Pictorial Offset Corp v. Zurich American Insurance Company | May'17 - Dec'17 | Prehearing Brief-Liability | Plaintiff | Technical interpretation; cause of equipment failure and loss | X | | | Completed |
| McCarter & English, LLP Boston, MA (Pentair Water Pool & Spa, Inc. and Danfoss Drives A/S v. Hayward Industries, Inc.) | Oct'11 - Dec'12 | Infringement | Defendant | Technical interpretation; evaluation of electronic design, variable speed drives and pumping systems | X | X | | Completed |
| Greenburg Traurig, LLP Dallas, TX (Whirlpool Corp. v. Sensata Tech. and Texas Instruments Corp) | Jul '11 -Oct'11 | Product Liability | Defendant | Technical interpretation, computer simulation and interpretation of cause, motor starter | X | X | | Completed |
| Phillips Lytle LLP Buffalo, NY (Version New York Inc. v. National Grid USA Service Company) | Oct '06 - Apr'07 | Contractual | Plaintiff | Technical interpretation, review of problem and standards, expert report. Resolved through the PSC; favorable resolution | X | | | Completed |
| Latham & Watkins, Chicago, IL (*Microsemi v. Monolithic Power Systems)* | Dec '04 -Mar'06 | Infringement | Defendant | Expert report, deposition response for summary judgment, electronic lighting; favorable resolution | X | X | | Completed |
| Gresens & Gillen Buffalo, NY | Dec '05 | Product Liability | Plaintiff | Technical interpretation, expert opinion, electronic lighting; favorable resolution | X | | | Completed |
| Jenner & Block (IMS) Chicago, IL | Apr '05 -Apr'06 | Infringement | Plaintiff | Technical interpretation/prior art, perform circuit analysis and tests for electronic lighting | X | | | Completed |
| Baker, Strechi, Cowden and Rice (KKAI) Kansas City, MO | Mar '05 -'06 | Product Liability | Defendant | Evaluate marine electrical system for high voltage insulation failure, source of spark; favorable resolution | X | | | Competed |
| George W. Narby, Attorney at Law, Buffalo, NY | Jan '04 | Liability | Plaintiff | Technical opinion/report on electrical insulation breakdown in factory fire | X | | | Completed Appealed |
| Varity Zecal, Inc., Churchville, NY | Jun '98 | Infringement | Plaintiff | Technical interpretation; evaluation of electronic packaging design and processing. Unfavorable resolution | X | | | Completed |

OPN: Expert Opinion, may have public report DEP: Deposition given TRIAL: Testified at trial

## BOOKS (CHAPTERS):

1. Power Electronics Handbook, Academic Press, New York, chapter 35: "Packaging and Smart Power Systems," 2001; 2nd ed. 2006; 3rd ed. 2011.

## HONORS AND AWARDS:

1. Outstanding Educator Award – Int'l Microelectronics Assembly and Packaging Society, 2013
2. Fellow, International Microelectronics and Packaging Society, November 2007
3. Nominated Best Paper of Conference, IMAPS Int'l Symp. on Microelectronics, 2006
4. Outstanding Contribution to Education, Research and Professionalism, IEEE – Region I, 2001
5. IEEE Third Millennium Medal recipient, 1999.
6. Senior Member – International Microelectronics and Packaging Society (IMAPS), ~1996.
7. NYS/UUP PDQWL Term Faculty Development Award, 1995.

8. Recognition of Accomplishment for Sustaining Base Information Services Limited Technical Tests: from C. L. Austin, Prog. Exec. Officer, Dept. of the Army and B. M. Horowitz, Pres. & CEO of MITRE Corp. 1995
9. Best Paper of Session, ISHM Int'l Symp. on Microelectronics, 1988, '89, '92, '94, '09, '11.
10. Who's Who in Science and Engineering, 1993.
11. Senior Member – Institute of Electrical and Electronics Engineers (IEEE), 1992.
12. Sigma Xi 1990.
13. First Place Technical Paper Competition – Alabama Section IEEE 1989.
14. Distinguished Service to ISHM Student Branch, VPI&SU 1988.
15. Eta Kappa Nu 1987.
16. Most Valuable Prof.–HKN/IEEE/ISHM Student Branches, VPI&SU 1986.

**CONSULTING**

| | |
|---|---|
| 2017 – 18 | Catawba Nuclear Station, Duke Power Corp, Charlotte, NC |
| 2013 – 20 | Indiana Integrated Circuits, South Bend, IN |
| 2009 – 15 | Emerson Motor Company, St. Louis, MO |
| 2008 – 08 | Renewable Energy Development Inc., Oneonta, NY |
| 2006 – 07 | Emerson Climate Technologies, Sidney. OH |
| 2005 – 05 | Eaton Aerospace, Grand Rapids, Michigan |
| 2005 – 09 | Kevin Kennedy & Associates, Indianapolis, Indiana |
| 2004 – 04 | Yazaki North America, Canton, Michigan |
| 2003 – 03 | Ridge Tool Company, Elyria, OH |
| 2003 – 04 | Astec Power Andover, MA |
| 2002 – 03 | Celestica Power, Milwaukie, OR |
| 2002 – 03 | Precision Magnetic Bearings, Albany, New York |
| 2002 – 15 | Emerson Motor Company, Columbus, Ohio |
| 2002 – 02 | Emerson Energy Systems, Montreal, Canada |
| 2001 – 15 | Emerson Design Center, Columbus, Ohio |
| 2000 – 02 | Verizon Corp., Boston, MA |
| 2000 – 01 | SYSTEL, Inc., Israel |
| 1998 – 00 | Grundfos A/S, Bjerringbro, Denmark |
| 1998 – 00 | JRS Technology Incorporated, Endicott, New York |
| 1996 – 06 | Custom Electronics Incorporated, Oneonta, New York |
| 1995 – 00 | Varity Zecal Incorporated, Churchville, New York |
| 1995 – 99 | BrushWellman Incorporated, Tucson, Arizona |
| 1992 – 97 | Power Technology Services, Raleigh, North Carolina |
| 1992 – 92 | Marconi Circuits Technology, Farmingdale, New York |
| 1991 – 93 | BrushWellman Inc., Cleveland, Ohio |
| 1989 – 93 | Power Tech, Fair Lawn, New Jersey |
| 1991 – 91 | Micon Engineering, College Station, Texas |
| 1988 – 89 | Digital Equipment Corp., Burlington, Vermont |

**PATENTS:**

1. US10,325,875B2 "Edge Interconnect Packaging of Integrated Circuits for Power Systems," Jason M Kulick, Douglas Hopkins, June 18, 2019
2. US Patent Application 17/576,921, "High Voltage Cascaded SuperCascode Power Switch," filed January 15, 2022 [NCSU Attorney Docket No. 221404-1840]

**JOURNAL PUBLICATIONS:** *(Excerpt from 150+ articles since 1983)*

1. "Electric Field and Thermo-Mechanical Stress Management Using Stacked Substrate Power Module Structure for Medium Voltage Applications," Sourish S. Sinha, Pouria Zaghari, Jong Eun Ryu, Douglas C. Hopkins, IEEE Components, Packaging and Manufacturing Technologies Journal, Special Section on Power Electronics Packaging, *in preparation 15Oct'23*

2. "New Methodology for Analyzing Common-Mode Currents Utilizing Ultra-Thin Dielectrics In Power Modules," Tzu-Hsuan Cheng, Sourish S. Sinha and Douglas C. Hopkins, IEEE Components, Packaging and Manufacturing Technologies Journal, Special Section on Power Electronics Packaging, *in preparation 15Oct'23*

3. "Scalable 3D Heterogeneously Integrated Power Microsystem (3DHIP) with Embedded GaN HEMT in Glass Substrates," Sourish S. Sinha, Pouria Zaghari, Jong Eun Ryu, Bill Batchelor, Bob Conner, Douglas C. Hopkins, IEEE Components, Packaging and Manufacturing Technologies Journal, Special Section on Power Electronics Packaging, *in preparation 15Oct'23*

4. "Cost Comparison of the Cascaded SuperCascode Power Switch versus a Paralleled HV MOSFET Power Switch," Utkarsh Mehrotra and Douglas C. Hopkins, *IEEE Power Electronics Regular Paper/Letter/Correspondence, in revision*

5. "Methodologies of Cascading and Scaling to realize High Voltage Cascaded SuperCascode Power Switch," Utkarsh Mehrotra and Douglas C. Hopkins, IEEE Jou of Emerging and Selected Topics in Power Electronics, Print ISSN: 2168-6777, Online ISSN: 2168-6785, DOI: 10.1109/JESTPE.2023.3314025

6. "Thermal and Reliability Characterization of an Epoxy Resin-Based Double-Side Cooled Power Module," T. H. Cheng, K. Nishiguchi, Y. Fukawa, B. J. Baliga, S. Bhattacharya and D. C. Hopkins, *Jou. of Microelectronics and Electronic Packaging*, vol.18, pp.123-136, 2021

7. "Bidirectional Solid-State Circuit Breaker Super Cascode for MV SST and Energy Systems," Utkarsh Mehrotra, Bahji Ballard, and Douglas C. Hopkins, *IEEE Jou of Emerging and Selected Topics in Power Electronics*, DOI-10.1109/JESTPE.2021.3081684

8. "3-D Prismatic Packaging Methodologies for Wide Band Gap Power Electronics Modules," Haotao Ke, Utkarsh Mehrotra, Douglas C. Hopkins, *IEEE Tran. on Power Electronics*, v 36, i 11, pp 13057-66, Nov 2021DOI: 10.1109/ TPEL.2021.3081679

9. "1.2 kV, 10 A, 4H-SiC Bi-Directional Field Effect Transistor (BiDFET) with Low On-State Voltage Drop," A. Kanale, T-H. Cheng, K. Han, B. J. Baliga, S. Bhattacharya, and D. Hopkins, in *Mat. Sci. Forum.*, vol 1004, Jul 2020, pp. 872-881, doi: 10.4028/www.scientific.net/msf.1004.872

10. "Design, Package and Hardware Verification of a High Voltage SiC Current Switch", Ankan De, Adam Morgan, Vishnu Mahadeva Iyer, Haotao Ke, Xin Zhao, Kasunaidu Vechalapu, Douglas Hopkins, S. Bhattacharya; *IEEE Jou of Emerging and Selected Topics in Power Electronics, Special Issue on Wide Bandgap Power Devices and Applications*, Vol.6, Issue 1, pp 441-50, July 14, 2017.

11. "Multi-physics FEA Based Thermal-Mechanical Design Optimization for DBC Based Power Modules", Yang Xu, Zelin Xu, Douglas C Hopkins, *IEEE Transactions on Power Electronics* (in preparation)

12. A MEMS Sensor for Gas Detection in High Voltage Oil Filled Equipment," Krishna P. Bhat, Douglas C. Hopkins, Kwang Oh, *IEEE Trans. on Industry Applications*, Jan. 2013

13. "A Dynamic Model for a Gas-Liquid Corona Discharge Using Neural Networks," A. Hosny, D. C. Hopkins, et.al, *IEEE Trans. on Power Engineering*, July 2009

14. "Systems Design Considerations for Using a Direct-Attached-Ceramic MMC Power Package," D.C. Hopkins, J. M. Pitarressi and J. A. Karker, invited and under submission, *Int'l Jour. on Microelectronics Reliability,* 1998.

15. "Thermal Impedance and Induced Stress in a Power Package Due to Variation in Layer Thickness," D.C. Hopkins and J. M. Pitarressi, under review *Int'l Jour. of Microcircuits and Electronic Packaging, 1998*

16. "Extension of Battery Life via Charge Equalization Control," S. T. Hung, D.C. Hopkins and C. R. Mosling, *IEEE Trans. on Industrial Electronics.* Vol. 40, No. 1, pp. 96 - 104, February, 1993.

17. "Dynamic Equalization During Charging of Serial Energy Storage Elements," D.C. Hopkins, C. R. Mosling and S. T. Hung, *IEEE Trans. on Industry Applications*., Vol. 29, No. 2, pp. 363 – 368, March/April, 1993.

18. "Plated Copper on Ceramic Substrates for Power Hybrid Circuits," R.W. Johnson, R. Weeks, D.C. Hopkins, J. Muir , and J.R. Williams, *Trans. on Components, Hybrids, and Manufacturing Technology*, Vol. 12, No. 4, pp. 503-536, December 1989.

19. "Hybridized Off-Line 2-MHz Zero-Current-Switched Quasi-Resonant Converter," D.C. Hopkins, M.M. Jovanovic, F.W. Stephenson and F.C. Lee, IEEE *Transactions on Power Electronics*, Vol.4, No.1, pp. 147-154, Jan. 1989.

20. "Evaluation and Design of Megahertz-Frequency Off-Line Zero-Current- Switched Quasi-Resonant Converters," M.M. Jovanovic, D.C. Hopkins and F.C. Lee, *IEEE Transactions on Power Electronics*, Vol.4, No.1, pp. 136-146, January 1989; First Place - Alabama Section, IEEE.

21. "Development of a High-Density, Off-Line, Quasi-Resonant Converter Using Hybrid Techniques," Ph.D. Dissertation, Virginia Polytechnic Institute and State University, 1988.

22. "Characteristic Input Harmonics of DC-DC Converters and their Effects on Input Filter Design," R.L. Steigerwald and D.C. Hopkins, IEEE *Transactions on Industrial Electronics and Control Instrumentation*, Vol. IECI-28, pp 73-82.

**REFEREED CONFERENCE PROCEEDINGS & PRESENTATIONS:** *(Excerpt ending in 2009)*

1. "A 400W, 250kHz (2kW Peak) Integrated GaN Half Bridge Power Module in a Non-Isolated Buck Converter," Sourish S Sinha, Tzu-Hsuan Cheng, Douglas C Hopkins, IEEE Applied Power Electronics Conf. (APEC), Long Beach, CA, February 25-29, 2024

2. "Single Sided Integrated GaN Power Module using Thin Substrate for 1kW Non-Isolated Converter Application," Sourish S. Sinha, Pouria Zaghari, Jong Eun Ryu, Douglas C. Hopkins, IEEE Wksp on Wide Bandgap Power Devices and Applications (WiPDA), Charlotte, NC, 4-6 Dec. 2023.

3. "Isolated Single-stage Three-phase AC/DC Converter using Bidirectional Switches," Ramandeep Narwal, Isaac Wong, Subhashish Bhattacharya, B. Jayant Baliga and Douglas C. Hopkins, IEEE Energy Conversion Congress and Exposition (ECCE'23), Nashville, TN Oct 29 – Nov 02, 2023

4. "Hybrid Thyristor and SiC FET Power Module for High-Efficiency AC Motor Control," Chunmeng Xu, Adam J. Morgan, Douglas C. Hopkins and Pietro Cairoli, IEEE Energy Conversion Congress and Exposition (ECCE'23), Nashville, TN Oct 29 – Nov 02, 2023

5. "Design and Optimization of High-Frequency Transformer for Dual Active Bridge Converter with SiC BiDFET for Solar PV Applications," Isaac Wong, Ramandeep Narwal, Subhashish Bhattacharya, B. Jayant Baliga and Douglas C. Hopkins, IEEE Energy Conversion Congress and Exposition (ECCE'23), Nashville, TN Oct 29 – Nov 02, 2023

6. "Finite Element Analysis and Fatigue Life Prediction of A Laterally Conducting Gan-Based Power Package Under Thermal Cycling," Pouria Zaghari, Sourish S. Sinha, Jong Eun Ryu, Paul D. Franzon, Douglas C. Hopkins, Proc ASME 2023 Int'l Mechanical Eng. Congress and Exposition (IMECE2023), Oct 29-Nov 2, 2022, New Orleans, LA, IMECE2023-111682

7. "Investigation of High Current Fine Grain Power Delivery for 3D Heterogeneous Integration," Sourish S Sinha, Pouria Zaghari, Jong E Ryu, Bob Conner, Bill Batchelor, Raymond A Fillion, Douglas C Hopkins, 34th Electronics Packaging Symposium, Albany NY, 6-7 September 2023

8. "Thermal cycling and fatigue life analysis of a GaN Wide-Bandgap Laterally Conducting Power Packaging," Pouria Zaghari, Sourish Sinha, Jong Ryu, Douglas Hopkins, Paul Franzon, IEEE International 3D System Integration Conference (3DIC), 10-12 May, 2023, Cork, Ireland

9. "The BiDFET Device and Its Impact on Converters," B. Jayant Baliga, Douglas Hopkins, Subhashish Bhattacharya, Aditi Agarwal, Tzu-Hsuan Cheng, Ramandeep Narwal, Ajit Kanale, Suyash Sushilkumar Shah, and Kijeong Han, IEEE Power Electronics Magazine, Vol.10, No.1, pp 22-29, March 2023

10. "Power Conversion Systems Enabled by SiC BiDFET Device," Subhashish Bhattacharya, Ramandeep Narwal, Suyash Sushilkumar Shah, B. Jayant Baliga, Aditi Agarwal, Ajit Kanale, Kijeong Han, Douglas C. Hopkins, and Tzu-Hsuan Cheng, IEEE Power Electronics Magazine, Vol.10, No.1, pp 39-43, March 2023

11. "Design & Integration of Solid-State Circuit Protection," Douglas C Hopkins, Sourish S Sinha, Professional Education Seminar (competitively selected, 3-hrs), IEEE Applied Power Electronics Conference, Orlando, FL, 19-23 March, 2023

12. "Analysis and Characterization of Four-quadrant Switches Based Commutation Cell," Ramandeep Narwal, Shubham Rawat, Ajit Kanale, Tzu-Hsuan Cheng, Aditi Agarwal, Subhashish Bhattacharya, B. Jayant Baliga, Douglas C. Hopkins, IEEE Applied Power Electronics Conference, Orlando, FL, 19-23 March, 2023

13. "Advanced GaN IPM for High-Frequency Converter Applications Enabled with Thin-Substrates," Sourish Sinha, Tzu-Hsuan Cheng, Keval Parmar, Douglas C Hopkins, IEEE Applied Power Electronics Conference, Orlando, FL, 19-23 March, 2023

14. "Heterogeneous Integration of Power Electronics (IPE) and the Road Ahead," Douglas C Hopkins, 33rd Electronic Packaging Symposium, Binghamton, NY, 7-8 Sept 2022

15. “Double Sided Integrated GaN Power Module with Double Pulse Test (DPT) Verification,” Sourish S. Sinha, Tzu-Hsuan Cheng, Wensong Yu, Douglas C. Hopkins, Int’l Microelectronic Sym., Boston, MA, 4-7 October 2022

16. “Design Considerations for Developing 1.2 kV 4H-SiC BiDFET-enabled Power Conversion Systems,” Ajit Kanale, Tzu-Hsuan Cheng, Ramandeep Narwal, Aditi Agarwal, B. Jayant Baliga, Subhashish Bhattacharya, Douglas C. Hopkins, IEEE Energy Conversion Congress and Expo. (ECCE’22), Detroit, MI, 2022, pp. 1-7, doi: 10.1109/ECCE50734.2022.9947715

17. “Comparison of the Capacitances and Switching Losses of 1.2 kV Common-Source and Common-Drain Bidirectional Switch Topologies,” Ajit Kanale, Tzu-Hsuan Cheng, Aditi Agarwal, Suyash Sushilkumar Shah, B. Jayant Baliga, Subhashish Bhattacharya and Douglas C. Hopkins, 2021 IEEE 8th Workshop on Wide Bandgap Power Devices and Applications (WiPDA’21), 2021, pp. 112-117, doi: 10.1109/WiPDA49284.2021.9645130.

18. “Optimized AC/DC Dual Active Bridge Converter using Monolithic SiC Bidirectional FET (BiDFET) for PV Applications,” Suyash Sushilkumar Shah, Subhashish Bhattacharya, Ajit Kanale, Tzu-Hsuan Cheng, Utkarsh Mehrotra, Aditi Agarwal, B. Jayant Baliga and Douglas C. Hopkins, IEEE Energy Conversion Congress and Exposition (ECCE’21), Vancouver, Canada, October 10-14, 2021

19. "Design and Characterization of 3.3kV-15kV Rated DBC Power Modules for Developmental Testing of WBG Devices" U. Mehrotra, A.J. Morgan and D. C. Hopkins, IEEE Applied Power Electronics Conference (APEC’21), Virtual (Phoenix) June 14-17, 2021

20. "A New Cascaded SuperCascode High Voltage Power Switch," U. Mehrotra, D. C. Hopkins, IEEE Applied Power Electronics Conference (APEC’21), Virtual (Phoenix, AZ) June 14-17, 2021

21. “Advanced Dual-Sided Half-bridge Packaging with Epoxy Insulated Metal Substrates (eIMS),” Douglas C Hopkins, Tzu-Hsuan Cheng, Utkarsh Mehrotra, Wensong Yu, IEEE Applied Power Electronics Conference (APEC’21), Virtual (Phoenix) June 14-17, 2021 *(Invited Paper)*

22. “Switching Characteristics of a 1.2 kV, 50 mΩ SiC Monolithic Bidirectional Field Effect Transistor (BiDFET) with Integrated JBS Diodes,” Ajit Kanale, Tzu-Hsuan Cheng, Suyash Sushilkumar Shah, Kijeong Han, Aditi Agarwal, B. Jayant Baliga, Douglas Hopkins and Subhashish Bhattacharya, IEEE Applied Power Electronics Conference (APEC’21), Virtual (Phoenix) June 14-17, 2021

23. “Study of Al wire bonds to understand cross-talk and current carrying capacity in WBG Power Module Design,” Utkarsh Mehrotra, Adam J Morgan, Michael, McKeown, Douglas C Hopkins, IMAPS International Advanced Power Electronics Packaging Symposium (APEPS’21), Virtual (Albuquerque), April 26-29, 2021

24. “Lithium Battery Cell Level Fusing with Aluminum Heavy Wire Bonds,” Utkarsh Mehrotra, Arthur Brazzle, Michael McKeown, Douglas C. Hopkins, 53rd Int’l Sym on Microelectronics, Virtual Global Event, October 5-8, 2020 *Best of Session*

25. “High Current Medium Voltage Bidirectional Solid-State Circuit Breaker Using Cascaded JFETs,” Utkarsh Mehrotra, Bahji Ballard and Douglas C. Hopkins, 2020 IEEE Energy Conversion Congress and Exposition, Detroit, Michigan, Virtual, October 11-15, 2020

26. “Packaging Development for a 1200V SiC BiDFET Switch Using Highly Thermally Conductive Organic Epoxy Laminate,” Utkarsh Mehrotra, Tzu-Hsuan Cheng, Ajit Kanale, Aditi Agarwal, Kijeong



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Han, B. Jayant Baliga, Subhashish Bhattacharya, Douglas C. Hopkins, The 32nd International Symposium of Power Semiconductor Devices and ICs (ISPSD), Hofburg Vienna, Austria, (virtual), September 13-18, 2020.

27. "Monolithic 4-Terminal 1.2 kV/20 A 4H-SiC Bi-Directional Field Effect Transistor (BiDFET) with Integrated JBS Diodes," K. Han, A. Agarwal, A. Kanale, B. J. Baliga, S. Bhattacharya, T-H. Cheng, D. Hopkins, V. Amarasinghe, and J. Ransom, 2020 32nd International Symposium on Power Semiconductor Devices and ICs (ISPSD), Hofburg Vienna, Austria, pp. 242-245, September 13-18, 2020, doi: 10.1109/ISPSD46842.2020.9170064.

28. "Optimized Highly Efficient SSCB Using Organic Substrate Packaging for Electric Vehicle Applications", Utkarsh Mehrotra, Bahji Ballard, Tzu-Hsuan Cheng, B. Jayant Baliga, Subhashish Bhattacharya, Douglas C Hopkins, IEEE Transportation Electrification Conference & Expo (iTEC), Chicago, IL, Virtual, July 17, 2020

29. "Design and Integration of WBG Solid State Circuit Protection,", Douglas C. Hopkins, Bahji Ballard, Utkarsh Mehrotra, *Tutorial (3 hrs)* IEEE Applied Power Electronics Conference, Anaheim, CA, March 17-21, 2019

30. "Designing for Switching Stresses in a Circuit Breaker Application using SiC Semiconductors," Bahji Ballard, Utkarsh Mehrotra, Douglas C Hopkins, *Tutorial (1.5hrs)* 7th IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA), Raleigh, NC, October 29-31, 2019

31. "A High-Bandwidth Resistive Current Sensing Technology for Breakers and Desaturation Protection," Bo Gao, Utkarsh Mehrotra, Douglas C. Hopkins, 7th IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA), Raleigh, NC, October 29-31, 2019

32. "1.2 kV, 10 A, 4H-SiC Bi-Directional Field Effect Transistor (BiDFET) with Low On-State Voltage Drop," Ajit Kanale1, Tzu-Hsuan Cheng, Kijeong Hanl, B. Jayant Baliga, Subhashish Bhattacharya, Douglas Hopkins, Int'l. Conf. on Silicon Carbide and Related Materials, Kyoto Japan, 29 Sept – 04 Oct. 2019

*33.* "Power Packaging Assembly Challenges," Douglas C Hopkins, A.R.E.A. Consortium Meeting Universal Instruments, Binghamton, NY, March 27-28, 2019 *(Invited Keynote)*

34. "Design and Integration of WBG Solid State Circuit Protection," *Tutorial (3 hrs)*, Douglas C. Hopkins, Bahji Ballard, Utkarsh Mehrotra, IEEE Applied Power Electronics Conference, Anaheim, CA, March 17-21, 2019

35. "New Dynamic Power MOSFET Model to Determine Maximum Device Operating Frequency," Adam Morgan, Ajit Kanale, Kijeong Han, Jayant Baliga, Douglas Hopkins, IEEE Applied Power Electronics Conference, Anaheim, CA, March 17-21, 2019

36. "New Short Circuit Failure Mechanism for 1.2kV 4H-SiC MOSFETs and JBSFETs," Kijeong Han, Ajit Kanale, B. J. Baliga, Bahji Ballard, Adam Morgan, and Douglas C. Hopkins IEEE Workshop on Wide Bandgap Power Devices and Appl (WiPDA), Atlanta, GA, Oct 31-Nov 2, 2018

37. "6.5kV SiC JFET-based Super Cascode Power Module with High Avalanche Energy Handling Capability," Bo Gao, Adam Morgan, Yang Xu, Xin Zhao, Bahji Ballard, Douglas C. Hopkins, IEEE Workshop on Wide Bandgap Power Devices and Appl (WiPDA), Atlanta, GA, Oct 31-Nov 2, 2018

38. “Increasing Electrical and Thermal Performances of VRMs by Using Folded Flexible Substrate,” Bo Gao, Xin Zhao, Douglas C. Hopkins, Int’l Symp. on 3D Power Electronics Integration and Manufacturing, College Park, MD, June 25-27, 2018

39. “6.0kV, 100A, 175kHz Super Cascode Power Module for Medium Voltage, High Power Applications,” Bo Gao, Adam J. Morgan, Yang Xu, Xin Zhao, Douglas C. Hopkins, IEEE Applied Power Electronics Conference, San Antonio, TX, March 4-8, 2018

40. “Performance optimization of A 1.2 kV SiC High Density Half Bridge Power Module In 3D Package,” Xin Zhao, Bo Gao, Liqi Zhang, Douglas C Hopkins, Alex Q Huang, Applied Power Electronics Conference, San Antonio, TX, March 4-8, 2018

41. “Flexible Epoxy-Resin Substrate Based 1.2 kV SiC Half Bridge Module with Ultra-low Parasitics and High Functionality,” Xin Zhao, Bo Gao, Yifan Jiang, Liqi Zhang, Sizhen Wang, Yang Xu, Kenji Nishiguchi, Yoshi Fukawa, Douglas C. Hopkins, IEEE Energy Conversion Congress & Exposition (ECCE), Cincinnati, Ohio, October 1 – 5, 2017

42. “Numerical and Experimental Determination of Temperature Distribution in 3D Stacked Power Devices,” Adam Morgan, Leila Choobineh, David Fresne and Douglas C. Hopkins, ASME 2017 Int’l Technical Conf. and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems, San Francisco, California, August 29–September 1, 2017 (doi:10.1115/IPACK2017-74222)

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