leads to greater production volume; greater production volume further reduces cost, and so on. And consumers are getting a better, more energy-efficient product," asserted Baliga.

To implement and qualify this process, the PRESiCE team is using the X-Fab Texas foundry, Lubbock. Currently, the process is using 6-in substrates (Figure 1). NCSU researchers have built 1.2-kV inversion-mode power MOSFETs, accumulation-mode power MOSFETs (AccuFETs), and junction-barrier Schottky (JBS) rectifiers. Additionally, researchers have demonstrated a monolithically integrated JBS rectifier and power MOSFET structure to create JBSFET (Figure 2), which allows third-quadrant operation without turning on the body diode of the MOSFET. Details were presented at ICSCRM 2017.

The PRESiCE process is now available for commercial manufacturing of SiC devices at X-Fab. "Our process has a yield of over 90%," stated Baliga. Researchers have already licensed the PRESiCE process and chip design to one U.S.-based semiconductor company, and several others are in negotiation.

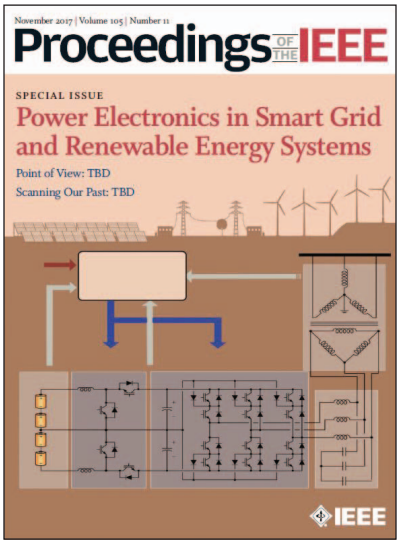
Reference

[1] B. J. Baliga, K. Han, J. Harmon, A. Tucker, S. Syed, and W. Sung, "PRESiCE: Process engineered for manufacturing SiC electronic-devices," presented at the Int. Conf. on Silicon Carbide and Related Materials, Washington, D.C., Sept. 2017.

Special Issue on Power Electronics in Smart Grid and Renewable Energy Systems

The IEEE has published a one-time publication on "Power Electronics in Smart Grid and Renewable Energy Systems" with Prof. Bimal K. Bose, IEEE Life Fellow and emeritus chair professor in power electronics, Department of Electrical and Computer Engineering at the University of Tennessee, as the guest editor. This special issue comprises 14 state-of-the-art technology review articles contributed by renowned specialists in the field. The invited articles are as follows:

- "Power Electronics, Smart Grid, and Renewable Energy Systems," by Bimal K. Bose
- "Power Semiconductor Devices for Smart Grid and Renewable Energy Systems," by Alex Q. Huang
- "Multilevel Converters: Circuits and Systems," by Hirofumi Akagi
- "Multilevel Converters: Control and Modulation Techniques for their Operation and Industrial Applications," by Jose Leon, Sergio Vazquez, and Leopoldo Franquelo
- "HVDC Systems in Smart Grids," by Mike Barnes, Dirk van Hertem, Simon P. Teeuwsen, and Magnus Callavik
- "Flexible ac Transmission Systems (FACTS) and Resilient ac Distribution Systems (RACDS) in Smart Grid," by Fang Peng
- "Wind Energy Systems," by Frede Blaabjerg and Ke Ma
- "Solar Energy Systems," by Mariusz Malinowski, Jose Leon, and Haitham Abu-Rub
- "Ocean and Geothermal Energy Systems," by Annette von Jouanne and Ted Brekken
- "Fuel Cell Power Systems and Applications," by Jih-Sheng Lai and Michael Ellis
- "Energy Storage and Power Electronics Technologies: A Strong Combination to Empower the Transformation of the Smart Grid," by Marcelo Molina
- "Smart Grid Modeling and Simulation," by Aranya Chakrabortty and Anjan Bose
- "Controls for Smart Grids: Architectures and Applications," by Tariq Samad and Anuradha Annaswamy
- "Artificial Intelligence Techniques in Smart Grid and Renewable Energy Systems—Some Example Applications," by Bimal K. Bose. PEM



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