

Is GaN a Game Changer?

by Fred C Lee

University Distinguished Professor and Director

Center for Power Electronics Systems

Virginia Tech

Blacksburg, VA 24061

540- 231- 7716

FcLee@vt.edu

Digest

In today's power electronics products, quality and reliability are given, great emphases are placed on high efficiency, high power density and low cost. Further advances alone these areas will be closely linked to advancement we can make in the area of power devices and materials and fabrication techniques. With recent advances made in wide-band-gap (WBG) power devices, I believe the new generation of switches will make significant impacts to all three areas mentioned above.

It is evident that, for any given design, if you simple replace silicon devices with WBG, you will gain an improvement in efficiency. Although it is an important contribution, to leave it at that, it does not do the justice to WBG. It is also clear that WBG devices can operate at much higher frequencies compared to their silicon counterparts. Consequently, as much as a factor of 5-10 reduction in size/weight using WBG are achievable and have been demonstrated in some applications. Still it leave it at that, it does not realize the full potential of WBG.

If we can design a converter with 10X, 20X or even 50X in switching frequency, comparing to our current practice using silicon devices, what has been taken for granted in our design practice is being challenged. Certain design trade off previously inconceivable can be realized with not only significant performance enhancement but also drastic reduction of the labor contents in the manufacturing and assembly process.

Short Biography

Dr. Lee is a University Distinguished Professor at Virginia Tech and the Founder and Director of the NSF ERC – Center for Power Electronics Systems (CPES). He is a member of the *U.S. National Academy of Engineering*, an academican of Taiwan's *Academia Sinica*, and a foreign member of the *Chinese Academy of Engineering*, China. As CPES Director, Dr. Lee leads a program that encompasses research, technology development, educational outreach, industry collaboration, and technology transfer. To date, more than 225 companies worldwide have benefited from this industry partnership program.

Dr. Lee has supervised to completion 82 Ph.D. and 89 M.S. students. He holds 82 US patents, and has published over 277 journal articles and more than 700 refereed technical papers. His research interests include high-frequency power conversion, magnetics and EMI, distributed power systems, renewable energy, power quality, high-density electronics packaging and integration, and modeling and control.

Dr. Lee is a recipient of the 2015 IEEE Medal in Power Engineering "for contributions to power electronics, especially high-frequency power conversion."

Special Lecture by Chair Professor Fred C. Lee Department of Electrical and Computer Engineering National Chiao Tung University

Date: Friday 28th April 2017

Time: 14:00 (Doors Open at 13:45)

Venue: Room 816, Engineering Building 4

Registration: <https://goo.gl/forms/6Vo9N4nNfTfvJwV62>

