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	Nota di contenuto	GaN Transistors for Efficient Power Conversion; Contents; Foreword; Acknowledgments; 1 GaN Technology Overview; 1.1 Silicon Power MOSFETs 1976-2010; 1.2 The GaN Journey Begins; 1.3 Why Gallium Nitride?; 1.3.1 Band Gap (Eg); 1.3.2 Critical Field (Ecrit); 1.3.3 On- Resistance (RDS(on)); 1.3.4 The Two-Dimensional Electron Gas; 1.4 The Basic GaN Transistor Structure; 1.4.1 Recessed Gate Enhancement- Mode Structure; 1.4.2 Implanted Gate Enhancement-Mode Structure; 1.4.3 pGaN Gate Enhancement-Mode Structure; 1.4.4 Cascode Hybrid Enhancement-Mode Structure; 1.4.5 Reverse Conduction in HEMT Transistors 1.5 Building a GaN Transistor 1.5.1 Substrate Material Selection; 1.5.2 Growing the Heteroepitaxy; 1.5.3 Processing the Wafer; 1.5.4 Making Electrical Connection to the Outside World; 1.6 Summary; References; 2 GaN Transistor Electrical Characteristics; 2.1 Introduction; 2.2 Key Device Parameters; 2.2.1 Breakdown Voltage (BVDSS) and Leakage Current (IDSS); 2.2.2 On-Resistance (RDS(on)); 2.2.3 Threshold Voltage (VGS(th) or Vth); 2.3 Capacitance and Charge; 2.4 Reverse Conduction; 2.5 Thermal Resistance; 2.6 Transient Thermal Impedance; 2.7 Summary; References; 3 Driving GaN Transistors

	<ul> <li>3.1 Introduction 3.2 Gate Drive Voltage; 3.3 Bootstrapping and Floating Supplies; 3.4 dv/dt Immunity; 3.5 di/dt Immunity; 3.6 Ground Bounce;</li> <li>3.7 Common Mode Current; 3.8 Gate Driver Edge Rate; 3.9 Driving Cascode GaN Devices; 3.10 Summary; References; 4 Layout Considerations for GaN Transistor Circuits; 4.1 Introduction; 4.2 Minimizing Parasitic Inductance; 4.3 Conventional Power Loop Designs;</li> <li>4.4 Optimizing the Power Loop; 4.5 Paralleling GaN Transistors; 4.5.1 Paralleling GaN Transistors for a Single Switch; 4.5.2 Paralleling GaN Transistors for Half-Bridge Applications; 4.6 Summary References 5 Modeling and Measurement of GaN Transistors; 5.1 Introduction; 5.2 Electrical Modeling; 5.2.1 Basic Modeling; 5.2.2 Limitations of Basic Modeling; 5.2.3 Limitations of Circuit Modeling; 5.3 Thermal Modeling; 5.3.1 Improving Thermal Performance; 5.4.2 Modeling of Multiple Die; 5.3.3 Modeling of Complex Systems; 5.4 Measuring GaN Transistor Performance; 5.4.1 Voltage Measurement Requirements; 5.4.2 Current Measurement Requirement; 5.5 Summary; References; 6 Hard-Switching Topologies; 6.1 Introduction; 6.2 Hard-Switching Losses</li> <li>6.2.2 Output Capacitance (COSS) Losses 6.2.3 Gate Charge (QG) Losses;</li> <li>6.2.4 Reverse Conduction Losses (PSD); 6.2.5 Reverse Recovery (QRR) Losses; 6.2.6 Total Hard-Switching Losses; 6.2.7 Hard-Switching Figure of Merit; 6.3 External Factors Impacting Hard-Switching Losses; 6.3.1 Impact of Common-Source Inductance; 6.3.2 Impact of High Frequency Power-Loop Inductance on Device Losses; 6.4 Reducing Body Diode Conduction Losses in GaN Transistors; 6.5 Frequency Impact on Magnetics; 6.5.1 Transformers; 6.5.2 Inductors; 6.6 Buck Converter Example; 6.6.1 Output Capacitance Losses</li> <li>6.6.2 Gate Losses (PG)</li> </ul>
Sommario/riassunto	The first edition of GaN Transistors for Efficient Power Conversion was self-published by EPC in 2012, and is currently the only other book to discuss GaN transistor technology and specific applications for the technology. More than 1,200 copies of the first edition have been sold through Amazon or distributed to selected university professors, students and potential customers, and a simplified Chinese translation is also available. The second edition has expanded emphasis on applications for GaN transistors and design considerations. This textbook provides technical and application-