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High-Frequency Isolated Bidirectional Dual Active Bridge DC–DC Converters with Wide Voltage Gain Pseudo-resonant Full Bridge DC/DC Converter The conducted EMI in DC-DC converters Multi-megawatt Three-phase Dual-active Bridge DC-DC Converter High Efficiency Non-isolated DC-DC Converters with Wide Voltage Gain Range for Renewable Energies Power Electronics Handbook DC-DC Converter Topologies Microgrids for Commercial Systems Soft Commutation Isolated DC-DC Converters Flexible Resources for Smart Cities Power Converters for Electric Vehicles Pulse Width Modulation for Power Converters Mechatronics 2013 Recent Advances in Power Electronics and Drives Soft-Switching PWM Full-Bridge Converters Conference Proceedings of 2021 International Joint Conference on Energy, Electrical and Power Engineering Applications of Power Electronics Autonomous Control of Unmanned Aerial Vehicles Advanced Electric Drive Vehicles Advanced Concepts and Technologies for Electric Vehicles Energy, Environment and Sustainable Development Alternative Energy in Power Electronics Design and Control of Grid-Connected Photovoltaic System Design and Control of Power Converters 2020 AI Enabled IoT for Electrification and Connected Transportation Control of Power Electronic Converters and Systems Power Quality: Infrastructures and Control Modulation and Dynamic Control of Intelligent Dual-active-bridge Converter Based Substations for Flexible Dc Grids Renewable Energy Integration with Building Energy Systems On the perspectives of SiC MOSFETs in high-frequency and

high-power isolated DC/DC converters Electronic Circuit Design Hybrid Electric Vehicles Wind and Solar Power Systems Advances in Supercapacitor Technology and Applications Sustainable Energy for Smart Cities Control of Series-Parallel Conversion Systems Proceedings High Power Density DC/DC Converter International Advanced Researches & Engineering Congress 2017 Proceeding Book The Proceedings of 2023 International Conference on Wireless Power Transfer (ICWPT2023)

High-Frequency Isolated Bidirectional Dual Active Bridge DC–DC Converters with Wide Voltage Gain 2018-05-17 written by experts this book is based on recent research findings in high frequency isolated bidirectional dc dc converters with wide voltage range it presents advanced power control methods and new isolated bidirectional dc dc topologies to improve the performance of isolated bidirectional converters providing valuable insights advanced methods and practical design guides on the dc dc conversion that can be considered in applications such as microgrid bidirectional ev chargers and solid state transformers it is a valuable resource for researchers scientists and engineers in the field of isolated bidirectional dc dc converters **Pseudo-resonant Full Bridge DC/DC Converter** 1987 this book presents the phenomena of conducted electromagnetic interference emi generation in dc dc converters the measurement and simulation are used to analyze the impact of the most important parameters on the character level and propagation path of interference in this book the analysis of the interference generation and propagation is presented on the example of three basic converters the wide banded behavior of all components is presented including basic elements and its parasitic and the connection layout it focuses on the influence of parasitic components on the nature of interference in the frequency domain up to 30mhz was carried out the book includes practical design and operation tips that will help to reduce the emi it provides useful knowledge about designing of the converters with the low level of outgoing emi they were obtained in original research and published in scientific articles by the author piotr musznicki gdansk university of technology faculty of electrical and control engineering buy this book on degruyter com degruyter com view product 510353 **The conducted EMI in DC-DC converters** 2018-07-31 power electronics which is a

rapidly growing area in terms of research and applications uses modern electronics technology to convert electric power from one form to another such as ac dc dc dc dc ac and ac ac with a variable output magnitude and frequency power electronics has many applications in our every day life such as air conditioners electric cars sub way trains motor drives renewable energy sources and power supplies for computers this book covers all aspects of switching devices converter circuit topologies control techniques analytical methods and some examples of their applications 25 new content reorganized and revised into 8 sections comprising 43 chapters coverage of numerous applications including uninterruptable power supplies and automotive electrical systems new content in power generation and distribution including solar power fuel cells wind turbines and flexible transmission

Multi-megawatt Three-phase Dual-active Bridge DC-DC Converter 2019 a comprehensive look at dc dc converters and advanced power converter topologies for all skills levels as it can be rare for source voltage to meet the requirements of a direct current dc load dc dc converters are essential to access service dc dc power converters employ power semiconductor devices like mosfets and igbts as switches and passive elements such as capacitors inductors and transformers to alter the voltage provided by a dc source into the necessary dc voltage as is required by a dc load this source can be a battery solar panels fuel cells or a dc bus voltage fed by rectified ac utility voltage as the many components of dc dc converters can be differently arranged into circuit structures called topologies there are as many possible circuit topologies as there are possible combinations of circuit elements focusing on dc dc switch mode power converters ranging from 50 w to 10kw dc dc converter topologies provides a survey of all converter topology types within this

power range general principles are described for each topology type using a representative converter as an example variations that can be found that differ from the example are then examined with a helpful discussion of comparisons when relevant a broad range of topics is covered within the book from simple low power converters to complex high power converters and everywhere in between dc dc converter topologies readers will also find a detailed discussion of four key dc dc converter topologies description of isolated two switch pulse width modulated pwm topologies including push pull half bridge and interleaved converters an exploration of high gain converters such as coupled inductors voltage multipliers and switched capacitor converters this book provides the tools so that a non expert will be equipped to deal with the vast array of dc dc converters that presently exist as such dc dc converter topologies is a useful reference for electrical engineers professors and graduate students studying in the field

High Efficiency Non-isolated DC-DC Converters with Wide Voltage Gain Range for Renewable Energies 2010-07-19 microgrids for commercial systems this distinct volume provides detailed information on the concepts and applications of the emerging field of microgrids for commercial applications offering solutions in the design installation and operation of this new cutting edge technology the microgrid is defined as distributed energy resources der and interconnected loads with clearly defined electrical boundaries that act as a single controllable entity concerning the grid as per ieee standard 2030 7 2017 it provides an uninterrupted power supply to end user loads with high reliability commercial systems like it ites shopping complexes malls the banking sector hospitals etc need an uninterrupted input power supply with high reliability microgrids are more suitable for commercial systems to

service their clients with no service discontinuity the microgrid enables both connection and disconnection from the grid that is the microgrid can operate both in grid connected and islanded modes of operation the microgrid controller plays an important role in microgrid systems it shall have an energy management system and real time control functions that operate in the following conditions both grid connected and islanded modes of operation automatic transfer from grid connected mode to islanding mode reconnection and re synchronization from islanded mode to grid connected mode optimization of both real and reactive power generation and consumption by the energy management system grid support ancillary services etc whenever a microgrid is in islanded mode it will work as an autonomous system without a distribution grid power supply in this mode of operation fault in the transmission or distribution grid will not propagate into the microgrid whenever a microgrid operates in grid connected mode power flows bi directionally between the distribution grid and microgrid at the point of interconnection hence microgrids ensure the interrupted power supply to the end user loads with high reliability this book aims to bring together the design installation operation and new research that has been carried out in the field of microgrid applications for commercial power systems

Power Electronics Handbook 2024-01-31 this book describes the operation and analysis of soft commutated isolated dc dc converters used in the design of high efficiency and high power density equipment it explains the basic principles behind first and second order circuits with power switches to enable readers to understand the importance of these converters in high efficiency and high power density power supply design for residential commercial industrial and medical use as well as in

aerospace equipment with each chapter featuring a different power converter topology the book covers the most important resonant converters including series resonant converters resonant llc converters soft commutation pulse width modulation converters zero voltage switching and zero current switching each topic is presented with full analysis a showcase of the power stages of the converters exercises and their solutions as well as simulation results which mainly focus on the commutation analysis and output characteristic this book is a valuable source of information for professionals working in power electronics power conversion and design of high efficiency and high power density dc dc converters and switch mode power supplies the book also serves as a point of reference for engineers responsible for development projects and equipment in companies and research centers and a text for advanced students

DC-DC Converter Topologies 2024-02-27 this book paves the road for researchers from various areas of engineering working in the realm of smart cities to discuss the intersections in these areas when it comes to infrastructure and its flexibility the authors lay out models algorithms and frameworks related to the smartness in the future smart cities in particular manufacturing firms electric generation transmission and distribution utilities hardware and software computer companies automation and control manufacturing firms and other industries will be able to use this book to enhance their energy operations improve their comfort and privacy as well as to increase the benefit from the electrical system the book pertains to researchers professionals and r d in an array of industries

Microgrids for Commercial Systems 2018-08-27 power converters for electric vehicles gives an overview topology design and simulation of different types of converters

used in electric vehicles ev it covers a wide range of topics ranging from the fundamentals of ev hybrid ev and its stepwise approach simulation of the proposed converters for real time applications and corresponding experimental results performance improvement paradigms and overall analysis drawing upon the need for novel converter topologies this book provides the complete solution for the power converters for ev applications along with simulation exercises and experimental results it explains the need for power electronics in the improvement of performance in ev this book presents exclusive information on the power electronics of ev including traction drives provides step by step procedure for converter design discusses various topologies having different isolated and non isolated converters describes control circuit design including renewable energy systems and electrical drives includes practical case studies incorporated with simulation and experimental results power converters for electric vehicles will provide researchers and graduate students in power electronics electric drives vehicle engineering a useful resource for stimulating their efforts in this important field of the search for renewable technologies

Soft Commutation Isolated DC-DC Converters 2021-11-10 the first single volume resource for researchers in the field who previously had to depend on separate papers and conference records to attain a working knowledge of the subject brings together the field s diverse approaches into an integrated and comprehensive theory of pwm

Flexible Resources for Smart Cities 2020-12-11 mechatronics as the integrating framework of mechanical engineering electrical engineering computer technology control engineering and automation forms a crucial part in the design manufacture

and maintenance of a wide range of engineering products and processes the mechatronics itself changes rapidly in last decade from original mixture of subfields into original approach in engineering as a technical discipline the book you are holding is aimed to help the reader to orient in this evolving field of science and technology mechatronics 2013 recent technological and scientific advances is the fourth volume following the previous editions in 2007 2009 and 2011 providing the comprehensive and accessible coverage of advances in mechatronics presented on the 10th international conference mechatronics 2013 hosted this year at the brno university of technology czech republic the contributions that passed the thorough review process give an insight into current trends in research and development among mechatronics 2013 contributing countries with paper topics covering design and modeling of mechatronic systems control and automation signal processing robotics and others keeping in mind the innovation benefits of mechatronics design approach leading to the development production and daily use of machines and devices possessing a certain degree of computer based intelligence *Power Converters for Electric Vehicles* 2003-10-03 soft switching pwm full bridge converters have been widely used in medium to high power dc dc conversions for topological simplicity easy control and high effi ciency early works on soft switching pwm full bridge converter by many researchers included various topologies and modulation strategies however these works were scattered and the relationship among these topologies and modulation strategies had not been revealed this book intends to describe systematically the soft switching techniques for pulse width modulation pwm full bridge converters including the topologies control and design and it reveals the relationship among the various topologies and pwm strategies

previously proposed by other researchers the book not only presents theoretical analysis but also gives many detailed design examples of the converters describes the soft switching techniques for pulse width modulation pwm full bridge converters systematically covers topologies control and design from the basics through to applications and development deliberates the soft switching pmw control technique rather than the standard pwm control technique presents detailed theoretical analysis with design examples for various possible variations to the full bridge topology using the soft switching technique soft switching pwm full bridge converters topologies control and design is an essential and valuable reference for graduate students and academics majoring in power electronics and power supply design engineers senior undergraduate students majoring in electrical engineering and automation engineering would also fi nd this book useful

Pulse Width Modulation for Power Converters 2013-09-12 this book will be a collection of the papers presented in the 2021 international joint conference on energy electrical and power engineering coeepe 21 covering new and renewable energy electrical and power engineering it is expected to report the latest technological developments in the fields developed by academic researchers and industrial practitioners with a focus on power electronics energy storage and system control in energy and electrical power systems the applications and dissemination of these technologies will benefit research society as new research directions are getting more and more inter disciplinary which require researchers from different research areas to come together and form ideas jointly it will also benefit the electrical engineering and power industry as we are now experiencing a new wave of industrial revelation that is electrification intelligentization and digitalization of our

transport manufacturing process and way of thinking

Mechatronics 2013 2014-04-03 power electronics technology is still an emerging technology and it has found its way into many applications from renewable energy generation i e wind power and solar power to electrical vehicles evs biomedical devices and small appliances such as laptop chargers in the near future electrical energy will be provided and handled by power electronics and consumed through power electronics this not only will intensify the role of power electronics technology in power conversion processes but also implies that power systems are undergoing a paradigm shift from centralized distribution to distributed generation today more than 1000 gw of renewable energy generation sources photovoltaic pv and wind have been installed all of which are handled by power electronics technology the main aim of this book is to highlight and address recent breakthroughs in the range of emerging applications in power electronics and in harmonic and electromagnetic interference emi issues at device and system levels as discussed in robust and reliable power electronics technologies including fault prognosis and diagnosis technique stability of grid connected converters and smart control of power electronics in devices microgrids and at system levels

Recent Advances in Power Electronics and Drives 2022-09-02 unmanned aerial vehicles uavs are being increasingly used in different applications in both military and civilian domains these applications include surveillance reconnaissance remote sensing target acquisition border patrol infrastructure monitoring aerial imaging industrial inspection and emergency medical aid vehicles that can be considered autonomous must be able to make decisions and react to events without direct intervention by humans although some uavs are able to perform increasingly complex

autonomous manoeuvres most uavs are not fully autonomous instead they are mostly operated remotely by humans to make uavs fully autonomous many technological and algorithmic developments are still required for instance uavs will need to improve their sensing of obstacles and subsequent avoidance this becomes particularly important as autonomous uavs start to operate in civilian airspaces that are occupied by other aircraft the aim of this volume is to bring together the work of leading researchers and practitioners in the field of unmanned aerial vehicles with a common interest in their autonomy the contributions that are part of this volume present key challenges associated with the autonomous control of unmanned aerial vehicles and propose solution methodologies to address such challenges analyse the proposed methodologies and evaluate their performance

Soft-Switching PWM Full-Bridge Converters 2019-06-24 electrification is an evolving paradigm shift in the transportation industry toward more efficient higher performance safer smarter and more reliable vehicles there is in fact a clear trend to move from internal combustion engines ices to more integrated electrified powertrains providing a detailed overview of this growing area advanced electric drive vehicles begins with an introduction to the automotive industry an explanation of the need for electrification and a presentation of the fundamentals of conventional vehicles and ices it then proceeds to address the major components of electrified vehicles i e power electronic converters electric machines electric motor controllers and energy storage systems this comprehensive work covers more electric vehicles mevs hybrid electric vehicles hevs plug in hybrid electric vehicles phevs range extended electric vehicles reevs and all electric vehicles evs including battery electric vehicles bevs and fuel cell vehicles fcvs describes the

electrification technologies applied to nonpropulsion loads such as power steering and air conditioning systems discusses hybrid battery ultra capacitor energy storage systems as well as 48 v electrification and belt driven starter generator systems considers vehicle to grid v2g interface and electrical infrastructure issues energy management and optimization in advanced electric drive vehicles contains numerous illustrations practical examples case studies and challenging questions and problems throughout to ensure a solid understanding of key concepts and applications advanced electric drive vehicles makes an ideal textbook for senior level undergraduate or graduate engineering courses and a user friendly reference for researchers engineers managers and other professionals interested in transportation electrification **Conference Proceedings of 2021 International Joint Conference on Energy, Electrical and Power Engineering** 2019-06-24 this book explains the basic and advanced technology behind the power electronics converters for ev charging and their significant developments and introduces the grid impact issues that underpin the grid integration of electric vehicles advanced concepts and technologies for electric vehicles reviews state of the art and new configurations and concepts of more electric vehicles and ev charging mitigating the impact of ev charging on the power grid and technical considerations of ev charging infrastructures the book considers the environmental benefits and advantages of electric vehicles and their component devices it includes case studies of different power electronic converters used for charging evs it offers a review of pfc based ac chargers wbg based chargers and wireless chargers the authors also explore multistage charging systems and their possible implementations the book also examines the challenges and opportunities posed by the progressive integration of electric drive vehicles on the power grid

and reported solutions for their mitigation the book is intended for professionals researchers and engineers in the electric vehicle industry as well as advanced students in electrical engineering who benefit from this comprehensive coverage of electric vehicle technology readers can get an in depth insight into the technology deployment in ev transportation and utilize that knowledge to develop novel ideas in the ev area

Applications of Power Electronics 2014-10-24 new information and strategies for managing the energy crisis from the perspective of growing economies are presented numerous case studies illustrate the particular challenges that developing countries many of which are faced with insufficient resources encounter as a result many unique strategies to the problems of energy management an conservation environmental engineering clean technologies biological and chemical waste treatment and waste management have been developed

Autonomous Control of Unmanned Aerial Vehicles 2023-08-30 this new resource is a practical overview of designing testing and troubleshooting power electronics in alternative energy systems providing you with the most important information on how power electronics components such as inverters controllers and batteries can play a pivotal role in the successful implementation of green energy solutions for both stand alone and grid connected applications you will learn how to choose the right components for diverse systems from utility scale wind farms to photovoltaic panels on single residences how to get the most out of existing systems and how to solve the tough challenges particular to alternative energy applications whether you are a renewables professional who needs to understand more about how power electronics impact energy output or a power engineer who is interested in learning what new

avenues the alternative energy revolution is opening for your work start here with advice and explanations from the experts including equations diagrams and tables designed to help you understand and succeed provides a thorough overview of the key technologies methods and challenges for implementing power electronics in alternative energy systems for optimal power generation includes hard to find information on how to apply converters inverters batteries controllers and more for stand alone and grid connected systems covers wind and solar applications as well as ocean and geothermal energy hybrid systems and fuel cells

Advanced Electric Drive Vehicles 2011-10-14 the current model for electricity generation and distribution is dominated by centralized power plants which are typically associated with combustion coal oil and natural gas or nuclear generation units these power models require distribution from the center to outlying consumers and have many disadvantages concerning the electric utilities transmission and distribution and greenhouse gas emissions this resulted in the modelling and development of cleaner renewable power generation with alternative sources such as photovoltaic pv wind and other sources further due to matured pv technology constant drop in installation cost greenhouse emissions reductions energy efficiency reduced transmission and distribution investments minimization of electric losses and network support the development of pv systems is proliferating in view of this development this book provides an idea for setting up the pv plant from initial study of the site to plan sizing once the first planning is covered the book focuses on the modeling aspects of power electronics converter and control elements associated with it keeping the operating standards specified for the development of distributed generation systems in check this book will be useful for industrial

professionals and researchers who are working toward modeling of pv plants and their control in grid connected operation all the necessary information related to these fields is available in the book

Advanced Concepts and Technologies for Electric Vehicles 2014-10-28 in this book nine papers focusing on different fields of power electronics are gathered all of which are in line with the present trends in research and industry given the generality of the special issue the covered topics range from electrothermal models and losses models in semiconductors and magnetics to converters used in high power applications in this last case the papers address specific problems such as the distortion due to zero current detection or fault investigation using the fast fourier transform all being focused on analyzing the topologies of high power high density applications such as the dual active bridge or the h bridge multilevel inverter all the papers provide enough insight in the analyzed issues to be used as the starting point of any research experimental or simulation results are presented to validate and help with the understanding of the proposed ideas to summarize this book will help the reader to solve specific problems in industrial equipment or to increase their knowledge in specific fields

Energy, Environment and Sustainable Development 2023-04-28 this book presents an overview of artificial intelligence ai in the automotive section especially in the modern era of green energy based electrification of vehicles and smart transportation systems the book also discusses different internet of things aspects involved in the automotive domain with ai the book presents autonomous driving systems advanced driver assistance systems adas autonomy ai involvement and machine learning techniques with challenges in electrification prognostics and diagnostics

ai and iot are two emerging technologies and their importance in other modern technology electrification on transportation connected vehicle segment are discussed thoroughly in this book with different topologies it also presents ai applications in the charging profile prediction state of charge state of health battery lifetime and battery temperature detection in dynamic conditions different algorithms are also given in the book to discuss the nearest point charging station for electric vehicle users the book also discusses cybersecurity issues and challenges in the real time environment for ai implementation iot in transportation and autonomous driving the other aspects of telematics smart sensors for the implementation of the iot and ai are also discussed especially in guidance and control aspects the book will be useful for the researchers practitioners and industry people working in ai iot in the electrification and transportation segment

Alternative Energy in Power Electronics 2021-06-04 control of power electronic converters and systems examines the theory behind power electronic converter control including operation modeling and control of basic converters the book explores how to manipulate components of power electronics converters and systems to produce a desired effect by controlling system variables advances in power electronics enable new applications to emerge and performance improvement in existing applications these advances rely on control effectiveness making it essential to apply appropriate control schemes to the converter and system to obtain the desired performance discusses different applications and their control explains the most important controller design methods both in analog and digital describes different important applications to be used in future industrial products covers voltage source converters in significant detail demonstrates applications across a much

broader context

Design and Control of Grid-Connected Photovoltaic System 2022-06-04 this book presents novel idea and concepts developed by the researchers academia and practicing engineers working in the domain of the power sector infrastructures where power electronics infrastructures are used for improving the system reliability and efficiency in on grid and off grid systems the infrastructures of distributed power generation based on wind solar hydro and many other renewable energy sources have increased manifold since last decade due to availability of efficient power converters and small rating generators the application of power electronics switching devices has made job much easier to make such system infrastructures more reliable and controllable the power quality pq issues in infrastructures of distributed power generation system are a major concern for customers the custom power devices such as voltage source converter are used to mitigate the pq and other issues such as voltage and frequency control under different loading conditions on the supply system the operation of these custom power devices or other power converters is dependent on the duty cycles generated by control algorithm the scope of control algorithm may be varying from model predictive control techniques machine learning techniques to other artificial intelligence based techniques in addition to it some classical control algorithm and adaptive type control algorithm may also be used for power converter operation this book creates awareness among teachers research students and industry persons about better utilization of infrastructures of distributed power generation system by making it more efficient with the use of power electronics and its control

Design and Control of Power Converters 2020 2018-01-25 construction as an industry

sector is responsible for around one third of the total world wide energy usage and about 20 of greenhouse gas emissions the rise in number of buildings and floor space area for both residential and commercial purposes has imposed enormous pressure on existing sources of energy implementations like efficient usage of building energy systems design measures utilization of local energy resources energy storage and renewable energy sources for meeting electricity demand are currently under development and deployment to improve the energy performance index however integrating all such measures and evaluation of developed nearly zero energy and zero emission buildings is yet to be explored in this book different control techniques together with intelligent building technology used to improve the energy performance of buildings have been illustrated every building energy control system has a two fold objective for energy and comfort requirements to achieve a high comfort index for thermal visual air quality humidity and various plug loads and to increase the energy performance index the most significant aspect of the design of buildings energy control system is modelling all the components methodologies and processes involved in developing a renewable energy driven building are covered in detail this book is intended for graduates and professionals working towards the development of sustainable built environment using renewable energy sources

AI Enabled IoT for Electrification and Connected Transportation 2023-01-21

increasing demand for efficiency and power density pushes si based devices to some of their inherent material limits including those related to temperature operation switching frequency and blocking voltage recently sic based power devices are promising candidates for high power and high frequency switching applications today sic mosfets are commercially available from several manufacturers although

technology affiliated with sic mosfets is improving rapidly many challenges remain and some of them are investigated in this work the research work in this dissertation is divided into the three following parts firstly the static and switching characteristics of the state of the art 1 2 kv planar and double trench sic mosfets from two different manufacturers are evaluated the effects of different biasing voltages dc link voltages and temperatures are analysed the characterisation results show that the devices exhibit superior switching performances under different operating conditions moreover several aspects of using the sic mosfet s body diode in a dc dc converter are investigated comparing the body diodes of planar and double trench devices reverse recovery is evaluated in switching tests considering the case temperature switching rate forward current and applied voltage based on the measurement results the junction temperature is estimated to guarantee safe operation a simple electro thermal model is proposed in order to estimate the maximum allowed switching frequency based on the thermal design of the sic devices using these results hard and soft switching converters are designed and devices are characterised as being in continuous operation at a very high switching frequency of 1 mhz thereafter the sic mosfets are operated in a continuous mode in a 10 kw 100 250 khz buck converter comparing synchronous rectification the use of the body diode and the use of an external schottky diode further the parallel operation of the planar devices is considered thus the paralleling of sic mosfets is investigated before comparing the devices in continuous converter operation in this regard the impact of the most common mismatch parameters on the static and dynamic current sharing of the transistors is evaluated showing that paralleling of sic mosfets is feasible subsequently an analytical model of sic mosfets for switching loss

optimisation is proposed the analytical model exhibits relatively close agreement with measurement results under different test conditions the proposed model tracks the oscillation effectively during both turn on and off transitions this has been achieved by considering the influence of the most crucial parasitic elements in both power and gate loops in the second part a comprehensive short circuit ruggedness evaluation focusing on different failure modes of the planar and double trench sic devices is presented the effects of different biasing voltages dc link voltages and gate resistances are evaluated additionally the temperature dependence of the short circuit capability is evaluated and the associated failure modes are analysed subsequently the design and test of two different methods for overcurrent protection are proposed the desaturation technique is applied to the sic mosfets and compared to a second method that depends on the stray inductance of the devices finally the benefits of using sic devices in continuous high frequency high power dc dc converters is experimentally evaluated in this regard a design optimisation of a high frequency transformer is introduced and the impact of different core materials conductor designs and winding arrangements are evaluated a zvzcs phase shift full bridge unidirectional dc dc converter is proposed using only the parasitic leakage inductance of the transformer experimental results for a 10 kw 100 250 khz prototype indicate an efficiency of up to 98 1 for the whole converter furthermore an optimized control method is proposed to minimise the circulation current in the isolated bidirectional dual active bridge dc dc converter based on a modified dual phase shift control method this control method is also experimentally compared with traditional single phase shift control yielding a significant improvement in efficiency the experimental results confirm the theoretical analysis and show that

the proposed control can enhance the overall converter efficiency and expand the zvzcs range die steigende nachfrage nach effizienz und leistungsdichte bringt si basierte eistungsbauteile an einige inhärente materialgrenzen die unter anderem mit der temperaturbelastung der schaltfrequenz und der blockierspannung in zusammenhang stehen in jüngster zeit sind sic basierte leistungsbauelemente vielversprechende kandidaten für hochleistungs und hochfrequenzanwendungen aktuell sind sic mosfets von mehreren herstellern im handel erhältlich obwohl sich die technologie der sic mosfets rasch verbessert werden viele herausforderungen bestehen bleiben einige dieser herausforderungen werden in dieser arbeit untersucht die untersuchungen in dieser dissertation gliedern sich in die drei folgenden teile im ersten teil erfolgt die statische und die transiente charakterisierung der aktuellen 1 2 kv planarund doubletrench sic mosfets verschiedener hersteller die auswirkungen unterschiedlicher gatespannungen zwischenkreisspannungen und temperaturen werden analysiert die ergebnisse der charakterisierung zeigen dass die bauteile überlegene schaltleistungen unter verschiedenen betriebsbedingungen aufweisen darüber hinaus wird der einsatz der internen sic bodydioden in einem dc dc wandler untersucht wobei die unterschiede zwischen planar und doppeltrench bauteilen aufgezeigt werden das reverse recovery verhalten wird unter berücksichtigung der gehäusetemperatur der schaltgeschwindigkeit des durchlassstroms und der angelegten spannung bewertet anhand der messergebnisse wird die sperrschichttemperatur geschätzt damit ein sicherer betrieb gewährleistet ist ein einfaches elektrothermisches modell wird vorgestellt um die maximal zulässige schaltfrequenz auf der grundlage des thermischen designs der sic bauteile abzuschätzen anhand dieser ergebnisse werden hart und weichschaltende umrichter konzipiert und die bauteile werden im

dauerbetrieb mit einer sehr hohen schaltfrequenz von 1 mhz untersucht danach werden die sic mosfets im dauerbetrieb in einem 10 kw 100 250 khz tiefsetzsteller betrieben dabei wird die synchrongleichrichtung die verwendung der internen diode und die verwendung einer externen schottky diode verglichen außerdem wird die parallelisierung von sic mosfets untersucht bevor die parallelschaltung der verschiedenen bauelemente ebenso im kontinuierlichen konverterbetrieb verglichen wird es wird der einfluss der häufigsten parametervariationen auf die statische und dynamische stromaufteilung der transistoren analysiert was zeigt dass eine parallelisierung von sic mosfets möglich ist anschließend wird ein analytisches modell der sic mosfets zur schaltverlustoptimierung vorgeschlagen das analytische modell zeigt eine relativ enge Übereinstimmung mit den messergebnissen unter verschiedenen testbedingungen das vorgeschlagene modell bildet die schwingungen sowohl beim ein als auch beim ausschalten effektiv nach dies wurde durch die berücksichtigung der wichtigsten parasitären elemente in strom und gatekreisen erreicht im zweiten teil wird eine umfassende bewertung der kurzschlussfestigkeit mit fokus auf verschiedene ausfallmodi der planaren und double trench sic bauelemente vorgestellt die auswirkungen unterschiedlicher gatespannungen zwischenkreisspannungen und gate widerstände werden ausgewertet zusätzlich wird die temperaturabhängige kurzschlussfähigkeit ausgewertet und die zugehörigen fehlerfälle werden analysiert anschließend wird die auslegung und prüfung von zwei verschiedenen verfahren zum Überstromschutz evaluiert die desaturation technik wird auf sic mosfets angewendet und mit einer zweiten methode verglichen welche die parasitäre induktivität der bauelemente nutzt schließlich wird der nutzen des einsatzes von sic bauteilen in kontinuierlichen hochfrequenz hochleistungs dc dc wandlern

experimentell untersucht in diesem zusammenhang wird eine designoptimierung eines hochfrequenztransformators vorgestellt und der einfluss verschiedener kernmaterialien leiterausführungen und wicklungsanordnungen wird bewertet es wird ein unidirektionaler zvzcs vollbrücken dc dc wandler vorgestellt der nur die parasitäre streuinduktivität des transformators verwendet experimentelle ergebnisse für einen 10 kw 100 250 khz prototyp zeigen einenwirkungsgrad von bis zu 98 1 für den gesamten umrichter abschließend wird ein optimiertes regelverfahren verwendet welches auf einem modifizierten dual phase shift regelverfahren basiert um den kreisstrom im isolierten bidirektionalen dual aktiv brücken dc dc wandler zu minimieren diese regelmethode wird experimentell mit der herkömmlichen single phase shift regelung verglichen hierbei zeigt sich eine deutliche effizienzsteigerung durch die neue regelmethode die experimentellen ergebnisse bestätigen die theoretische analyse und zeigen dass die vorgeschlagene regelung den gesamtwirkungsgrad des umrichters erhöhen und den zvzcs bereich erweitern kann *Control of Power Electronic Converters and Systems* 2019 with growing consumer demand for portability and miniaturization in electronics design engineers must concentrate on many additional aspects in their core design the plethora of components that must be considered requires that engineers have a concise understanding of each aspect of the design process in order to prevent bug laden prototypes electronic circuit design allows engineers to understand the total design process and develop prototypes which require little to no debugging before release it providesstep by step instruction featuring modern components such as analog and mixed signal blocks in each chapter the book details every aspect of the design process from conceptualization and specification to final implementation and release the text

also demonstrates how to utilize device data sheet information and associated application notes to design an electronic system the hybrid nature of electronic system design poses a great challenge to engineers this book equips electronics designers with the practical knowledge and tools needed to develop problem free prototypes that are ready for release

Power Quality: Infrastructures and Control 2022-07-19 the latest developments in the field of hybrid electric vehicles hybrid electric vehicles provides an introduction to hybrid vehicles which include purely electric hybrid electric hybrid hydraulic fuel cell vehicles plug in hybrid electric and off road hybrid vehicular systems it focuses on the power and propulsion systems for these vehicles including issues related to power and energy management other topics covered include hybrid vs pure electric hev system architecture including plug in charging control and hydraulic off road and other industrial utility vehicles safety and emc storage technologies vehicular power and energy management diagnostics and prognostics and electromechanical vibration issues hybrid electric vehicles second edition is a comprehensively updated new edition with four new chapters covering recent advances in hybrid vehicle technology new areas covered include battery modelling charger design and wireless charging substantial details have also been included on the architecture of hybrid excavators in the chapter related to special hybrid vehicles also included is a chapter providing an overview of hybrid vehicle technology which offers a perspective on the current debate on sustainability and the environmental impact of hybrid and electric vehicle technology completely updated with new chapters covers recent developments breakthroughs and technologies including new drive topologies explains hev fundamentals and applications offers a holistic

perspective on vehicle electrification hybrid electric vehicles principles and applications with practical perspectives second edition is a great resource for researchers and practitioners in the automotive industry as well as for graduate students in automotive engineering

Modulation and Dynamic Control of Intelligent Dual-active-bridge Converter Based Substations for Flexible Dc Grids 2020-08-11 this book provides technological and socio economic coverage of renewable energy it discusses wind power technologies solar photovoltaic technologies large scale energy storage technologies and ancillary power systems in this new edition the book addresses advancements that have been made in renewable energy grid connected power plants power electronics converters and multi phase conversion systems the text has been revised to include up to date material statistics and current technology trends three new chapters have been added to cover turbine generators ac and dc wind systems and recent advances solar power conversion discusses additional renewable energy sources such as ocean special turbines etc covers system integration for solar and wind energy presents emerging dc wind systems includes coverage on turbine generators updated sections on solar power conversion it offers students practicing engineers and researchers a comprehensive look at wind and solar power technologies it is designed as a reference and can serve as a textbook for senior undergraduates in a one semester course on renewable power or energy systems

Renewable Energy Integration with Building Energy Systems 2017-12-19 energy storage is a key topic for research industry and business which is gaining increasing interest any available energy storage technology batteries fuel cells flywheels and so on can cover a limited part of the power energy plane and is characterized by

some inherent drawback supercapacitors also known as ultracapacitors electrochemical capacitors pseudocapacitors or double layer capacitors feature exceptional capacitance values creating new scenarios and opportunities in both research and industrial applications partly because the related market is relatively recent in practice supercapacitors can offer a trade off between the high specific energy of batteries and the high specific power of traditional capacitors developments in supercapacitor technology and supporting electronics combined with reductions in costs may revolutionize everything from large power systems to consumer electronics the potential benefits of supercapacitors move from the progresses in the technological processes but can be effective by the availability of the proper tools for testing modeling diagnosis sizing management and technical economic analyses this book collects some of the latest developments in the field of supercapacitors ranging from new materials to practical applications such as energy storage uninterruptible power supplies smart grids electrical vehicles advanced transportation and renewable sources

On the perspectives of SiC MOSFETs in high-frequency and high-power isolated DC/DC converters 2017-09-11 this book constitutes the refereed post conference proceedings of the second eai international conference on sustainable energy for smart cities sesc 2020 held in portugal in december 2020 the conference was framed within the 6th annual smart city 360 summit due to covid 19 pandemic the conferences were held virtually the 13 revised full papers were carefully reviewed and selected from 27 submissions they present multidisciplinary scientific results toward answering the complex technological problems of emergent smart cities the subjects related to sustainable energy framed with the scope of smart cities and addressed along with

the sesc 2020 conference are crucial to guarantee an equilibrium among economic growth and environmental sustainability as well as to contribute to reducing the impact of climate change

Electronic Circuit Design 2021-03-24 series parallel conversion systems in which multiple standardized converter modules are connected in series or parallel at the input and output sides to meet the demands of various applications this book focuses on the control strategies for the series parallel conversion systems with dc dc converters and dc ac inverters as the basic modules respectively to achieve input voltage current sharing and output voltage current sharing among the constituent modules the detailed theoretical analysis with design examples and experimental validations are presented this book is essential and valuable reference for graduate students and academics majoring in power electronics and engineers engaged in developing dc dc converters dc ac inverters and power electronics transformers

Hybrid Electric Vehicles 2020-12-15 the work involved in the identification and selection of a suitable converter topology is described three new dc dc converter topologies are proposed phase shifted single active bridge dc dc converter single phase dual active bridges dc dc converter and three phase dual active bridges dc dc converter topology c the salient features of these topologies are 1 all are minimal in structure i e each consists of an input and output bridge input and output filter and a transformer all components essential for a high power dc dc conversion process 2 all devices of both the bridges can operate under near zero voltage conditions making possible a reduction of device switching losses and hence an increase in switching frequency 3 all circuits operate at a constant frequency thus simplifying the task of the magnetic and filter elements 4 since the leakage inductance of the

transformer is used as the main current transfer element problems associated with the diode reverse recovery are eliminated also this mode of operation allows easy paralleling of multiple modules for extending the power capacity of the system 5 all circuits are least sensitive to parasitic impedances infact the parasitics are efficently utilized and 6 the soft switching transitions result in low electromagnetic interference a detailed analysis of each topology was carried out based on the analysis the various device and component ratings for each topology operating at an optimum point and under the given specifications are tabulated and discussed divan deepakraj m unspecified center

Wind and Solar Power Systems 2021-05-13 international workshops at iarec 17 this book inclueds english main and turkish languages international workshop on mechanical engineering international workshop on mechatronics engineering international workshop on energy systems engineering international workshop on automotive engineering and aerospace engineering international workshop on material engineering international workshop on manufacturing engineering international workshop on physics engineering international workshop on electrical and electronics engineering international workshop on computer engineering and software engineering international workshop on chemical engineering international workshop on textile engineering international workshop on architecture international workshop on civil engineering international workshop on geomatics engineering international workshop on industrial engineering international workshop on food engineering international workshop on aquaculture engineering international workshop on agriculture engineering international workshop on mathematics engineering international workshop on bioengineering engineering international workshop on biomedical engineering

international workshop on genetic engineering international workshop on environmental engineering international workshop on other engineering science
Advances in Supercapacitor Technology and Applications 2018-12-11
Sustainable Energy for Smart Cities 2005
Control of Series-Parallel Conversion Systems 2018-07-08
Proceedings 2017-12-29
High Power Density DC/DC Converter
International Advanced Researches & Engineering Congress 2017 Proceeding Book
The Proceedings of 2023 International Conference on Wireless Power Transfer (ICWPT2023)

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