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Institution Making Students Ready for "Industry 4.0"

Editorial Board

EEE NEWS LETTER

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

INDEX

- To provide students with high quality education so that they are well prepared to become high caliber Electrical and Electronics Engineers, and it aspires to grow to the level of gaining global recognition.

- To develop competent technocrats who strive continuously in pursuit of professional excellence in the field of Electrical and Electronics Engineering.
- To develop and sustain a culture of research while promoting values, ethics and professionalism.
- To offer well balanced curriculum to help students acquire professional competencies and to arrange placements for students.
- To develop state of art infrastructure and research for effective teaching learning process.
- Strengthening of soft skills especially for rural students through co-curricular and extra-curricular activities.

STUDENTS ACHIEVEMENTS

Third-year students participated in a symposium at MAMCET on 25.04.2025 and won the overall first place in the events.

- G. Kiruthika Sri and S. Dhanusuya won first prize in the Paper Presentation event.
- S. Dhanusuya and K. Devatharshini won second prize in the Connection event.
- K. Devatharshini and S. Dhanusuya won third prize in the Technical Quiz.
- R. Sarvanasanjith and S. Mohamed Thoufeequ won first prize in the Jigsaw Puzzle.
- K. Devatharshini won first prize in the Fake Logo event.
- A. Arunkarthick and Mohamed Asumudeen won third prize in the Fake Logo event.


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Certificate of Appreciation
Mr / Ms. G. KIRUTHIKA SRI III YR / EEE of
J.J COLLEGE OF ENGINEERING AND TECHNOLOGY has
Won I / II / III prize in the event IDEA IGNITE (PAPER PRESENTATION) during 'ELECTROBLITZ - 2K25'
A National Level Technical Symposium held on 25th April 2025.
Co-ordinator
HoD / EEE
Principal


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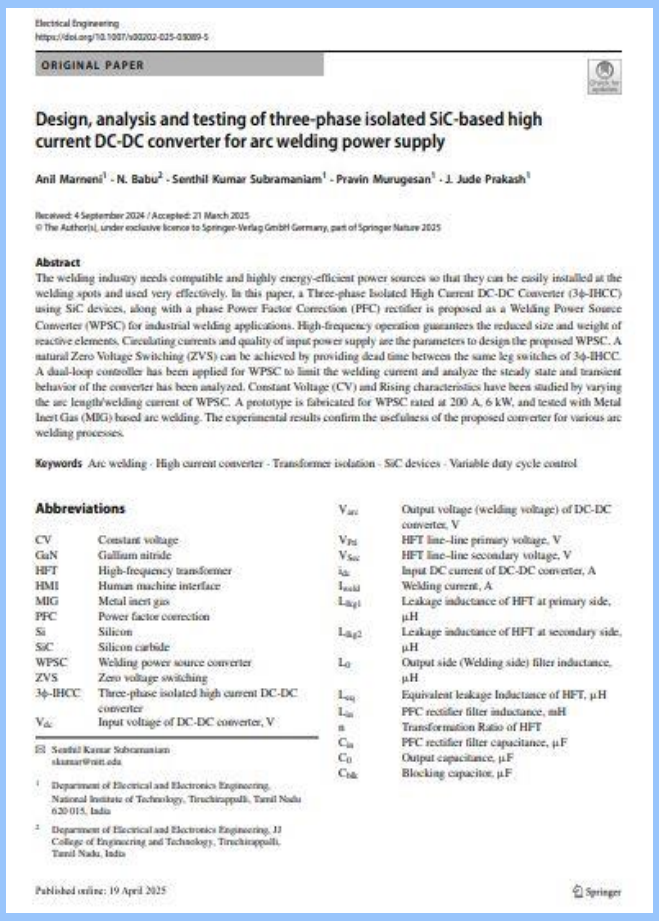
Mr / Ms. DEVA THARSHINI.K III YR / EEE of
J. J COLLEGE OF ENGINEERING AND TECHNOLOGY has
Won I / II / III prize in the event BRAND BLUFF (Fake Logo) during 'ELECTROBLITZ - 2K25'
A National Level Technical Symposium held on 25th April 2025.
Co-ordinator
HoD / EEE
Principal

FACULTY'S ACHIEVEMENTS

Dr. N. Babu, Associate Professor in the Department of Electrical and Electronics Engineering, has published a research paper titled *'Design, Analysis, and Testing of a Three-Phase Isolated SiC-Based High-Current DC-DC Converter for Arc Welding Power Supply'* in a prestigious SCI-indexed journal by Springer.

Dr. G. Sundararajan, Assistant Professor in the Department of Electrical and Electronics Engineering, has presented a research paper titled *'Hybrid Photovoltaic Thermal Power Cogeneration During Different Irradiances'* at an international conference, and it has been published in IEEE Xplore. The paper is indexed in Scopus.



Electrical Engineering
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ORIGINAL PAPER

Design, analysis and testing of three-phase isolated SiC-based high current DC-DC converter for arc welding power supply

Anil Marneni[1] · N. Babu[2] · Senthil Kumar Subramaniam[1] · Pravin Murugesan[1] · J. Jude Prakash[1]

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Abstract
The welding industry needs compatible and highly energy-efficient power sources so that they can be easily installed at the welding spots and used very effectively. In this paper, a Three-phase Isolated High Current DC-DC Converter (3ϕ-IHCC) using SiC devices, along with a phase Power Factor Correction (PFC) rectifier is proposed as a Welding Power Source Converter (WPSC) for industrial welding applications. High-frequency operation guarantees the reduced size and weight of reactive elements. Circulating currents and quality of input power supply are the parameters to design the proposed WPSC. A natural Zero Voltage Switching (ZVS) can be achieved by providing dead time between the same leg switches of 3ϕ-IHCC. A dual-loop controller has been applied for WPSC to limit the welding current and analyze the steady state and transient behavior of the converter has been analyzed. Constant Voltage (CV) and Rising characteristics have been studied by varying the arc length/welding current of WPSC. A prototype is fabricated for WPSC rated at 200 A, 6 kW, and tested with Metal Inert Gas (MIG) based arc welding. The experimental results confirm the usefulness of the proposed converter for various arc welding processes.

Keywords Arc welding · High current converter · Transformer isolation · SiC devices · Variable duty cycle control

Abbreviations

CV	Constant voltage
GaN	Gallium nitride
HFT	High-frequency transformer
HMI	Human machine interface
MIG	Metal inert gas
PFC	Power factor correction
Si	Silicon
SiC	Silicon carbide
WPSC	Welding power source converter
ZVS	Zero voltage switching
3ϕ-IHCC	Three-phase isolated high current DC-DC converter
V_{dc}	Input voltage of DC-DC converter, V
V_{arc}	Output voltage (welding voltage) of DC-DC converter, V
V_{Pri}	HFT line–line primary voltage, V
V_{Sec}	HFT line–line secondary voltage, V
i_{dc}	Input DC current of DC-DC converter, A
I_{weld}	Welding current, A
L_{lkg1}	Leakage inductance of HFT at primary side, µH
L_{lkg2}	Leakage inductance of HFT at secondary side, µH
L_O	Output side (Welding side) filter inductance, µH
L_{eq}	Equivalent leakage Inductance of HFT, µH
L_{in}	PFC rectifier filter inductance, mH
n	Transformation Ratio of HFT
C_{in}	PFC rectifier filter capacitance, µF
C_O	Output capacitance, µF
C_{blk}	Blocking capacitor, µF

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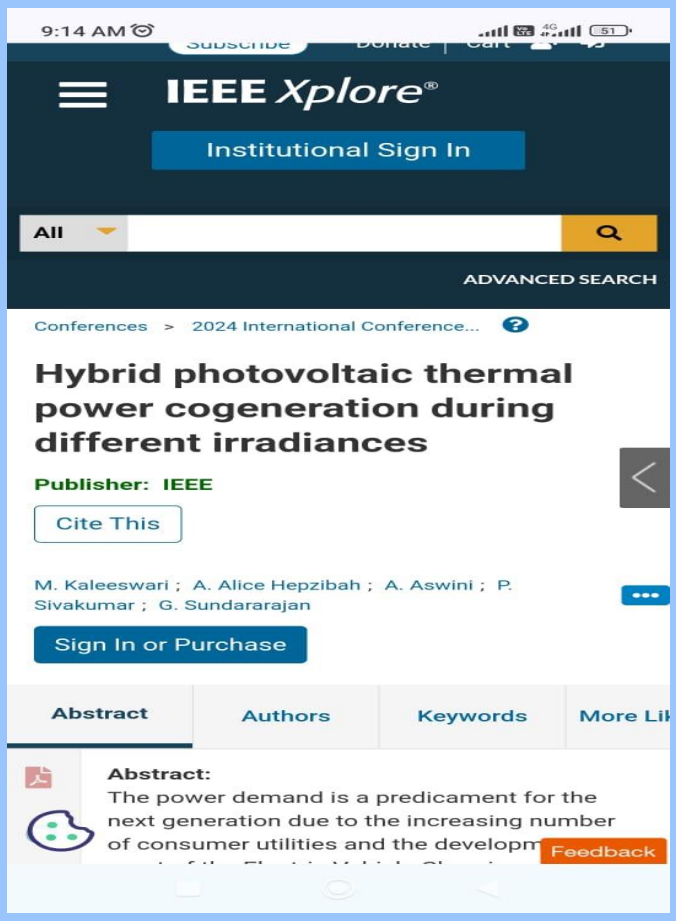

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The power demand is a predicament for the next generation due to the increasing number of consumer utilities and the develop

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