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| **Title:** | A Comparative Study on various Recent Single-Phase Single-Switch Non-Isolated AC-DC SEPIC Configurations | | |
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| **Published Journal Name:** | SEU JOURNAL OF ELECTRICAL AND ELECTRONIC ENGINEERING (SEUJEEE) | | |
| **Type of Publication:** | Journal | | |
| **Volume:** | 2 | Issue | 1 |
| **Publisher:** | EEE-SEU | | |
| **Publication Date:** | January 2022 | | |
| **ISSN:** | p-2710-2130, e-2710-21 | | |
| **DOI:** |  | | |
| **URL:** | http://www.seu.edu.bd/seujeee/downloads/vol\_02\_issue\_01\_Jan\_2022/SEUJEEE-Vol02Issue01-1.pdf | | |
| **Other Related Info.:** | pp. 1-11 | | |
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| **Abstract:** |  |
|   Abstract— In this comparative analysis-based research paper, five recent power electronic circuits of single-phase, non-isolated AC-to-DC SEPIC configurations are considered, such as, switched capacitor, modified, high-efficiency, input switched, and improved performance based SEPIC circuits. The open-loop performance analyses were made among these five recent converter circuits. Before that, a good number of articles on power electronic converter circuits are studied and key performance parameters, for example, voltage gain, efficiency, power factor of the supply current signal, Total Harmonic Distortion, and the number of parts were identified. Then these are analyzed based on the variation of load resistance and duty cycles. The performance evaluation points out that the high-efficiency SEPIC circuit provides an impressive efficiency of over 99% within a wide range of load resistances or duty cycles. In terms of power factor, the modified SEPIC circuit demonstrates better results of over 0.98. The switched capacitor SEPIC circuit can provide the lowest THD among the five topologies. | |