Simulation and Analysis of Diode Clippers and Clampers Using eSIM

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Introduction:

Clippers and Clampers are essential nonlinear circuits used for waveform shaping in communication and signal processing systems. Clippers (limiters) remove parts of the input waveform that exceed a certain voltage level, while Clampers shift the entire waveform to change its DC level without altering the shape. This project focuses on simulating these circuits using the open-source eSIM software, promoting low-cost circuit simulation practices aligned with industry standards.

Objectives:

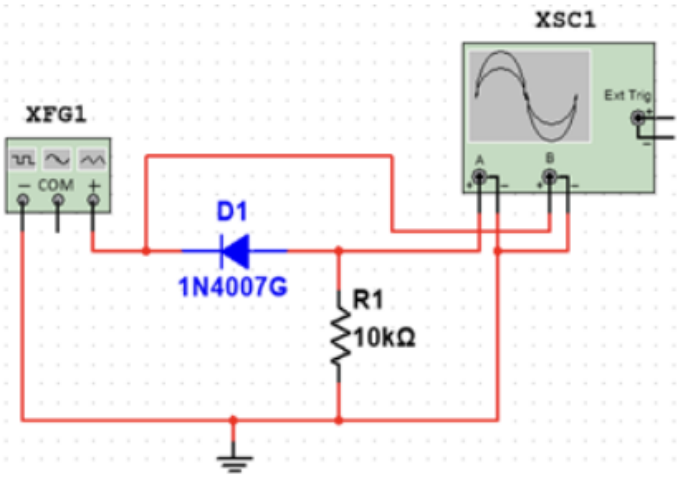
- To design and simulate various clipper and clamper circuits in eSIM.

- To analyze waveform modifications caused by these circuits.

- To understand their practical applications in analog signal processing.

Expected Outcome:

- Successful simulation showcasing the clipping and clamping effects.
- Observed changes in waveform amplitude and DC level shifts, validating the theory.
- Documentation of practical understanding of signal conditioning.



Positive Clipper Circuit

References:

1. "Design and Analysis of Clipper and Clamper Circuits" - IRE Journals
https://www.irejournals.com/paper-details/1701522

2. CircuitBread: Diodes as Clippers and Clampers
https://www.circuitbread.com/tutorials/using-diodes-as-clippers-or-clampers

3. IEEE Xplore Publication:
"Diode Applications in Nonlinear Wave Shaping Circuits"
https://ieeexplore.ieee.org/document/793507

Tools Used:

eSIM (Open-source Electronic Circuit Simulation Software developed by FOSSEE, IIT Bombay)

Result:

Clippers and Clampers were successfully simulated on eSIM. Waveform modifications due to diode action and biasing were clearly observed, demonstrating their significance in practical electronic circuit design.