Clipper

A clipper circuit is an electronic circuit designed to remove or "clip" a portion of an input signal without distorting the remaining part of the waveform. This operation ensures that the output voltage stays within a specific range. By doing so, a clipper circuit effectively limits the amplitude of a signal.

Main Features:

- Clipper circuits can clip signals either above or below a reference voltage.
- They use components such as diodes, resistors, and sometimes additional biasing voltage sources.
- They are simple, cost-effective, and versatile.

Types of Clipper Circuit

Clipper circuits are categorized based on their design and operation. Below are the primary types of clipper circuit:

- Positive Clipper Circuit
- Negative Clipper Circuit
- Biased Clipper Circuit
- Series Clipper Circuit
- Dual Clipper Circuit

Positive Clipper Circuit

A positive clipper circuit is designed to remove the positive part of the input signal above a certain reference voltage.

Working Principle:

- When the input voltage exceeds the reference voltage, the diode becomes forward-biased, conducting the excess voltage to ground.
- The output waveform contains only the negative cycle and the unclipped portion of the positive cycle.

Negative Clipper Circuit

A negative clipper circuit removes the negative part of the signal below a predefined threshold.

Working Principle:

- When the input voltage drops below the reference voltage, the diode conducts, clipping the negative part of the signal.

- The output contains only the positive cycle and the unclipped portion of the negative cycle.

Biased Clipper Circuit

A biased clipper circuit allows you to clip the waveform at voltage levels other than zero by introducing a DC bias.

Types:

- Positive Biased Clipper: Clips positive signals above a reference voltage.
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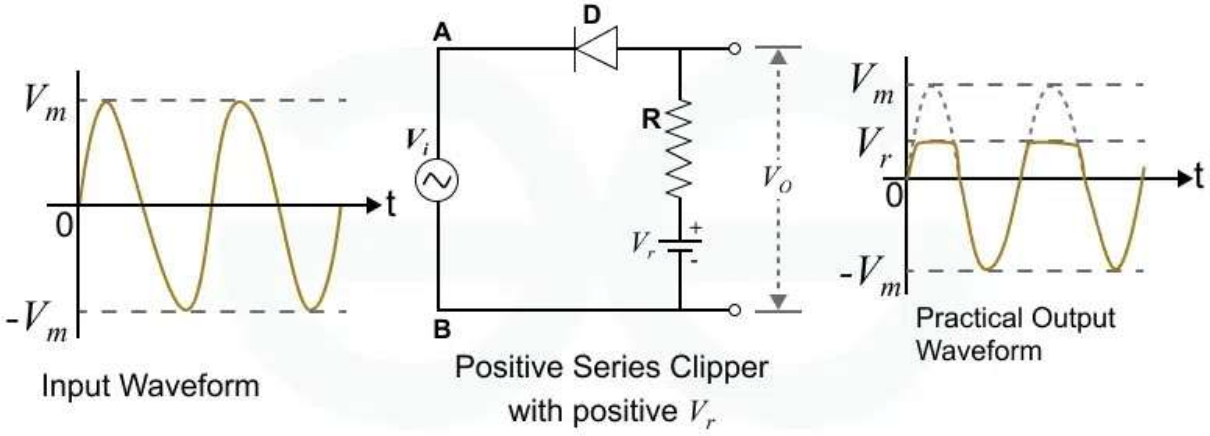
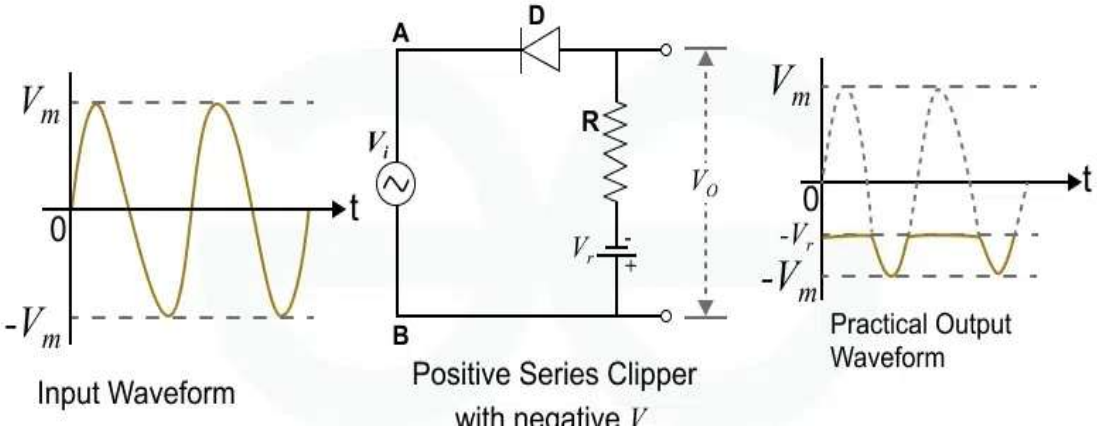


Negative Biased Clipper: Clips negative signals below a reference voltage



Series Clipper Circuit

In a series clipper circuit, the diode is placed in series with the load.

Characteristics:

- Affects the entire signal when the diode conducts.
- Can be used for both positive and negative clipping.

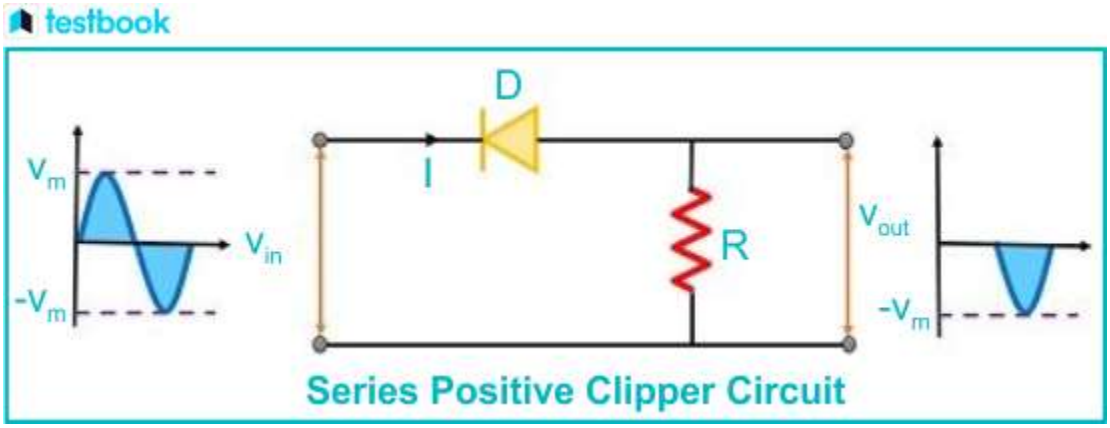


Fig-Series Positive Clipper Circuit

Dual Clipper Circuit

A dual clipper circuit removes both the positive and negative parts of the signal. It uses two diodes in opposite orientations.

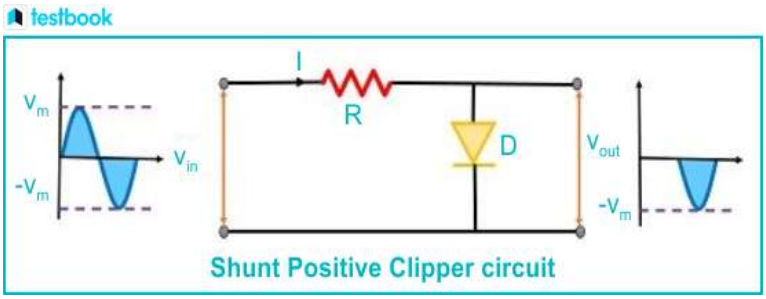


Fig-Shunt Positive Clipper Circuit Diagram

Advantages of Clipper Circuit

- **Waveform Shaping:** Useful for signal processing and noise reduction.
- **Overvoltage Protection:** Protects circuits from voltage spikes.
- **Simplicity:** Easy to design and implement.
- **Versatility:** Applicable in various fields such as communications and instrumentation.

Disadvantages of Clipper Circuit

1. **Signal Loss**: Reduces parts of the input signal.
2. **Distortion**: May introduce waveform distortion if not designed correctly.
3. **Voltage Dependency**: Performance depends on component tolerances and reference voltage stability.

Applications of Clipper Circuit

Clipper circuits find extensive applications in electronics and communication systems. Below are some common **clipper circuit applications**:

1. **Voltage Limiting**: Protect sensitive components from voltage surges.
2. **Waveform Shaping**: Generate specific waveform shapes for testing.
3. **Noise Reduction**: Remove noise spikes in communication signals.
4. **Signal Conditioning**: Prepares signals for further processing.
5. **Audio Processing**: Limits audio signal peaks to prevent distortion.