



Study of CLIPPER and its applications : A Review

Ekta, Msc. Physics, Email : ektahanda.ed@gmail.com

Abstract : It controls the shape of the output waveform by removing or clipping a portion of the applied wave. Half wave rectifier is the simplest example. It is also referred as voltage limiters/ amplitude selectors/ slicers.



Key Words : Clippers, Diodes.

Types of Clipper Circuit

1. Series- Diode is in series with the source
2. Parallel- Diode is in parallel with the source.

• Clipper circuit which uses a DC battery is called a biased clipper.

SERIES CLIPPER:

Assumption- diode is ideal in characteristics

Analysis

+ve Half Cycle:

Diode is on because of forward biasing condition. Since no voltage drop across the diode the output voltage becomes

$$V_O = V_R = V_X - V_i$$

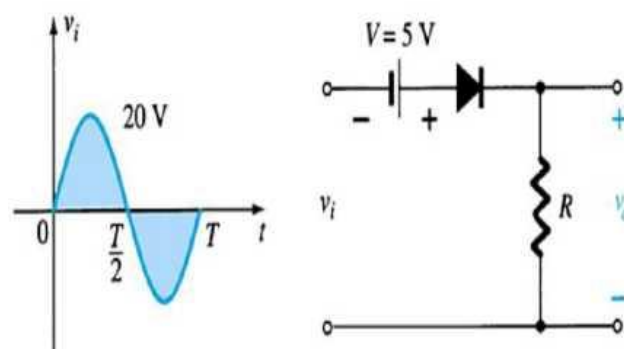
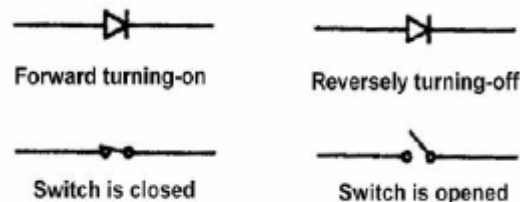
Ve Half Cycle:

Diode is off because of reverse biasing condition. Since no current flows through the circuit the output voltage $V_O = 0$.

Figure shows the output waveform of a simple series clipper with input as square and triangular waveform. Since the negative half cycle is clipped off in the output it is called as a negative clipper circuit.

Biased Series Clipper:

Assumption- diode is ideal in characteristics





Analysis

Since the diode is on because of the 5v battery

The transition of the diode from one state to another can be found out to be at $V_i = -5v$ above which the diode is ON and below which the diode is OFF.

+ve Half Cycle:

Since the diode is on the output voltage will be (Applying KVL)

$$V_i + 5 = VR$$

$$V_o = V_i + 5$$

-ve Half Cycle:

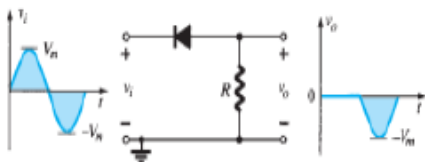
Since the diode is off $V_o = 0$.

Figure Shows the input and output waveform.

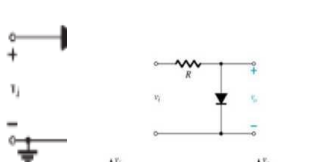
Example of Other Series Clipper Circuits:

Simple Series Clippers (Ideal Diodes)

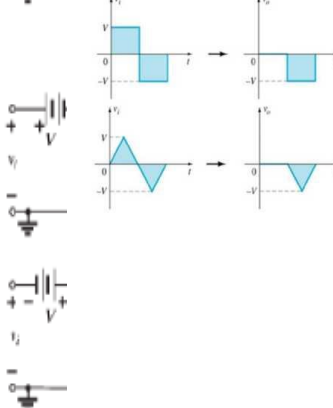
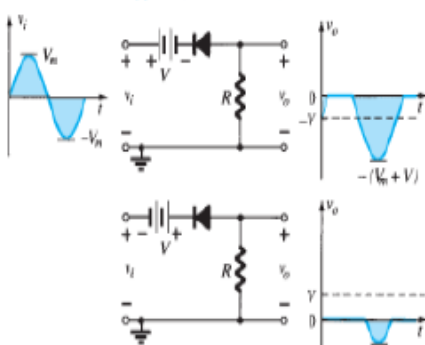
POSITIVE



NEGATIVE



Biased Series Clippers (Ideal Diodes)



PARALLEL CLIPPER:

Assumption- diode is ideal in characteristics

Analysis

+ve Half Cycle:



Diode is on because of forward biasing condition.

Since no voltage drop across the diode the output

voltage becomes

$$V_o = V_d = 0$$

-ve Half Cycle:

Diode is off because of reverse biasing condition.

Since no current flows through the circuit the output voltage $V_o = V_i$.

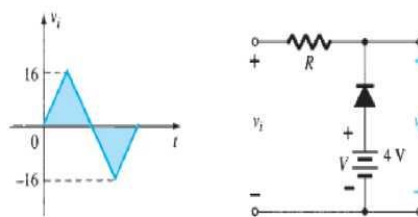
Figure shows the output waveform of a simple parallel clipper with input as square and triangular waveform. Since the positive half cycle is clipped off in the output it is called as a positive clipper circuit.

Biased parallel Clipper:

Assumption- diode is ideal in characteristics

Analysis

The transition of the diode from another can be found out to be which the diode is OFF and diode is ON.



one state to at $V_i = 4V$ above below which the

+ve Half Cycle:

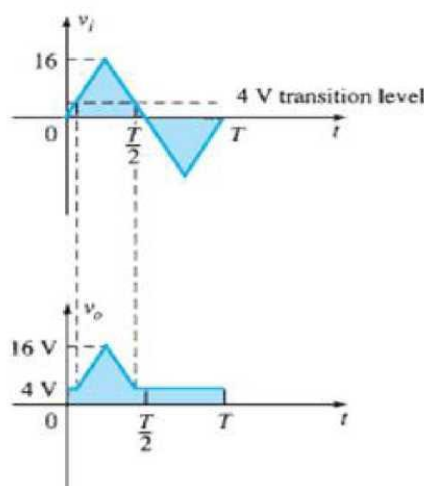
Since the diode is OFF (above voltage will be (Applying KVL)

$$V_i = V_o$$

-ve Half Cycle:

Since the diode is ON (below

$$V_o = 4V.$$



4v) the output

4v)

Figure Shows the input and output waveform.

Example of other parallel clipper circuits:

Applications:



- In radio receivers for communication circuits.
- In radars, digital computers and other electronic systems.
- Generation for different waveforms such as trapezoidal, or square waves. Helps in processing the picture signals in television transmitters.
- In television receivers for separating the synchronizing signals from composite picture signals

References :

1. <https://www.elprocus.com/types-of-clipper-and-clamper-circuits-and-applications/>
2. <https://www.electronicshub.org/diode-clippers-and-clampers/>
3. <https://www.gopracticals.com/electronics/basic-electronics/to-study-clipper-circuit/>
4. <https://www.electronics-tutorials.ws/diode/diode-clipping-circuits.html>