Clippers

A Clipper is a circuit that removes either positive or negative parts of a waveform. Useful for signal shaping, circuit protection and communications.

- positive clipper: removes all the positive parts of the input signal

1. negative clipper: removes all the negative parts of the input signal

**Defining conditions:** Series resistance, $R_s$ is to be chosen appropriately. For example,
\[
R_B = \frac{1 \text{ V} - 0.7 \text{ V}}{1.0 \text{ mA}} = 30 \Omega
\]

\(R_B\) is the forward base resistance. Then series resistance should be more than 3kΩ and load should be more than 300kΩ. That is,

\[R_L \gg R_S \gg R_B\] thmb rule: 100R_B < R_S < 0.01R_L

**Biased Clipper**

Usually the reference level is considered at zero or ground. A clipper ckt with reference level other than zero is called Biased Clipper.

**Combination clipper**

**Biases the Clipper without battery**

Setting the bias using battery is impractical. Alternatively, we can add more silicon diodes or use a potential divider network.
Clampers
Clamper is a circuit which inserts dc to the signal in order to shift its reference level from zero.

1. positive clamp: shifts ac reference level up to a +ve dc level.
2. negative clamp: shifts ac reference level up to a –ve dc level.

** Use of dc battery is not practical

Using diodes a positive clamper

Using diodes a negative clamper

** RC time constant must be much larger than the time period of the signal,

\[ R_L C > 100T \]
Voltage Multipliers

a. Voltage Doublers

b. Voltage Tripler

c. Quadrupler ??