# SNS COLLEGE OF TECHNOLOGY

**Coimbatore-35**
**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade (III Cycle)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

# DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## 23ECB202 – LINEAR INTEGRATED CIRCUITS

II YEAR/ IV SEMESTER



UNIT 2 – **APPLICATIONS OF OPERATIONAL AMPLIFIERS**

TOPIC – Clipper

# Clipper

- A **clipper** is an electronic circuit that produces an output by removing a part of the input above or below a reference value.
- That means, the output of a clipper will be same as that of the input for other than the clipped part.
- The peak to peak amplitude of the output of a clipper will be always less than that of the input.
- The main advantage of clippers is that they eliminate the unwanted noise present in the amplitude of an ac signal.

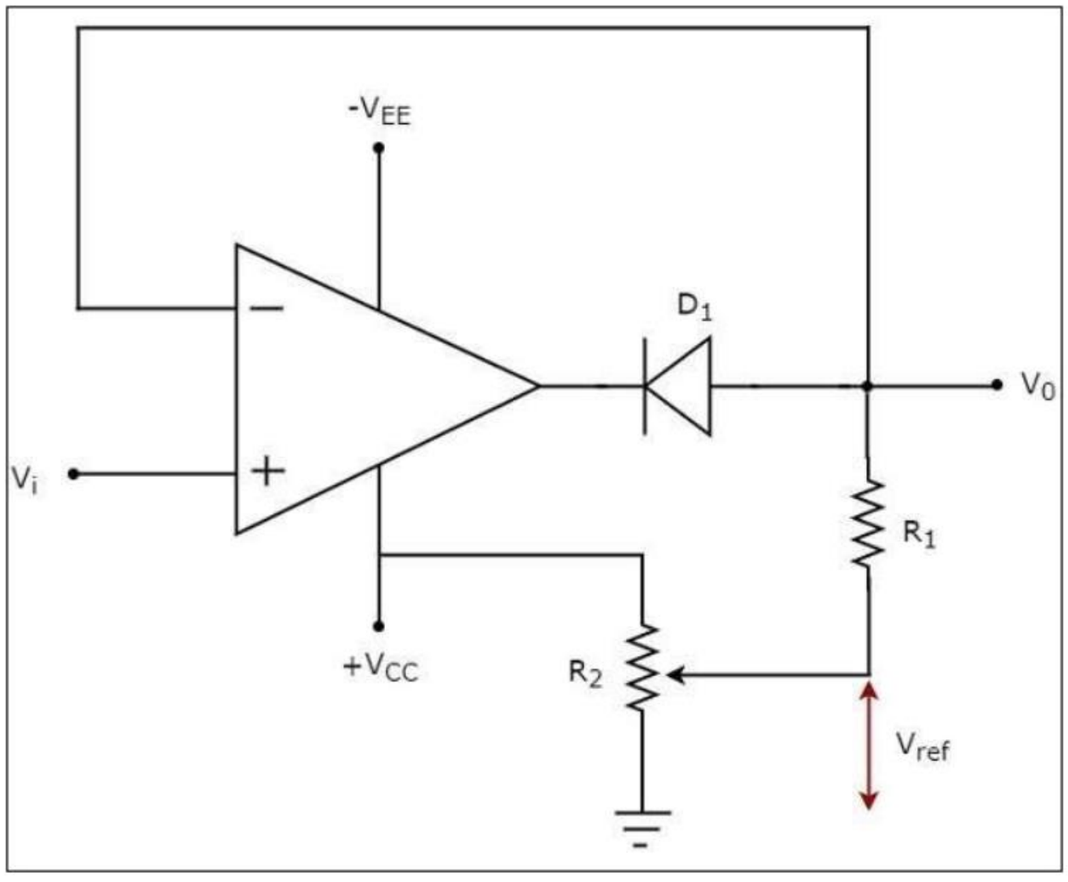
# TYPES

Clippers can be classified into the following two types based on the clipping portion of the input.

- Positive Clipper
- Negative Clipper

# Positive Clipper

A **positive clipper** is a clipper that clips only the positive portion(s) of the input signal.

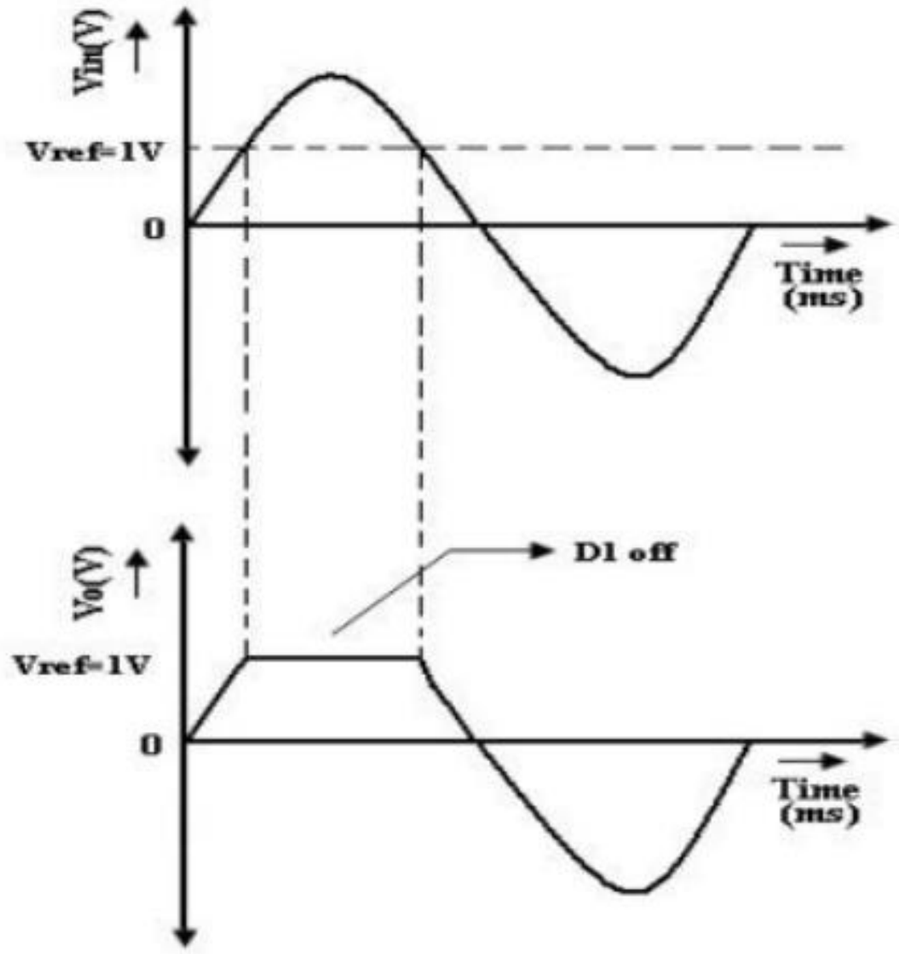


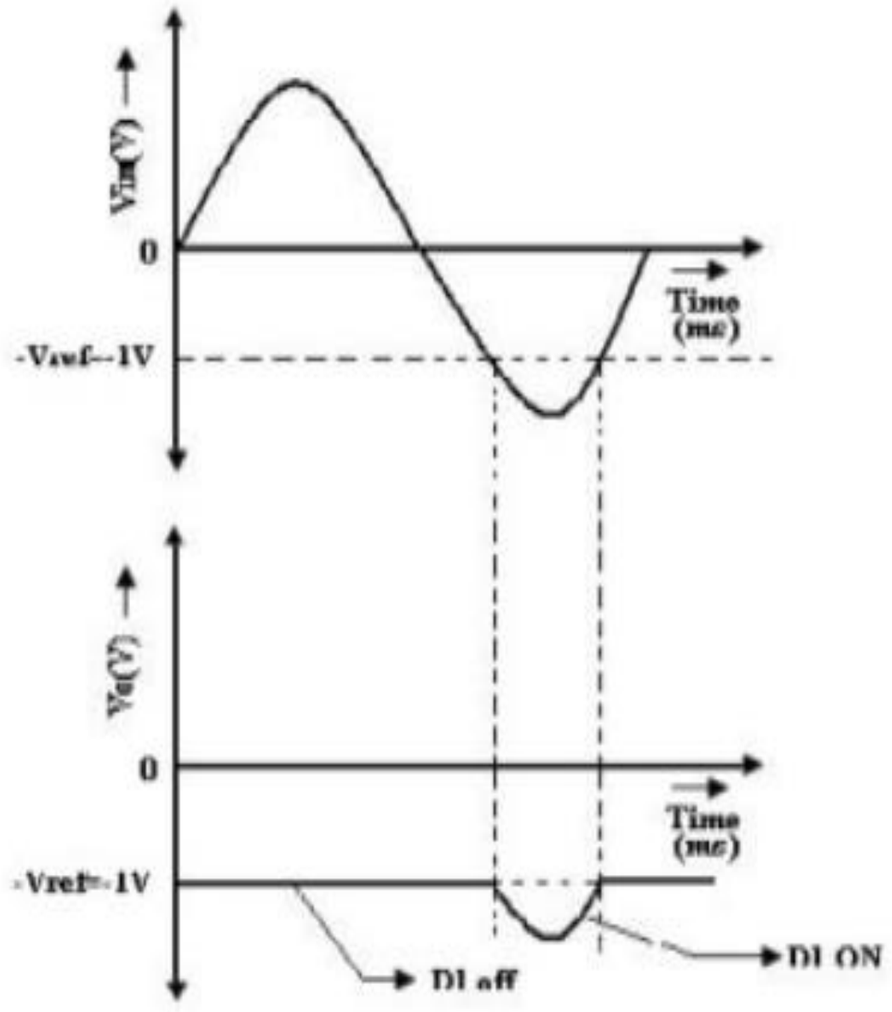

- The value of the reference voltage Vref can be chosen by varying the resistor R2.

# Working

- $V_i < V_{ref}$ - diode $D_1$ conducts - the circuit given above behaves as a **voltage follower**
- Therefore, the output voltage V0V0 of the above circuit will be same as that of the input voltage
- $V_i > V_{ref}$ - diode $D_1$ will be off - op-amp operates in an open loop since the feedback path was open.
- The output voltage will be equal to the reference voltage.

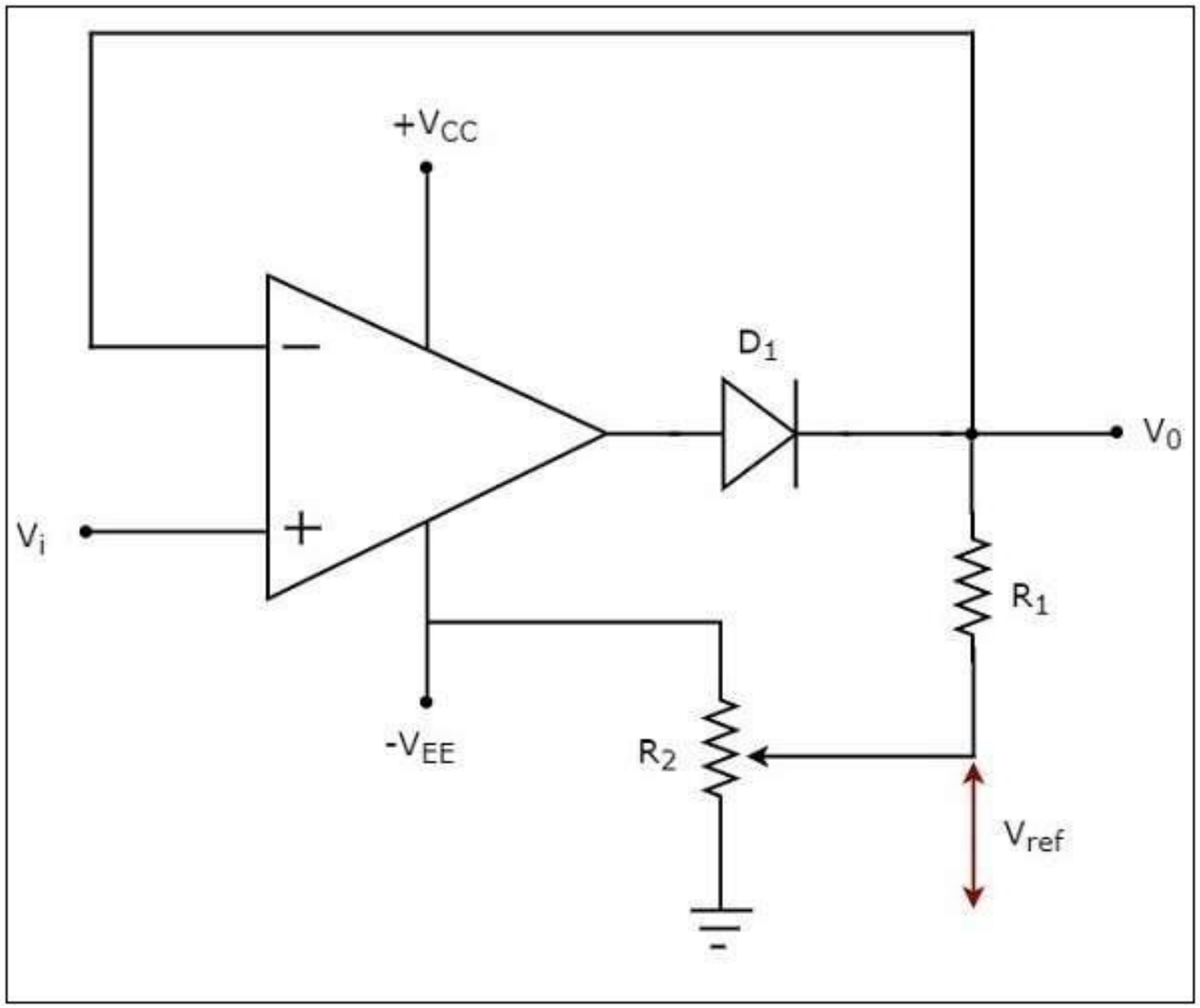
# Waveforms


Vin(V)
Vref=1V
0
Time
(ms)
Vo(V)
Vref=1V
0
D1 off
Time
(ms)


Vin(V)
0
Time
(ms)
-Vref=-1V
Vo(V)
0
Time
(ms)
-Vref=-1V
D1 off
D1 ON

# Negative Clipper

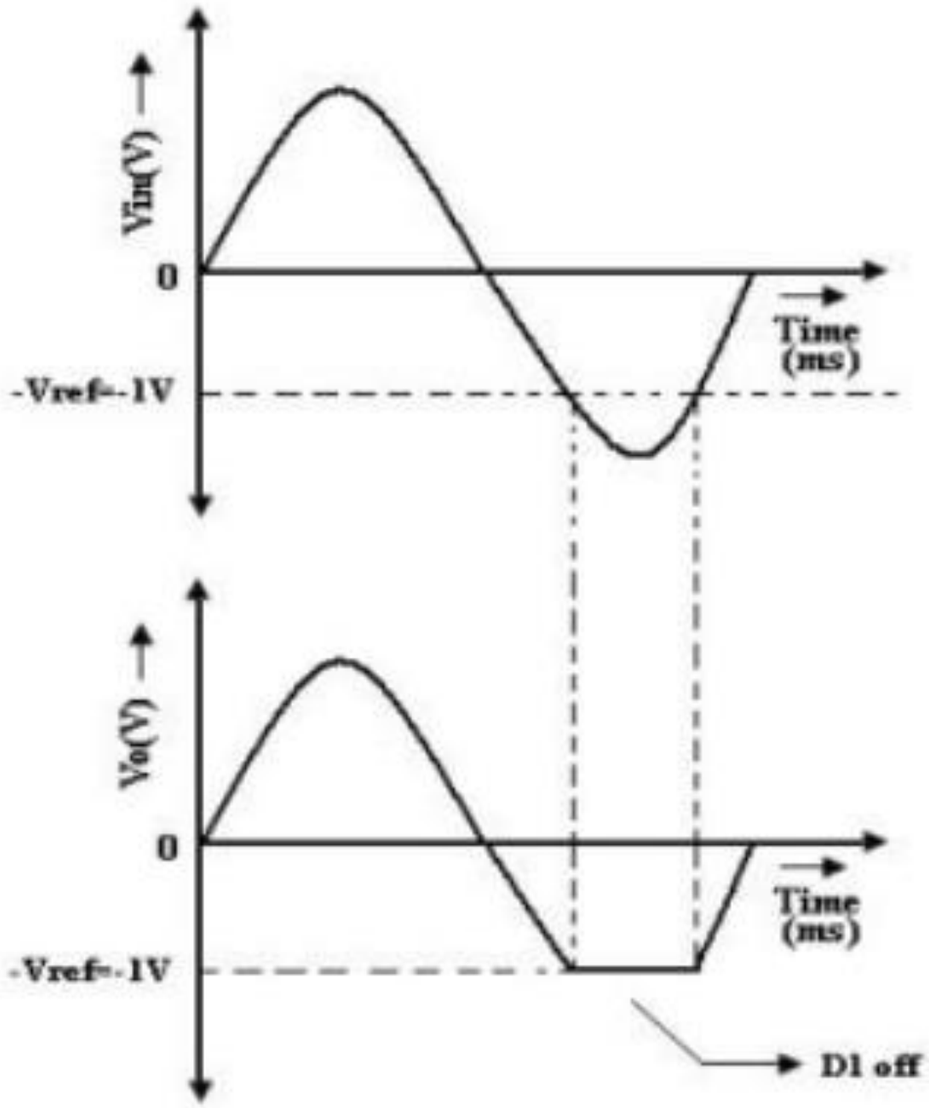
- A **negative clipper** is a clipper that clips only the negative portion(s) of the input signal.

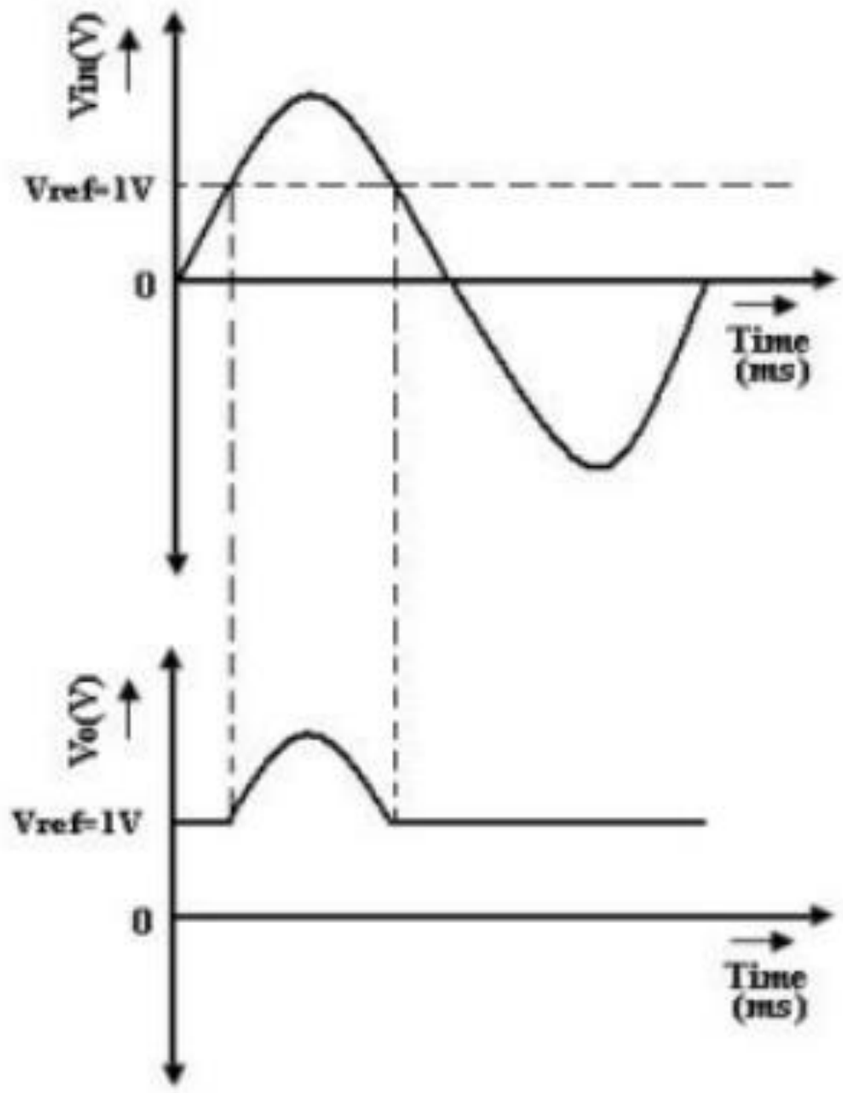


# Working

- $V_i > V_{ref}$ - diode $D_1$ conducts - the circuit given above behaves as a **voltage follower**
- Therefore, the output voltage V0V0 of the above circuit will be same as that of the input voltage
- $V_i < V_{ref}$ - diode $D_1$ will be off - op-amp operates in an open loop since the feedback path was open.
- The output voltage will be equal to the reference voltage.

# Waveforms


Vin(V)
0
-Vref=-1V
Time
(ms)
Vo(V)
0
-Vref=-1V
Time
(ms)
D1 off


Vin(V)
Vref=1V
0
Time
(ms)
Vo(V)
Vref=1V
0
Time
(ms)

# Assessment

1. The clipping level in op-amp is determined by
   a) AC supply voltage
   b) Control voltage
   **c) Reference voltage**
   d) Input voltage

2. In a positive clipper, the diode conducts when
   a) Vin < Vref
   **b) Vin = Vref**
   c) Vin > Vref
   d) None of the mentioned


3. What happens if the input voltage is higher than reference voltage in a positive clipper?
   **a) Output voltage = Reference voltage**
   b) Output voltage = DC Positive voltage
   c) Output voltage = Input voltage
   d) All of the mentioned

# THANK YOU