

# **High Side vs. Low Side Switching**

## **1. Introduction:**

High-side and low-side switching are fundamental concepts in power electronics, referring to the placement of a switching element (typically a MOSFET or IGBT) within a power circuit. The choice between these two configurations depends on various factors, including load characteristics, system requirements, and component availability.

## **2. high-side switching**

In high-side switching, the switching element is placed between the power supply and the load. The gate of the MOSFET is driven with respect to the power supply rail, requiring a level shifter or bootstrap circuit to generate the appropriate gate voltage.

### **Advantages:**

- Single-point ground for the entire system.
- Easier protection for the load.
- Can be used for both inductive and resistive loads.

### **Disadvantages:**

- Requires additional circuitry (level shifter or bootstrap) for gate driving.
- Higher component count and complexity.
- Potentially higher cost.

## **Low Side Switching**

In low-side switching, the switching element is placed between the load and ground. The gate of the MOSFET is driven with respect to ground, simplifying the gate drive circuitry.

### **Advantages:**

- Simpler gate drive circuitry.
- Lower component count and cost.
- Typically higher efficiency due to lower voltage drop across the switch.

### **Disadvantages:**

- Separate ground for the load and control circuitry.
- Potential for ground loops and noise issues.
- Not suitable for all load types (e.g., inductive loads without additional components).