

# High Side vs. Low Side Switching

## 1. Introduction

Depending on where the switch (typically a transistor or MOSFET) is located in relation to the load, there are two separate techniques used to regulate the electrical currents in a circuit: high side switching and low side switching.

## 2. the difference between high side and low side switching

When using high-side switching, the load and the positive power line are connected to the switch. In contrast, low-side switching links the load to ground. As illustrated by the following figure

### 2.1 High side switching

#### ➤ Common methods:

A P-channel MOSFET or a high-side driver IC are two popular devices for high-side switching.

#### ➤ Disadvantages:

The voltage drop across the circuit is one possible problem with high side switching that may impact the load's performance.

#### ➤ Advantages:

Random short circuits are frequently less likely when connected to the ground.

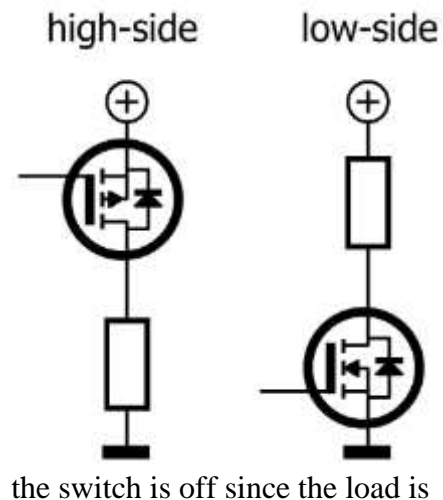


Figure 2.1

High side switches simplify controlling and modifying the voltage level in various applications using logic circuits or microcontrollers.

### 2.2 Low side switching

#### ➤ Common methods:

Relays, transistors, low-side driver ICs, N-channel MOSFETs, and other semiconductors can all be used to accomplish low side switching.

#### ➤ Disadvantages:

In addition to causing problems if the load is linked to ground, low side switching can also generate noise and induce ground loops in the circuit.

#### ➤ Advantages:

Easy Heat Management is helpful for high-load applications because any heat produced is frequently harmless and quickly scattered.

Cost-Effectiveness as it frequently uses fewer passive components, leading to a simpler and less expensive design.

### **3. Choosing the right method**

#### **3.1 High side switching**

It is used for applications for vehicles or machinery where the majority of the body or structure is anchored to the ground. Disconnecting the load from the battery in such circumstances is safer than doing so from the ground. Additionally, because the load is not carrying any voltage when it is off, this usually leads to reduced connector corrosion in humid situations.

So, in these applications high side switching is preferred.

It also minimizes the possibility of short circuits in the event that a component breaks.

#### **3.2 Low side switching**

Compared to high side switching, low side switching is easier to install and more affordable. Additionally, it makes it simpler to isolate the load from the circuit, which is beneficial in some applications.

Also, low side switches can switch faster in high-frequency applications because they usually have a lower driving complexity.

Low side switching may be possible if the design can withstand heat and the load does not interact negatively with the ground potential.

✓ **References**

- ✓ <https://www.physicsforums.com/threads/high-side-and-low-side-switching.872134/>
- ✓ <https://www.elektormagazine.com/articles/high-side-low-side-switching>