High Side vs. Low Side Switching

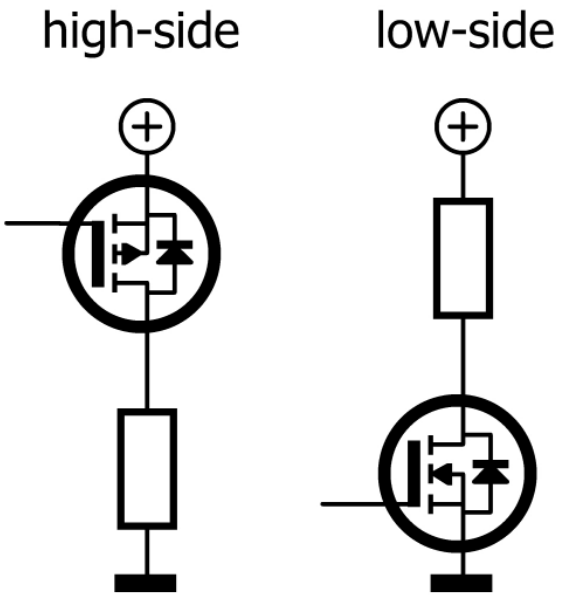
There are two configurations for a transistor switch: low side and high side. The location of the transistor determines the type of circuit and its name. Either transistor configuration can use a BJT or MOSFET.

Low Side Switching

When the transistor is connected to ground, that means the load is between +V and the transistor. Since the transistor is switching the path to ground or is sitting on the low side of the load, When the switch is closed (turned on), current flows from the power supply through the load to ground, thereby powering the load, NPN BJT or an N-Channel MOSFET are the most implemented transistors in the case of low side switching

High Side

The opposite of the low-side switch is the high-side switch places the switch between the load and ground. The load is connected between the power supply and the switch, places the switch between the load and ground. The load is connected between the power supply and the switch PNP BJT or P-Channel MOSFE are typically used.



The difference between High and Low Side Switch

- The position of the switch relative to the load as we mentioned above

- Load Behavior as in the case High Side Switching The load is connected directly to ground. Which can be beneficial when requiring stable ground reference or when multiple loads share a common ground, and in the case of Low Side Switching: The load is connected directly to the power supply, with the switch providing the path to ground. This is often simpler to implement, especially when dealing with standard N-channel MOSFETs or NPN BJTs.

- Safety concerned: High Side Switching Offers better protection against faults such as short circuits because the load is directly connected to ground unlike the Low Side Switching

Application and advantage of each kind

High-Side Switching:

Commonly used in applications where the load needs to be isolated from the power supply when off, such as in automotive electronics, battery management systems, and certain power supplies.

Low-Side Switching:

Often used in simpler, cost-sensitive applications such as motor controllers, and basic power switching circuits where ground-referenced control is advantageous.