

WHAT ARE DISADVANTAGES OF H- BRIDGE (CONSISTING OF 4 TRANSISTOR NPN) AND HOW TO OVERCOME THEM?

1. High-Side Switching Challenges:

- **Issue:** When using NPN transistors for the upper switches, the drive signal to the base must be higher than the upper supply rail to fully turn on the transistor. This presents a complication.
- **Solution:** Consider using **P-channel MOSFETs** for the high-side switches. P-channel MOSFETs can simplify the drive circuit and avoid the need for higher-than-supply-rail gate voltages

1. Power Losses on High Side:

- **Issue:** NPN transistors as high-side switches result in power losses due to their source follower behavior. Fully turning on an NMOS requires a gate voltage higher than the supply voltage.
- **Solution:** Opt for **P-channel MOSFETs** for the high-side switches. These devices can conduct fully with a gate voltage lower than the supply voltage, reducing power losses.

2. Switching Delays:

- **Issue:** There may be delays in switching times when transitioning between on and off states.
- **Solution:** Use **fast-switching transistors** or MOSFETs to minimize switching delays. Additionally, consider gate drivers that ensure saturation and faster turn-on times.