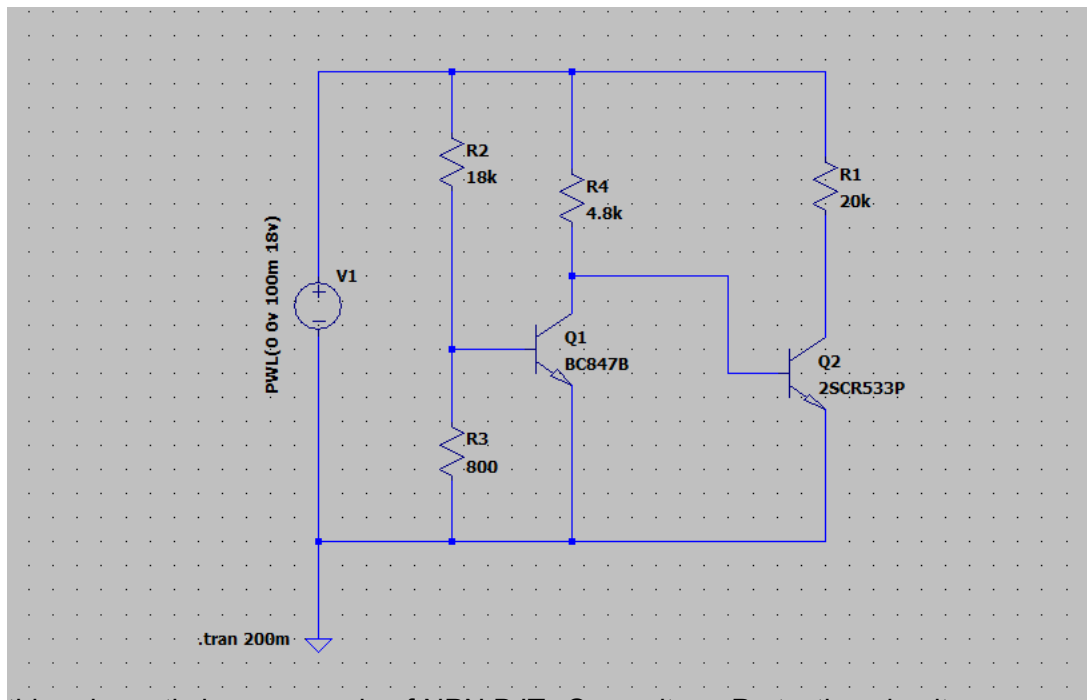


## Overvoltage Protection BJT transistors

It is a common requirement for electronic circuits to have to withstand some degree of overvoltage and/or reverse voltage on the power-supply lines. These conditions can arise from various sources, such as power surges, lightning strikes, load switching, or malfunctioning power supplies. To safeguard sensitive electronic devices and ensure the reliability and to make the systems robust as possible against this dangerous

### Overvoltage Protection Using NPN BJTs:

In an overvoltage protection circuit using an NPN BJT, the transistor is typically used as a switch that disconnects or shunts the load when an overvoltage condition is detected. The NPN BJT is placed in series with the load, and the base is connected to a voltage detection circuit.



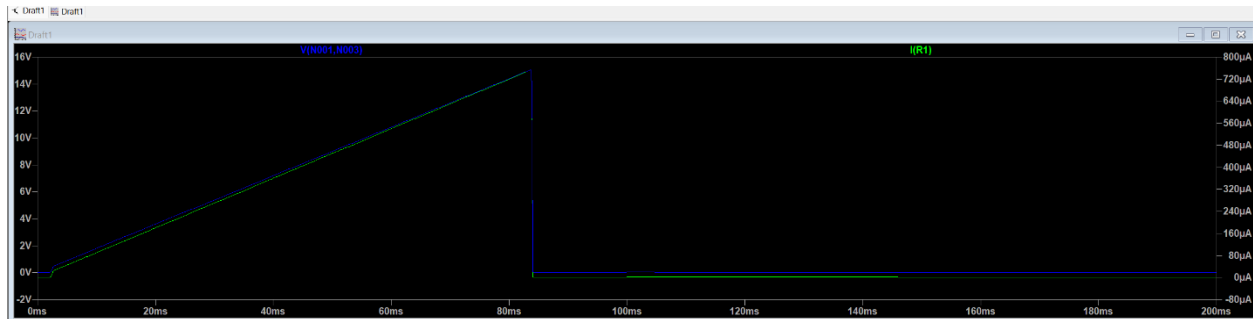
this schematic is an example of NPN BJTs Overvoltage Protection circuits

which used voltage divider in the to detect certain voltage in the case of this circuits it's 15v max

when the when the volt exceeds the maximum rating for the given circuit the transistor Q1 is turned on (the switch is closed) which bias the transistor Q2 in the cutoff region (open switch)

It is important to mention that this configuration implement low side switching

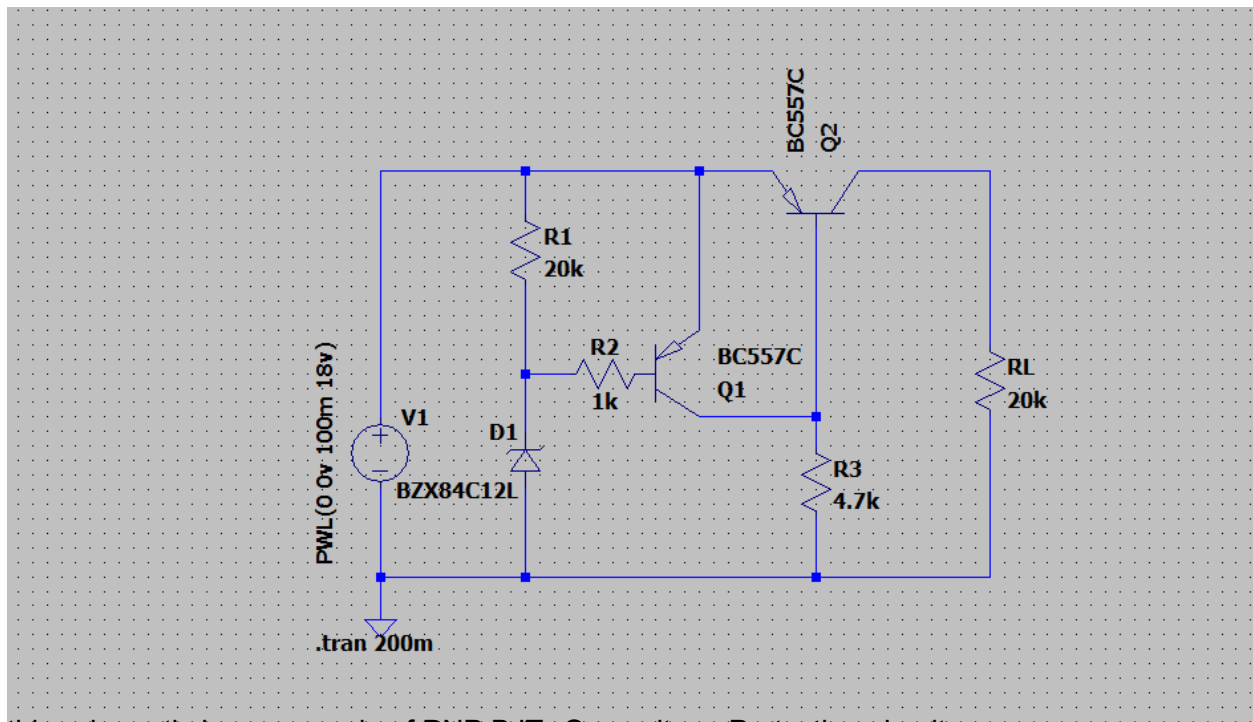
When it comes to Switching Action, the switch is connected in series or disconnects the load by preventing current flow from the collector to the emitter, or it shorts the overvoltage to ground if connected in shunt configuration



We used ITspice to simulate this circuits and as it clear that the current through the load reach zero when the voltage exceeded 15v

## Overvoltage Protection Using PNP BJTs:

A PNP BJT is used in overvoltage protection circuits where the transistor needs to control current flow in the high side of the circuit. The PNP BJT is placed in series with the power supply and the load, and the base is connected to a voltage detection circuit.

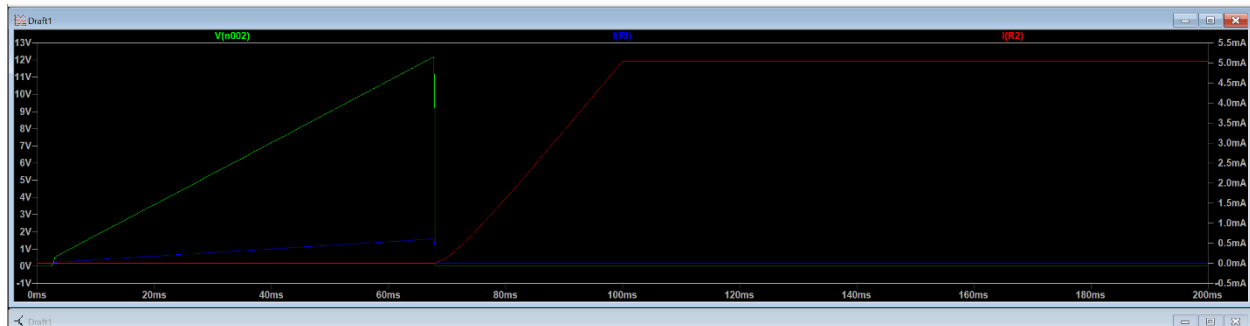


this schematic is an example of PNP BJTs Overvoltage Protection circuits

we used a Zener diode as detection mechanism as when the apply voltage exceeded 12v (the Zener voltage) the transistor Q1 will tern on so that is bias the Q2 transistors as an open switch

note this configuration implement high side switching

and when it comes to Switching Action, When the PNP BJT is turned off due to the overvoltage condition, it effectively disconnects the load from the power supply, preventing overvoltage from reaching the load.



We used ITspice to simulate this circuits and as it clear that the current through the load reach zero when the voltage exceeded 12v (Zener voltage) and it also clear that the Q1 transistor is on.

### For more info

[https://drive.google.com/drive/folders/10gYURsy\\_pYNVhglsacObkWFTGcq7Zdty?usp=sharing](https://drive.google.com/drive/folders/10gYURsy_pYNVhglsacObkWFTGcq7Zdty?usp=sharing)