

PROGRAMMABLE UNIJUNCTION TRANSISTOR

The programmable unijunction transistor (PUT) is an improved version of UJT. But PUT is a four layer PNPN device it also known as small version of thyristors as shown in figure 12.

Its operation is similar to the UJT hence it is always considered with UJT, its trigger voltage V_P can be programmed or decided by the designer via external potential divider [but in UJT, it is fixed for the given device] thus it is known as programmable unijunction transistor.

The symbol of PUT is shown in figure 12. In this case the gate terminal is connected to the N region [but in thyristor or SCR gate is connected with P region], thus the anode and cathode constitute the PN junction which controls the ON and OFF states of PUT.

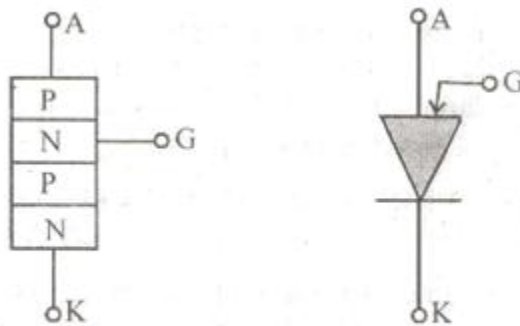


Figure 12 PUT structure and symbol

Usually positive potential is applied to gate with respect to cathode. When the anode voltage is less than gate voltage V_G the anode gate junction becomes reverse biased, the PUT is in OFF state.

When the anode voltage exceeds the gate voltage V_G anode cathode junction becomes forward biased, thus PUT is turned ON. In the ON state, the PUT behaves like other four layer PNPN devices [SCR]. The PUT is also known as complementary SCR [because the gate is connected with 'N' layer instead of 'P' layer].

Advantages of PUT over UJT

1. The switching voltage is easily varied by changing V_G through the potential divider.
2. PUT can operate at lower voltages than IC's.
3. Peak current is lower UJT.

PUT as relaxation oscillator

A PUT can be used as relaxation oscillator it is shown in figure 12. The gate voltage V_G is maintained from the supply by the potential divider R_1 and R_2 and determines the peak point voltage V_p In the case of the UJT, V_p is fixed for a device

by the dc supply voltage. But V_P of a PUT can be varied by varying the potential divider it and if the anode voltage V_A is less than the gate voltage V_G the device will remain in its off state.

Source : <http://mediatoget.blogspot.in/2011/10/programmable-unijunction-transistor.html>