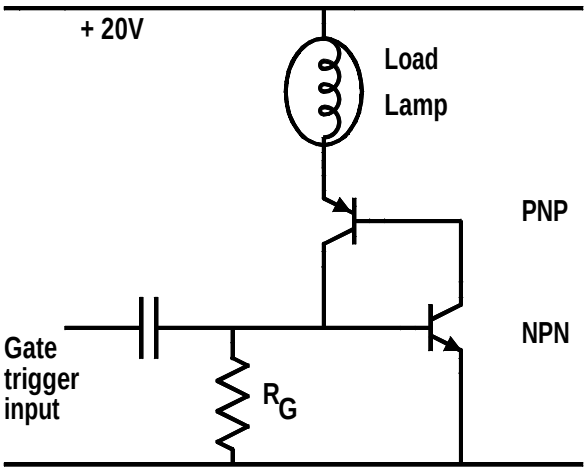
- SCR can conduct in the forward direction.
- Triac can conduct in either direction
- UJT is used to give a train of trigger pulses for SCRs and triacs.
- A diac conducts when the threshold voltage of about $20V$ is exceeded.
- In phase angle triggering of triacs, a variable segment of each half waveform of current is passed through the load.
- In burst fire control, the full power is applied to the load for a variable fraction of the time

No power is dissipated in an ideal switch because there is either vo voltage drop across the switch or no current in switch.

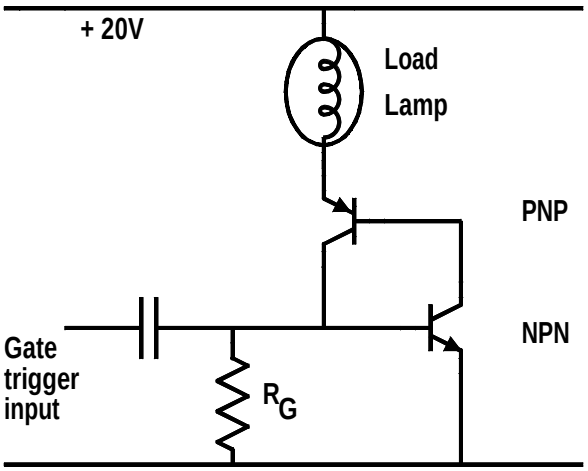
$$P = V \times I$$



A two transistor latch circuit.

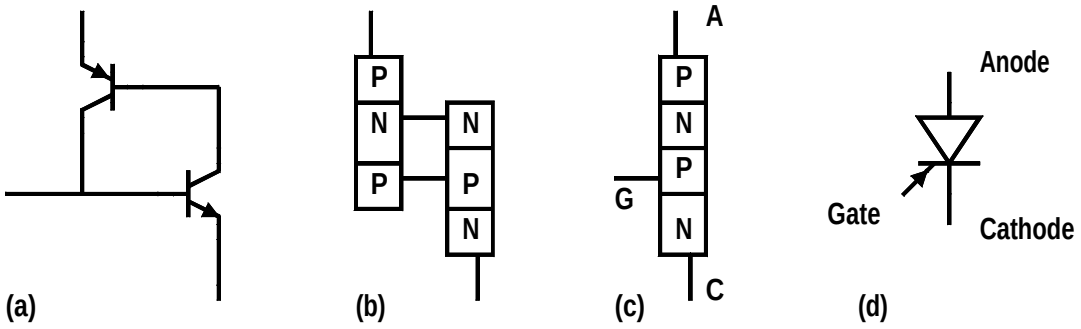
No current until triggered.

Then positive feedback gives rapid turn-on and latching action.



Turned off by turning off power.

Not easy to turn-off electronically.



Evolution of a latch circuit to an SCR. Merge layers

Silicon Controlled Rectifier or Thyristor

Holding current

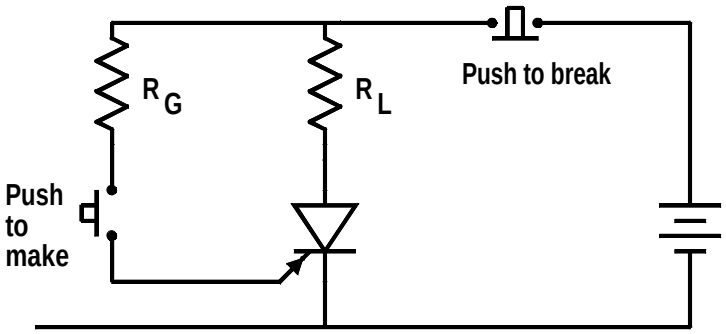
Break Over Voltage

V_{RRM} reverse blocking voltage

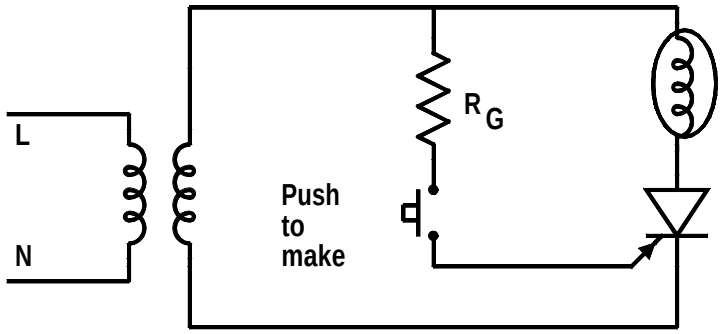
Trigger of the order of $2V$ and $20mA$ for about 5μs.

$\frac{dV}{dt}max$

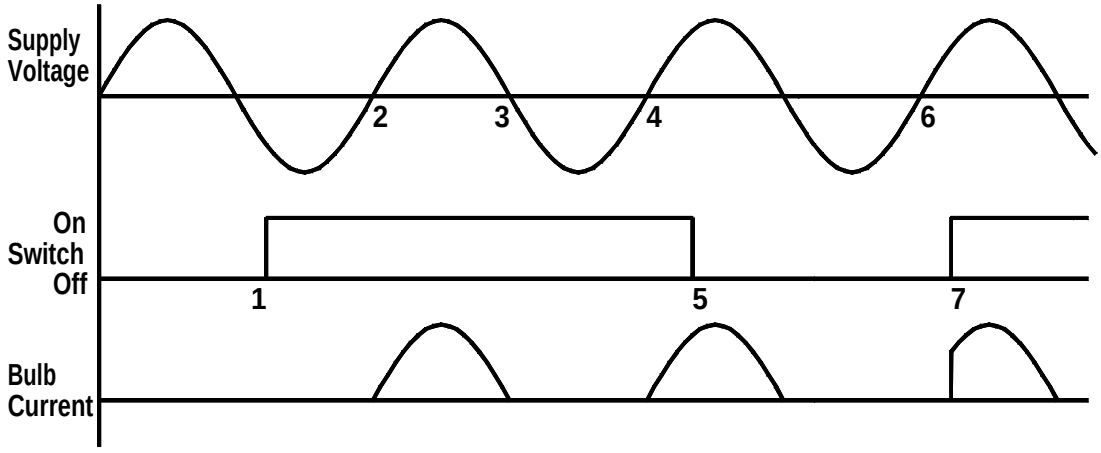
$I_{T\,ave}$



DC triggering of an SCR.

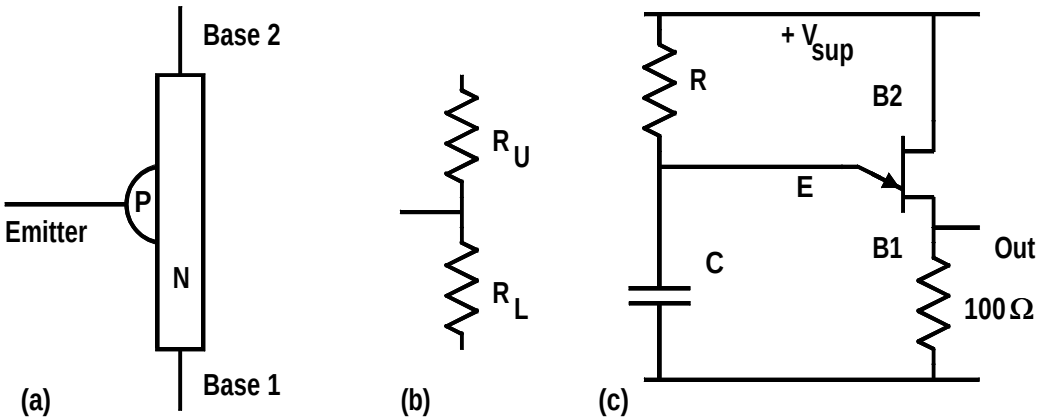


Triggering of an SCR in an AC circuit.

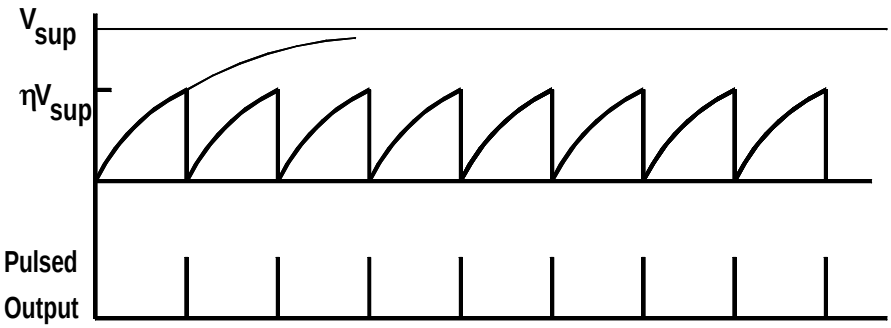


V and I Waveforms in an AC SCR circuit.

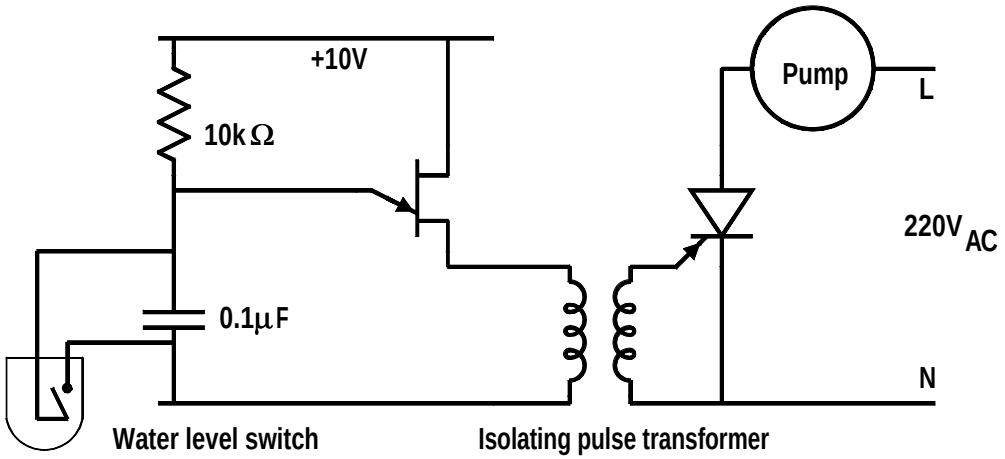
Take care with oscilloscope grounds!



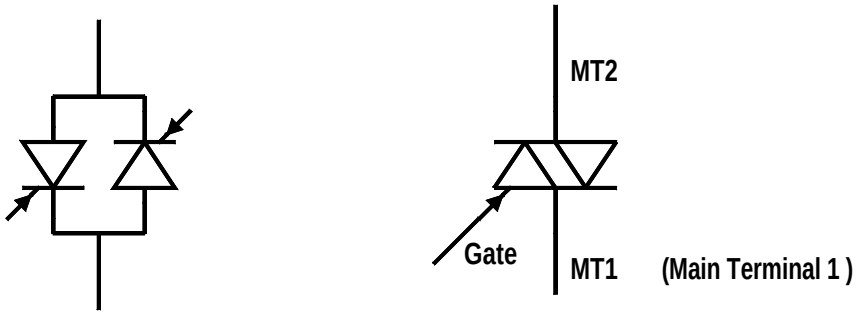
Unijunction transistor oscillator circuit.



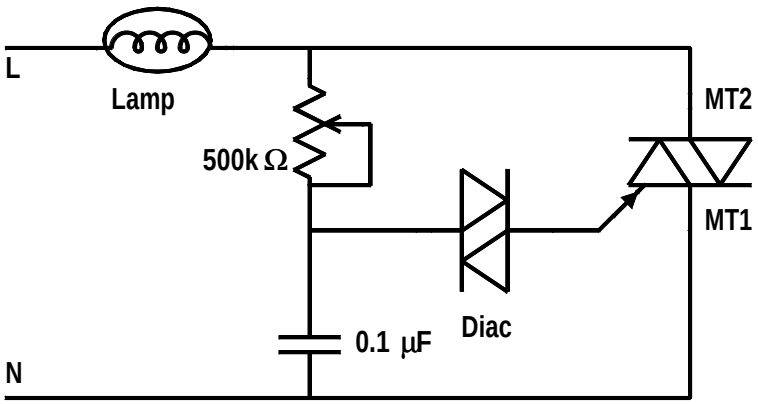
Voltage waveforms in a UJT oscillator circuit.



Use of UJT oscillator for galvanic isolation.

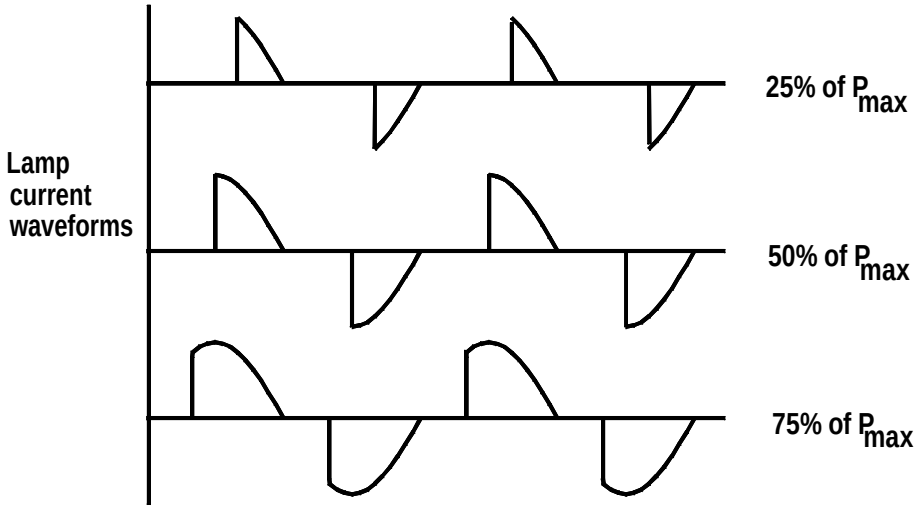


Evolution of two back to back SCR into a TRIAC.

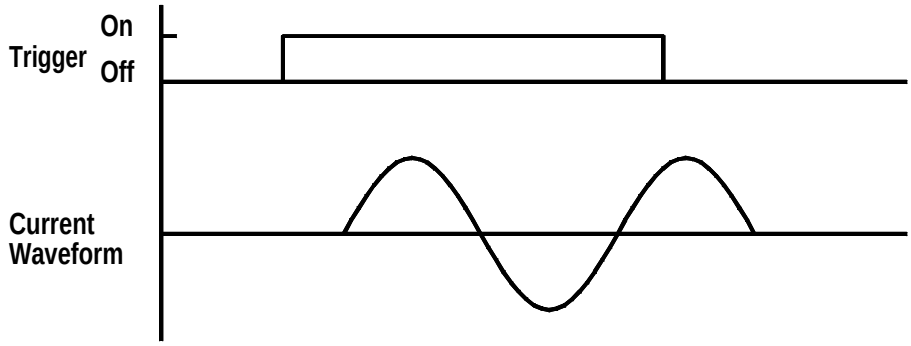


Phase angle triggering of a triac.

Use of a triac allows the implementation of phase control of triggering



Waveforms in phase angle triggering circuit.



Waveforms in a Zero Volt Switching controller.

When the electrical power supply to heaters, which have a longer time constant than lamps, is to be controlled, a better system is to use a zero volt switch system.

Isolation and reduced interference.