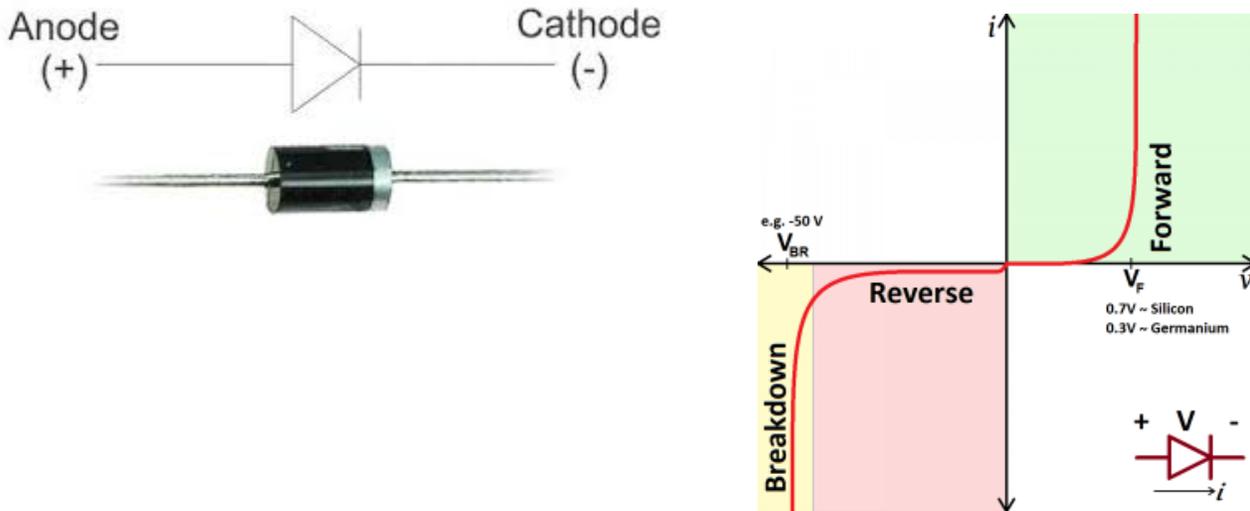


# Diodes

## Overview

The key function of an ideal diode is to control the *direction* of current-flow. Current passing through a diode can only go in one direction, called the forward direction. Current trying to flow the reverse direction is blocked. They're like the one-way valve of electronics.



Depending on the voltage applied across it, a diode will operate in one of three regions:

1. Forward bias: When the voltage across the diode is positive the diode is "on" and current can run through. The voltage should be greater than the forward voltage ( $V_F$ ) in order for the current to be anything significant.
2. Reverse bias: This is the "off" mode of the diode, where the voltage is less than  $V_F$  but greater than  $-V_{BR}$ . In this mode current flow is (mostly) blocked, and the diode is off. A very small amount of current (on the order of nA) – called reverse saturation current – is able to flow in reverse through the diode.
3. Breakdown: When the voltage applied across the diode is very large and negative, lots of current will be able to flow in the reverse direction, from cathode to anode.

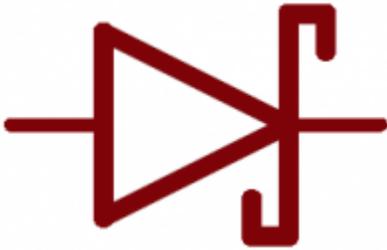
## Types of Diodes

### Normal Diodes

Type	Forward Voltage	Max Forward Current	Example Diode	Image
Signal Diode	0.7v	300 mA	1N4148	
Power Diode	1.1v	1A	1N4001	

### Schottky Diodes

Schottky diodes are like regular diodes but with smaller forward **voltage drop** which is usually **between 0.15V and 0.45V**. They'll still have a very large breakdown voltage though. Schottky diodes are especially useful in limiting losses, when every last bit of voltage *must* be spared.

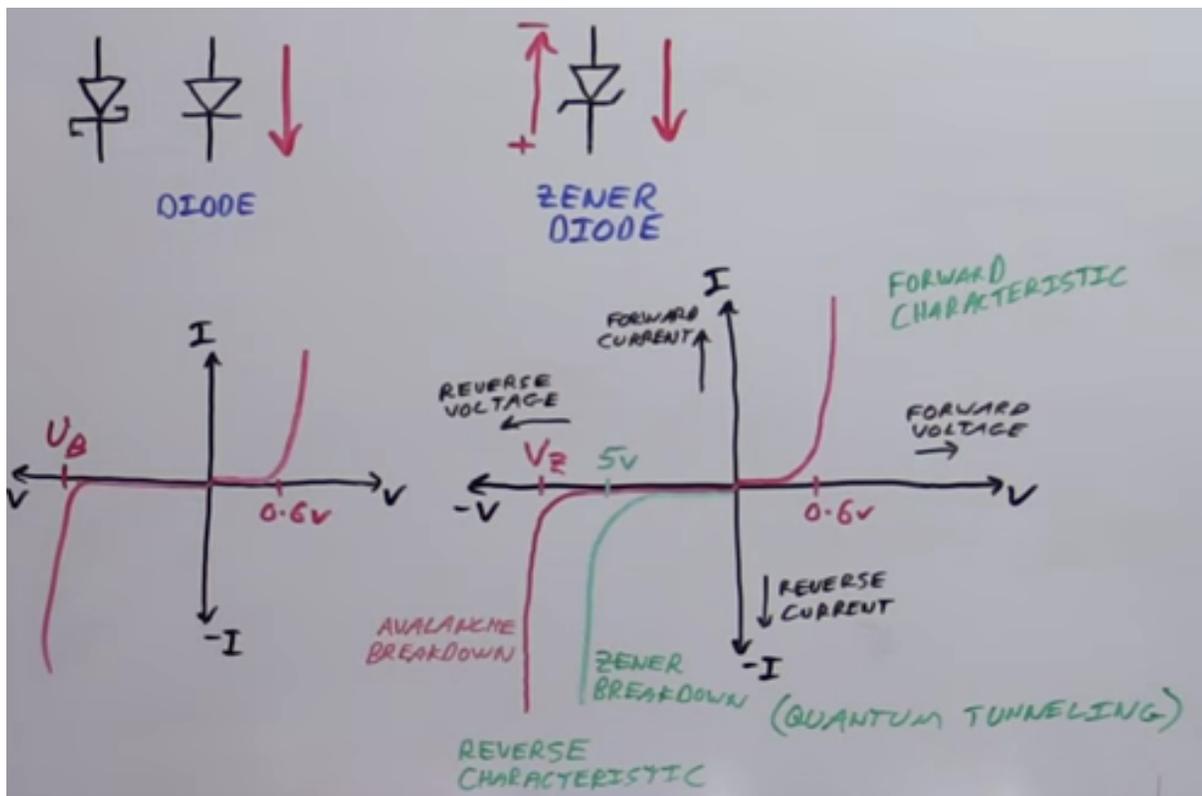


### Zener Diodes

Zener diodes can conduct current in both directions. Zener's are designed to have a very precise breakdown voltage, called the zener breakdown or zener voltage. **When enough current runs in reverse through the zener, the voltage drop across it will hold steady at the breakdown voltage.**



Taking advantage of their breakdown property, Zener diodes are often used to create a known reference voltage at exactly their Zener voltage. They can be used as a voltage regulator for small loads, but they're not really made to regulate voltage to circuits that will pull significant amounts of current.



# References

Reference	URL
Diodes - Sparkfun	<a href="https://learn.sparkfun.com/tutorials/diodes">https://learn.sparkfun.com/tutorials/diodes</a>
Zener Diodes	<a href="http://www.electronics-lab.com/zener-diodes-theory-practice/">http://www.electronics-lab.com/zener-diodes-theory-practice/</a>
Wikipedia - Zener Diode	<a href="https://en.wikipedia.org/wiki/Zener_diode">https://en.wikipedia.org/wiki/Zener_diode</a>