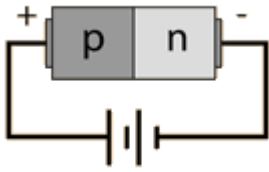
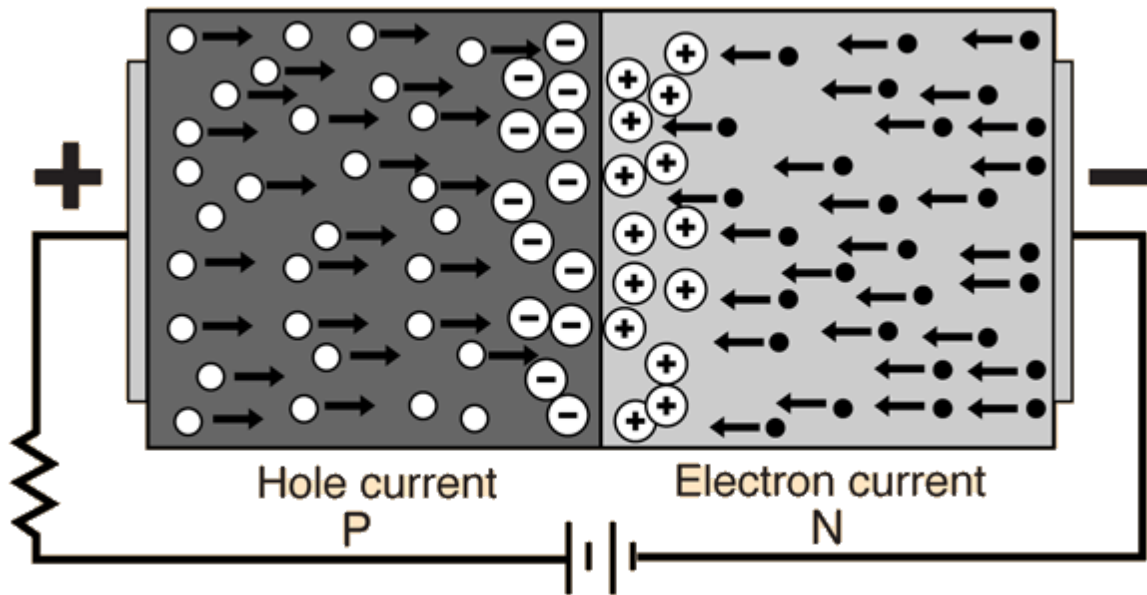


Forward Biased P-N Junction



Forward biasing the [p-n junction](#) drives holes to the junction from the [p-type](#) material and electrons to the junction from the [n-type](#) material. At the junction the electrons and holes [combine](#) so that a continuous current can be maintained.



[Show energy bands.](#) [Compare to reverse bias.](#)

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R Nave

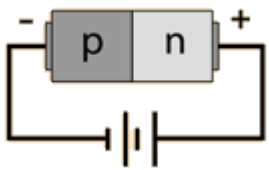
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Reverse Biased P-N Junction

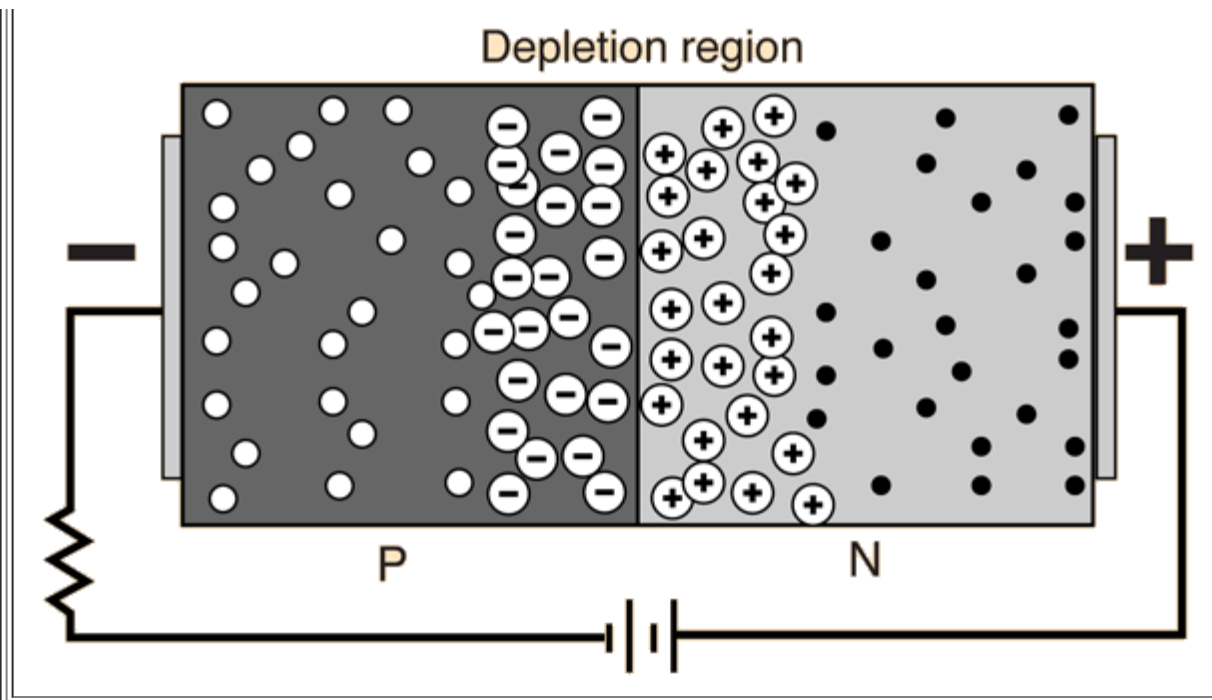


The application of a reverse voltage to the [p-n junction](#) will cause a transient current to flow as both [electrons and holes](#) are pulled away from the junction. When the potential formed by the widened [depletion layer](#) equals the applied voltage, the current will cease except for the small [thermal current](#).

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The P-N Junction Diode

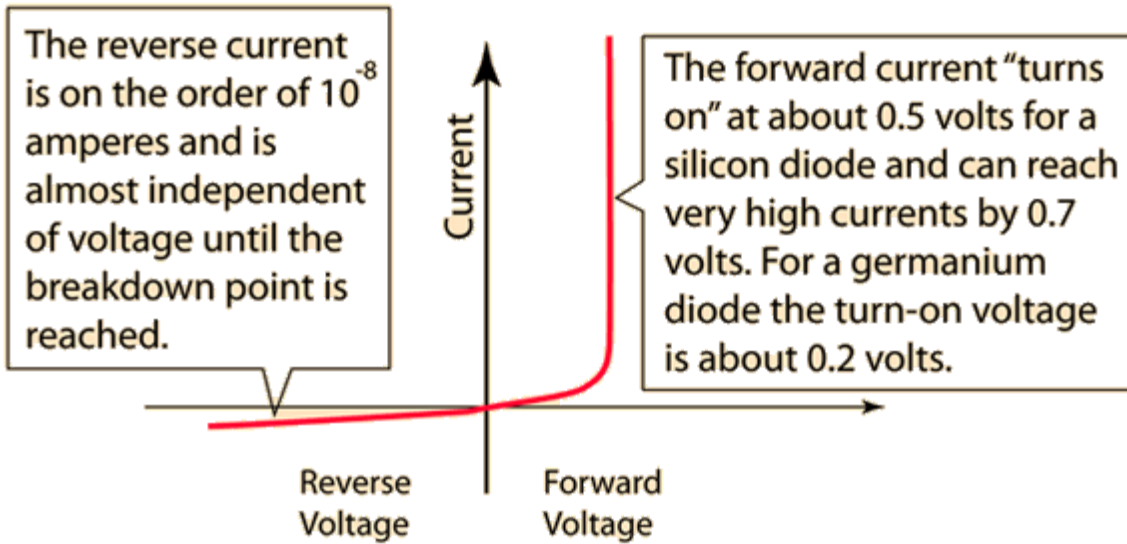


The nature of the [p-n junction](#) is that it will conduct current in the [forward](#) direction but not in the [reverse](#) direction. It is therefore a basic tool for [rectification](#) in the building of DC power supplies.

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The PIN Diode



The PIN diode has heavily doped [p-type](#) and [n-type](#) regions separated by an [intrinsic](#) region. When [reverse biased](#), it acts like an almost constant capacitance and when [forward biased](#) it behaves as a variable resistor.

The forward resistance of the intrinsic region decreases with increasing current. Since its forward resistance can be changed by varying the bias, it can be used as a modulating device for AC signals. It is used in microwave switching applications.

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Step-Recovery Diode

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In the step-recovery diode the doping level is gradually decreased as the junction is approached. This reduces the switching time since the smaller amount of stored charge near the junction can be released more rapidly when changing from [forward](#) to [reverse](#) bias.

The forward current can also be established more rapidly than in the ordinary [junction diode](#). This diode is used in fast switching applications.

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