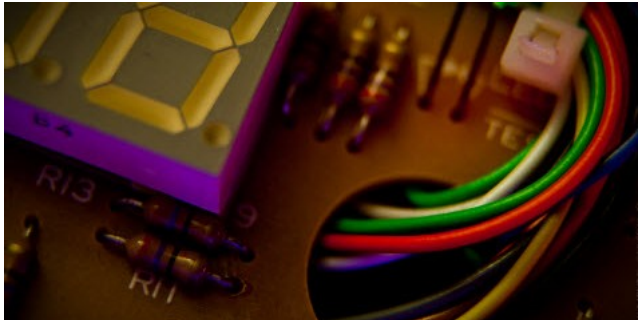




Search

- [Home](#)
- [Project Ideas](#)

Featured



82%

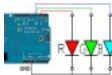
[10 Good Electronics Mini Projects Ideas for ECE Students](#)

[Tarun Agarwal](#)

[Project Ideas](#), [Popular posts](#), [Projects](#), [ECE Projects](#)

[118 Comments](#)

Recent



[Simple Arduino LED Projects for Engineering Students](#)

[Tarun Agarwal](#)

[2](#)



[Use Breadboard to Build a Simple Electronic Projects](#)

[Tarun Agarwal](#)

[8](#)



[Steps to Building a Project on Breadboard Circuit](#)

[Tarun Agarwal](#)

[4](#)



[Top 10 Breadboard Projects for Beginners in Engineering](#)

[Tarun Agarwal](#)

[2](#)



[Line Following Robotic Vehicle with Walking and Climbing Mechanism](#)

[Tarun Agarwal](#)

[20](#)



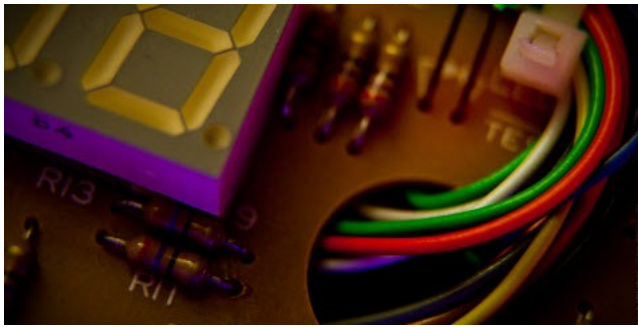
[Electronic Mini Projects Circuits – Simple Electronic Circuits](#)

[Tarun Agarwal](#)

6

- [Popular Projects](#)

Featured



82%

[10 Good Electronics Mini Projects Ideas for ECE Students](#)

[Tarun Agarwal](#)

[Project Ideas](#), [Popular posts](#), [Projects](#), [ECE Projects](#)

[118 Comments](#)

Recent



95%

[Sensor Based Project Ideas for Final Year Engineering Students](#)

[Tarun Agarwal](#)

100



89%

[List EIE Projects for Electronics and Instrumentation Engineering Students](#)

[Tarun Agarwal](#)

32



91%

[Best Electrical Projects Ideas for Final Year Engineering Students](#)

[Tarun Agarwal](#)

204



91%

[Top Embedded Systems Projects Ideas for Engineering Students](#)

[Tarun Agarwal](#)

96



81%

[Top Electronics Projects Ideas for Engineering Students](#)

[Tarun Agarwal](#)

254



77%

[GSM based Projects for Engineering Students](#)

[Tarun Agarwal](#)

87

• [Electrical](#)

Featured



[Mains Operated LED](#)

[Tarun Agarwal](#)

[Electrical](#)

[6 Comments](#)

Recent



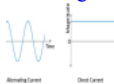
[The Classes and Classification of Amplifiers With Their Applications](#)

[Tarun Agarwal](#)



[What are Motion Sensors And How Do They Work](#)

[Tarun Agarwal](#)



[What is the Difference Between AC and DC Currents](#)

[Tarun Agarwal](#)



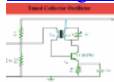
[Difference Between Impatt Diode and Trapatt Diode and Baritt Diode](#)

[Tarun Agarwal](#)



[What is the Difference between the Motion Sensor, Position Sensor and Proximity Sensor](#)

[Tarun Agarwal](#)



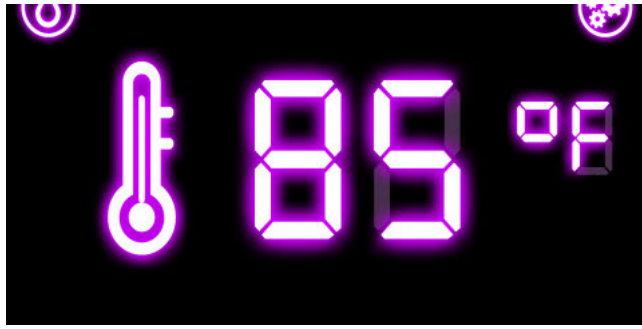
[Tuned Collector Oscillator Circuit Working And Application](#)

[Tarun Agarwal](#)

2

• [Electronics](#)

Featured



[Digital Thermometers - Basics, Working and Applications](#)

[Tarun Agarwal](#)
[Electronics](#)
 8 Comments

Recent



[Complex Programmable Logic Device \(CPLD\) Architecture and Its Applications](#)

[Tarun Agarwal](#)



[What are Motion Sensors And How Do They Work](#)

[Tarun Agarwal](#)



[Tuned Collector Oscillator Circuit Working And Application](#)

[Tarun Agarwal](#)



[PIN Diode Basics, Working and Applications](#)

[Tarun Agarwal](#)



[Buck Boost Converter Circuit Theory Working and Applications](#)

[Tarun Agarwal](#)



[Different Types of Printed Circuit Boards](#)

[Tarun Agarwal](#)

- [Robotics](#)
Featured



80%

[Projects on Robotic Applications for Engineering Students](#)

[Tarun Agarwal](#)

[Robotics](#)

[24 Comments](#)

Recent



[Make a Wireless Robotic Vehicle Using IR Sensors](#)

[Tarun Agarwal](#)

[6](#)



[Line Following Robotic Vehicle with Walking and Climbing Mechanism](#)

[Tarun Agarwal](#)

[20](#)



[Know all about Soccer Playing Robot – Elprocus](#)

[Tarun Agarwal](#)

[2](#)



[Namaste Robot with Voice Control Working and Applications](#)

[Tarun Agarwal](#)



[Accelerometer based Gesture Control Robot](#)

[Tarun Agarwal](#)

[2](#)



[Know about the Working of Fire Fighting Robot Project](#)

[Tarun Agarwal](#)

[10](#)

- [General](#)
- [Random](#)



o

[Top Paper Presentation Topics \(PPT\) for Electronics Engineering Students](#)

[Tarun Agarwal](#)
[Electronics, General](#)
[34 Comments](#)

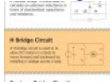
Recent



o

[Infographics: A Brief About IC 555 Timer And its Applications](#)

[Tarun Agarwal](#)



o

[Infographics: Different Types of Bridge Circuits and Circuit Diagrams](#)

[Tarun Agarwal](#)



o

[Infographics: Different Types of Simple IC's Available to Build Projects](#)

[Tarun Agarwal](#)

- o [Arduino](#)
- o [Technology](#)
- o [Free Circuits](#)
- o [Interview Questions](#)
- o [Download Projects List](#)
- [B.Tech Projects](#)
- o
- [Expert Outreach](#)
- [Communication](#)
- [Giveaways](#)
- [IC](#)
 - o [Microcontrollers](#)
 - [8051](#)
 - [AVR](#)
 - [PIC](#)
 - [ARM](#)
- [Infographics](#)
- [Projects](#)
 - o [ECE Projects](#)
 - o [EEE Projects](#)
- [Quiz](#)
- [Tools](#)
 - o [Resistor Color Code Calculator](#)
 - o [Ohms Law Calculator](#)
- [White Papers](#)

[Home](#)
[Electronics](#)



How to Construct and Operate a Uni-Junction Transistor(UJT)

[Tarun Agarwal](#)
[Electronics](#)
[2 Comments](#)

Voltage Supervisors

Monitor Critical System Voltages DSP & Processor Power Applications. Go to ti.com/Supervisor-IC



Introduction to Uni-Junction Transistor



Uni-junction transistor

[Uni-junction transistor](#) is also known as double-base diode because it is a 2-layered, 3-terminal solid-state switching device. It has only one junction so it is called as a uni-junction device. The unique characteristic feature of this device is such that when it is triggered, the emitter current increases until it is restricted by an emitter power supply. Owing to its low cost, it can be used in a wide range of applications including oscillators, pulse generators and trigger circuits, etc. It is a low-power absorbing device and can be operated under normal conditions.

Ads by Google

[Circuit Diagram](#)

[Transistor Emitter](#)

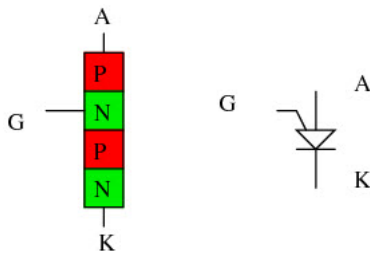
There are 3 types of uni junction transistors

1. Original Uni-junction transistor
2. Complimentary Uni-junction transistor
3. Programmable Uni-junction transistor (PUT)

1. Original Uni-junction transistor or UJT is a simple device in which a bar of N-type semiconductor material into which P-type material is diffused; somewhere along its length defining the device parameter as intrinsic standoff. The 2N2646 is the most commonly used version of UJT. UJTs are very popular in switching circuits and are never used as amplifiers. As far as Applications of UJT are concerned, they can be used as [relaxation oscillators](#), phase controls, timing circuits and trigger devices for SCRs and triacs.

2. Complimentary Uni-junction transistor or CUJT is a bar of P-type semiconductor material into which N-type material is diffused somewhere along its length defining the device parameter as intrinsic standoff. The 2N6114 is one version of CUJT.

3. Programmable Uni-junction transistor or PUT is a close relative of thyristor; just like thyristor, it consists of four P-N layers and has anode and cathode placed at first and last layers. The N-type layer near the anode is known as anode gate. It is inexpensive in production.

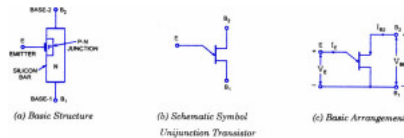


Programmable Uni junction Transistor

Among these three transistors, this article talks about UJT transistor's working features and its construction in brief.

Construction of UJT

UJT is a three-terminal, single-junction, two-layered device, and it is similar to a thyristor compare to a [transistors](#). It has a high-impedance off state and low-impedance on state quite similar to a thyristor. From off state to an on state, switching is caused by conductivity modulation and not by a bipolar transistor action.



Construction of UJT

The silicon bar has two Ohmic contacts designated as base1 and base2, as shown in the fig. The function of the base and the emitter are different from the base and emitter of a bipolar transistor.

The emitter is of P-type, and it is heavily doped. The resistance between B1 and B2 when the emitter is open-circuited is called an inter-base resistance. The emitter junction is usually situated closer to the base B2 than the base B1. So the device is not symmetrical, because symmetrical unit does not provide electrical characteristics to most of the applications.

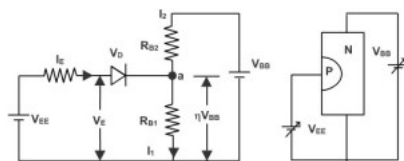
The symbol for uni-junction transistor is shown in the fig. When the device is forward-biased, it is active or is in the conducting state. The emitter is drawn at an angle to the vertical [line which represents](#) the N-type material slab and the arrow head points in the direction of conventional current.

Operation of a UJT

This transistor operation starts by making the emitter [supply voltage](#) to zero, and its emitter diode is reverse biased with the intrinsic stand-off voltage. If V_B is the voltage of the emitter diode, then the total reverse bias voltage is $V_A + V_B = \eta V_{BB} + V_B$. For silicon $V_B = 0.7$ V, If V_E gets slowly increases to the point where $V_E = \eta V_{BB}$, then I_E will be reduced to zero. Therefore, on each side of the diode, equal voltages results no current flow through it, neither in reverse bias nor in forward bias.

Start Download - View PDF

Convert Any File to a PDF. Get the Free From Doc to Pdf App! Go to fromdoctopdf.com



Equivalent Circuit of a UJT

When the emitter supply voltage is increased rapidly, then the diode becomes forward-biased and exceeds the total reverse bias voltage ($\eta V_{BB} + V_B$). This emitter voltage value V_E is called the peak-point voltage and is denoted by V_P . When $V_E = V_P$, emitter current I_E flows through the R_{B1} to the ground, that is, B1. This is the minimum current required for triggering the UJT. This is called the peak-point emitter current and is denoted by I_P . I_P is inversely proportional to the Inter-base voltage, V_{BB} .

Now when the emitter diode starts conducting, charge carriers are injected into the RB region of the bar. As the resistance of a semiconductor material depends upon doping, the resistance of R_B decreases due to additional charge carriers.

Then the voltage drop across R_B also decreases, with the decrease in resistance because the emitter diode is heavily forward biased. This in turn results in larger forward current, and as a result charge carriers are injected and it will cause the reduction in the resistance of the R_B region. Thus, the emitter current goes on increasing until the emitter power supply is in limited range.

V_A decreases with the increase in emitter current, and UJT have the negative resistance characteristic. The base 2 is used for applying external voltage V_{BB} across it. The terminals E and B1 are the active terminals. UJT usually gets triggered by applying a positive pulse to the emitter, and it can be turned off by applying a negative trigger pulse.

Thanks for spending your valuable time with this article, and we hope that you might have received a good content about [UJT applications](#). Please share your views on this topic by commenting below.

Photo Credits

- Uni-junction transistor by [blogspot](#)
- Programmable Uni junction Transistor by [allaboutcircuits](#)
- Construction of UJT by [circuitstoday](#)
- Equivalent Circuit of a UJT by [nptel](#)



Voltage Supervisors

Monitor Critical System Voltages DSP & Processor Power Applications. Go to ti.com/Supervisor-IC



Share On:



[Tweet](#)

[Know about PIC Microcontrollers and Its Architecture with Explanation](#)
[Expert Opinion on Latest Technologies and Electronics – UC Patnaik](#)

About The Author



[Tarun Agarwal](#)

[Tarun Agarwal](#) is the Chief Customer Support Officer at Edgefx Technologies Pvt Ltd. He has 8 years of experience in Customer Support, Operations and Administration.

Related Posts



•

[What are Motion Sensors And How Do They Work](#)

[Tarun Agarwal](#)

•

[Wavelength Division Multiplexing \(WDM\) Working and Applications](#)

[Tarun Agarwal](#)

2 Responses

•
•



1. *test*

Thanks for sharing your thoughts. I truly appreciate your efforts and I will be waiting for your next post thanks once again.

[Reply](#)



[Tarun Agarwal](#)

Hello,

Thank you for your appreciation. It really helps us to work hard. Also, Please check the user friendly website <http://www.edgefxkits.com> for project ideas on all the latest technologies. Please check the user friendly website for complete details in the kit content section and go through the FAQ for details.

Raji (Mobile: +91 9959178000)

[Reply](#)



2. [azhar a](#)

Gud
Ujt construction

[Reply](#)

•
•

Leave a Reply

Your email address will not be published.

Comm