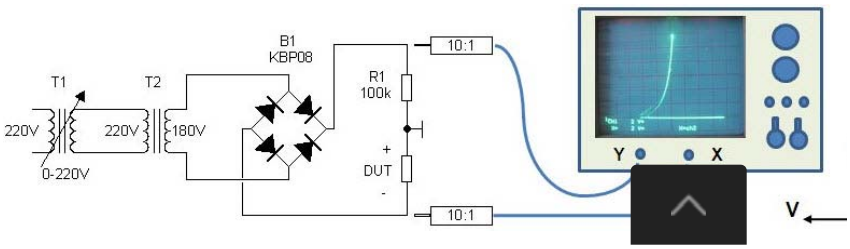
Arduino Project on Transistor Curv

Teaching becomes easy and effective if it becomes a practical realm. Showing in-hand practice and conceptual demonstrations always help remember the le period of time than the simple theoretical lessons' explanations. This could h tracers to know the concept of how the transistor works. This is an easy, gooc the working of a transistor and to determine its parameters.

The curve tracer usage is expanding nowadays for laboratory usage and oth This concept of implementing curve tracer by using an Arduino board enab graspable about the transistor and Arduino technology.

Curve Tracer

A Curve-tracer is test equipment that displays voltage to current relationship o several application areas in which these I-V curve tracers provide visual rep voltage waveforms with quantitative measurements. Curve tracing equipn circuitry to test various basic electronic components like transistors, diodes devices. These curve tracers enables us to analyze the waveforms for findir gain, impedance, offset, etc.

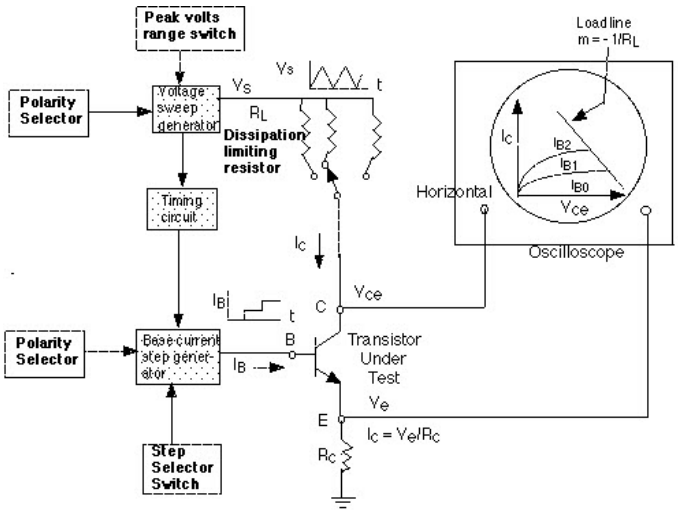


The above circuit shows how a simple curve tracer works for a device unde transformer is connected to a bridge rectifier circuit that converts AC to pulsa under test is connected through a series resistor to limit the current. Voltage Cathode Ray Oscilloscope (CRO) are varied by varying the input voltag transformer. In this way,one can analyze and observe the curves using curve tra

Transistor Curve Tracer

Transistor is a current controlled device wherein the collector to emitter volta varying the base current applied to the base terminal of the transistor. A tr instrument that measures the transistor's parameters like current gain, ir voltages. It generates and displays a set of curves of the collector current IC ve voltage VCE for different values of the base current. From this curves, the tra determined.

Three major functional circuits that are used in this tracer include a sweep volta collector voltage; a base current step generator to control the base curr increments of voltage seep generator; and, a timing circuit to change the base voltage sweep.



Transistor Curve Tracer

The sweep voltage generator applies Vs with a time period repetitively to voltage can be observed in oscilloscope.And, also the base current source inc in equal incremental steps for each consecutive voltage sweep with the beginning of each collector voltage sweep. The base current repeats this st stable for the last incremented period. Selector switches are provided for ea conditions.

The transistor current gain is determined by:

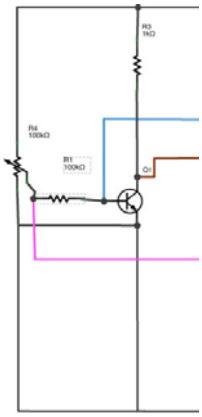
$$b = DIc/DIB$$

Where, the setting of the Step Selector switch is represented as DIB.

Therefore, from the above waveform in the oscilloscope, we can determi transistor. Thus, the transistor curve tracer enables to find different parameter provides the analysis of it waveforms for different input varying conditions.

Arduino project on Transistor Curve Tracer

This circuit is implemented with the use of a potentiometer connected to a transistor base to vary the base current. Arduino uno board is used as a main data acquisition controller that acquires the analog parameters of the base, collector and source voltages. A transistor with two resistors and one potentiometer comes under the circuitry under the test with the use of Arduino development board.



Arduino ba

By varying the potentiometer, the base current is varied, and the base voltage, collector and emitter voltage values are read by the Arduino with converter. The Arduino program code is programmed in such a way that the a are processed further and the results are calculated. The digitized values proce

the below parameters.

Ib is determined by (Vs – Vb) / Rb

And Ic by (5V – Vc) / Rc

These values of base and collector currents must be plotted to determine the transistor's characteristics. To plot these values,USB serial link is connected between the Arduino controller and host computer.The host computer consists of a special type of application to process and plot the graphs.Software or programs like SciLab and Octave can read and plot the values from the serial cable.

Advancement to the above Arduino project is by connecting the Arduino to plot the graphs of BiCMOS transistor. These curves are obtained by dual rail-to-rail I/O Operational Amplifier, resistors, and capacitors and solderless bread board.

Bulk voltage is selected by using a selector switch to change the PNP/NPN polarity. This project is same as the above project, but the code is somewhat After compiling and uploading the code into the hardware development boar voltages from the transistor with different values of the base currents, which c program code.

This Arduino board processes these values and sends it to the computer to pro a serial communication cable. As similar to the above project, application soft plot the acquired data for finding parameters of particular transistors like PM transistors.

This is a simple Arduino project with a few external circuitries for obtaining the the applications of Arduino based projects are home automation syste underground cable fault detection systems, etc. If you want an of hel

based projects for developing code, circuit diagrams, simulation software an you can reach us by commenting below.

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