

## ABSTRACT

Bipolar Junction Transistor (BJT) is an electronic device made of semiconductor material. It has several functions including a switch and an amplifier. The voltage and current (I-V) characteristics is usually available in the datasheet issued by the producer. However, the value is still in the form of range. Hence, to get an actual I-V curve characterization, an electronic device such as a curve tracer is used to test the BJT. The testing process is usually conducted manually and requires a lot of time. An I-V characterization device that is able to record data automatically is mostly expensive. Therefore, this research aims to produce automatic I-V curve characterization instrument. The instrument has a controlled bipolar voltage source with DC output of  $-9.9\text{V} - +9.9\text{V}$  and a controlled bipolar current source with DC output  $-189\mu\text{A} - 189\mu\text{A}$ . The current sensor uses a transimpedance amplifier instrumentation circuit or more familiarly known as I to V converter. The current sensing is able to measure  $-25\text{mA} - +22\text{mA}$  with 98% accuracy. Besides BJT, the instrument is also capable to characterize the IV characteristic of other electronic devices such as resistor and diode. The measurement data acquisition is controlled by an Arduino Due microcontroller and displayed in Microsoft Excel connected to microcontroller by Parallax data acquisition software.

**Keywords:** BJT, Controlled Bipolar Current and Voltage Source, Current Measurement, I-V curves