

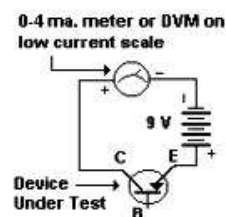
26. How do I measure Gain?

Based on an explanation of the basics from R. G. Keen, I worked out a bare-bones method for getting an estimate of the static DC gain of a transistor, good enough for sorting devices for the FF and clones. You'll need the following:

- o A DVM
- o a 1 meg resistor
- o a 9-volt battery or power supply
- o a few test leads with alligator clips

The temperature sensitivity of older germanium transistors has to be seen to be believed; when setting up these tests, only pick up the devices using tweezers or wearing gloves. The polarities of the battery and meters are shown for PNP devices; they are reversed for NPN.

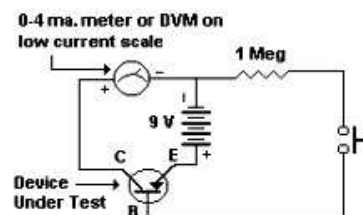
First, measure the leakage current:



It may take a few minutes for this reading to become stable. (I swear that some of the ones I have tested are reacting to variations in room temp and/or my body heat!) Record the figure on the meter. This is the leakage current.

Keen has noted that too much leakage makes suspect the long-term reliability of a device. How much is too much? My own spec has always been to reject any device that leaks more than 300 microamps at room temp.

Now apply forward base bias through the resistor:



Again, wait for a stable reading. Record the figure for collector current.

Do the following arithmetic to get Hfe:

(Collector Current - Leakage Current)

Base Current

(all values in microamps)

The base current will be 9.0 (microamps) if the resistor is exactly 1 meg and the power source is really 9 volts. The normal 5% tolerance of a carbon film type will get you close enough, though R. G. Keen has pointed out that you can use the resistance scale of your DVM to select one that is closer.