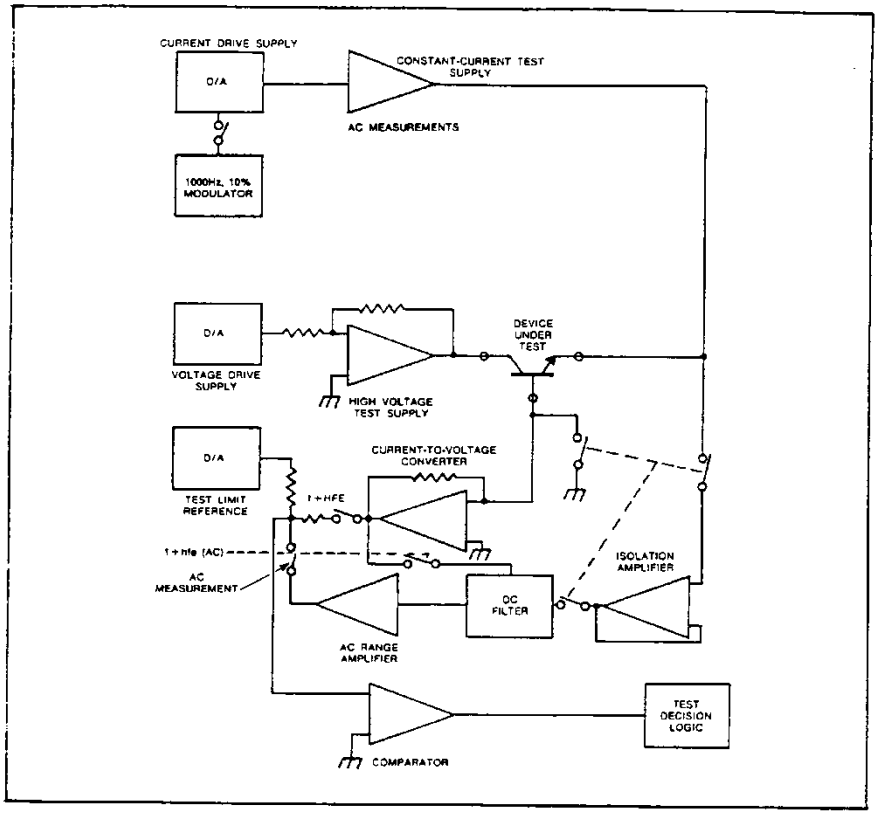
HOW TO MEASURE COMMON BASE CURRENT GAIN (I + HFE) AC (1 kHz) ON SEMICONDUCTORS



The test available are: Current Gain (I+HFE), and Common Base Input Impedance (HIB).

The simplified circuit diagram for the common-base current gain and 1-kHz measurements are shown below. Two digital-to-analog converters supply the individual precision drive voltages to a Constant-Current Test Supply and the High Voltage Test Supply. The Constant-Current Supply provides the emitter bias current for the device under test, and the High Voltage Supply provides the collector-to-base bias voltage. The current-to-voltage converter senses the base current and maintains the base at zero potential. For 1+HFE dc measurements, the output is fed to the comparator input and compared with the test limit reference. The output polarity of the comparator is the test decision.

For 1+HFE ac measurements, the emitter current is modulated with a 1-kHz signal which is always exactly 10 percent of the programmed value. The Current-to-Voltage Converter senses both the ac and dc components of the base current. At the output, the dc component is filtered out and the ac signal is amplified and connected to the comparator input. The ac signal is compared to the test limit reference, and in this application, the comparator serves as a peak detector.

For HIB measurements, an Isolation Amplifier senses the emitter voltage and connects it to the input of the filter. The dc component is filtered out, the ac signal is amplified and connected to the comparator input. It is compared to a programmed output of the Test Limit Reference, and a test decision is made. The computer performs the mathematical division of the measured value of VEB and the programmed value of IE to generated the test decision. For HIE the same procedure is followed but now the system datalogs and retains the VEB and IB for the HIE calculation .

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