Laboratory Application Assignment

In this lab application assignment you will examine how to properly test an SCR with an analog VOM. You will also see that a DMM cannot properly test an SCR. Finally, you will build a simple test circuit that reinforces the basic operation of an SCR.

Equipment: Obtain the following items from your instructor.

- Two SPST switches
- Simpson 260 analog VOM or equivalent
- DMM
- 12-V incandescent lamp
- Variable dc Power Supply
- 330-Ω carbon-film resistor
- Low- or medium-current SCR

Analog VOM

Examine the analog VOM you will be using for this part of the experiment. Set the VOM to the $R \times 1$ resistance range, and short the ohmmeter leads together. Adjust the zero-ohms control for full-scale deflection of the meter's pointer. If the pointer does not deflect all the way to 0 Ω, the meter's battery needs to be replaced. If this is the case, ask your instructor for a new battery.

Testing an SCR

With the analog VOM set to the $R \times 1$ range, connect the ohmmeter leads as shown in Fig. 32–16*a*. As you can see, this connection provides a positive (+) voltage at the anode (A) of the SCR with respect to the cathode (K). Even though the SCR is forward-biased, the forward voltage applied by the VOM is much less than the SCR's forward breakover voltage, V_{BRF}. Therefore, the meter should read infinite ohms, indicating that the SCR is *not* conducting. Does your meter show infinite ohms?

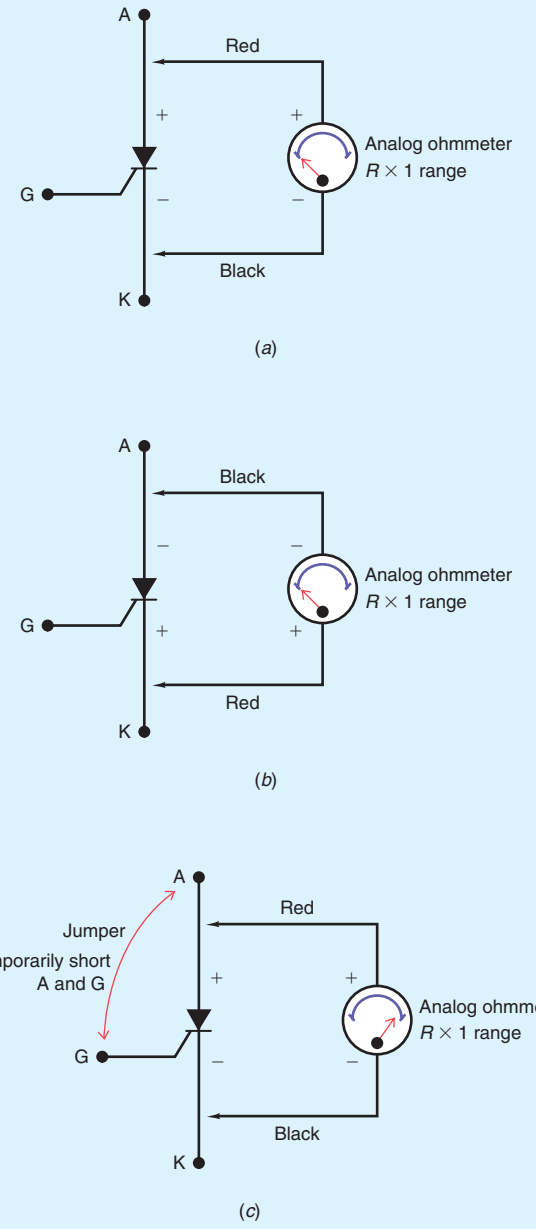
_____

Reverse the connection of the ohmmeter leads as shown in Fig. 32–16*b*. As you can see, this connection reverse-biases the SCR because it applies a negative (−) voltage at the anode (A) with respect to the cathode (K). As a result, the meter should still read infinite ohms. Does it?_____

Return the ohmmeter leads to their original polarity as shown in Fig. 32–16*c*. With the gate lead still open, the meter should read infinite ohms. Now place a jumper from the anode (A) to the gate (G) as shown. This connection provides the gate with a positive (+) voltage with respect to the cathode (K). The meter should now read a low resistance. Does it?_____
If the meter shows a low resistance, it indicates the SCR is ON or conducting.

Remove the jumper from the anode to the gate. The meter should still show a low resistance. Does it? _____ Does this test indicate that once the SCR is conducting, the gate loses all control? _____

Figure 32–16



Do the results of your test indicate that the SCR is good or bad?

_____

Repeat this testing procedure with a DMM. Pay special attention to the step where the jumper is removed from the anode to the gate. Describe, in detail, your results below.

_____

_____

_____

SCR Test Circuit

Connect the SCR test circuit in Fig. 32–17. Switches S_1 and S_2 should initially be in the *open* position. Indicate the state of the lamp in each step of the following procedure.

a. With both S_1 and S_2 open, is the lamp lit or is it dark?

_____

b. Close S_1. Did the lamp light? _____

c. With S_1 still closed, now close S_2. Is the lamp lit now?

_____

d. Open S_2. Did the lamp stay lit, or did it go dark?

_____

e. Open S_1. What is the condition of the lamp now?

_____

In step d, did the SCR turn off when S_2 was opened? _____ If not, explain why.

_____

_____

Figure 32–17