A POWER NOMOGRAPH

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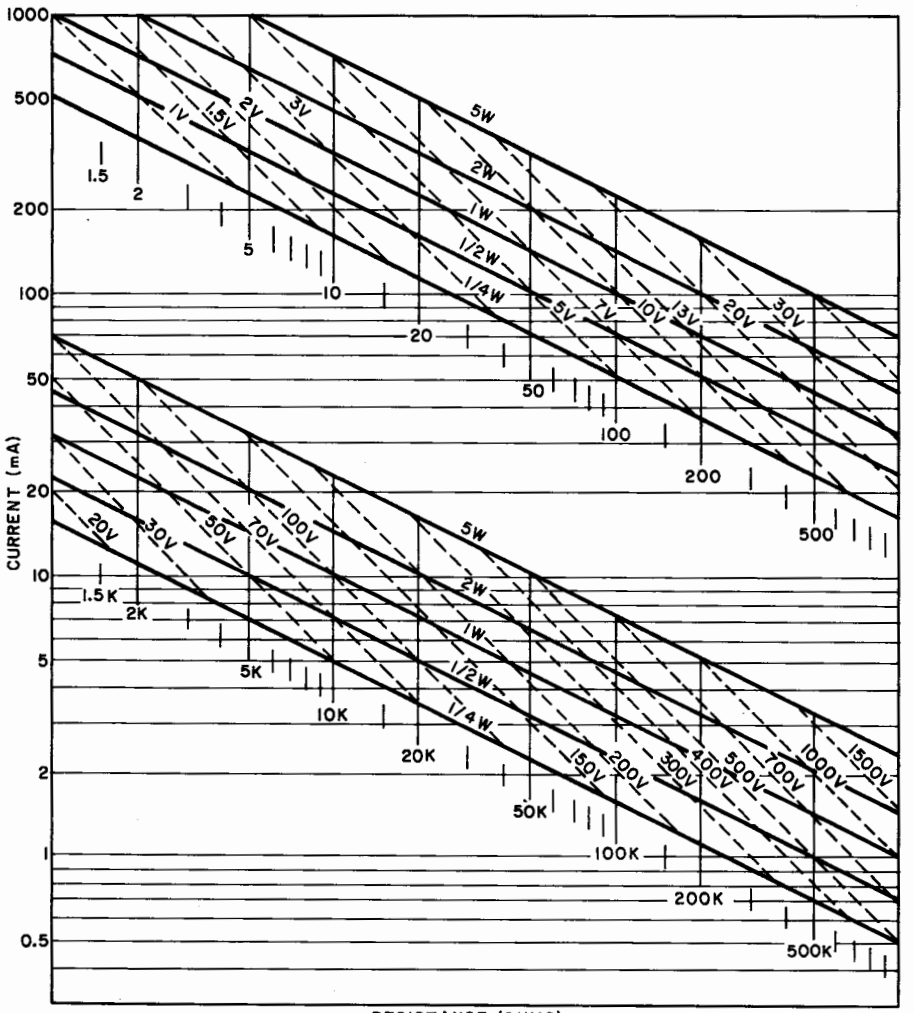
THE NOMOGRAPH shown here can be quite a time saver when designing and/or breadboarding a circuit. It shows at a glance the maximum resistance required to safely pass a given current as well as the minimum resistance required for a given voltage drop to be applied safely across it. In addition, the nomograph tells what the wattage rating for a given resistor should be, given the voltage and current.

The nomograph is used as follows. Assume a 10-mA current is to be passed through a ½-watt resistor. Referring to the nomograph, we can see that the maximum allowable resistance is 5000 ohms. This would be a 50-volt drop across the resistor. Using another example, if 100 volts were to be applied across the ½-watt resistor, we can see that the minimum allowable resistance must be 20,000 ohms. This means that 5 mA of current would flow through the 20,000-ohm resistor at 100 volts.



Other combinations of voltage, current, resistance, and power rating, keeping two figures constant and determining the third figure, are possible.

The seemingly linear plot of the nomograph can be explained by the fact that the plot is made on log-log paper. From Ohm's Law, $P = I^2R$ (P is power in watts, I is current in amperes, and R is resistance in ohms). Hence, I versus R on log-log paper is a straight line with a slope of $-\frac{1}{2}$. This greatly simplifies plotting and makes it easy to use the nomograph in calculations. ◇