



Figure 157. Chart showing maximum permissible percentage of maximum rated dissipation as a function of temperature.

To use the chart, it is necessary to know the maximum dissipation rating and the maximum operating temperature for a given transistor. The calculation involves only two steps:

1. A vertical line is drawn at the desired operating temperature value on the abscissa to intersect the curve representing the maximum operating temperature for the transistor.

2. A horizontal line drawn from this intersection point to the ordinate establishes the permissible percentage of the maximum dissipation at the given temperature.

The following example illustrates the calculation of the maximum permissible dissipation for transistor type 2N1490 at a case temperature of 100 degrees centigrade. This type has a maximum dissipation rating of 75 watts at a case temperature of 25 degrees centigrade, and a maximum permissible case-temperature rating of 200 degrees centigrade.

1. A perpendicular line is drawn from the 100-degree point on the abscissa to the 200-degree curve.

2. Projection of this point to the ordinate shows a percentage of 57.5.

Therefore, the maximum permissible dissipation for the 2N1490 at a case temperature of 100 degrees centigrade is 0.575 times 75, or approximately 43 watts.

Semiconductor devices require close control of thermal variations not only during operation, but also during storage. For this reason, the maximum ratings for transistors usually include a maximum permissible storage temperature, as well as a maximum operating temperature.

Characteristics are covered in the Transistor Characteristics section, and such data should be interpreted in accordance with the definitions given in that section. Characteristic curves represent the characteristics of an average transistor. Individual transistors, like any manufactured product, may have characteristics that range above or below the values given in the characteristic curves. Although some curves are extended beyond the maximum ratings of the transistor, this extension has been made only for convenience in calculations; no transistor should be operated outside of its maximum ratings.