

Resistors Reliability

Resistor failure rates vary considerably. This is true not only between resistor styles, but also between the quality levels of a single style. Figure 2 of the Resistor Failure Mechanisms and Anomalies section shows the relative difference in failure rate between each resistor style addressed in this section.

As a rule, fixed value resistors should be used whenever practical due to their higher reliability and lower cost. A fixed value resistor style will typically be an order of magnitude more reliable than an equivalent variable resistor in the same application.

The difference between reliability of fixed value film and wirewound resistors is not significant. It is more dependent upon the environment in which it is used (particularly temperature) and power dissipation requirements than on the construction method of the resistor. However, as a rule, film styles are more reliable than wirewounds.

The difference between reliability of variable resistors is more pronounced than it is for fixed resistors, as Figure 2 shows. This is primarily because the unenclosed styles are more susceptible to damage from environmental factors such as salt/fog, dust and dirt, humidity, etc. In addition, the very high power ratings of some variable resistors increase stress factors, thermal expansion/contraction, and thus naturally cause higher failure rates.