Tel: +1-613-236-8359 info@ppisystems.com

Laser Resistor Trimming and Testing

During trimming of a resistor a laser is used to cut the resistive element while the resistance is measured to achieve the target resistance value. During the trimming process the current pathway is narrowed, increasing resistance.
During the trim process, a high precision voltage is applied across the resistor, the resulting current is measured and the resistance is then known. Once the target resistance value is met the laser is stopped.

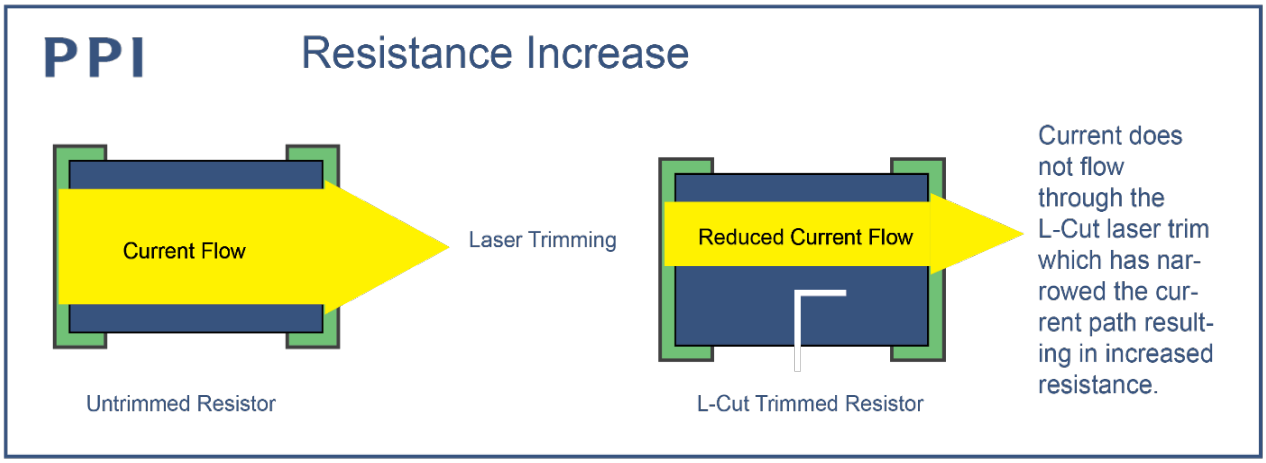

Figure 1: Example of Reduced Current/Increased Resistance From an L-Cut

Standard manufacturing tolerances for thin- and thick-film resistors are in many cases ± 10 percent or worse. However many applications demand tolerances closer to ± 1 percent. To reach these values laser trimming is used. Trimming is performed in a closed loop environment with voltage applied to the resistor using fine probes.

Different types of cuts are used during trimming according to the specifications for the resistor or the circuit. Each geometry results in a variance in the reduction of current flow. Common cut types are shown in Figure 2.

In addition to standard passive trims where the resistor is measured directly, active trimming can measure some given characteristic of a powered circuit and trim a resistor until that parameter achieves its target value.

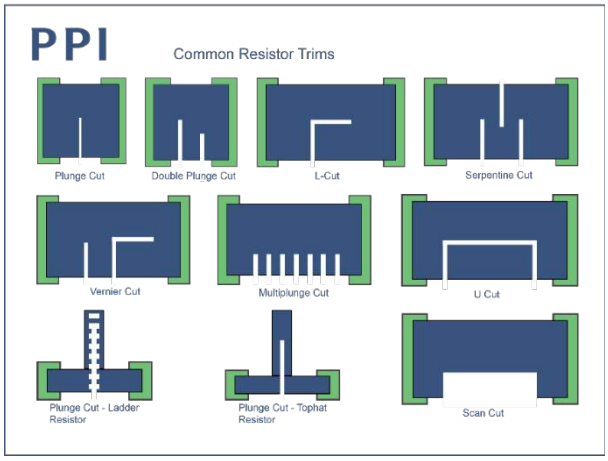

Figure 2: Common Resistor Trims

Trimmable resistors are often used in applications that require an initial calibration. This includes electronic systems such as sensors, oscillators, voltage dividers and operational amplifiers. The main benefit is the ability to bring a device into specification in a single, simple step. Increasing production efficiency and reducing cost.