The low cost and convenience of surface mount components and automated installation is inspiring new surface mount high power devices that have previously required chassis mounting. The design of systems using high power surface mount elements requires careful attention to the electrical grounding and heat sinking of the component to achieve specified performance and power handling. Because the component will be attached to a printed circuit board instead of a metal chassis, finite inductance to ground will be introduced. For terminations, VSWR may rise with increasing frequency and for attenuators, attenuation flatness may degrade. The relatively high thermal resistance of the printed circuit board compared to a metal mounting surface will result in lower power handling limits to maintain reliable operating temperatures. A properly designed surface mount printed circuit will minimize these effects and allow high performance.

The best way to decrease printed circuit board inductance to ground and thermal resistance is to maximize the amount of plated via holes under and around the surface mount component and specify heavy copper cladding (2 oz.) to spread the dissipated heat.

Filled or plugged via holes should be used to avoid component attachment solder from wicking down to the bottom surface of the printed circuit board. High temperature solder such as Sn96 is preferable to Sn62. Because of relatively high thermal resistance mounting, most devices will be capable of reflowing their attachment solder before device damage occurs if extremely high RF power is applied. In addition, application of thermally conductive elastomers or epoxies around the perimeter of the part will aid in heat spreading, however the top surface should be avoided to eliminate detuning of the internal matching structures.