



APPLICATION NOTES

INTRODUCTION

In recent years, as hermetically sealed MIC (Microwave Integrated Circuit) devices have come into common usage, designers have sought an alternative to “spark plug” type SMA connectors for launching from microstrip to a coaxial line. “Spark plug” launchers perform well electrically and mechanically, but they have some disadvantages: Because the hermetic seal is integral to the connector, the package loses hermeticity if the connector is removed. They are also expensive to manufacture, requiring costly special welding and testing equipment, and manufacturing yields can be quite low.

The alternative approach discussed here is to seal the package with an inexpensive 50 ohm hermetic seal and use a non-hermetic SMA connector that fits over the protruding seal pin. There are several advantages to this method: If the seal is damaged during installation, it can be replaced easily and inexpensively. If a connector is damaged during service, it can be replaced without compromising the package’s hermeticity. If devices are to be shipped with pins only, a connector can be put on for testing, removed and reused for testing on other packages.

This type of connector is known by many names as no industry-wide generic term has come into use. It may be variously described as a hermetic seal launcher, MIC launcher, field replaceable jack or various combinations of these terms.

All of these terms are descriptions of the same thing: SMA series receptacles designed for mounting on a hermetic seal which provides an environmental, mechanical and electrical transition from a microstrip line to a coaxial line. They typically have flanges for mounting to the package; screw-in types are available but require a thick-walled package to allow for seal mounting.

DESIGN

AEP SMA hermetic seal launchers are designed with mechanically captivated contacts and insulators. Epoxy captivation is avoided in order to eliminate RF leakage through epoxy fill holes at high frequencies.

50 ohm hermetic seals with pin diameters of 0.012”, 0.015” and 0.018” use glass dielectrics that yield an outer ring diameter considerably smaller than the inner diameter of a standard SMA body. In order to make the transition from an SMA interface to this smaller diameter, the diameters of the connector body, contact and insulator must be stepped down from the front (SMA interface) end of the connector to the rear (seal interface) end.

These steps, together with the barbs and shoulders used to captivate the contact and insulator, are designed and located to perform electrical compensation for locally capacitive or inductive sections. The seal’s electrical characteristics and the impedance at the connector/seal interface are also compensated for, in order to produce a connector and seal combination as close to 50 ohm overall as possible. Figure A illustrates the transitional steps and contact captivation method.