

## ***Mechanical Installation of Dorado's Substrate type microstrip devices***

### **1. 50 Ohm**

Dorado International Microstrip ferrite devices have a circuit impedance of 50 ohm and compatible with other 50 ohm circuits.

### **2. Mounting**

- A. Substrate type Microstrip isolators and circulators (i.e. devices not mounted on carriers) should be mounted on either a magnetic or non-magnetic type base. The type of base required is specified on the product certificate or data sheet. The minimum thickness for a magnetic or non-magnetic base is One Millimeter.
- B. Dorado Suggests two options for mounting substrate type ferrite microstrip devices on a conductive carrier or base.
- To attach a ferrite substrate device to a metal carrier a lead free soldering process could be used. The maximum temperature that the standard Dorado ferrite products can tolerate is +150°C for up to 60 seconds or +130°C continually. It is our recommendation that a suitable solder for use with Dorado Microstrip devices is "Indalloy #1 (In, Sn)" which has a melting point of +125°C. An appropriate flux to be used with this indium solder alloy would be the "Kester" type 135 or 197.
  - An alternate method for mounting ferrite substrate type devices is by using most types of conductive epoxy with a polymerization temperature that is below +130°C. this epoxy is available from Emerson & Cuming, Chomerics Inc. or Epoxy Technology Inc. the epoxy material should be prepared in accordance to the manufactures instructions.

The maximum thickness of the conductive epoxy or the lead-free solder should not exceed 30  $\mu\text{m}$  (micrometers).

### **3. Connection Gap**

The gap between the ferrite device and the adjacent microstrip substrate to which it is to be connected must be tightly controlled. This gap has a direct effect on the insertion loss of the connection and it's VSWR. Dorado Recommends that the maximum dimension of the gap between the ferrite device and the adjacent PCB should not exceed the dimensions shown in the following chart

Maximum Allowed Gap (mm)	Maximum Allowed Gap (Mil)	Frequency range, GHz
0.200	7.87	2.0 to 5.0
0.127	5.00	5.0 to 10.0
0.100	4.00	10.0 to 17.0
0.076	3.00	17.0 to 24.0
0.050	2.00	24.0 to 30.0
0.040	1.57	30.0 to 40.0

#### 4. Magnetic Environment

The electrical performance may be affected if a ferrite device is mounted very close to magnetic material (other than its magnetic carrier) or exposed to strong magnetic fields from nearby magnetic devices. All external magnetic material should be kept at least 2.5mm away from any surface of the ferrite device.

#### 5. Electrical connection

- A. We recommend Thermocompression (Wedge-Ball) bonding for the tab connections. The parallel gap welding is the most suitable process for wirebonding of substrate type microstrip devices. Thermocompression bonding requires a high-force on a surface with a high temperature; around +350°C. We recommend the following regime of Thermocompression (parallel gap) wirebonding: +350°C @ 25usec. Please note that the temperature of +350°C allowed at the bonding pads area only during 25usec max. Do not heat the device body above +150°C @ 60 sec or +130°C. Tab's material should be gold. We recommend 20 um – 25um gold foil tabs for wirebonding.
- B. The connection tabs width should be greater than 75% and should not exceed a 100% of the width of device's output (input) microstrip lines. The connection tabs length should not be more than twice the width of the device's output (input) microstrip