



Handling Guidelines for ESD Protection of GaAs MMICs

General Application Note

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All electrical components are sensitive in some degree to Electrostatic Discharge (ESD), and GaAs MMICs are no exception. Many digital semiconductors have some level of protection circuitry designed into the input and output pins. GaAs MMIC designs rarely include built-in protection circuitry however, due to RF performance issues. Protection circuits will add reactive parasitic that limit high frequency performance.

Circuitry on GaAs MMICs can be damaged by electrostatic discharge at voltages below 250 V. In some cases, this classifies these devices as Class 0, meaning that stringent levels of ESD protection must be observed.

Electrostatic charges are created by the contact and separation of two objects. The magnitude of this charge buildup varies within different materials. Conductive and static dissipative materials release this charge quite easily to a grounded surface. Insulators retain the charge for a longer period of time.

To protect static sensitive devices from an electrostatic discharge, the parts must be completely enclosed with protective conductive packaging. This shielding protects the parts inside by causing any static discharge to follow the shortest conductive path to ground. Prior to opening the protective packaging, the part must be placed on a conductive workbench to dissipate any charge that has built up on the outside of the package.

Once the part is removed from its protective package, it must be handled only at a grounded workstation by an operator grounded through a conductive wrist strap. Equipment used in the manufacture, assembly and test of GaAs MMIC devices must also be properly grounded.

Antistatic or dissipative tubes and pink poly bags provide No ESD Protection to the device. The antistatic or dissipative name only implies that it will not create an ESD hazard.

The only proper protection is to completely enclose the device in a conductive "Static Shield". This is typically a silver colored bag, black conductive tote box and/or conductive carrier tape.

Hittite Microwave maintains proper ESD handling and packaging throughout our facility as well as with our subcontractors. We are in full compliance to the ESD/EOS association guidelines and specifications. We maintain proper procedures, a comprehensive ESD training program and frequent internal auditing to assure constant compliance.

For more information on proper ESD handling, please consult the ESD Association advisory ESD-ADV-2.0-1994 or MIL-STD-1686.

2 References

ESD Association Advisory (Reference) AS-9100.