



GaAs Integrated Circuits

Handling and Storage

- *Storage:* All ICs are packaged in a GEL-PAK™ ESD-protective containers and sealed in an ESD-protective bag with a desiccant. Once the sealed protective bag is opened, the ICs should be stored in a nitrogen environment.
- *Cleanliness:* All ICs are protected by a passivation layer; however, all handling operations should be performed in a clean, dry environment. Devices should not be exposed to solvents; plasma cleaning is acceptable.
- *Static Sensitivity:* GaAs ICs are “Class 1” ESD sensitive and require proper handling to preclude damage. Assembly equipment, benches, tweezers, and operators should be grounded to avoid damage from electrostatic discharge.
- *Transients:* Instrument and power supply transients should be avoided while bias is connected to the IC. It is recommended to use shielded signal and bias cables to minimize inductive effects.
- *General Handling:* Do not touch the surface of the die. It is recommended that the IC be handled along the long side with a sharp pair of tweezers.
- *Automation:* Note that force impact is critical during pick-up and placement in automated manufacturing environments because of the brittle nature of GaAs devices. In any automated pick-up and placement it is recommended to avoid air-bridge locations.

Mounting

All RF circuit connections are made to the top side of the IC. It is essential to RF performance that the backside be well grounded and that the length of topside interconnects be minimized. WJ Communications recommends mounting the ICs to a clean, flat surface using Au/Sn eutectic attach or thermally and electrically conductive epoxy. Some of WJ Communications' ICs utilize vias for effective RF ground and care must be exercised when mounting ICs with vias to preclude excess runout on the top side of the die. The WJ Communications ICs with vias have a plated backside metallization of 3 micron gold, while the ICs without vias have a sputtered backside metallization of 3000 angstrom gold.

- *Eutectic Die Attach:* A fluxless 80/20 Au/Sn preform in .001 inch nominal thickness directly to a gold plated copper rib is recommended for optimal thermal and electrical contact. A dry nitrogen or forming gas atmosphere is suggested, along with a stage temperature of $290^{\circ} \pm 10^{\circ}\text{C}$ where die attach time is minimized and does not exceed one minute.
- *Conductive Epoxy Attach:* A thermally and electrically conductive epoxy, such as Ablebond 84-1LMIT epoxy, is suggested providing the absolute maximum thermal ratings are not exceeded. Epoxy attach is recommended for larger ICs. The epoxy should be cured per the manufacturer's recommended schedule.

Bonding

WJ Communications ICs have gold bond pads and thermo-compression wedge bonding with a .0007 or .0008 inch gold bond wire is recommended where wire lengths are minimized for best RF performance. The bonds should originate on the die and terminate on the package or substrate. A nominal stage temperature of 230°C and a bonding pressure of 18-22 grams for a one mil bond foot and a tip temperature of 180°C are the recommended bonding parameters. For WJ Communications limiter ICs, a .004 inch gold ribbon is recommended for ground connections on pads 5 and 8, or connection can be made using two bonds of .0007 or .0008 inch gold bond wire.