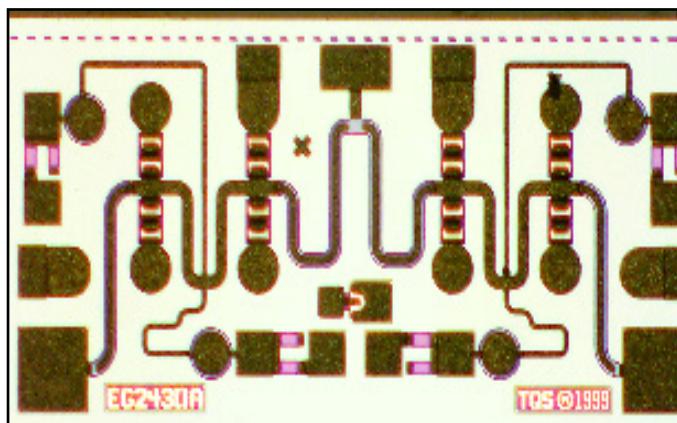
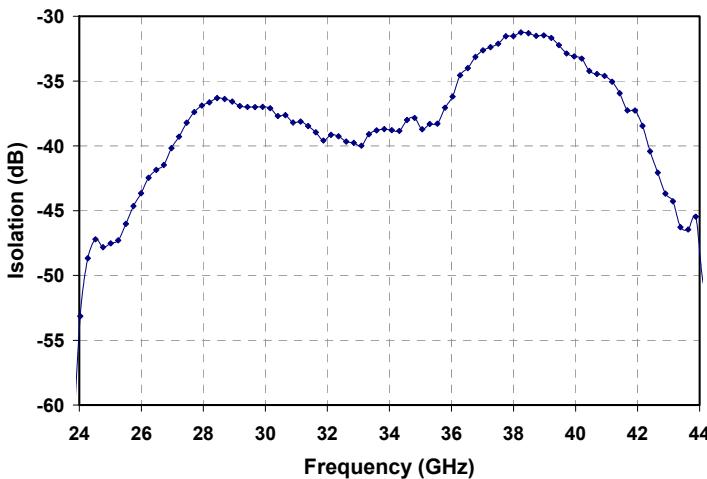
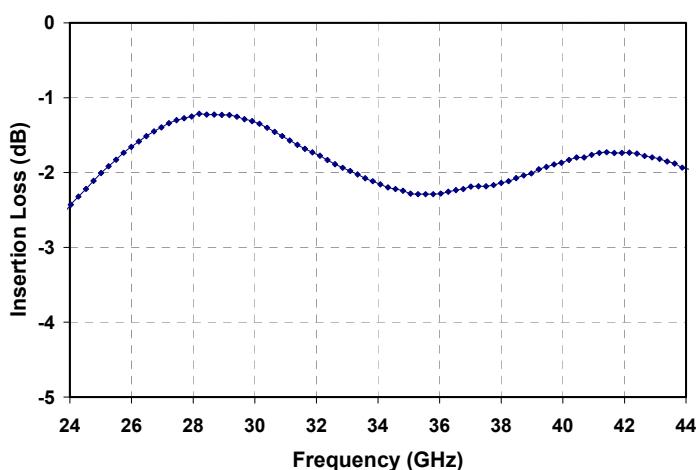


## Wideband mmWave VPIN SPDT Switch

**TGS4301**



### Fixture Measured Performance



### Key Features

- 24-43 GHz High Isolation SPDT
- < 2 dB Typical Insertion Loss
- -10dB Typical Return Loss
- On-Chip Bias resistors
- Flexible Bias Pad Configuration
- Reflective Switch Design
- Integrated DC Blocks on RF Pads
- 2.164 x 1.055 x 0.1 mm (2.283 mm<sup>2</sup>)

### Primary Applications

- Point-to-Point Radio
- Point-to-Multipoint Radio
- Ka Band VSAT
- LMDS

*Note: Datasheet is subject to change without notice*

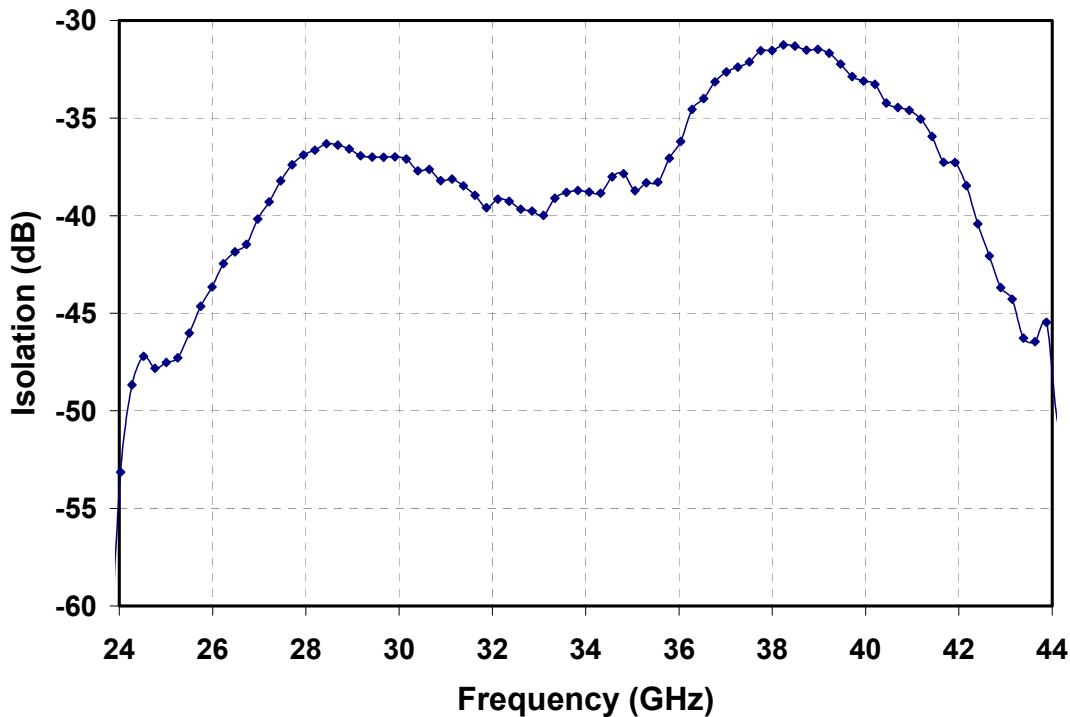
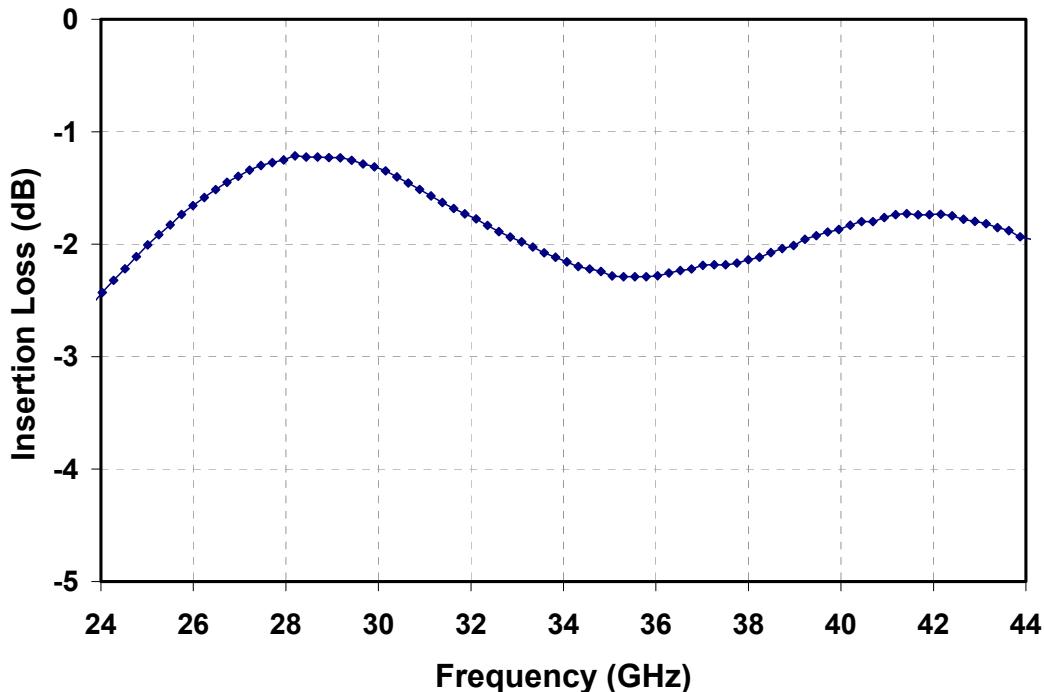
**TABLE I**  
**MAXIMUM RATINGS**

Symbol	Parameter 1/	Value	Notes
$V^+$	Positive Supply Voltage	+5V	<u>2/</u> , 3/
$V^-$	Negative Supply Voltage	-10 V	
$I^+$	Positive Supply Current (Quiescent)	22.5 mA	<u>2/</u> <u>3/</u>
$P_{IN}$	Input Continuous Wave Power	TBD	<u>3/</u>
$P_D$	Power Dissipated	TBD	<u>3/</u>
$T_M$	Mounting Temperature (30 Seconds)	320 $^{\circ}$ C	4/, 5/
$T_{STG}$	Storage Temperature	-65 to 150 $^{\circ}$ C	

- 1/ These ratings represent the maximum operable values for this device.
- 2/  $V^+_{max}$  and  $I^+_{max}$  are both per bias pad.
- 3/ Combinations of supply voltage, supply current, input power, and output power shall not exceed  $P_D$ .
- 4/ When operated at this bias condition with a base plate temperature of 70  $^{\circ}$ C, the median life is reduced from TBD to TBD hours.
- 5/ Junction operating temperature will directly affect the device mean time to failure (MTTF). For maximum life it is recommended that junction temperatures be maintained at the lowest possible levels

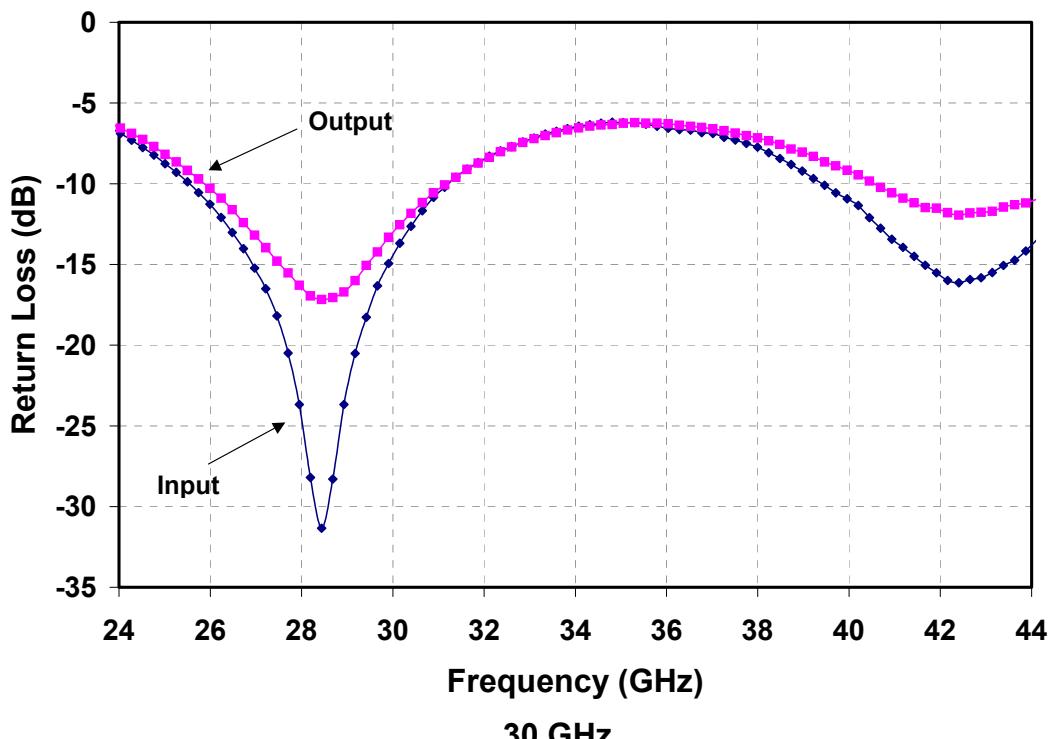
### Measured Fixtured Data

Bias Conditions:  $V_{control} = \pm 5$  V,  $I_t = 22$  mA



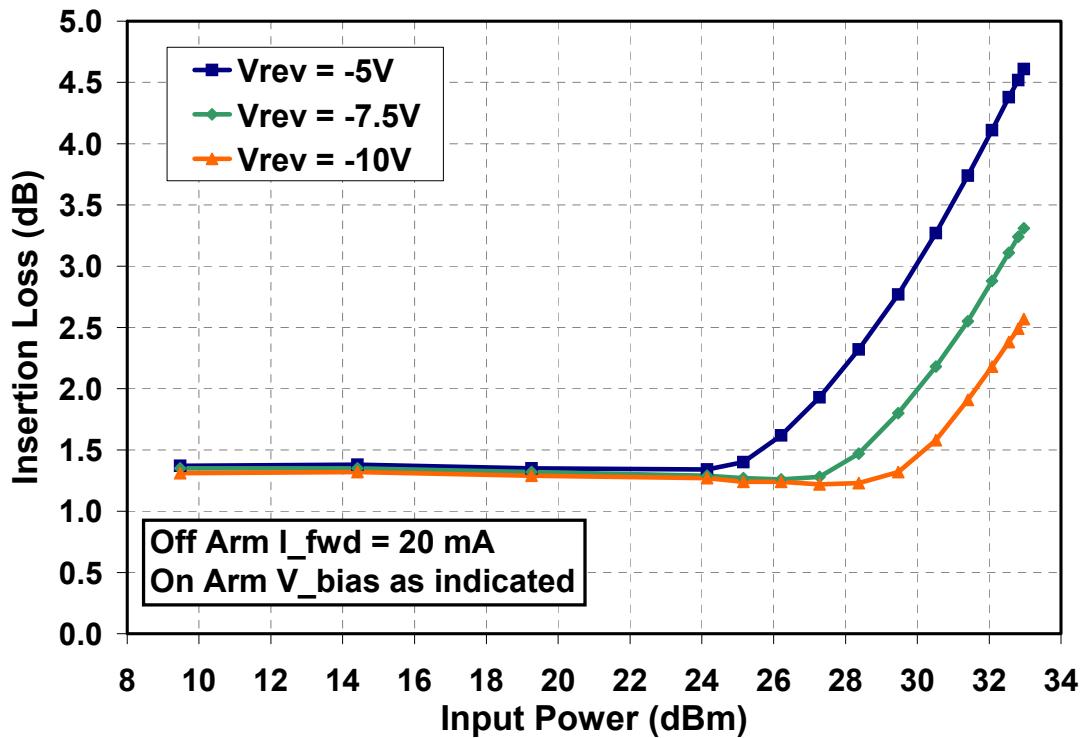
## Measured Fixtured Data

Bias Conditions:  $V_{control} = \pm 5$  V,  $I_+ = 22$  mA



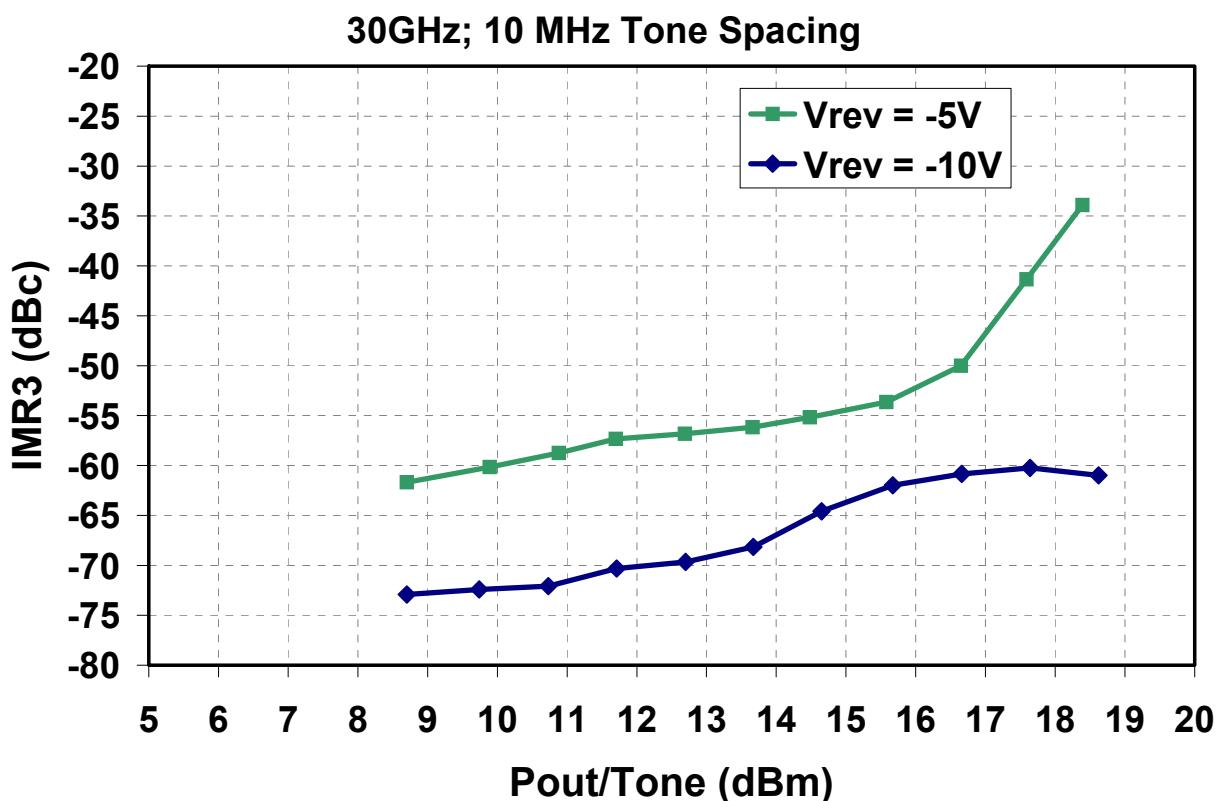
Frequency (GHz)

30 GHz



Off Arm  $I_{fwd}$  = 20 mA  
On Arm  $V_{bias}$  as indicated

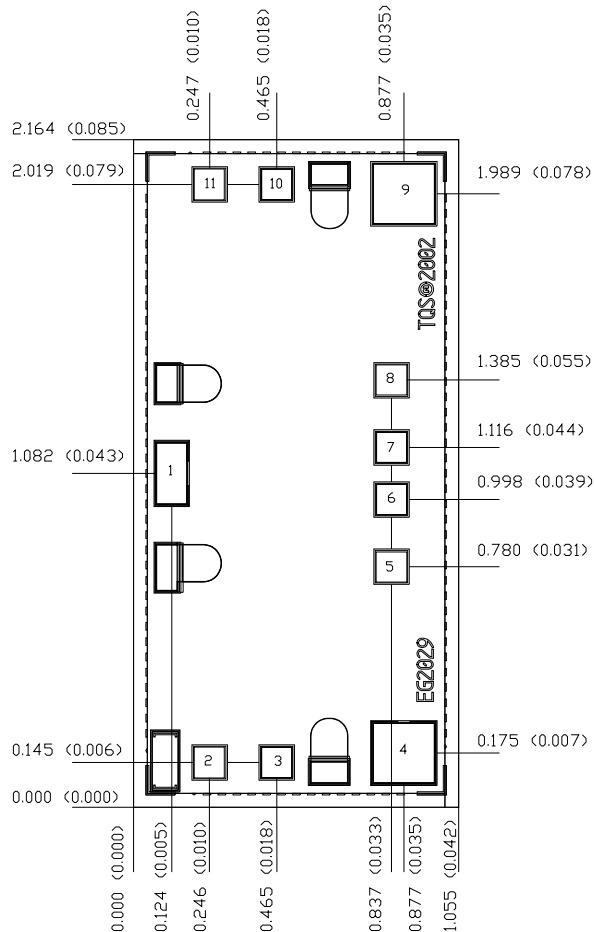
**Measured Fixtured Data**



**FUNCTION TABLE**

STATE	RF-B	RF-C	VB1 or VB2	VC2 or VC1
0	Isolated	Isolated	+ 5V	+ 5 V
1	Isolated	Low-Loss	+ 5V	-5 V
2	Low-Loss	Isolated	-5 V	+ 5V
3	TBD	TBD	-5 V	-5 V

## Mechanical Drawing



Units: millimeters (inches)

Thickness: 0.100 (0.004)

Chip edge to bond pad dimensions are shown to center of bond pads.

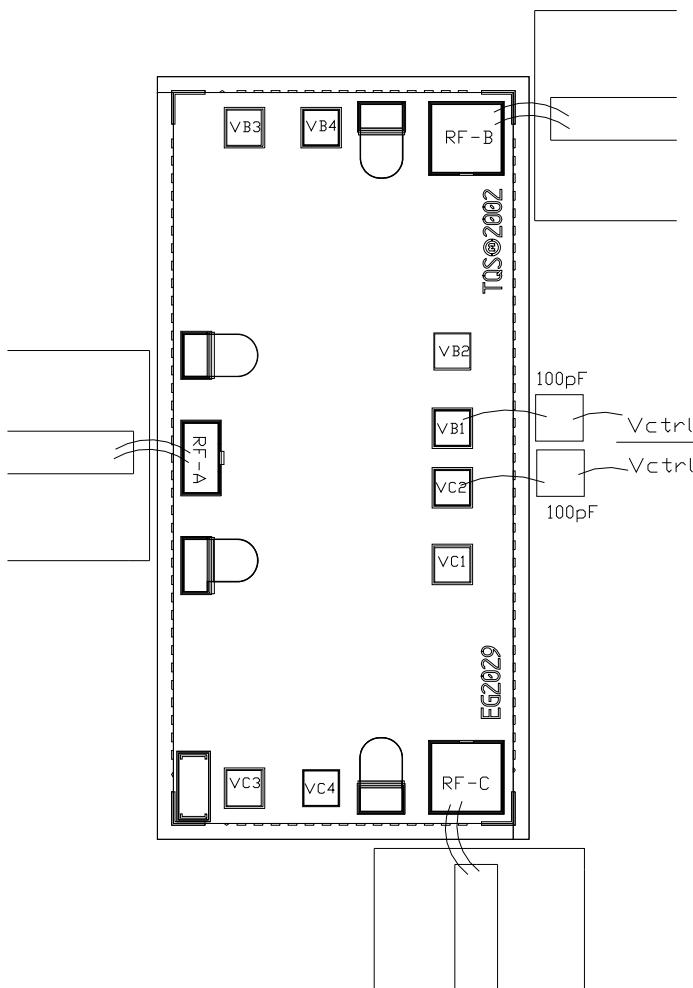
Chip size tolerance: +/- 0.0508 (0.002)

GND IS BACKSIDE OF MMIC

Bond Pad #1 (RF_A)	0.105 x 0.205	<0.004 x 0.008>
Bond Pad #2 (VC3)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #3 (VC4)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #4 (RF_C)	0.205 x 0.200	<0.008 x 0.008>
Bond Pad #5 (VC1)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #6 (VC2)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #7 (VB1)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #8 (VB2)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #9 (RF_B)	0.205 x 0.200	<0.008 x 0.008>
Bond Pad #10 (VB4)	0.105 x 0.105	<0.004 x 0.004>
Bond Pad #11 (VB3)	0.105 x 0.105	<0.004 x 0.004>

**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

**MMIC Carrier Plate Assembly Drawing**



**Notes:**

1. For biasing flexibility, two sets of bias pads are available for each branch.
  - Control Lines  $\pm 5V$  (VC2 or VC4, VB1 or VB4) use on-chip resistors for diode current control.
  - Auxiliary pads (VC1 or VC3, VB2 or VB3) can be used if connected to a 20mA current source.
2. Positive biasing with both VC2 and VC4 or VB1 and VB4 may increase the switch's isolation at the expense of higher dissipated power.

**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

## Assembly Process Notes

Reflow process assembly notes:

- Use AuSn (80/20) solder with limited exposure to temperatures at or above 300 °C for 30 sec
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- No fluxes should be utilized.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- Devices must be stored in a dry nitrogen atmosphere.

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.
- Organic attachment can be used in low-power applications.
- Curing should be done in a convection oven; proper exhaust is a safety concern.
- Microwave or radiant curing should not be used because of differential heating.
- Coefficient of thermal expansion matching is critical.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonics are critical parameters.
- Aluminum wire should not be used.
- Discrete FET devices with small pad sizes should be bonded with 0.0007-inch wire.
- Maximum stage temperature is 200 °C.

**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

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