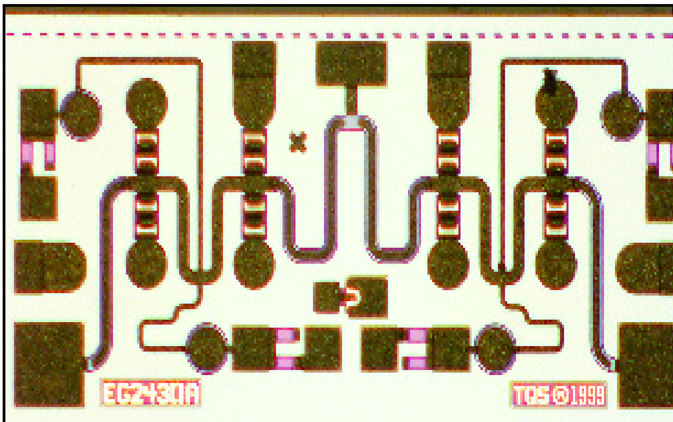
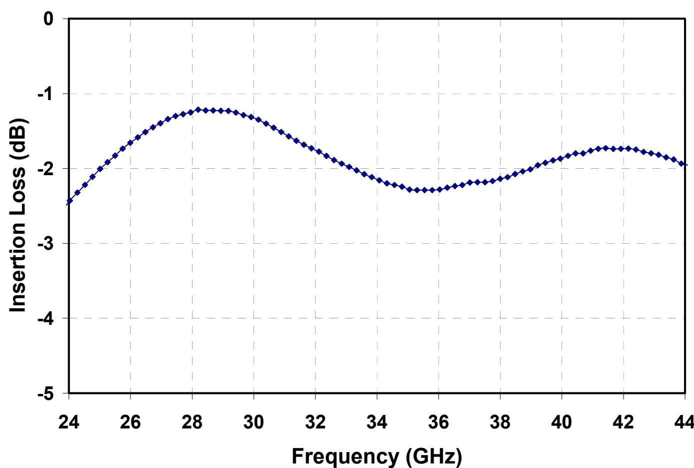
Wideband mmWave VPIN SPDT Switch TGS4301

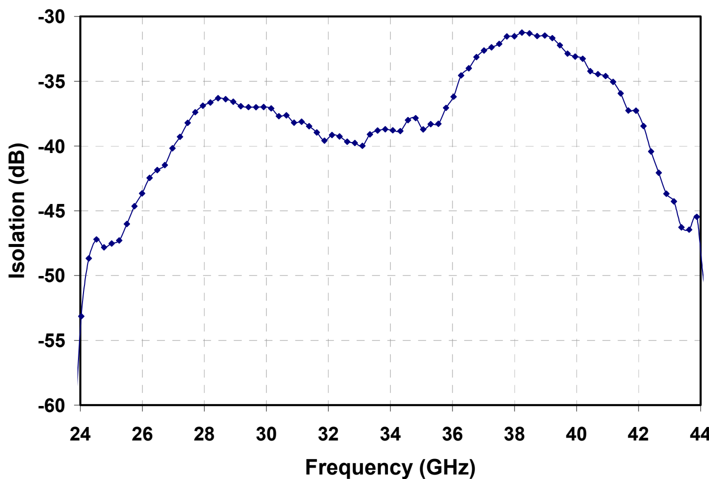


Key Features

- 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^2)

Fixtured Measured Performance





Note: Datasheet is subject to change without notice

Primary Applications

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

TABLE I
MAXIMUM RATINGS

Symbol	Parameter 1/	Value	Notes
V^+	Positive Supply Voltage	+5V	2/, 3/
V^-	Negative Supply Voltage	-10 V	
I^+	Positive Supply Current (Quiescent)	22.5 mA	2/ 3/
P_{IN}	Input Continuous Wave Power	TBD	3/
P_D	Power Dissipated	TBD	3/
T_M	Mounting Temperature (30 Seconds)	320 ^{0}C	4/, 5/
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	

1/ These ratings represent the maximum operable values for this device.

2/ V^+_{max} and I^+_{max} are both per bias pad.

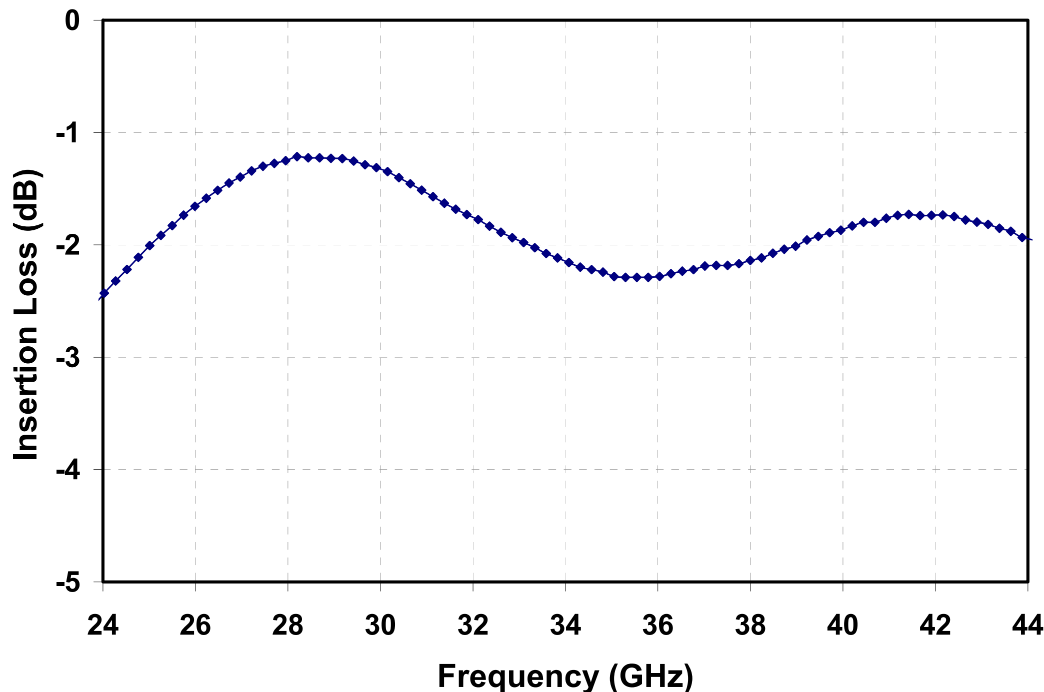
3/ Combinations of supply voltage, supply current, input power, and output power shall not exceed P_D.

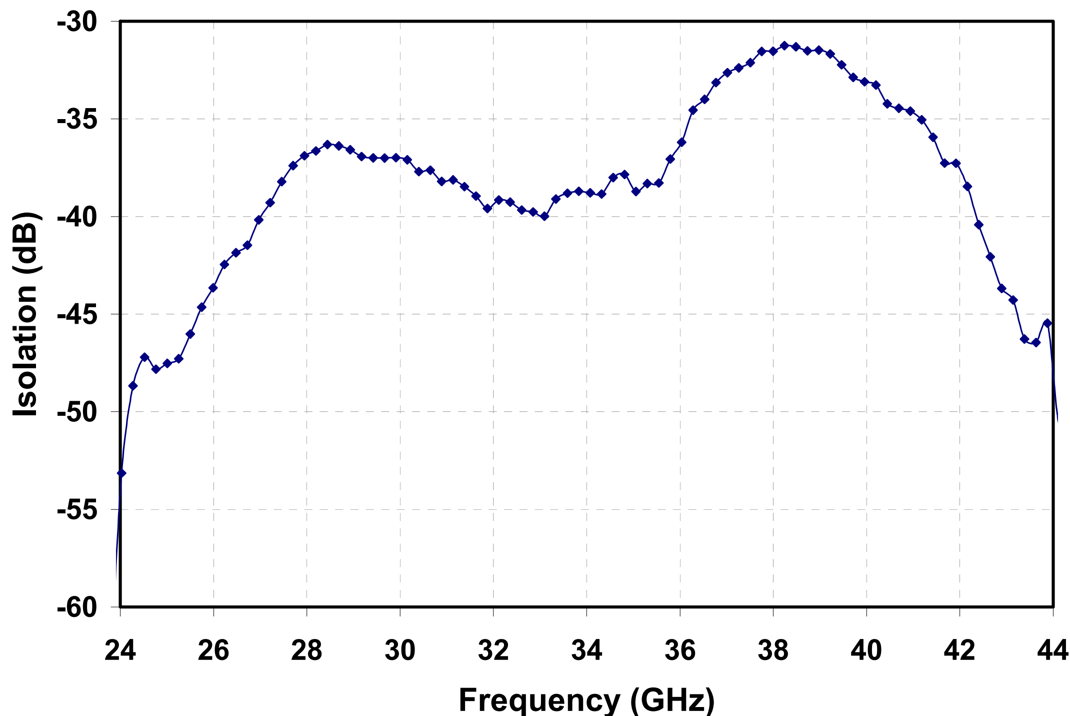
4/ When operated at this bias condition with a base plate temperature of 70 ^{0}C, the median life is reduced from TBD to TBD hours.

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: Vcontrol=±5 V, I+=22 mA





Measured Fixtured Data

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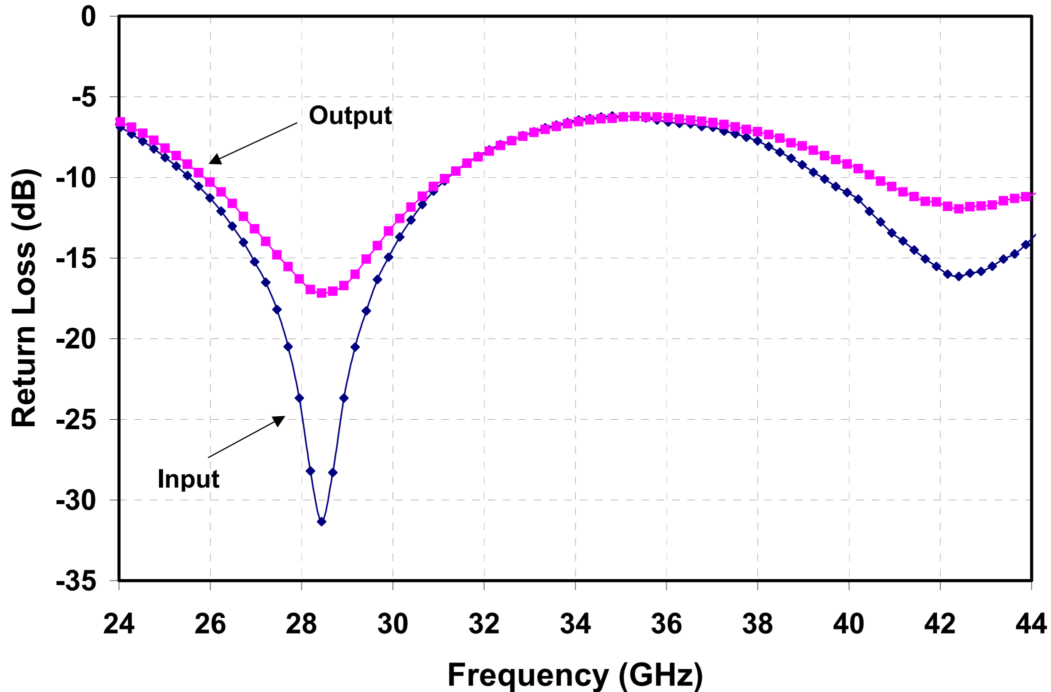
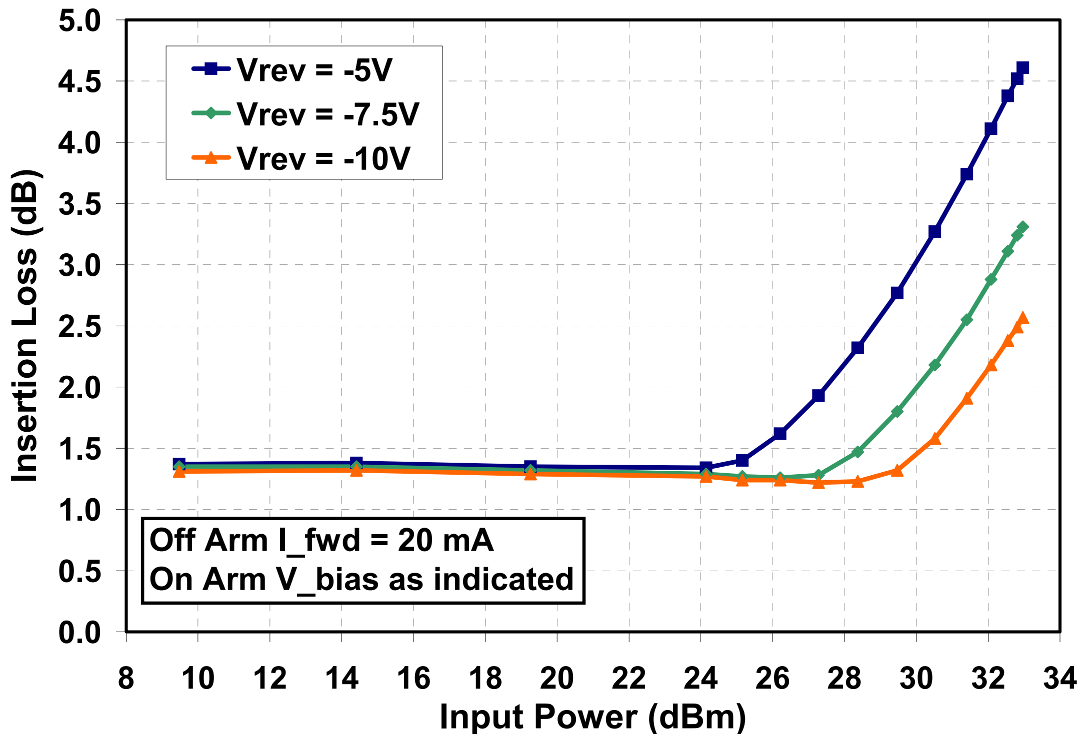
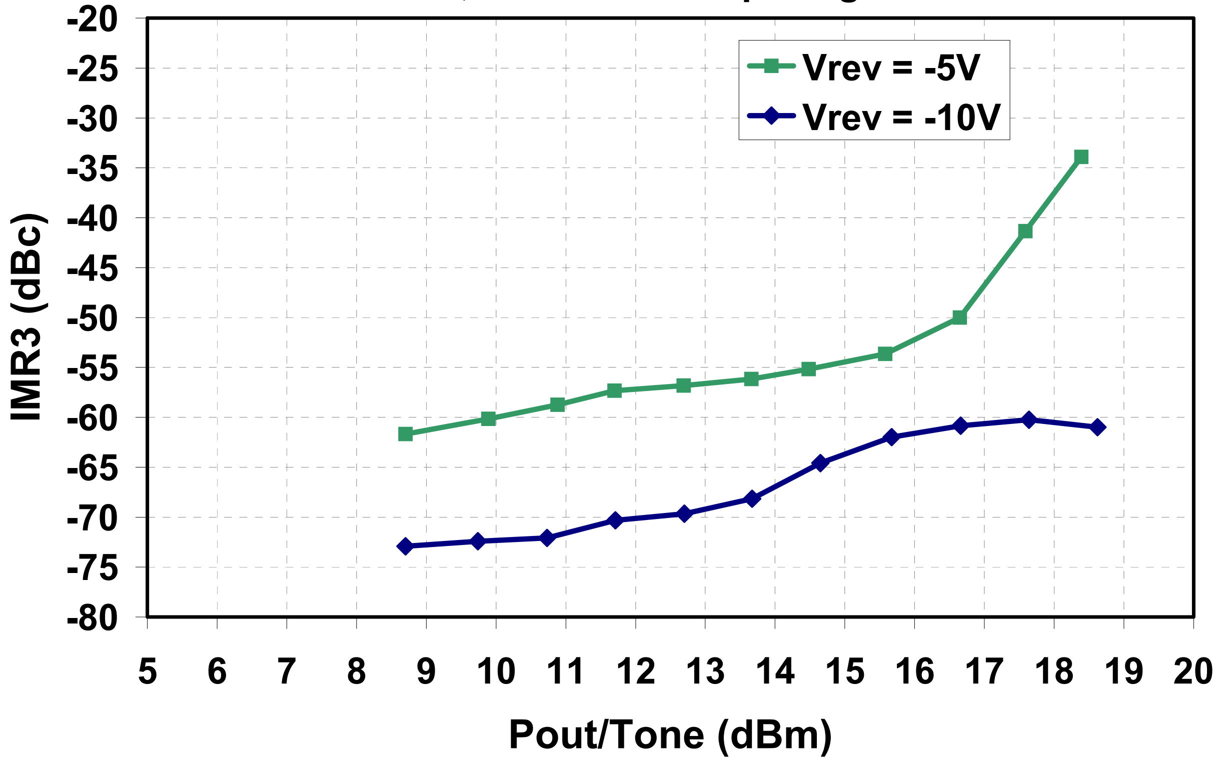




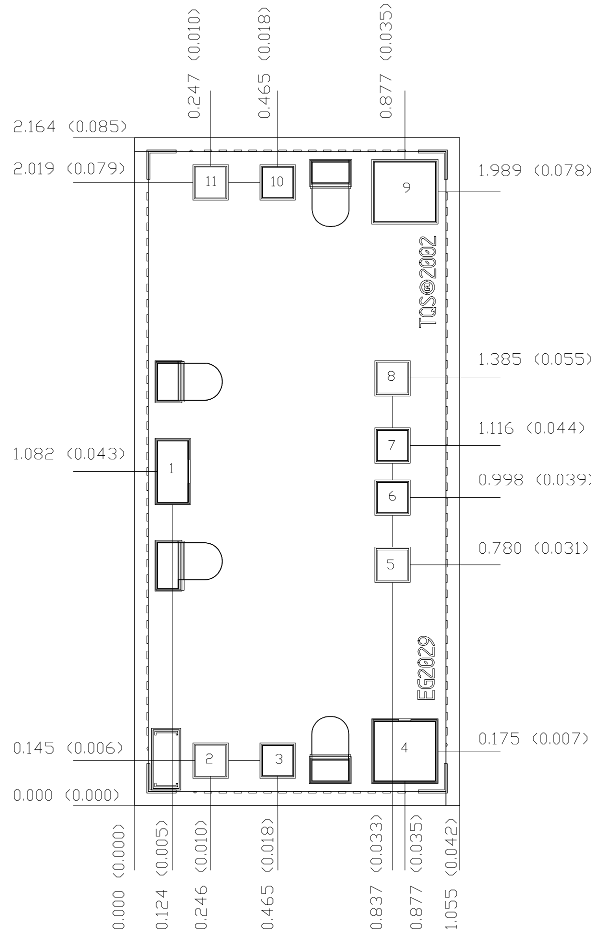
Measured Fixtured Data



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

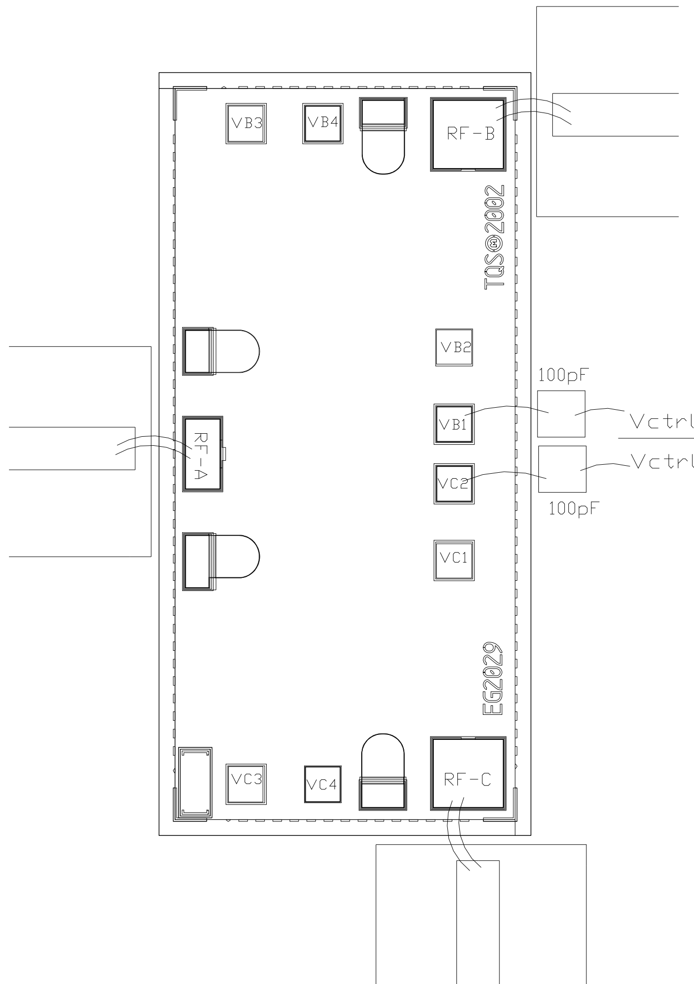


Units: millimeters (inches)
Thickness: 0.100 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pads.
Chip size tolerance: +/- 0.0508 (0.002)
GND IS BACKSIDE OF MMIC

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 ±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.

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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.

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