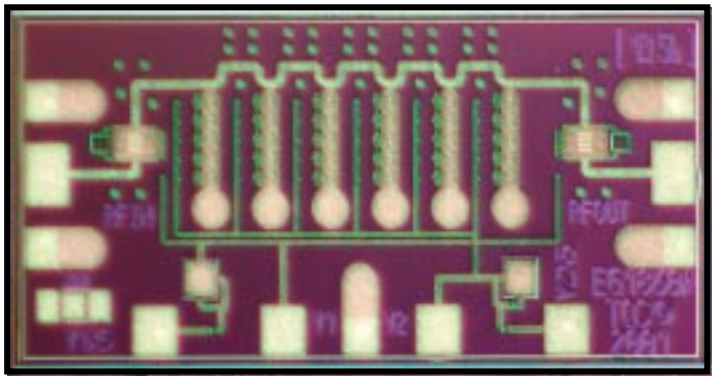
TriQuint SEMICONDUCTOR

Advance Product Information
January 18, 2005

50 GHz Wideband Analog Attenuator TGL4203-EPU



Chip Dimensions 1.7mm x 0.8 mm x 0.1mm

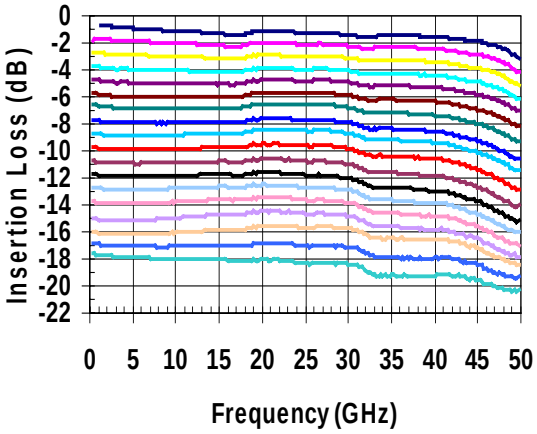
Key Features and Performance

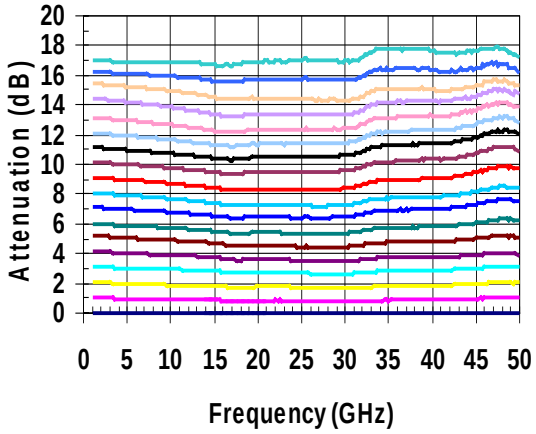
- 0.25um 3MI MMW pHEMT
- Broadband Response DC to > 50 GHz
- 2dB typical Insertion Loss
- 17dB Variable Attenuation Range
- 15dB typical Return Loss
- Bias: -1V to 0V

Primary Applications

- Point to Point Radio
- Fiber Optic
- Wideband Military & Space

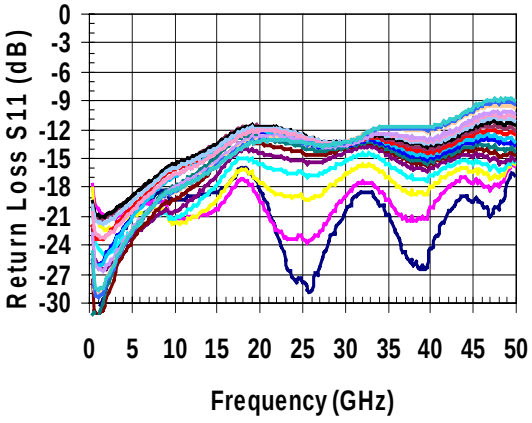
Typical Electrical Characteristics

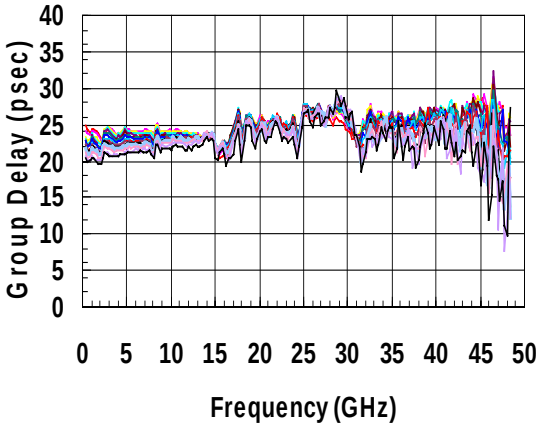




	V1 / V2
REF	0.000 / -1.000
1dB	-0.549 / -0.838
2dB	-0.606 / -0.752
3dB	-0.635 / -0.708
4dB	-0.659 / -0.680
5dB	-0.673 / -0.651
6dB	-0.679 / -0.626
7dB	-0.689 / -0.597
8dB	-0.705 / -0.578
9dB	-0.713 / -0.549
10dB	-0.719 / -0.518
11dB	-0.730 / -0.489
12dB	-0.744 / -0.461
13dB	-0.762 / -0.430
14dB	-0.794 / -0.392
15dB	-0.800 / -0.327
16dB	-0.851 / -0.267
17dB	-0.900 / -0.203

Bias Voltages Optimized for Flatness of Attenuation with respect to Reference over Frequency





Note: Devices designated as EPU are typically early in their characterization process prior to finalizing all electrical and process specifications. Specifications are subject to change without notice

TABLE I
MAXIMUM RATINGS 1/

SYMBOL	PARAMETER	VALUE	NOTES
	Attenuation Control Voltage Range	-5 to +1 V	
$\| I_{G1} \|$	Gate 1 Supply Current	2.2 mA	
$\| I_{G2} \|$	Gate 2 Supply Current	19.8 mA	
P_{IN}	Input Continuous Wave Power	> 30dBm	
P_D	Power Dissipation	TBD	
T_{CH}	Operating Channel Temperature	150 ^{0}C	2/ 3/
T_M	Mounting Temperature (30 Seconds)	320 ^{0}C	
T_{STG}	Storage Temperature	-65 to 150 ^{0}C	

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

2/ Junction operating temperature will directly affect the device median time to failure (T_M). For maximum life, it is recommended that junction temperatures be maintained at the lowest possible levels.

3/ These ratings apply to each individual FET.

TABLE II
ELECTRICAL CHARACTERISTICS
(Ta = 25°C Nominal)

PARAMETER		TEST CONDITIONS	TYP	UNIT
	Attenuation Control Voltage	DC ~ 50 GHz	-1 to 0	V
IL	Insertion Loss	DC ~ 50 GHz	2	dB
	Maximum Attenuation	DC ~ 50 GHz	17	dB
IRL	Input Return Loss	DC ~ 50 GHz	15	dB
ORL	Output Return Loss	DC ~ 50 GHz	15	dB
Pin1dB	Input Power @ 1dB Atten. Change	5 to 25 GHz	*	dBm
	Group Delay Variation	DC ~ 50 GHz	+/-5	psec
	Max. Insertion Loss Ripple (peak to peak)	DC ~ 50 GHz	0.5	dB

* Pin1dB varies depending on Attenuation State and frequency. See graphs on page 3 for details

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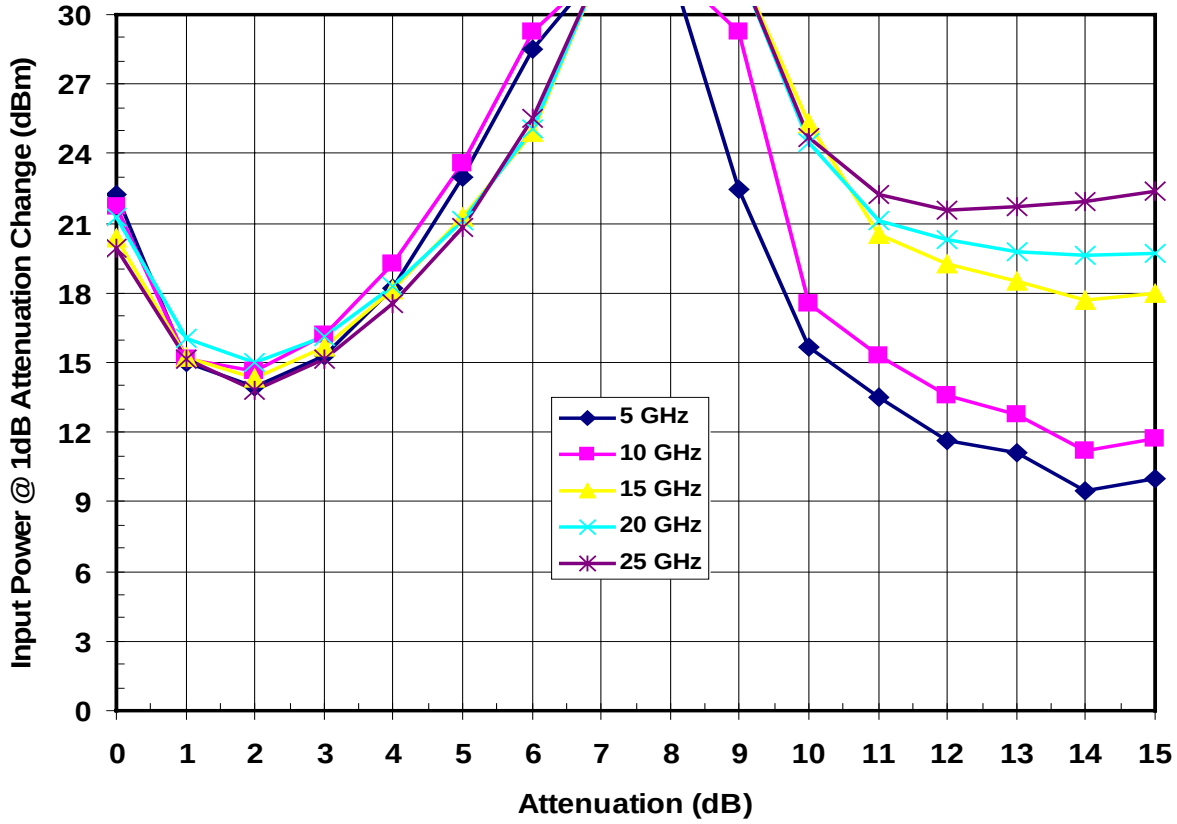
Typical Pin1dB vs Attenuation

Ta = 25°C Nominal



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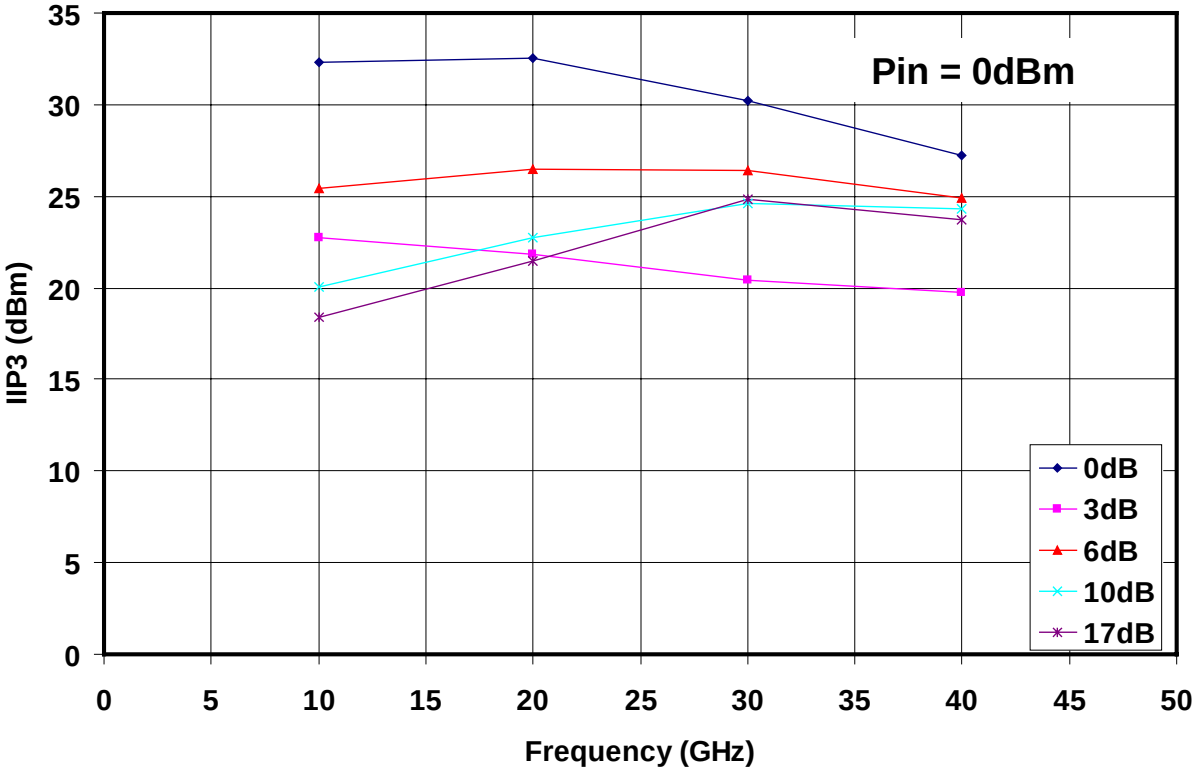
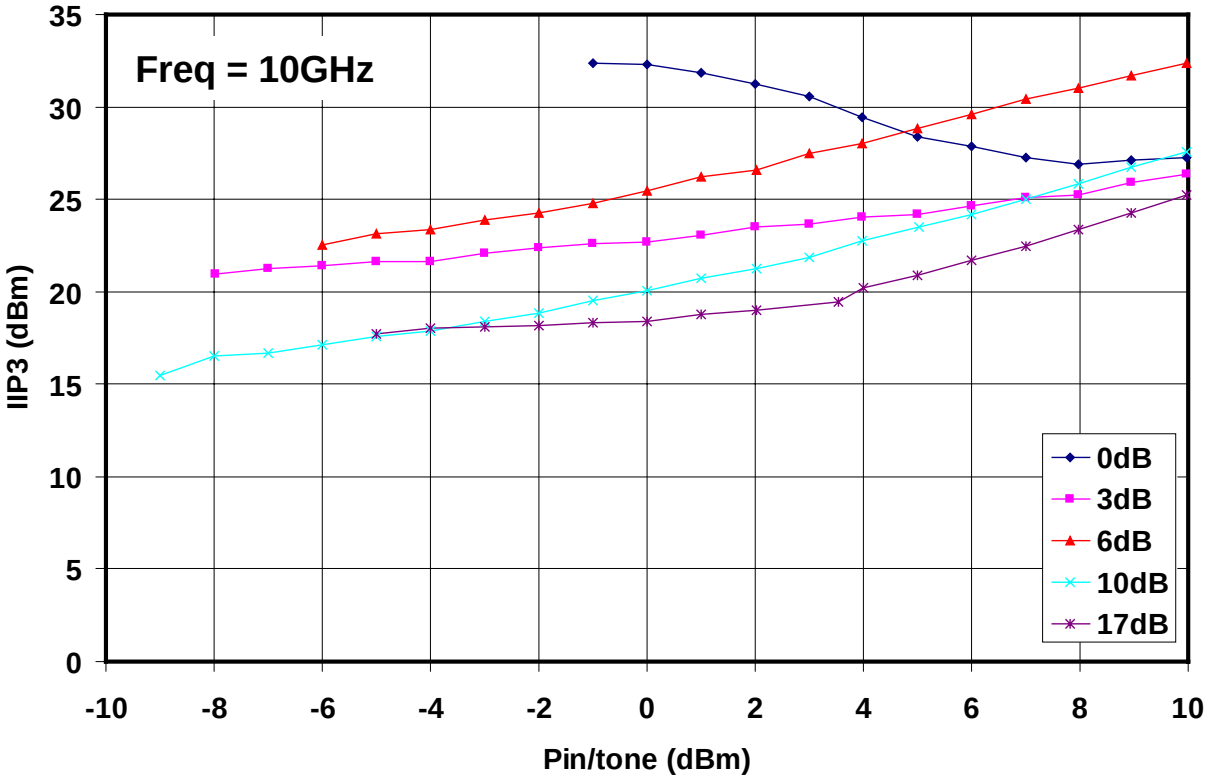
Typical Attenuator Input TOI vs. Attenuation





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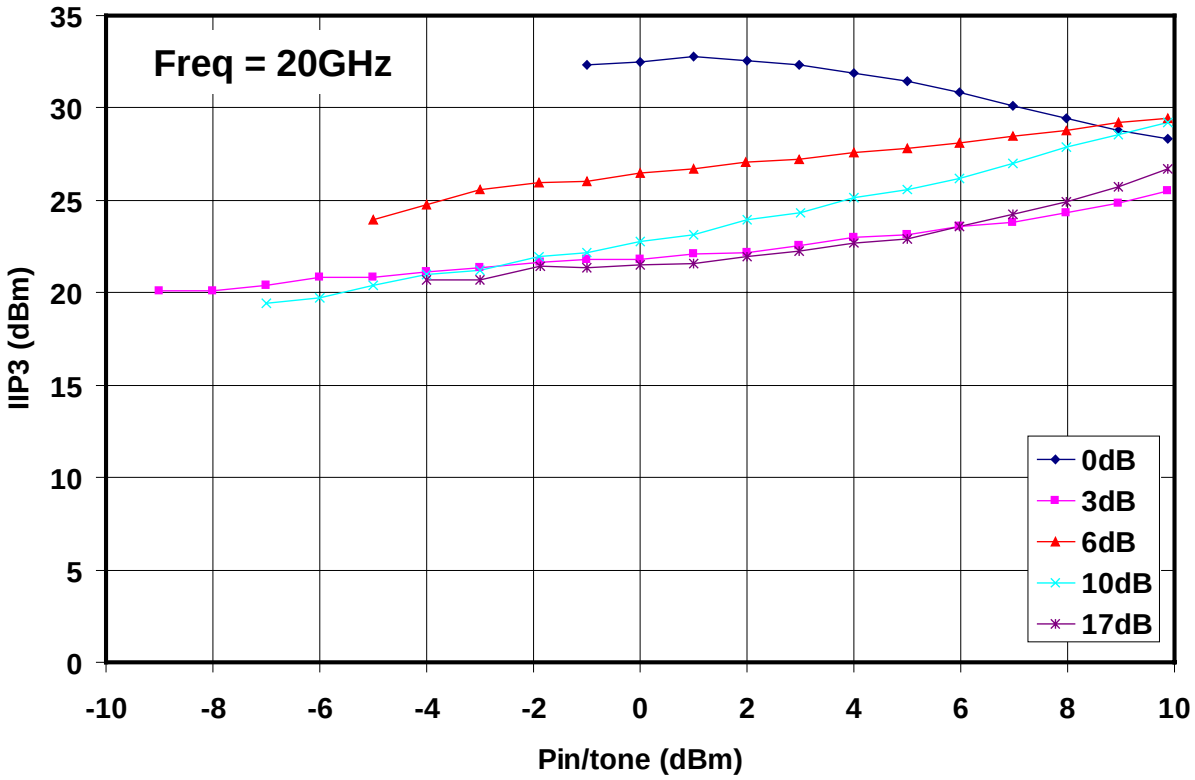

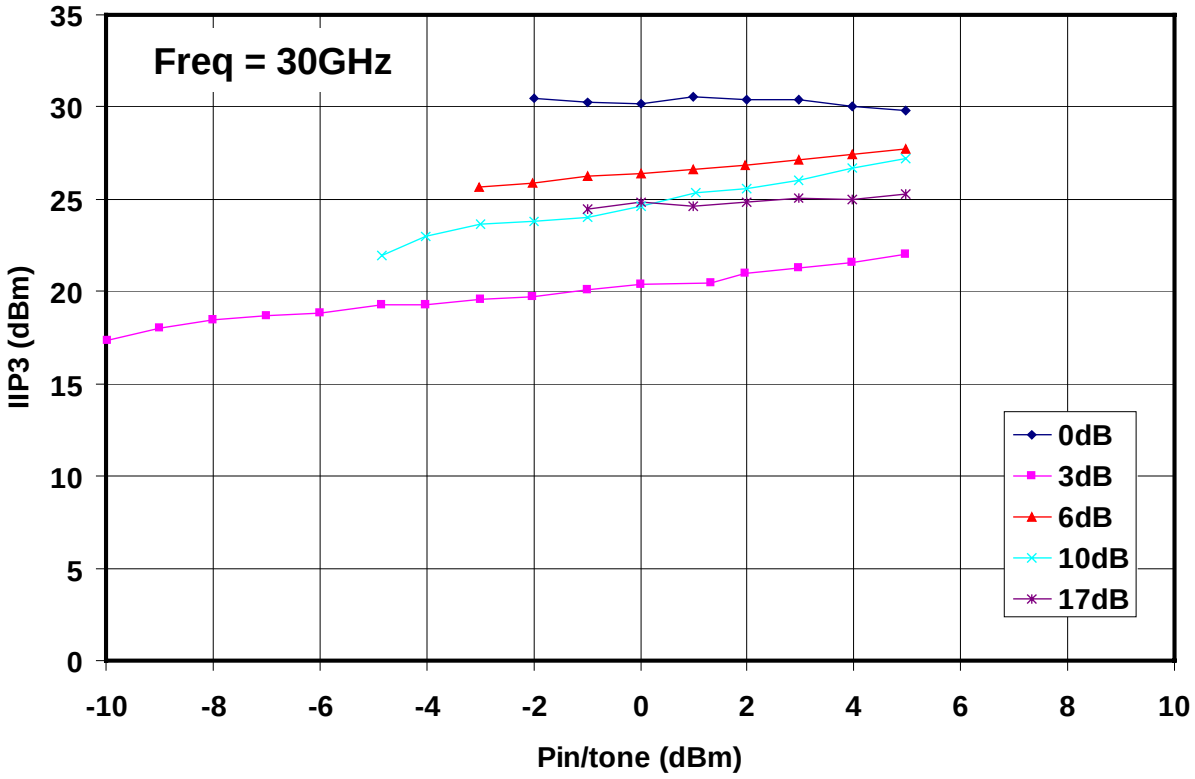

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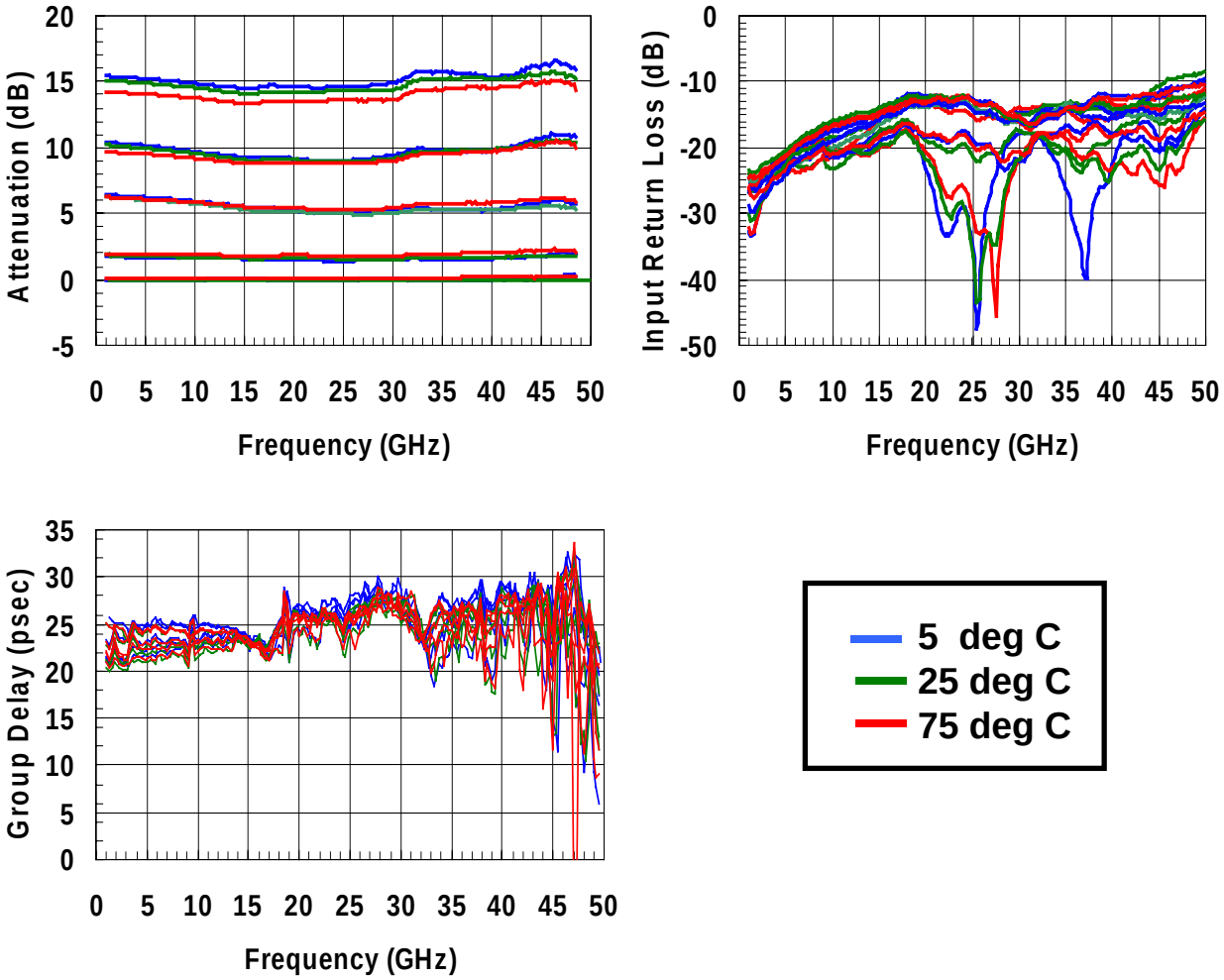
Typical Measurement Over Temperature



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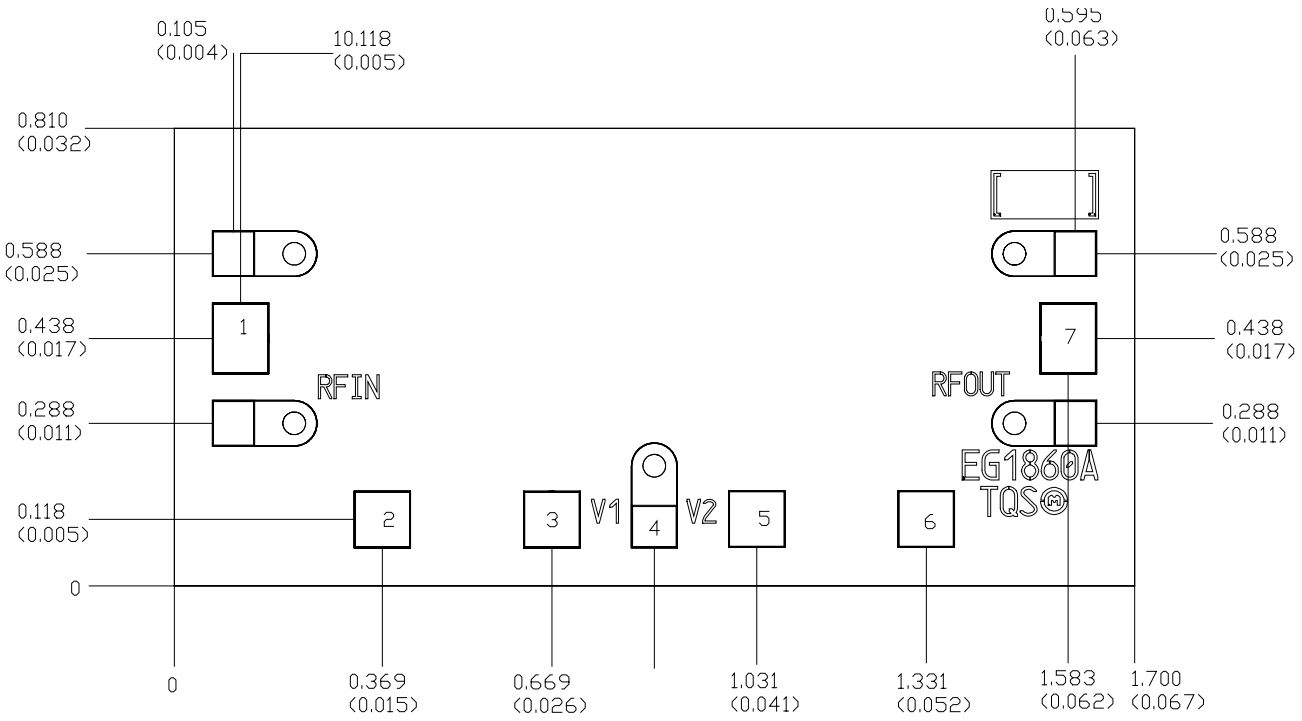
Mechanical Drawing



Units: millimeters (inches)
Thickness: 0.100 (0.004)
Chip edge to bond pad dimensions are shown to center of bond pad
Chip size tolerance: +/- 0.051 (0.002)
RF GND is back side of MMIC

Bond pad #1	(RF In)	0.100 x 0.125	(0.004 x 0.005)
Bond pad #2	(NC)	0.100 x 0.100	(0.004 x 0.004)
Bond pad #3	(VG1)	0.100 x 0.100	(0.004 x 0.004)
Bond pad #4	(DC GND)	0.081 x 0.075	(0.003 x 0.003)
Bond pad #5	(VG2)	0.100 x 0.100	(0.004 x 0.004)
Bond pad #6	(NC)	0.100 x 0.100	(0.004 x 0.004)
Bond pad #7	(RF Out)	0.100 x 0.125	(0.004 x 0.005)

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

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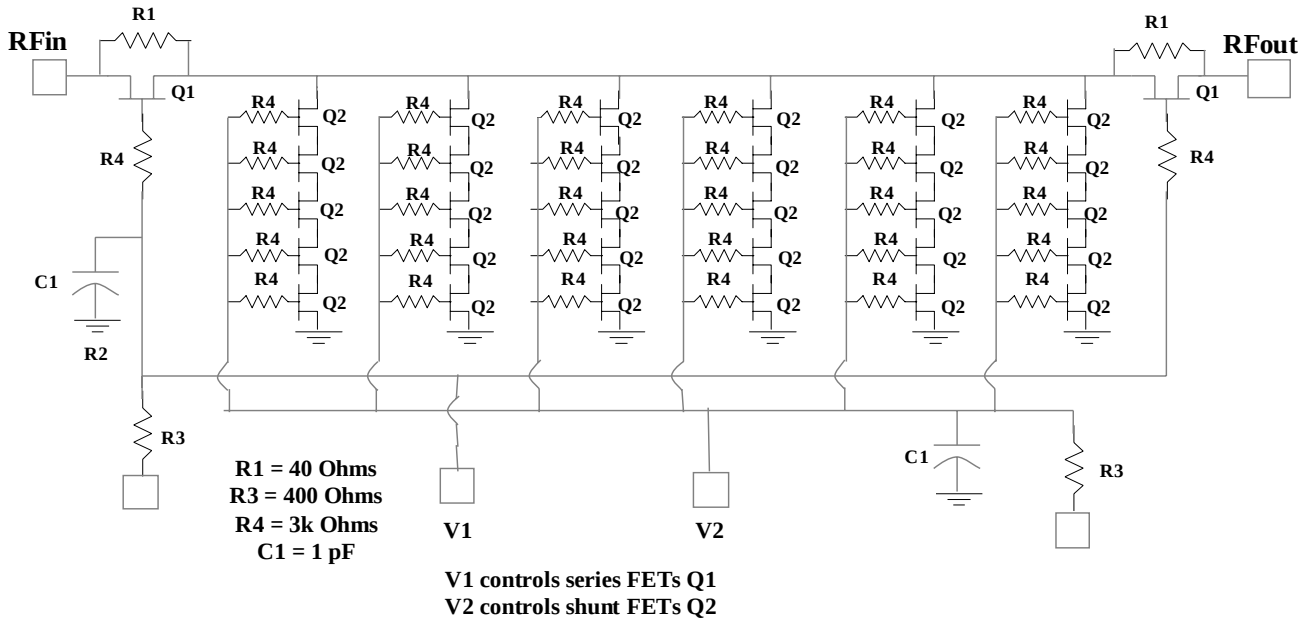
DC Schematic



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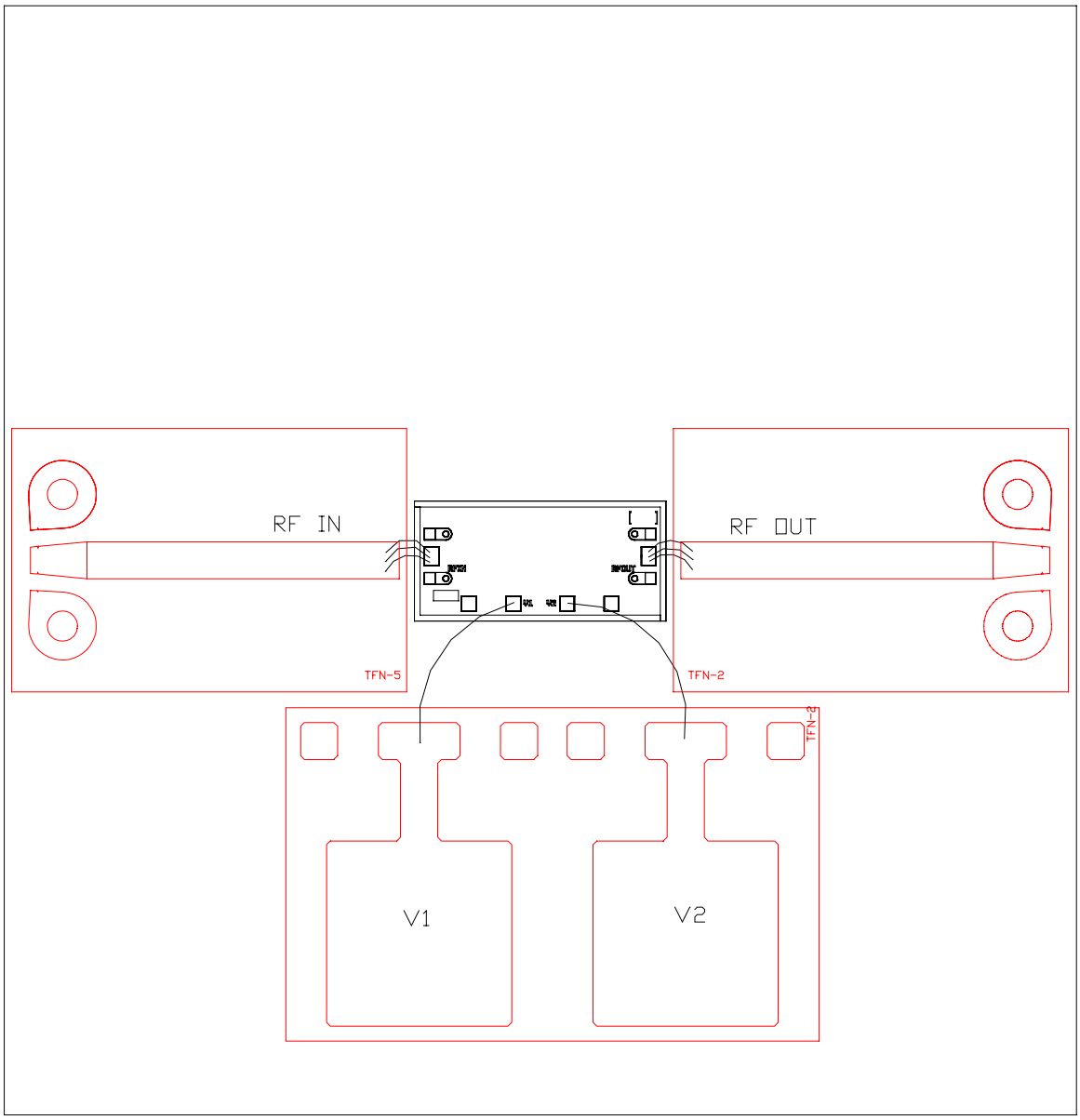
Chip Assembly Diagram



RF Ports must be DC Blocked

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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 (30 seconds max).
- 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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