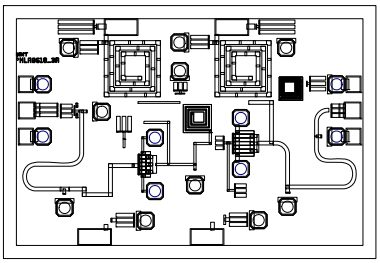
MLA-06183A

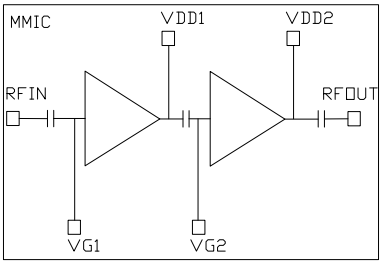
5 - 18 GHz Low-Noise MMIC Amplifier
Data Sheet Rev A
May, 2010

Features:

- **Wideband: 5 to 18 GHz**
- **Noise Figure: 3.4 dB @ 6 GHz, 3 dB @ 12 GHz and 3.7 dB @ 18 GHz**
- **P-1dB Output Power: 17 dBm @ 6 GHz, 21 dBm @ 12 GHz and 22 dBm @ 18 GHz**
- **OIP3: + 29 dBm @ 6 GHz, + 29 dBm @ 12 GHz and + 27 dBm @ 18 GHz**
- **High Gain: 19 db (mid-band @ 12 GHz)**
- **Supply Voltage: +4.5V @ 135 mA, typical.**
- **Die Size: 1.95 x 1.31 x 0.1 mm**
- **On-chip matching with Bias circuit choke and DC blocking**
- **Unconditionally Stable from 50 MHz to 20 GHz**



Functional Diagram



Applications:

- **Microwave Radios**
- **Satellite Communications**
- **Test Instrumentation**
- **Gain Stage for EW Systems**
- **Driver/Buffer for Wide-band Communication Systems**
- **Military & Space Systems**
- **Commercial Wireless Systems**

Description:

The MLA-06183A is a fully-matched 2-stage broadband low-noise MMIC amplifier utilizing high-reliability low-noise GaAs PHEMT technology. This MMIC is suited for Satellite Communications, Microwave radios, Instrumentation, Wideband Systems and also many commercial, military & space wireless applications where low-noise figure and high-gain are desirable. It has excellent gain of 19 dB and Noise Figure of 3 dB @ 12 GHz. Typical P-1dB is 21 dBm and OIP3 is + 29 dBm @ 12 GHz. It has on-chip bias circuit, choke and DC blocking to provide bias stability and ease of use.

Electrical Specifications: *VDD1,VDD2=+4.5V,VG1/VG2= - 0.025V (2),IDD=135mA, Ta=25°C Z0=50 ohm (1)*

Parameter	Units	Typical	Test Conditions
Frequency Range	GHz	5-18	
Gain	dB	20 19 17.8 16	6 – 8 GHz 8 – 14 GHz 14 – 17.5 GHz 18 GHz
Gain Flatness	+/-dB	0.75 1.25	6 – 14 GHz 14 – 18 GHz
Input Return Loss	dB	9 12	6 – 14 GHz 14 – 18 GHz
Output Return Loss	dB	12	
Output P-1dB	dBm	17 21 22	6 GHz 12 GHz 18 GHz
Output IP3 **@ 0 dBm/tone, 1 MHz separation**	dBm	29 29 27	6 GHz 12 GHz 18 GHz
Noise Figure	dB	3.4 3.0 3.7	6 GHz 12 GHz 18 GHz
Operating Bias Conditions: VDD1,VDD2 **IDD**	V mA	+ 4.5 135	VG1,VG2= - 0.025 V, typical
Stability Factor K		> 1	0.05 to 20 GHz

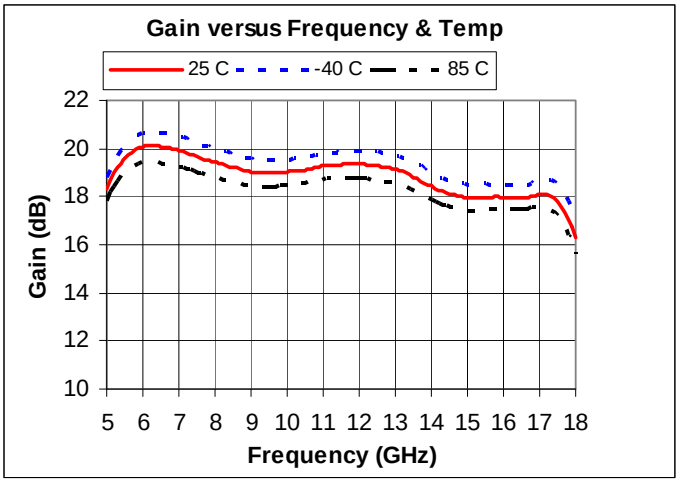
(1) All Data is measured on 50 Ohm carrier, with Dual-Bias Supply and stub tuning shown in the datasheet assembly diagram.
(2) Since the VG bias setting has typical range of -0.1 to +0.1V, VG1,VG2 bias inputs may be directly grounded/bonded to DC ground to convert to single +ve supply operation such that VG = 0V. The bias current will then be fixed and cannot be controlled or shutdown by VG input.

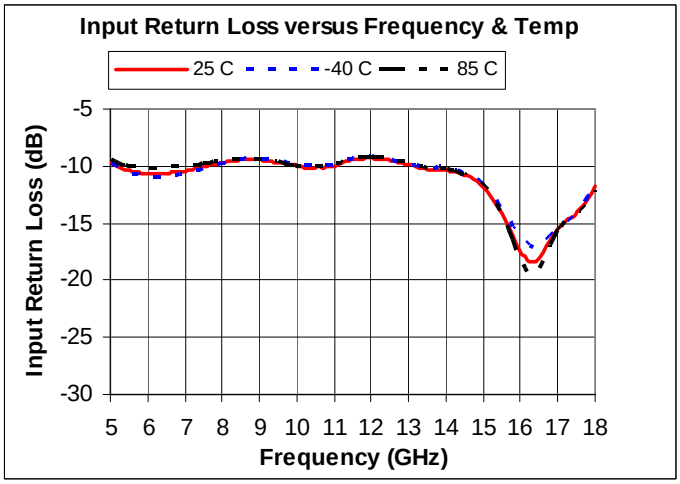
Absolute Maximum Ratings:

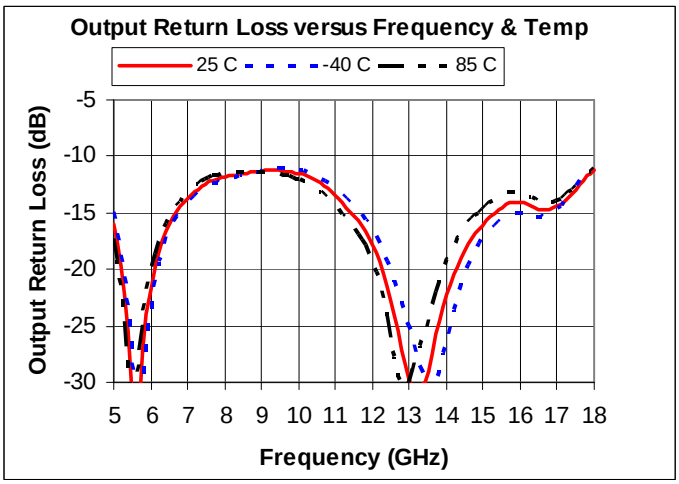
SYMBOL	PARAMETERS	UNITS	ABSOLUTE MAXIMUM
VDD	Drain Voltage	V	5.5
IDD	Drain Current	mA	200
Pdiss	DC Power Dissipation	W	TBD
Pin max	RF Input Power	dBm	+13
Toper	Operating Case/Lead Temperature Range	ºC	- 40 to + 85
Tch	Channel Temperature	ºC	150
Tstg	Storage Temperature	ºC	-60 to +150

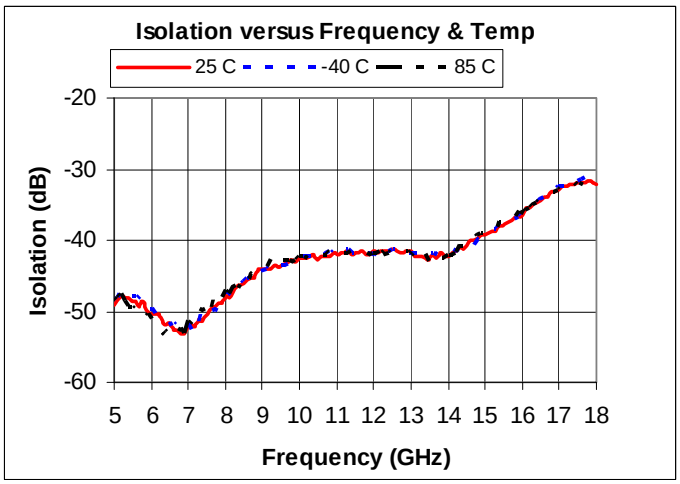
*****Operation of this device above any one of these parameters may cause permanent damage.

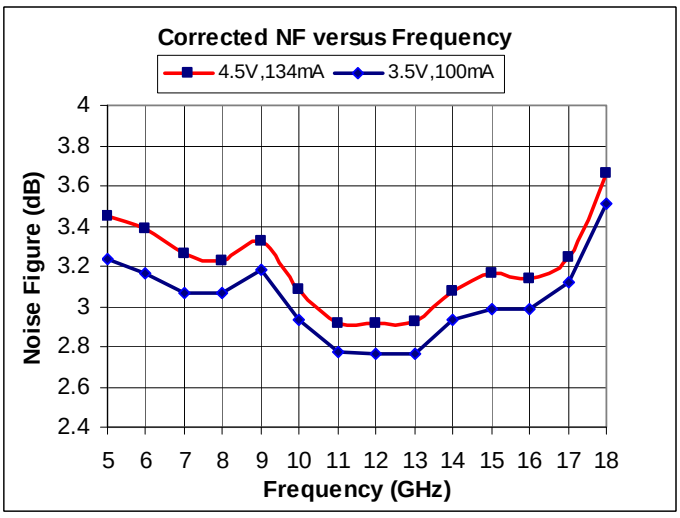
Typical RF Performance: *VDD1,VDD2=+4.5V,VG1/VG2= - 0.025V [2],IDD=135mA, Ta=25°C Z0=50 ohm [1]*

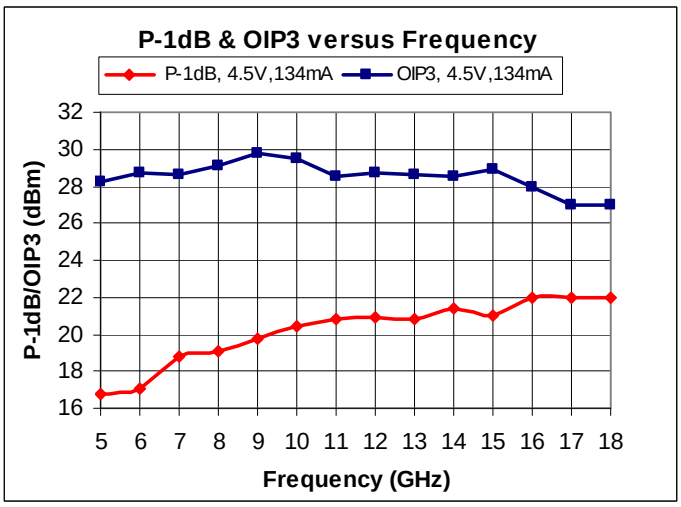




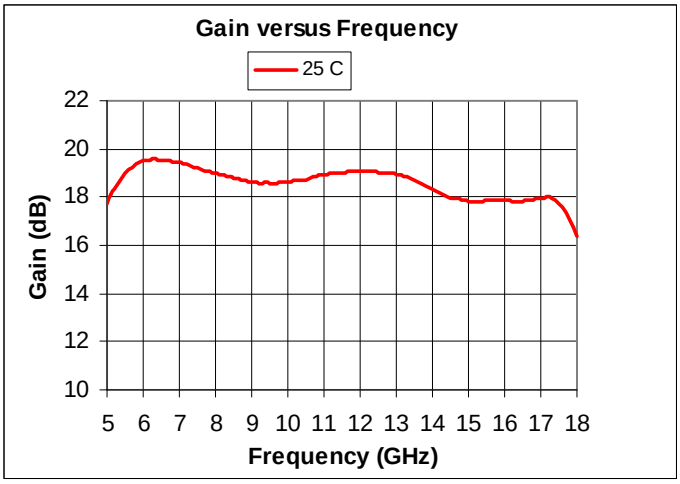


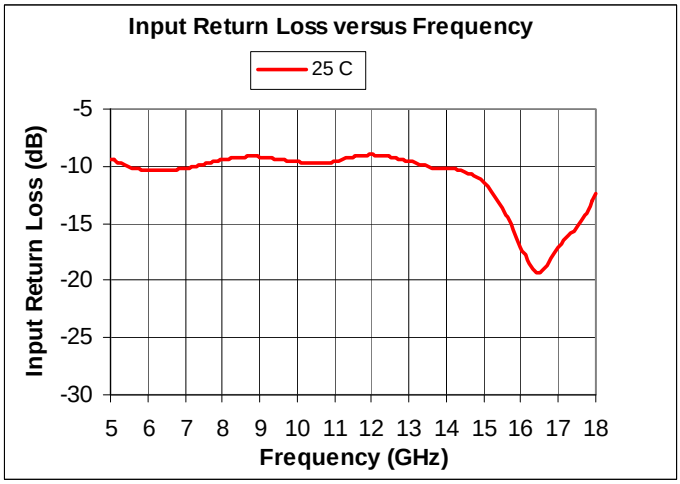


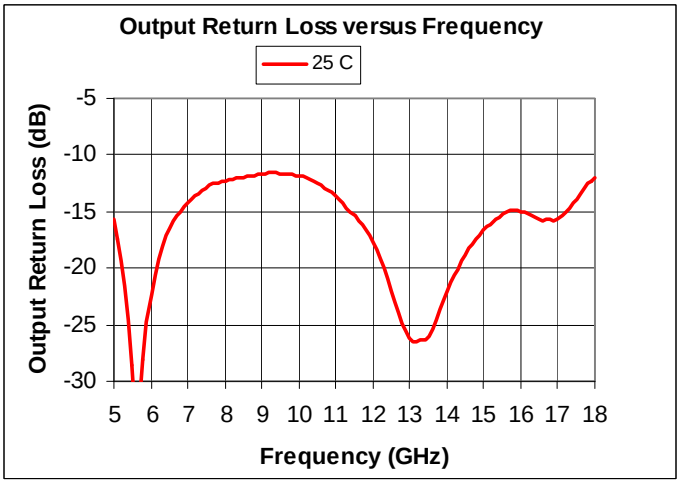


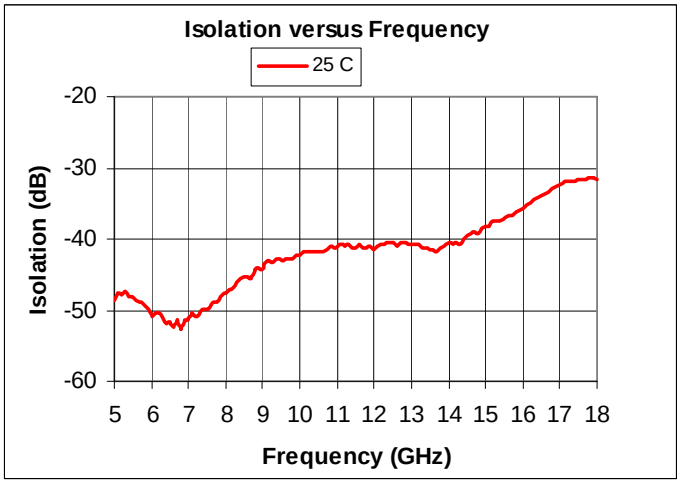


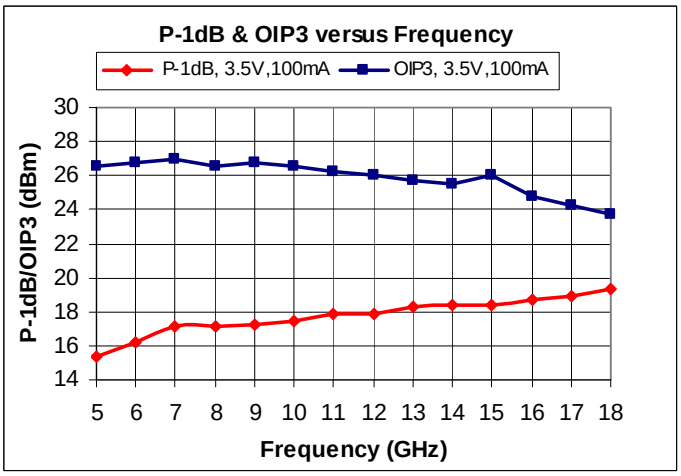
Typical RF Performance: *VDD1,VDD2=+3.5V,VG1/VG2= - 0.025V [2],IDD=100mA, Ta=25°C Z0=50 ohm [1]*





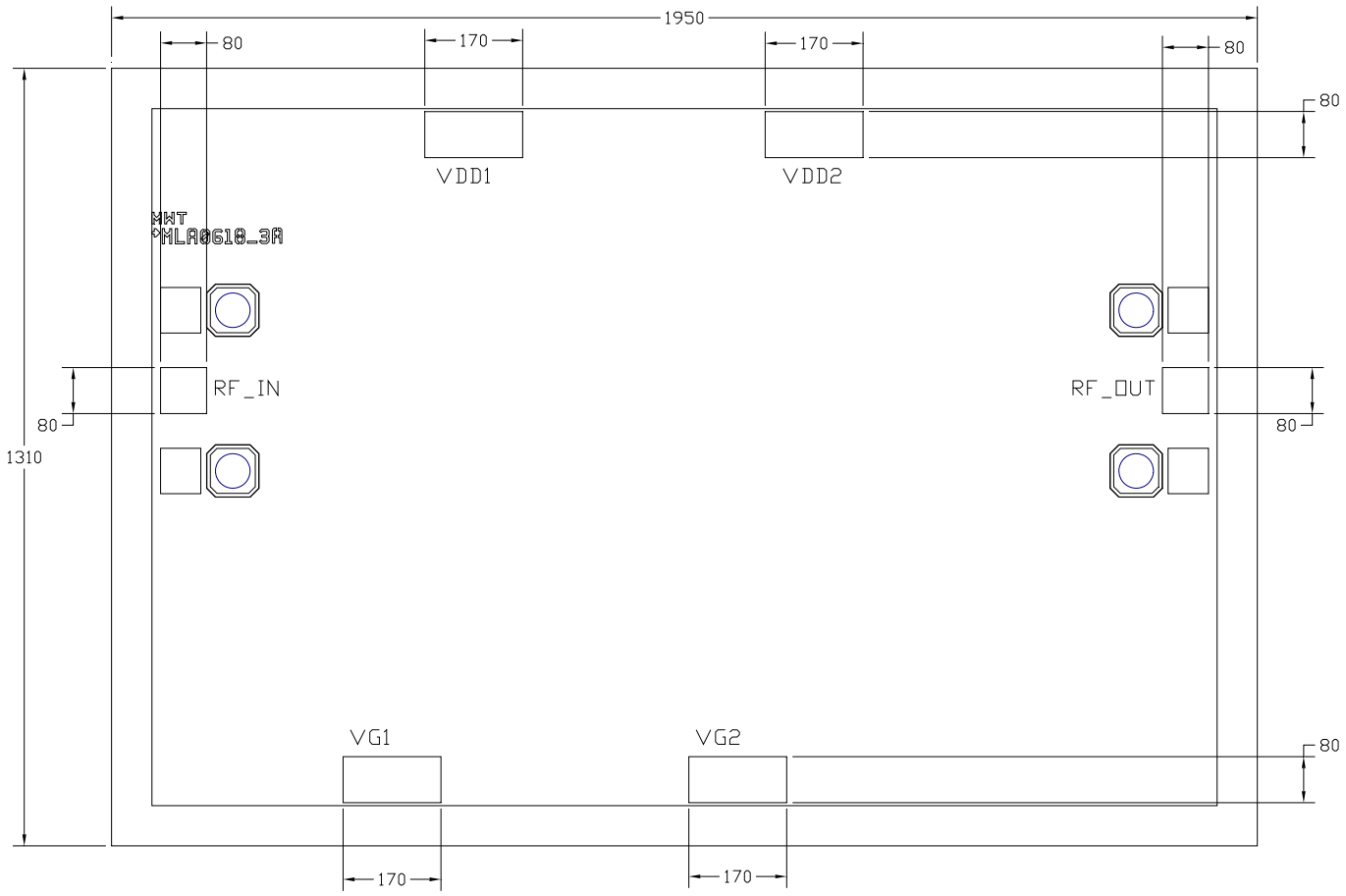






Mechanical Information:

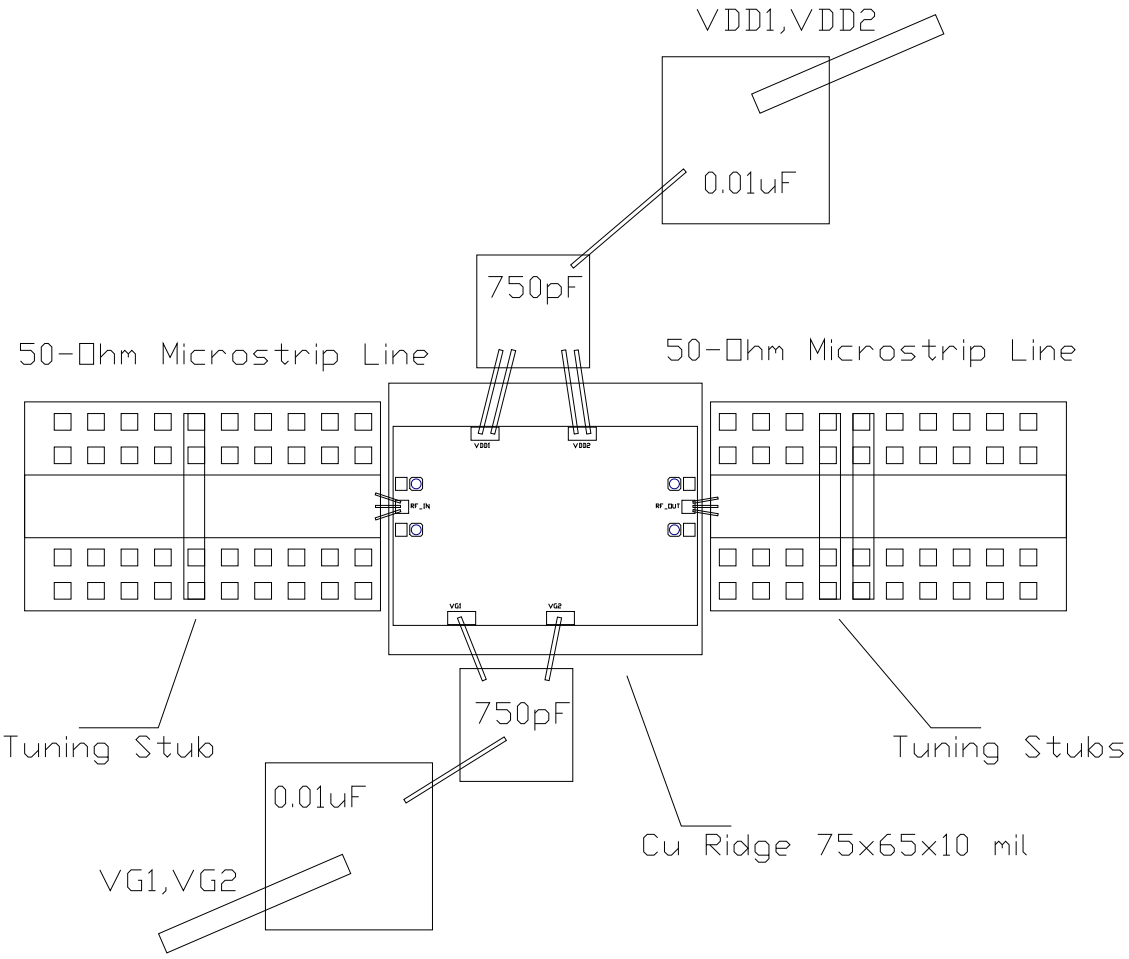
Outline Drawing
Dimensions are in microns



Notes:

1) RFIN, RFOUT Bond Pad Size is: 80 x 80 micron.
   VDD1, VDD2, VG1 and VG2 Bond Pad Size is: 80 x170 micron
2) Backside of chip is metalized and provides DC & RF Ground with on-chip vias
3) Bond Pad & Backside metallization: Gold

Assembly Diagram:



Notes:

1) **1st Close-in Bypass cap values must be at least 100pF and placed < 30mil from chip edge. The large bypass cap 0.01uF is also recommended to be as close to chip as possible.**
2) **RF IN/OUT Bonds must be 3 wires of length < 10 mil & 0.7 mil diameter for best RF performance.**
3) **2 Tuning stubs (5 x 50 mil each) on the 50 ohm line are required on output side about 25 mil from bond edge for good output return loss especially at frequencies > 15 GHz . Stub size & location may be tuned for best RF performance . All data shown include the tuning stubs.**
4) **1 Tuning stub (5 x 40 mil) on the 50 ohm line is required on input side about 40 mil from bond edge for good input return loss over the full band. Stub size & location may be tuned for best RF performance . All data shown includes the tuning stubs.**