MILLER MMIC

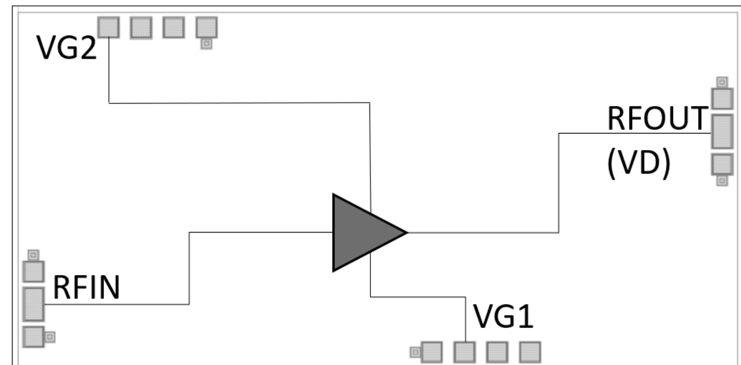
V1.0.0

GaAs MMIC
Wide-band Amplifier
0.2-30GHz

Features

- Frequency: 0.2GHz - 30GHz
- Small Signal Gain: 16dB
- Gain Flatness: ≤±1.0dB
- Noise Figure < 4dB, 2GHz – 25GHz
- P1dB: > 28dBm, 0.2GHz – 18GHz
- Power Supply: +12V/365mA
- Input/Output: 50Ω
- Die Size: 3.3 x 1.63 x 0.07 mm

Functional Block Diagram



Typical Applications

- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

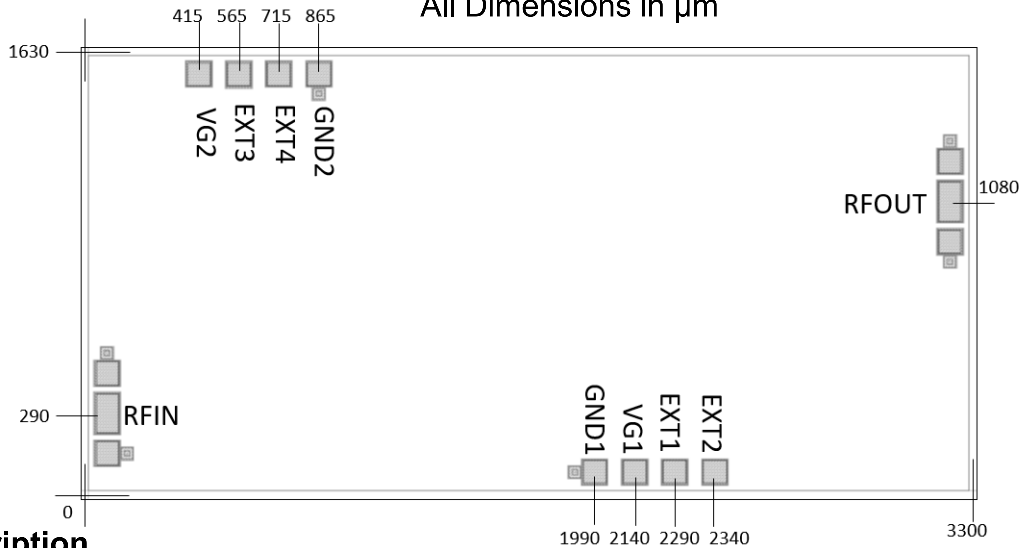
Electrical Specifications

TA = +25ºC, VD = +12V, VG1 = -0.4V, VG2 = 5.6V, ID = 365mA

Parameters	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency		0.2-5			5-18			18-30		GHz
Small Signal Gain		17			16			15		dB
Gain Flatness		±1			±0.5			±0.5		dB
Noise Figure		< 6			< 3			< 6		dB
Output 1dB Compression (P1dB)		28			28			22-28		dBm
Saturated Output Power (Psat)		29.5			29.5			>23.5		dBm
Input Return Loss		> 8			> 10			> 10		dB
Output Return Loss		> 20			> 15			> 10		dB
* Adjust VG1, VG2 slightly to obtain device current of 365mA.										

Outline Drawing:

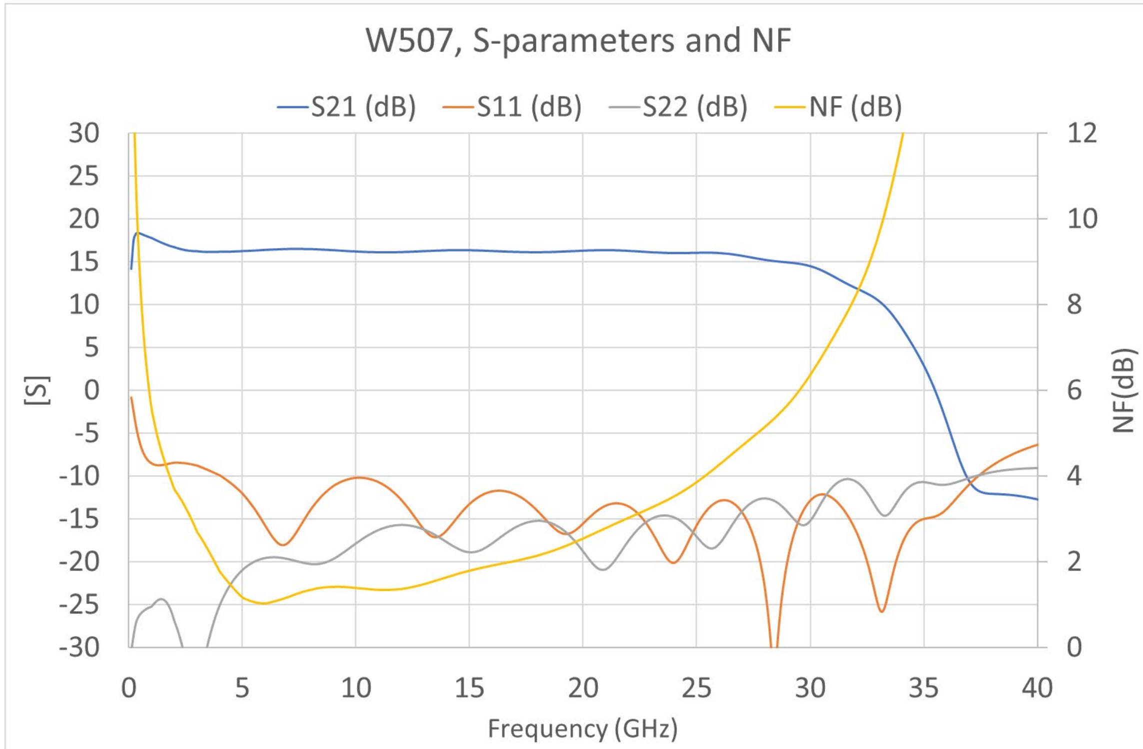
All Dimensions in µm



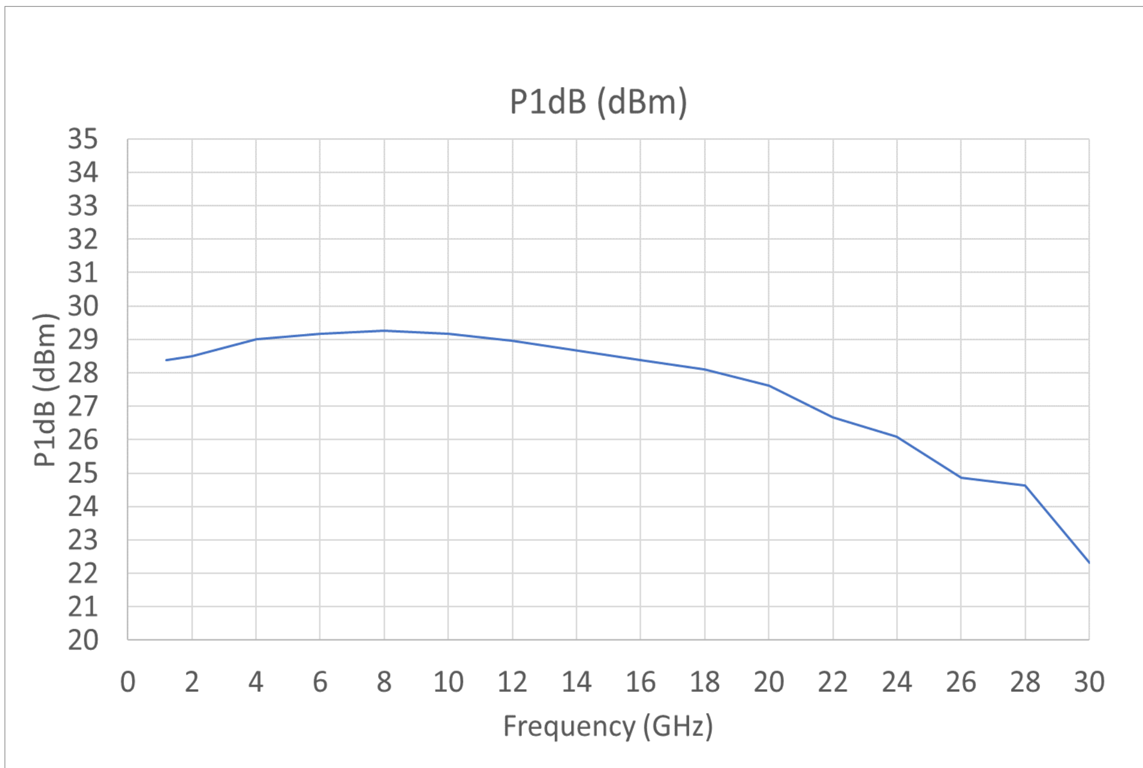
Pad Description

No	Function	Description
1	RF IN	Signal input terminal, connected to 50Ω circuit
2	RF OUT	Signal output terminal, connected to 50Ω circuit; blocking capacitor required; external DC biasing network required; drain current provided.
3	VG1	Amplifier 1st gate bias; connect to external 1000pF and 0.01uF bypass capacitors.
4	VG2	Amplifier 2nd gate bias; connect to external 1000pF and 0.01uF bypass capacitors.
5	EXT1	External bypass pad; connect to external 0.47uF bypass capacitor.
6	EXT2	External bypass pad; connect to external 1000pF bypass capacitor.
7	EXT3	External bypass pad; connect to external 1000pF bypass capacitor.
8	EXT4	External bypass pad; connect to external 0.47uF bypass capacitor.
9	GND1	Ground pad.
10	GND2	Ground pad.

Measurement Plots: S-parameters



Measurement Plots: P1dB



Assembly Drawing

To VG2 bias

0.1 uF

1000 pF

1000 pF

0.47 uF

RF OUT
50ohm line

Bias-T required
to provide VD

RF IN
50ohm line

1000 pF

1000 pF

0.47 uF

0.1 uF

To VG1 bias

Notes:

1. Die thickness: 70um
2. DC bond pad is 100 x 100 μm²
3. RF IN/OUT bond pad is 100 x 160 μm²
4. Bond pad metalization: Gold
5. Backside metalization: Gold
6. Backside of the die (GND)