MILLER MMIC

MMG004

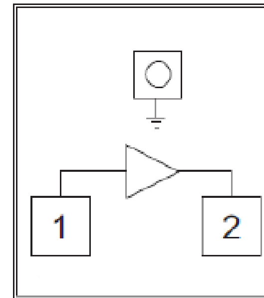
V1.0.0

GaAs pHEMT MMIC
Gain Block
DC-4GHz

Features

- Operating Frequency: DC-4GHz
- Small Signal Gain: 14.5dB
- Gain Flatness: ±0.25dB
- Noise Figure: 4.0dB
- P-1dB: 15.5dBm
- OIP3: 33.5dBm@1GHz with -5dBm input
- Current: 60mA
- 50Ohm input/output
- Die Size: 0.62 x 0.62 x 0.1 mm

Functional Block Diagram



Typical Applications

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

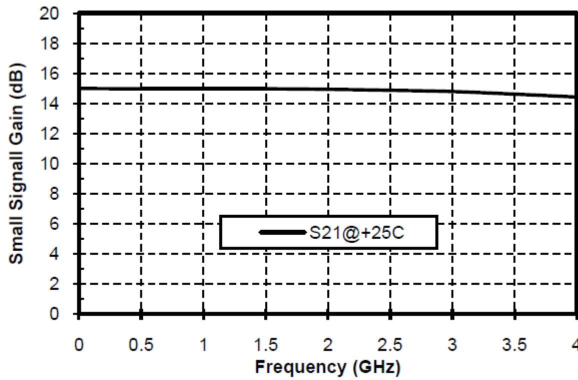
Electrical Specifications

TA = +25ºC, VCC=+7V, R_{BIAS}=38.3Ω

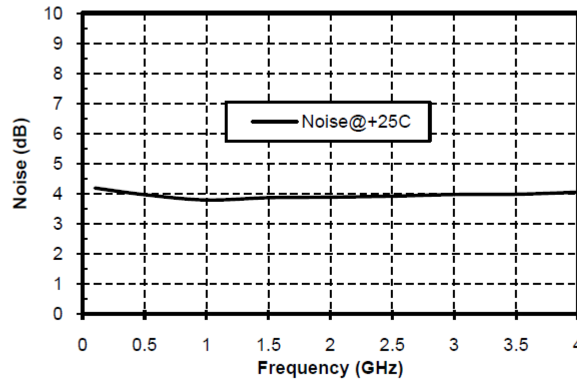
Parameters	Min.	Typ.	Max.	Units
Frequency		DC - 4		GHz
Small Signal Gain		14.5		dB
Gain Flatness		±0.25		dB
Input Return Loss		26		dB
Output Return Loss		22		dB
Reverse Isolation		19		dB
P-1dB	12.5	15.5	17	dBm
Psat	14	16.5	18	dBm
OIP3 @1GHz with -5dBm input		33.5		dBm
Noise Figure		4.0		dB
Static Current		60		mA
Device Voltage, V_{BIAS}	4.4	4.7	5.0	V

MMG004 GAIN BLOCK- MMIC DC-4GHz

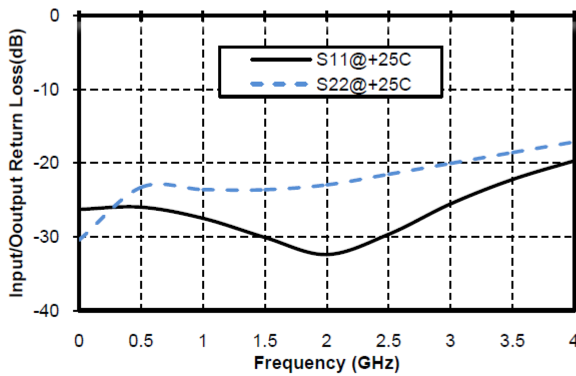
Gain vs. Frequency



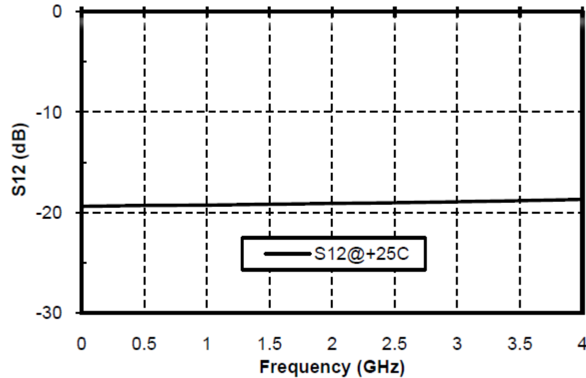
Noise Figure vs. Frequency



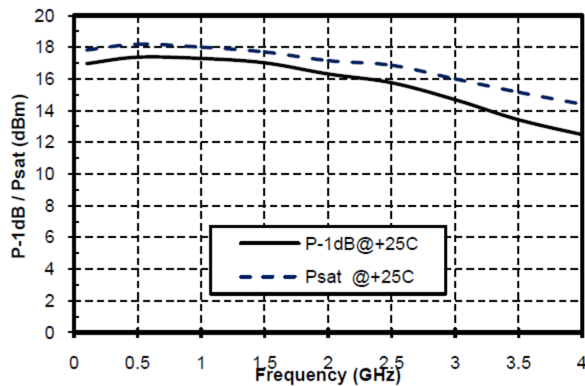
Input/Output Return Loss vs. Frequency



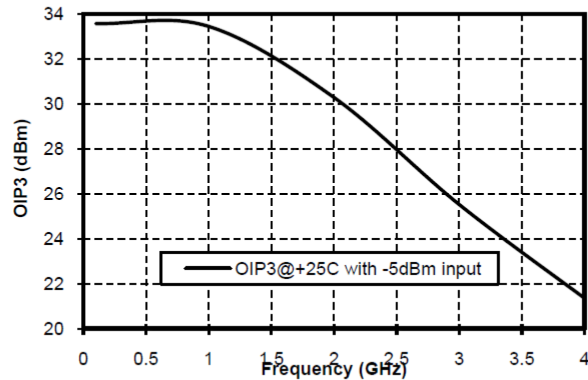
Reverse Isolation vs. Frequency



P-1dB/Psat vs. Frequency

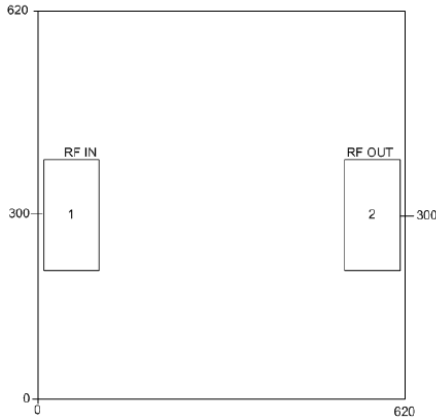


OIP3 with -5dBm input vs. Frequency

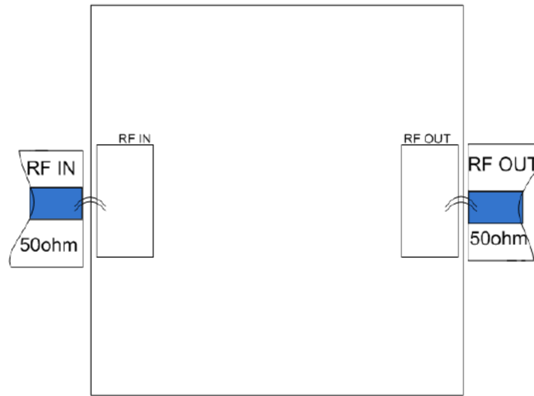


Outline Drawing(Die):

All Dimensions in um



Assembly Drawing(Die):



Pad Description

PAD	Function	Description
1	RF IN	RF input, external DC-blocking capacitor required
2	RF OUT	RF output and DC bias, bias the current by external choke inductor at output terminal , external DC-blocking capacitor required
Die Bottom	GND	Die bottom must be connected to RF/DC ground

Recommended bias circuit

Device	Frequency (MHz)							
	10		1000		2000		4000	
L1	10μH		270nH		270nH		270nH	
C1, C2	0.01μF		0.01μF		0.01μF		0.01μF	
V_{CC} (V)	5	6	7	8	10	12	15	20
R_{BIAS} (Ω)	7	24	38.3	52.3	80.6	115	158	237

*Note: RBIAS can be changed with different application condition, RBIAS=(VCC-VBIAS)/IBIAS

Notes:
1. Die thickness: 100um
2. Typical bond pad is 100*100 μm²
3. Bond pad metalization: Gold
4. Backside metalization: Gold
5. Backside of the die (GND)
6. No connection required for unlabeled bond pads

Maximum Ratings:
1. RF input power: +25dBm
2. Operating Current: 80mA
3. Storage temperature: -65℃ to +150℃
4. Operating temperature: -55℃ to +85℃