MILLER MMIC

MMG010

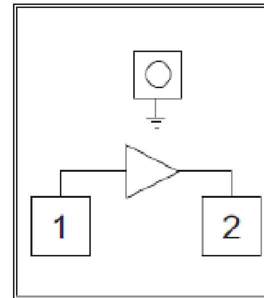
V1.0.0

GaAs pHEMT MMIC
Gain Block
DC-12GHz

Features

- Operating Frequency: DC-12GHz
- Small Signal Gain: 16dB
- Noise Figure: 4.5dB
- P-1dB: 13dBm
- Current: 55mA
- 50Ohm input/output
- Die Size: 0.62 x 0.62 x 0.1 mm

Functional Block Diagram



Typical Applications

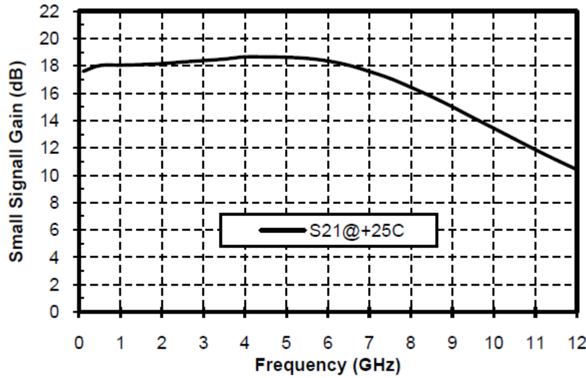
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

Electrical Specifications

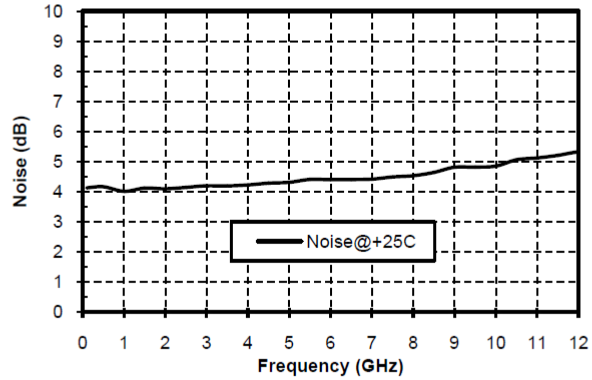
TA = +25°C, VCC=+5V, R_{BIAS}=12Ω

Parameters	Min.	Typ.	Max.	Units
Frequency		DC - 12		GHz
Small Signal Gain	10.5	16	18	dB
Input Return Loss		25		dB
Output Return Loss		15		dB
Reverse Isolation		21		dB
P-1dB	8	13	15.5	dBm
Psat	11	14.5	17	dBm
Noise Figure		4.5		dB
Static Current		55		mA
Device Voltage, Vbias	4.0	4.35	4.65	V

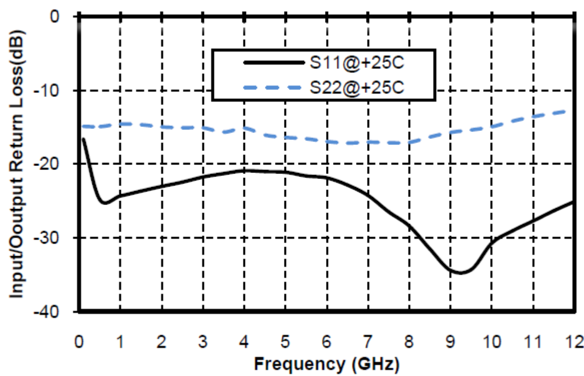
Gain vs. Frequency



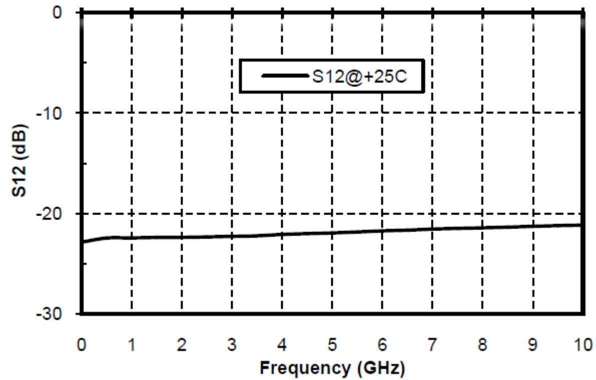
Noise Figure vs. Frequency



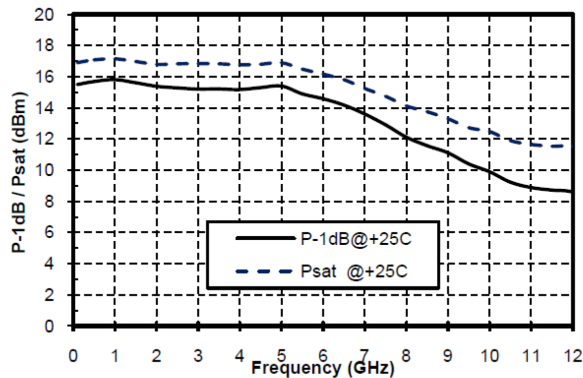
Input/Output Return Loss vs. Frequency



Reverse Isolation vs. Frequency

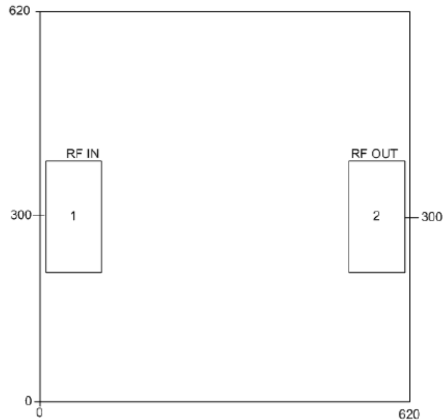


P-1dB/Psat vs. Frequency

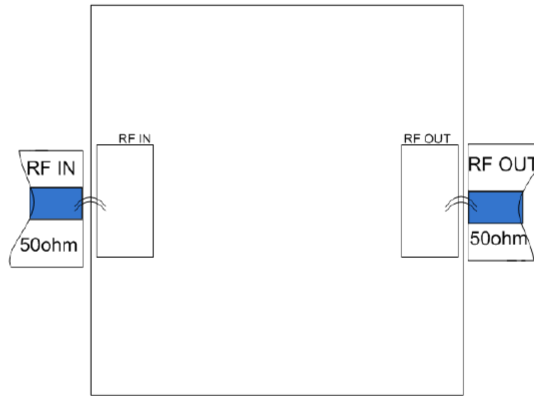


Outline Drawing(Die):

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	4000	8000	12000
L1	10μH	270nH	270nH	270nH
C1, C2	0.01μF	0.01μF	0.01μF	0.01μF

V_{CC} (V)	5	6	7	8	9	10
R_{BIAS} (Ω)	12	31	50	70	89	108

*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℃