MILLER MMIC

MMG021

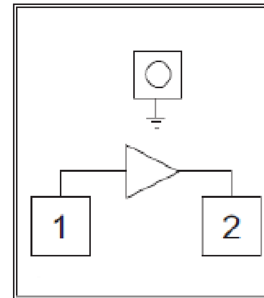
V1.0.0

GaAs pHEMT MMIC
Gain Block
DC-6GHz

Features

- Operating Frequency: DC-6GHz
- Small Signal Gain: 19.5dB
- Noise Figure: 4.6dB
- P1dB: 16.5dBm
- OIP3: 34.5dBm@1GHz with -10dBm input
- Current: 88mA
- 50Ohm input/output
- Die Size: 0.62 x 0.67 x 0.1 mm
- Both Die and SOT89 package are available

Functional Block Diagram



Typical Applications

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

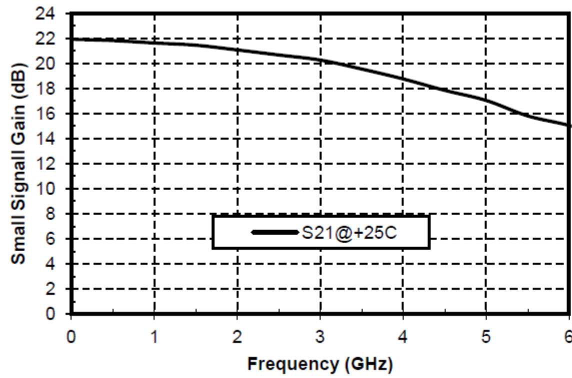
Electrical Specifications

TA = +25°C, VCC=+5V

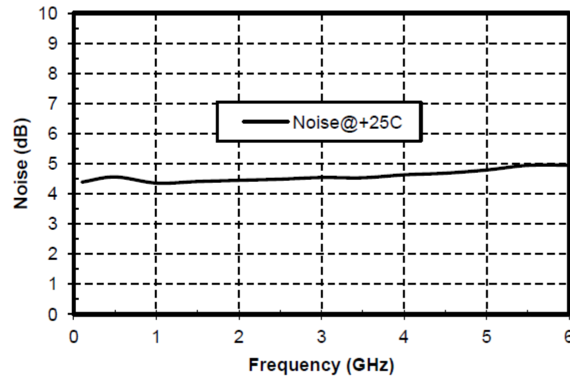
Parameters	Min.	Typ.	Max.	Units
Frequency		DC - 6		GHz
Small Signal Gain		19.5		dB
Input Return Loss		23		dB
Output Return Loss		19		dB
Reverse Isolation		14		dB
Output 1dB Compression (P1dB)	11.5	16.5	21	dBm
Psat	13.5	17.5	21.5	dBm
OIP3 @1GHz with -10dBm input		34.5		dBm
Noise Figure		4.6		dB
Operating Voltage		5		V
Static Current		88		mA

MMG021 GAIN BLOCK- MMIC DC-6GHz

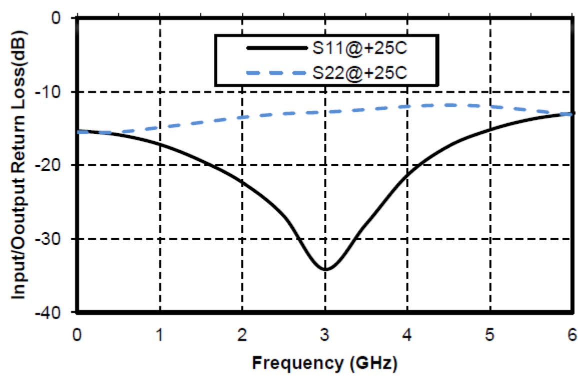
Gain vs. Frequency



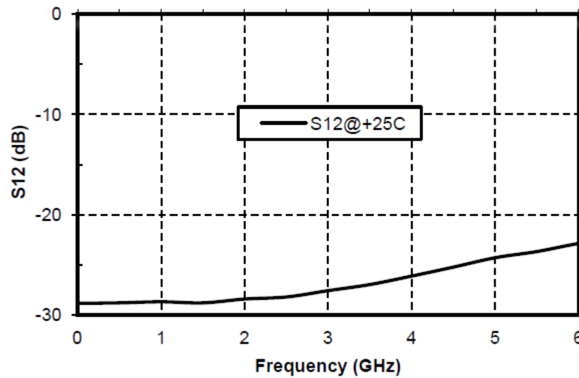
Noise Figure vs. Frequency



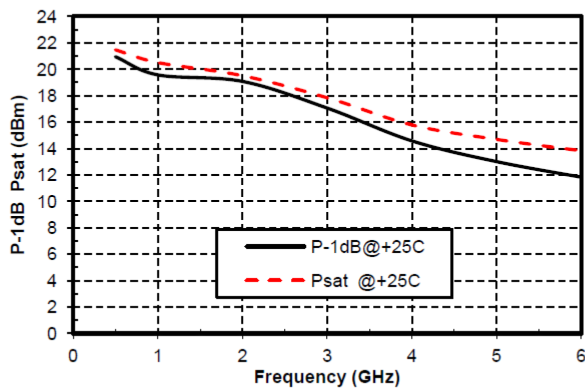
Input/Output Return Loss vs. Frequency



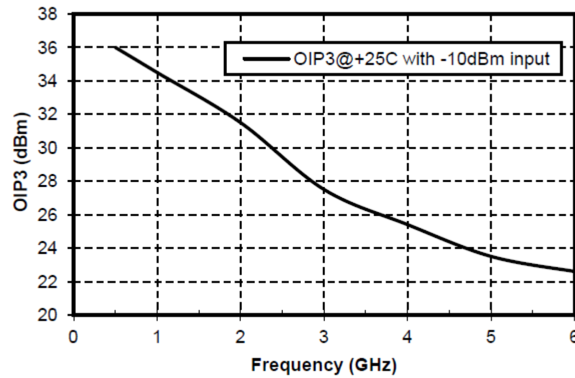
Reverse Isolation vs. Frequency



P-1dB/Psat vs. Frequency

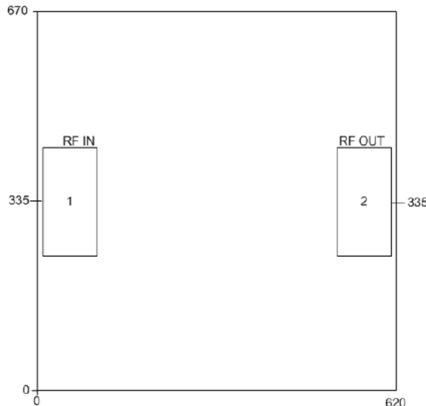


OIP3 with -10dBm input vs. Frequency

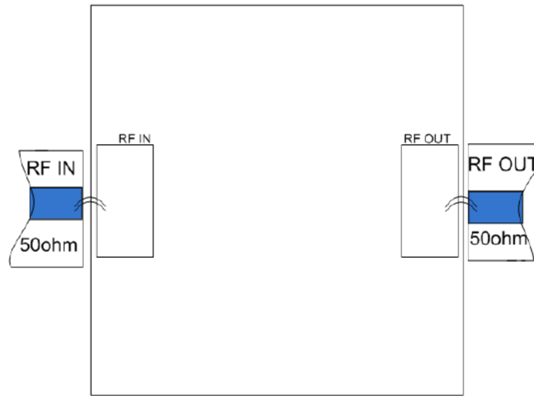


Outline Drawing(Die):

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

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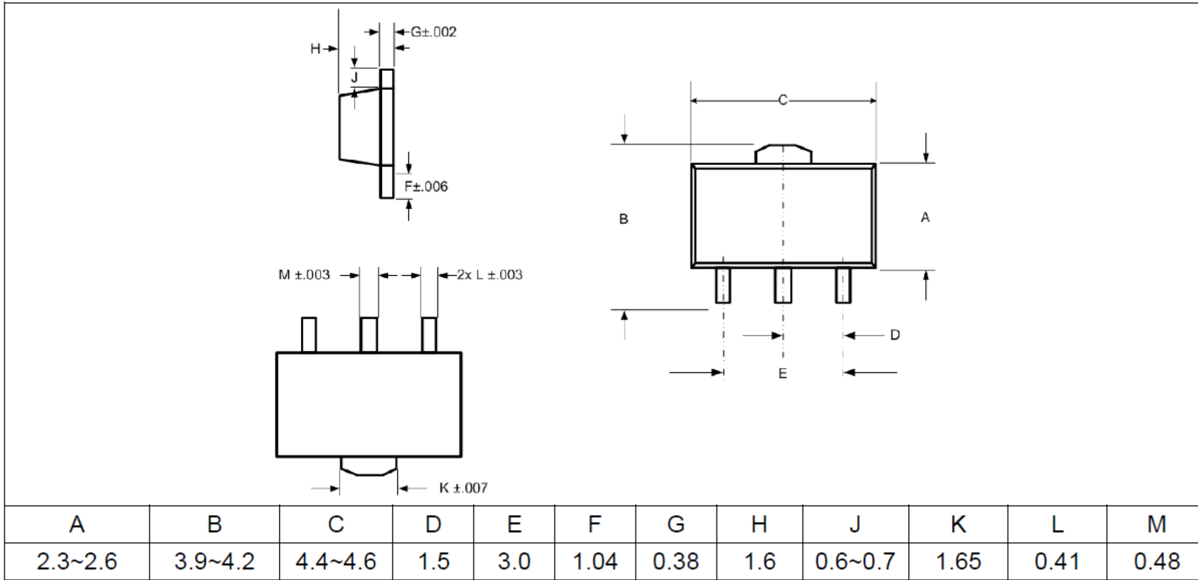
Outline Drawing(SOT-89):

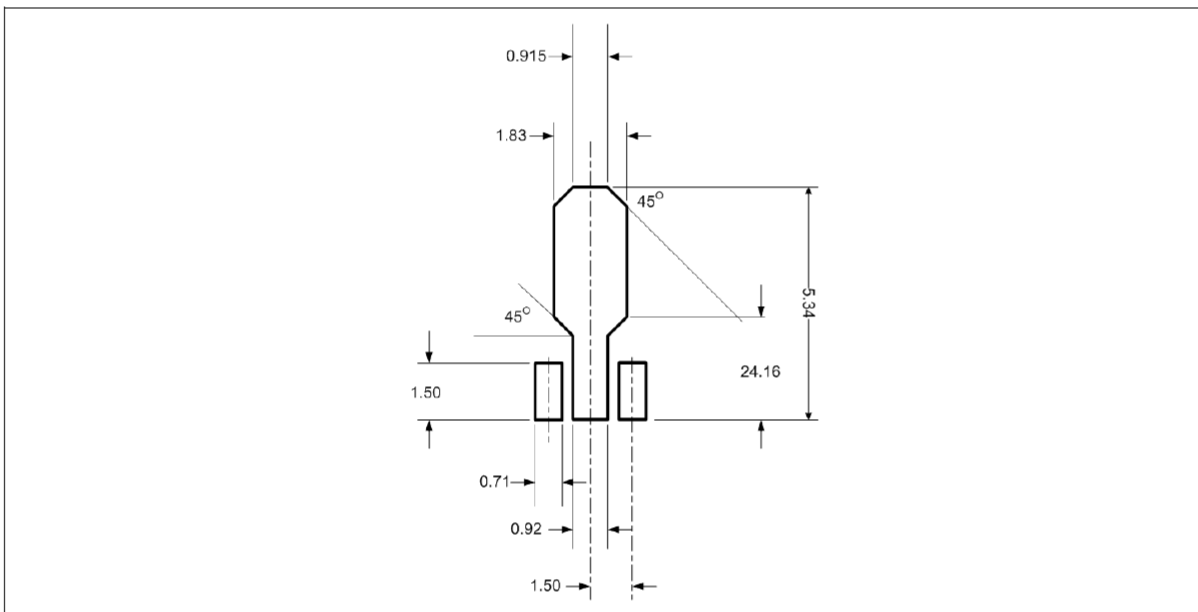
All Dimensions in mm



A	B	C	D	E	F	G	H	J	K	L	M
2.3~2.6	3.9~4.2	4.4~4.6	1.5	3.0	1.04	0.38	1.6	0.6~0.7	1.65	0.41	0.48

PCB Drawing(SOT-89):

All Dimensions in mm, tolerance ±0.05mm



Recommended bias circuit

RF IN, C1, C3 0.01uF, L1, C2, RF OUT, V_{BIAS}

Device	Frequency (MHz)			
	50	1000	2000	4000
L1	270nH	56nH	47nH	8.2nH
C1, C2	0.01µF	100pF	100pF	100pF
V_{CC} (V)	5			
R_{BIAS} (Ω)	-			

*Note: R_{BIAS} can be changed with different application condition, $R_{BIAS}=(V_{CC}-V_{BIAS})/I_{BIAS}$

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. Drain voltage(ON PIN or VD pad): +6V
2. RF input power: +25dBm
3. Storage temperature: -65℃ to +150℃
4. Operating temperature: -55℃ to +85℃