MicroWaveSys
A MICROSEMI COMPANY

MWS11-GB11-xx

InGaP HBT Gain Block

PREVIEW

DESCRIPTION

This general purpose amplifier is a low cost, broadband RFIC manufactured with an InGaP/GaAs Heterojunction Bipolar Transistor (HBT) process (MOCVD). This RFIC amplifier was designed as an easily cascadable 50 ohm gain block. The device is self-contained with 50 ohm input and output impedance. Applications include IF and RF amplification in wireless/ wired voice and data communication products and broadband test equipment operating up to 6 GHz.

This RFIC amplifier is initially available in a plastic SOT-89 3-Pin package to handle P1dB output power up to 19dBm (5V). The same RFIC will be available later in an advanced Microsemi Gigamite™ package, with significantly smaller footprint for applications where board space is at a premium.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

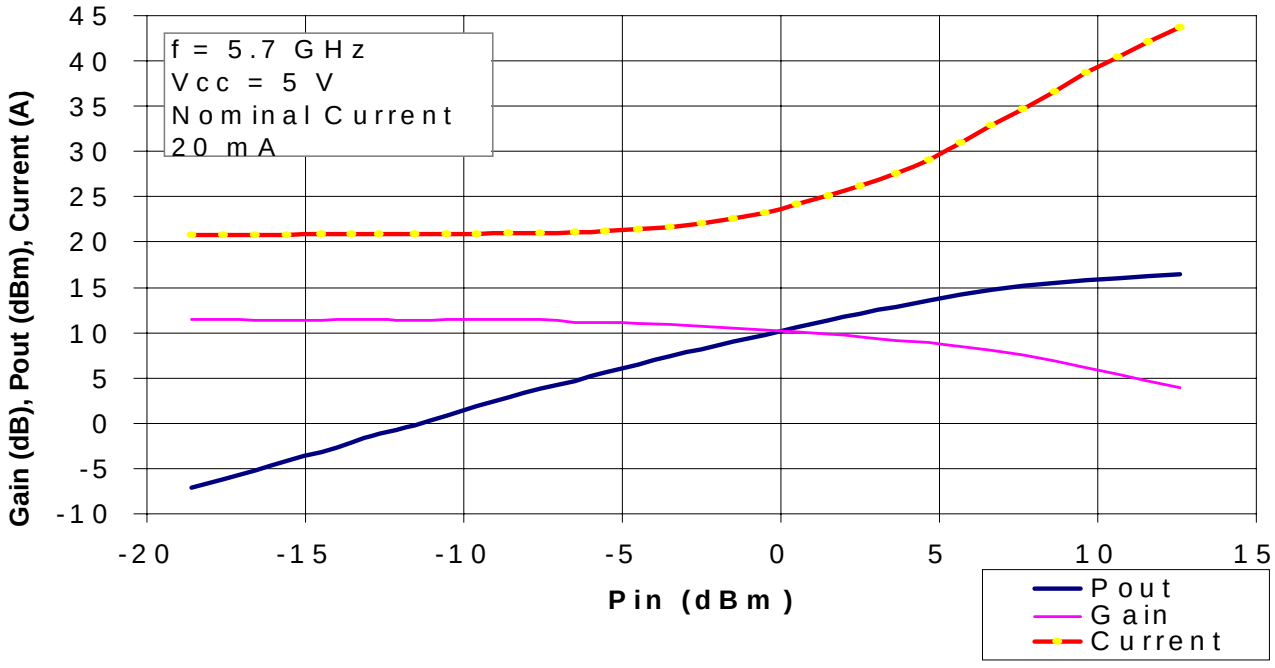
KEY FEATURES

- Advanced InGaP HBT
- DC to 6GHz
- Single +5V Supply
- Small Signal Gain = 16dB
- P1dB = 19dBm (5V), f=1GHz
- SOT-89 3-Pin, & Gigamite Packages

APPLICATIONS/BENEFITS

- Broadband Gain Blocks
- IF or RF buffer Amplifiers
- Driver Stage for Power Amps
- Final Power Amp for Low to Medium Power Applications
- Broadband Test Equipment

PRODUCT HIGHLIGHT



PACKAGE ORDER INFO

PK	Plastic SOT-89 3 Pin		Gigamite
	MWS11GB11-S1		MWS11GB11-G1

Note: Available in Tape & Reel.
Append the letter "T" to the part number. (i.e. MSW11GB11-S89T)

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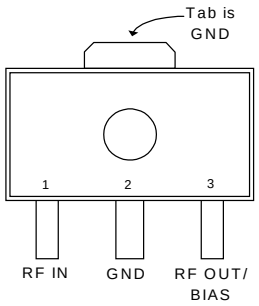
ABSOLUTE MAXIMUM RATINGS

DC Supply Voltage.....5.0 Vdc
Absolute Max. Limit.....60mA
RF Input Power (Pin).....10 dBm
Operating Case Temperature .....-40º to +85ºC
Storage Temperature.....-60º to +150ºC

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT



PK PACKAGE
(Top View)

THERMAL DATA

PK Plastic SOT-89 3-Pin

THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	xx°C/W
THERMAL RESISTANCE-JUNCTION TO CASE, θ_{JC}	149°C/W
THERMAL RESISTANCE-JUNCTION TO LEAD, θ_{JT}	xx°C/W

Gigamite

THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	xx°C/W
THERMAL RESISTANCE-JUNCTION TO CASE, θ_{JC}	xx°C/W
THERMAL RESISTANCE-JUNCTION TO LEAD, θ_{JT}	xx°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

FUNCTIONAL PIN DESCRIPTION

PIN NAME	DESCRIPTION
RF IN	RF Input pin. A DC blocking capacitor should be used in most applications.
GND	Ground connection. Traces should be minimized and connect immediately to ground.
RF OUT / BIAS	RF output and bias pin. In the bias network, a resistor is selected to set the DC current into this pin as: $$R = \frac{(V_{CC} - V_D)}{I_{CC}}$$ Note that maximum current limit I_{CC} must not be exceeded and a resistor should always be used. A DC blocking capacitor should also be used.

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the operating ambient temperature -40°C ≤ T_A ≤ +85°C except where otherwise noted. Test conditions: [Enter Test Conditions Here]

Parameter	Symbol	Test Conditions	MWS11-GB11-xx			Units
			Min	Typ	Max	
POWER SUPPLY						
Application Frequency Range	f		DC		6	GHz
Linear Output Power	P1dB	f=2GHz	16		19	dBm
Output 3rd Order Intermod Product*	IP3			34		dBm
Small-Signal Gain	G	f=1 GHz	13		16	dB
Noise Figure	NF	f=1.5 GHz	3.3	3.5	4	dB
Supply Voltage	V_{CC}			4.6	5	V
Supply Current				20	60	mA
OVERALL						
Frequency Range		T=25°C, V_D=5.5V, I_{CC}=70mA		DC to >6000		MHz
1dB Bandwidth				5.5		GHz
Gain		Freq = 100MHz		11.3		dB
		Freq = 1000MHz		11.3		dB
		Freq = 2000MHz	10.2	11.4		dB
		Freq = 3000MHz		11.5		dB
		Freq = 4000MHz		11.5		dB
		Freq = 6000MHz		9.9		dB
Gain Flatness		100MHz to 2000MHz		0.05		dB
Noise Figure		Freq = 1000MHz		7.6		dB
Input VSWR		In a 50Ω system, DC to 3000MHz		<1.8:1		
		In a 50Ω system, 3000MHz to 6000MHz		<2.5:1		
Output VSWR		In a 50Ω system, DC to 3000MHz		<1.8:1		
		In a 50Ω system, 3000MHz to 6000MHz		<2.5:1		
Output I_{P3}		Freq = 1000MHz		34.5		dBm
Output P_{1dB}		Freq = 1000MHz		18.5		dBm
Reverse Isolation		Freq = 1000MHz		16.5		dB
THERMAL						
Maximum Measured Junction Temp at DC Bias Conditions		T_A = +85°C		142		°C
Mean Time Between Failures		T_A = +85°C		$1.4x10^3$		Years†
		T_A = +25°C		$3.4x10^5$		Years†
		T_A = -40°C		$1.8x10^9$		Years†

* Output power at 1dB gain compression point, f=1 GHz

† In accordance with Manufacturer design

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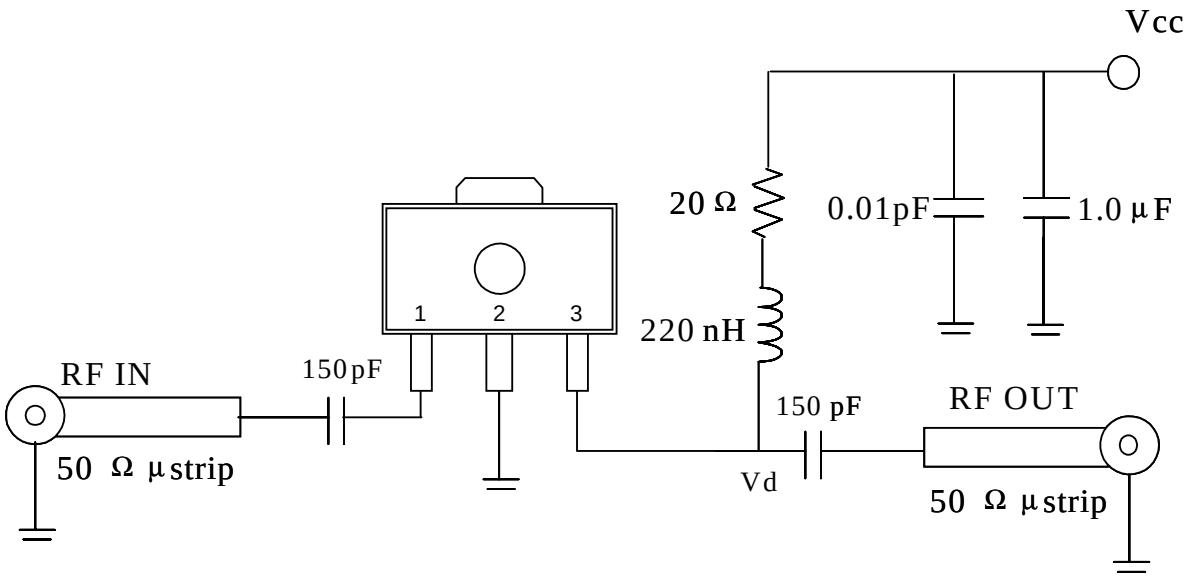
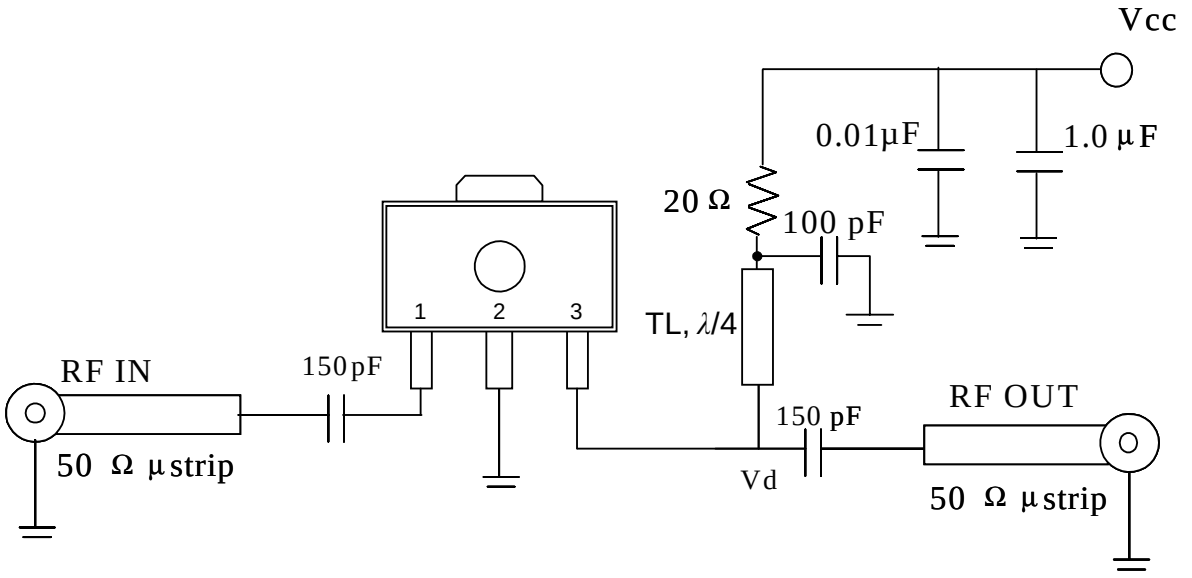
EVALUATION BOARD SCHEMATIC

STANDARD EVALUATION BOARD



5.7 GHz TUNED



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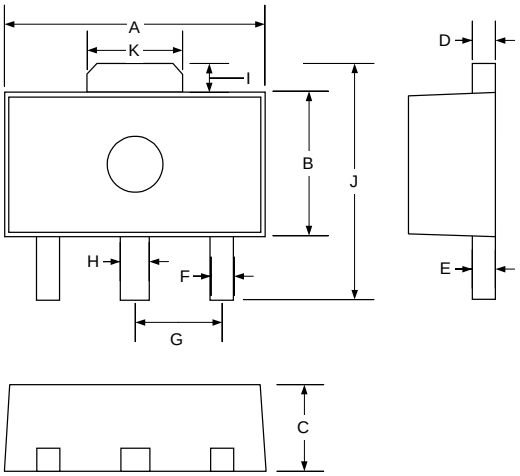
DIMENSIONS

PK — 3-Pin Plastic TO-89



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	2.30	2.70	0.090	0.106
C	1.30	1.70	0.051	0.066
D	0.35	0.45	0.013	0.017
E	0.35	0.50	0.013	0.019
F	0.30	0.50	0.011	0.019
G	1.50 BSC		0.059 BSC	
H	0.40	0.60	0.015	0.023
I	0.50	0.50	0.019	0.019
J	3.90	4.30	0.153	0.169
K	1.55	1.75	0.061	0.068

Note:

1. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.

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NOTES