AG603-86

InGaP HBT Gain Block

The Communications Edge ™

Preliminary Product Information

Product Features

- DC – 3000 MHz
- +19.5 dBm P1dB at 900 MHz
- +34 dBm OIP3 at 900 MHz
- 17.5 dB Gain at 900 MHz
- Single Voltage Supply
- SOT-86 SMT Package
- Internally matched to 50 Ω

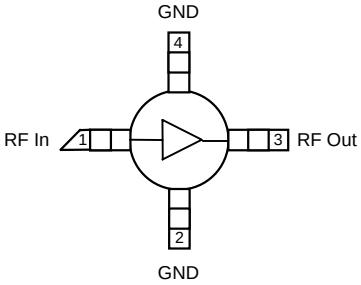
Product Description

The AG603-86 is a general-purpose buffer amplifier that offers high dynamic range in a low-cost surface-mount package. At 900 MHz, the AG603-86 typically provides 17.5 dB of gain, +34 dBm Output IP3, and +19.5 dBm P1dB. The device combines dependable performance with consistent quality to maintain MTBF values exceeding 100 years at mounting temperatures of +85° C and is housed in a SOT-86 industry-standard SMT package.

The AG603-86 consists of Darlington pair amplifiers using the high reliability InGaP/GaAs HBT technology process technology and only requires DC-blocking capacitors, a bias resistor, and an inductive RF choke for operation.

The broadband MMIC amplifier can be directly applied to various current and next generation wireless technologies such as GPRS, GSM, CDMA, W-CDMA, and UMTS. In addition, the AG603-86 will work for other various applications within the DC to 3.0 GHz frequency range such as CATV and fixed wireless.

Functional Diagram



Function	Pin No.
Input	1
Output/Bias	3
Ground	2, 4

Specifications

Parameter	Units	Min	Typ	Max
Frequency Range	MHz	DC	900	3000
S21 - Gain	dB		17.5	
S11 - Input Return Loss	dB		-20	
S22 - Output Return Loss	dB		-16	
Output P1dB	dBm		+19.5	
Output IP3	dBm		+34	
Noise Figure	dB		4.5	
Device Voltage	V		+5.1	
Device Current	mA		75	
Thermal Resistance	°C / W			206
Junction Temperature[3]	°C			177

Test conditions unless otherwise noted.
1. T = 25ºC, Supply Voltage = +6V, R_{bias} = 12 Ω, Frequency = 900 MHz, 50 Ω System.
2. 3OIP measured with two tones at an output power of +3 dBm/tone separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.
3. The max junction temperature ensures a minimum MTTF rating of 1 million hours of usage.

Typical Specifications

Parameter	Units	Typical		
Frequency	MHz	900	1900	2140
S21	dB	17.5	15.5	14.8
S11	dB	-20	-20	-20
S22	dB	-16	-12	-12
Output P1dB	dBm	+19.5	+19.1	+19.0
Output IP3	dBm	+34	+33.3	+33.2
Noise Figure	dB	4.5	4.5	4.5

Test conditions: T = 25ºC, Supply Voltage = +6V, R_{bias} = 12 Ω, 50 Ω System.

Absolute Maximum Rating

Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +125 °C
DC Voltage	+7 V
RF Input Power (continuous)	+18 dBm
Junction Temperature	250 °C

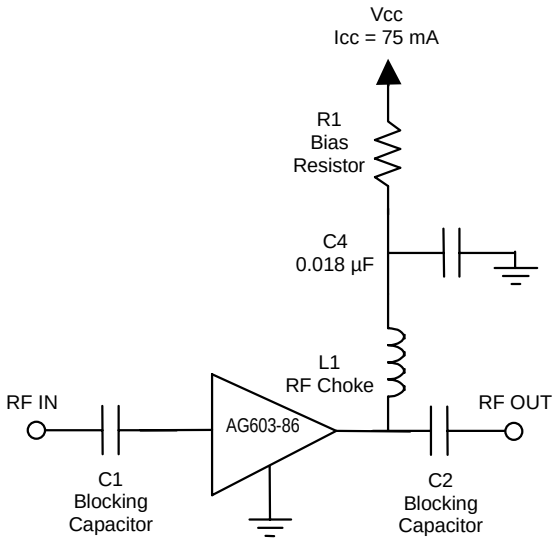
Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

Part No.	Description
AG603-86	InGaP HBT Gain Block
AG603-86PCB	700 – 2400 MHz Fully Assembled Eval. Board

This document contains information on a new product.
Specifications and information are subject to change without notice

Application Circuit



Recommended Component Values

Reference Designator	Frequency (MHz)						
	50	**500**	**900**	**1900**	**2200**	**2500**	**3500**
L1	820 nH	220 nH	68 nH	27 nH	22 nH	18 nH	15 nH
C1, C2	.018 µF	1000 pF	100 pF	68 pF	68 pF	56 pF	39 pF

1. The proper values for the components are dependent upon the intended frequency of operation.
2. An IRLML6302 MOSFET may be inserted on the WJ evaluation board in-between the bias resistor R1 and the supply pin Vcc to prevent any human errors of reverse-biasing the circuit and thus possibly damaging the device. This component is not required for operation and should not be included in a user's circuit design of this device.

Recommended Bias Resistor Values

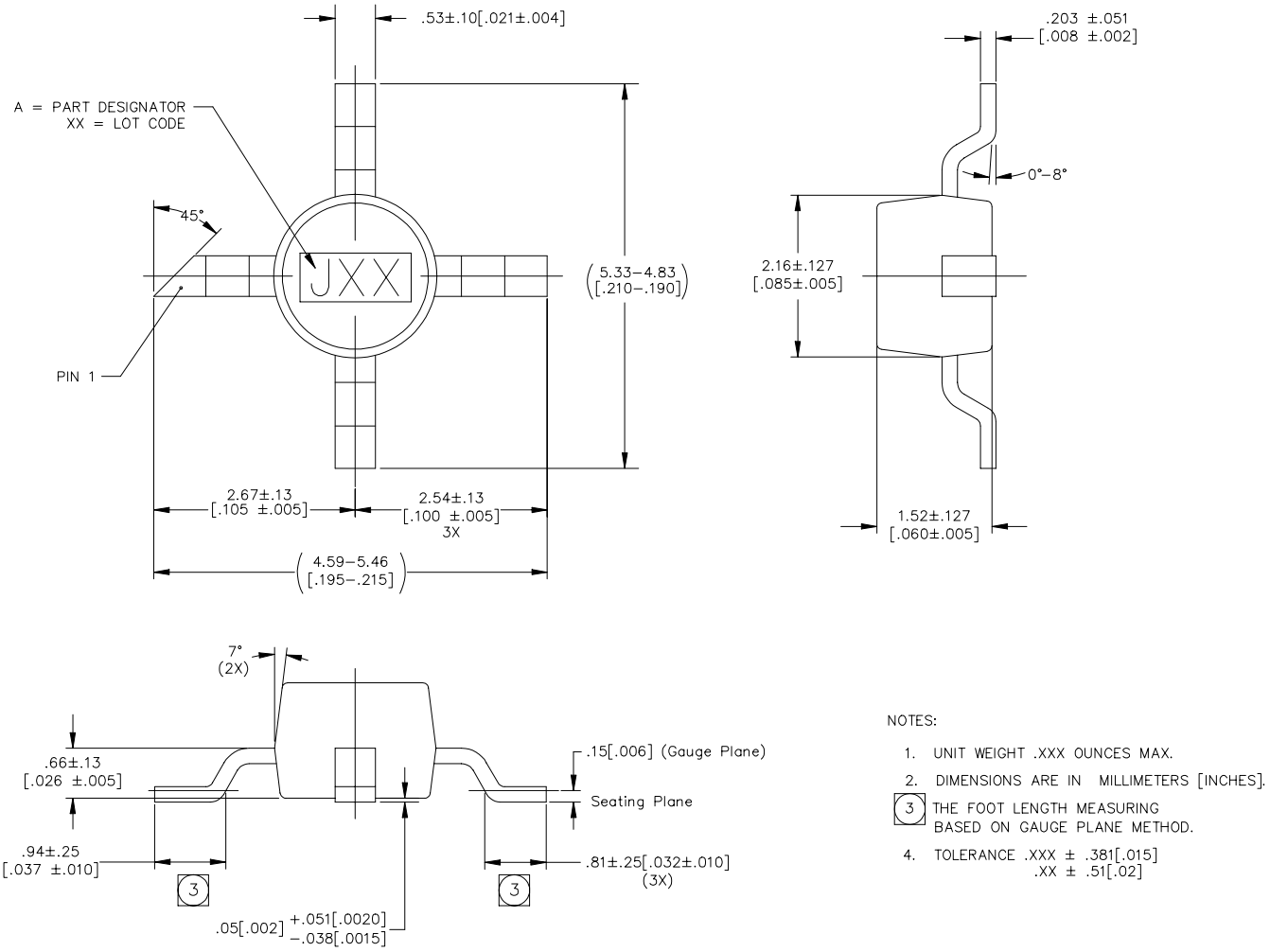
Supply Voltage	R1 value	Size
6 V	12 ohms	0805
7 V	25 ohms	1210
8 V	39 ohms	2010
9 V	52 ohms	2010
10 V	65 ohms	2010
11 V	79 ohms	2512

The proper value for R1 is dependent upon the supply voltage and allows for bias stability over temperature. WJ recommends a minimum supply bias of +6 V. A value of 12 Ω is used for the application board.

Caution! ESD sensitive device.

ESD Classification:	Class 0
Value:	Passes at 150 V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114
ESD Classification:	Class II
Value:	Passes at 250 V
Test:	Charged Device Model (CDM)
Standard:	JEDEC Standard JESD22-C101
MSL Rating:	Level 3
Standard:	JEDEC Standard J-STD-020A

Outline Drawing



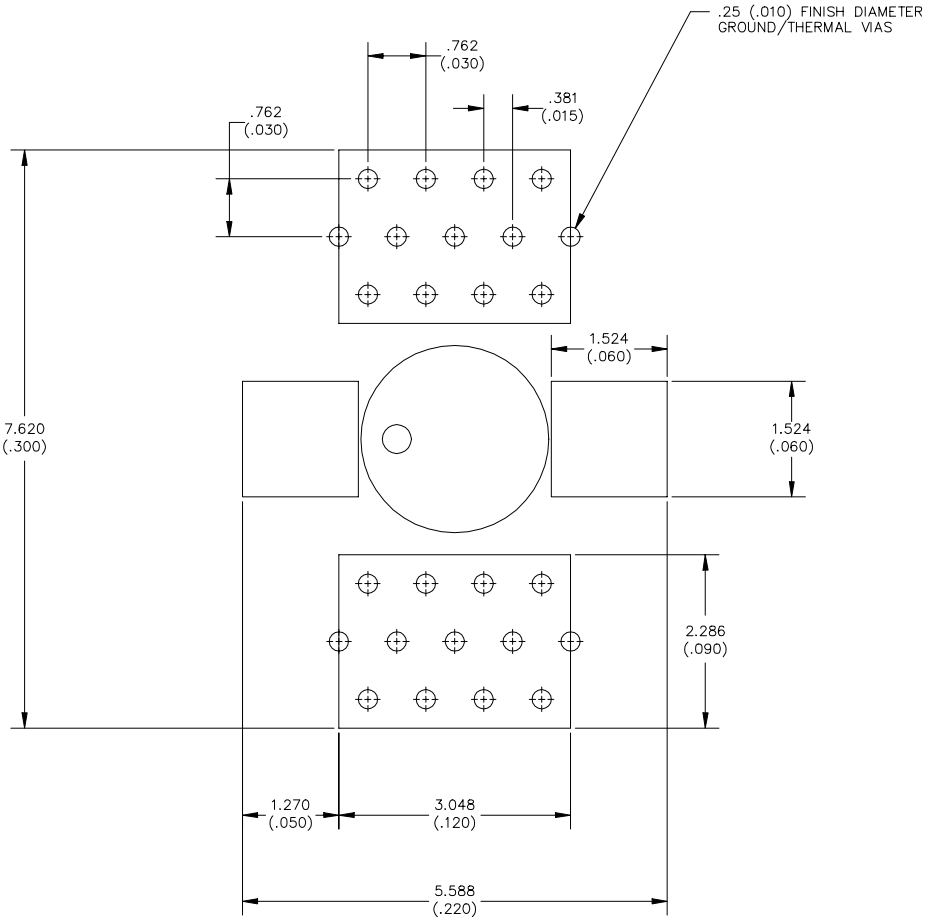
NOTES:

1. UNIT WEIGHT .XXX OUNCES MAX.
2. DIMENSIONS ARE IN MILLIMETERS [INCHES].
3. THE FOOT LENGTH MEASURING BASED ON GAUGE PLANE METHOD.
4. TOLERANCE .XXX ± .381[.015]
   .XX ± .51[.02]

Product Marking

The component will be marked with an “J” designator followed by a two-digit numeric lot code on the top surface of the package. Tape and reel specifications for this part is located on the website in the “Application Notes” section.

Land Pattern



Mounting Configuration Notes

NOTES:

1. THERMAL/GROUND VIAS ARE CRITICAL FOR THE PROPER PERFORMANCE OF THIS PART. VIAS SHOULD USE A .013" DIAMETER DRILL AND HAVE A FINAL, PLATED THRU DIAMETER OF .010".
2. ADD AS MUCH COPPER AS POSSIBLE TO INNER AND OUTER LAYERS NEAR THE PART TO ENSURE OPTIMAL THERMAL PERFORMANCE.
3. MOUNTING SCREWS ARE RECOMMENDED NEAR THE PART TO FASTEN THE BOARD TO A HEATSINK. ENSURE THAT THE THERMAL/GROUND VIAS CONTACT THE HEATSINK.
4. DO NOT PUT SOLDER MASK ON THE BACK SIDE OF THE PC BOARD IN THE REGIONS WHERE THE BOARD CONTACTS THE HEATSINK.
5. RF TRACE WIDTH DEPENDS UPON THE PC BOARD MATERIAL AND CONSTRUCTION.
6. USE 1 OZ. COPPER MINIMUM.
7. DIMENSIONS ARE IN MILLIMETERS / (INCHES).