

Products > RF ICs/Discretes > RF ICs > GaAs Amplifiers, Mixers, Switches > MGA-86563

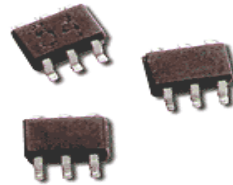
MGA-86563

**5V LNA, 20dB High Gain, 0.5-6GHz, SOT363(SC-70)**

#### Description



Lifecycle status: **Active**



#### Features

The MGA-86 is a 5V part with high gain and low noise figure. It is housed in the miniature SOT-363 package as well as in the 70 mil ceramic package and is designed for 5V low noise amplifier applications. Bias: 5V, 16mA; Gain = 20dB; NF = 2dB; P1dB = 6dBm; IP3i = -4dB all at 2GHz.

# MGA-86563

## 0.5 – 6 GHz Low Noise GaAs MMIC Amplifier



### Data Sheet

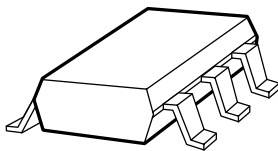
#### Description

Avago's MGA-86563 is an economical, easy-to-use GaAs MMIC amplifier that offers low noise figure and excellent gain for applications from 0.5 to 6 GHz. Packaged in an ultra-miniature SOT-363 package, it requires half the board space of the SOT-143.

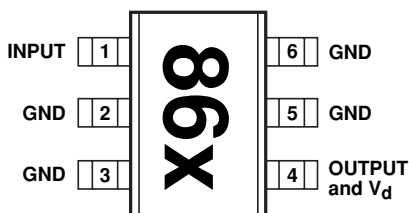
The MGA-86563 may be used without impedance matching as a high performance 2 dB NF gain block. Alternatively, with the addition of a simple shunt-series inductor at the input, the device noise figure can be reduced to 1.6 dB at 2.4 GHz. For 1.5 GHz applications and above, the output is well matched to 50 Ω. Below 1.5 GHz, gain can be increased by using conjugate matching.

The circuit uses state-of-the-art PHEMT technology with self-biasing current sources, a source-follower interstage, resistive feedback, and on-chip impedance matching networks. A patented, on-chip active bias circuit allows operation from a single +5 V power supply. Current consumption is only 14 mA, making this part suitable for battery powered applications.

#### Surface Mount Package SOT-363 (SC-70)



#### Pin Connections and Package Marking



#### Note:

Package marking provides orientation and identification.  
 "86" = Device Code  
 "x" = Date code character identifies month of manufacture

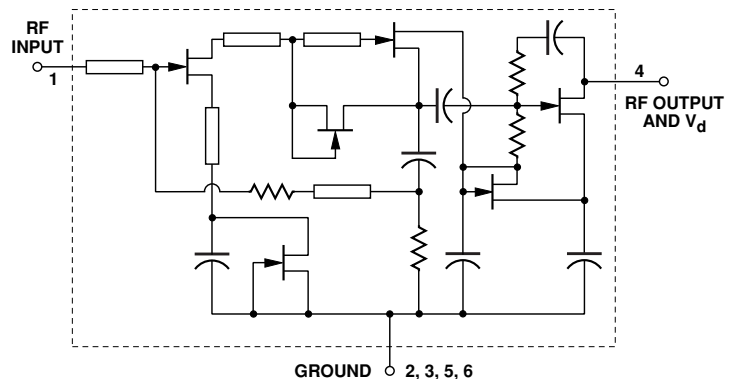
#### Features

- Lead-free Option Available
- Ultra-Miniature Package
- Internally Biased, Single +5 V Supply (14 mA)
- 1.6 dB Noise Figure at 2.4 GHz
- 21.8 dB Gain at 2.4 GHz
- +3.1 dBm P<sub>1dB</sub> at 2.4 GHz

#### Applications

- LNA or Gain Stage for ISM, PCS, MMDS, GPS, TVRO, and Other C band Applications

#### Equivalent Circuit



#### Attention:

Observe precautions for handling electrostatic sensitive devices.

ESD Machine Model (Class A)

ESD Human Body Model (Class 0)

Refer to Avago Application Note A004R: Electrostatic Discharge Damage and Control.

### MGA-86563 Absolute Maximum Ratings

Symbol	Parameter	Units	Absolute Maximum <sup>[1]</sup>
$V_d$	Device Voltage, RF Output to Ground	V	9
$V_{in}$	RF Input Voltage to Ground	V	+0.5 -1.0
$P_{in}$	CW RF Input Power	dBm	+13
$T_{ch}$	Channel Temperature	°C	150
$T_{STG}$	Storage Temperature	°C	-65 to 150

#### Thermal Resistance<sup>[2]</sup>:

$$\theta_{ch-c} = 160^{\circ}\text{C/W}$$

#### Notes:

1. Operation of this device above any one of these limits may cause permanent damage.
2.  $T_C = 25^{\circ}\text{C}$  ( $T_C$  is defined to be the temperature at the package pins where contact is made to the circuit board).

### Electrical Specifications, $T_C = 25^{\circ}\text{C}$ , $Z_0 = 50\ \Omega$ unless noted, $V_d = 5\ \text{V}$

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$G_{test}$	Gain in Test Circuit <sup>[1]</sup> f = 2.0 GHz		17	20	
$NF_{test}$	Noise Figure in Test Circuit <sup>[1]</sup> f = 2.0 GHz			1.8	2.3
$NF_0$	Optimum Noise Figure (Tuned for lowest noise figure) f = 0.9 GHz f = 2.0 GHz f = 2.4 GHz f = 4.0 GHz f = 6.0 GHz	dB		2.0 1.5 1.6 1.7 2.0	
$G_A$	Associated Gain at $NF_0$ (Tuned for lowest noise figure) f = 0.9 GHz f = 2.0 GHz f = 2.4 GHz f = 4.0 GHz f = 6.0 GHz	dB		20.8 22.7 22.5 18.0 13.7	
$P_{1\text{ dB}}$	Output Power at 1 dB Gain Compression (50 $\Omega$ Performance) f = 0.9 GHz f = 2.0 GHz f = 2.4 GHz f = 4.0 GHz f = 6.0 GHz	dBm		3.6 4.1 4.2 4.3 3.3	
$IP_3$	Third Order Intercept Point f = 2.4 GHz	dBm		+15	
$VSWR_{in}$	Input VSWR f = 2.4 GHz			2.3:1	
$VSWR_{out}$	Output VSWR f = 2.4 GHz			1.7:1	
$I_d$	Device Current	mA		14	

#### Note:

1. Guaranteed specifications are 100% tested in the circuit in Figure 10 in the Applications Information section.

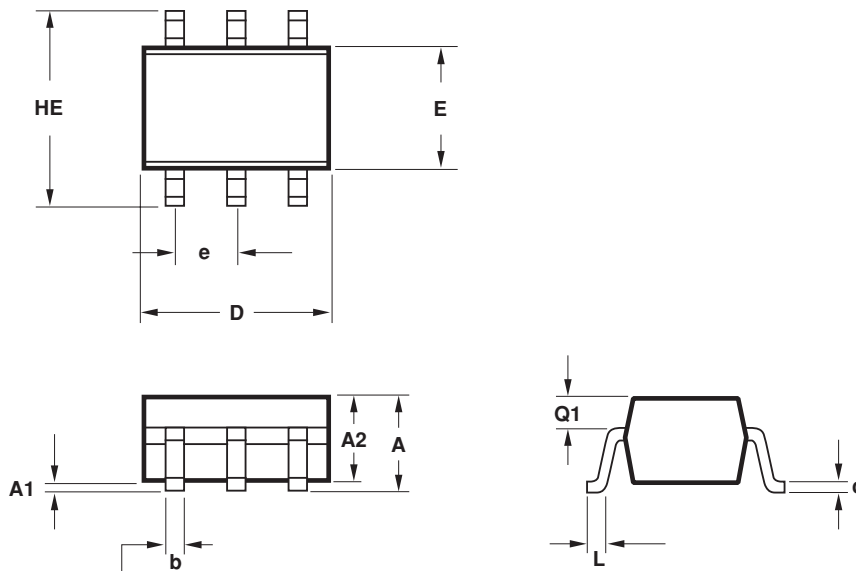
## Part Number Ordering Information

Part Number	No. of Devices	Container
MGA-86563-TR1	3000	7" Reel
MGA-86563-TR2	10000	13" Reel
MGA-86563-BLK	100	antistatic bag
MGA-86563-TR1G	3000	7" Reel
MGA-86563-TR2G	10000	13" Reel
MGA-86563-BLKG	100	antistatic bag

**Note:** For lead-free option, the part number will have the character "G" at the end.

## Package Dimensions

### Outline 63 (SOT-363/SC-70)



SYMBOL	DIMENSIONS (mm)	
	MIN.	MAX.
E	1.15	1.35
D	1.80	2.25
HE	1.80	2.40
A	0.80	1.10
A2	0.80	1.00
A1	0.00	0.10
Q1	0.10	0.40
e	0.650 BCS	
b	0.15	0.30
c	0.10	0.20
L	0.10	0.30

#### NOTES:

- All dimensions are in mm.
- Dimensions are inclusive of plating.
- Dimensions are exclusive of mold flash & metal burr.
- All specifications comply to EIAJ SC70.
- Die is facing up for mold and facing down for trim/form, ie: reverse trim/form.
- Package surface to be mirror finish.