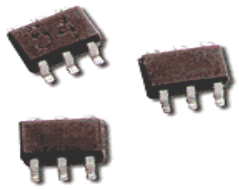
MGA-85563

3V LNA, 12 to 17dBm Adjustable OIP3, 0.8-6GHz, SOT363 (SC-70)

Description

Lead (PB) Free
RoHS 6 fully compliant

Lifecycle status: Active



Features

The MGA-85 is a 3V part with high gain and low noise figure. It is housed in the miniature SOT-363 package and designed for 3V low noise amplifier applications. Bias: 3V, 15-30mA (adjustable); Gain = 18dB; NF = 1.6dB; P1dB = 1 to 9dBm (adjustable); IP3i = -6 to 0dB (adjustable) all at 2GHz.

MGA-85563
3-volt, Low Noise Amplifier for 0.8 – 6 GHz Applications

Data Sheet

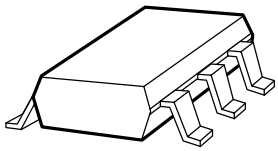
Description

Avago's MGA-85563 is an easy-to-use GaAs RFIC amplifier that offers low noise figure and high gain from 0.8 to 6 GHz. Packaged in an ultra-miniature SOT-363 package, it requires half the board space of a SOT-143 package.

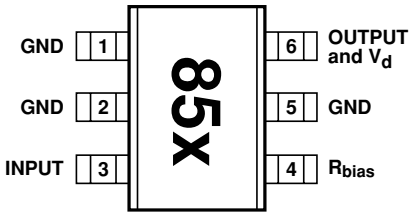
The MGA-85563 features a minimum noise figure of 1.6 dB and associated gain of 18 dB at 1.9 GHz. The output is matched internally to 50Ω, and the input is partially matched, requiring only a single external inductor for optimal performance. The supply current can be adjusted using an external resistor, varying IP3 from +12 dBm to +17 dBm.

The circuit uses state-of-the-art PHEMT technology with proven reliability. On-chip bias circuitry allows operation from a single +3 V supply, while resistive feedback ensures stability (K > 1) over frequency and temperature.

Surface Mount Package SOT-363 (SC-70)



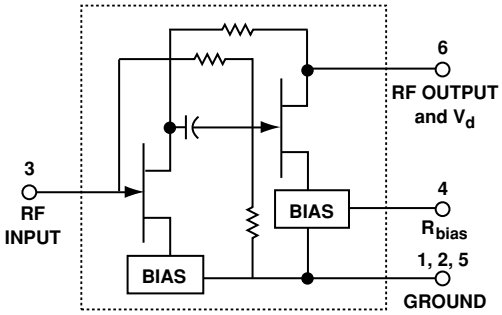
Pin Connections and Package Marking



Note:
Package marking provides orientation and identification; "x" is date code.

Equivalent Circuit

(Simplified)



Features

- **Lead-free Option Available**
- **1.6 dB minimum Noise Figure at 1.9 GHz**
- **Adjustable IP3 from +12 dBm to +17 dBm via External Resistor**
- **18 dB Gain at 1.9 GHz**
- **Single 3 V Supply**
- **Unconditionally Stable**

Applications

- **Amplifier for Cellular, PCS, and Wireless LAN Applications**

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-85563 Absolute Maximum Ratings

Symbol	Parameter	Units	Absolute Maximum[1]
V_d, max	Maximum Device Voltage	V	5.5
P_{in}	CW RF Input Power	dBm	+13
T_{ch}	Channel Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 to 150

Thermal Resistance[2]:
$\theta_{ch\ to\ c} = 155°C/W$

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

Electrical Specifications, $T_C = 25°C$, $Z_0 = 50\ \Omega$, $V_d = 3$ V, and using default of no external resistor at the R_{bias} pin

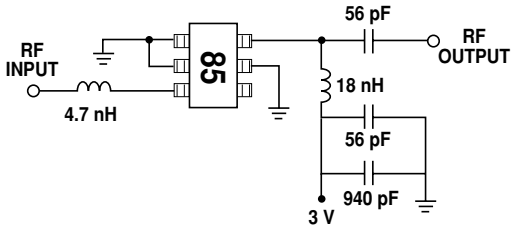
Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.	Std. Dev.[3]
G_{test}	Gain in Test Circuit[1]	f = 2.0 GHz	dB	16	19		1.0
NF_{test}	Noise Figure in Test Circuit[1]	f = 2.0 GHz	dB		1.85	2.3	0.1
NF_{MIN}	Minimum Noise Figure	f = 0.9 GHz	dB		1.6		
	(measured with G_{opt} presented to the	f = 1.5 GHz			1.6		
	input and 50 Ω presented to the output)	f = 2.0 GHz			1.6		0.1
		f = 2.4 GHz			1.6		
		f = 4.0 GHz			1.6		
		f = 5.0 GHz			1.6		
		f = 6.0 GHz			1.6		
G_A	Associated Gain at NF_{MIN}	f = 0.9 GHz	dB		17.0		
	(measured with G_{opt} presented to the	f = 1.5 GHz			17.5		
	input and 50 Ω presented to the output)	f = 2.0 GHz			18.0		1.0
		f = 2.4 GHz			18.5		
		f = 4.0 GHz			17.5		
		f = 5.0 GHz			16.0		
		f = 6.0 GHz			14.5		
IP_3	Third Order Intercept Point	f = 0.9 GHz	dBm		13		
	(measured with 50 Ω presented	f = 1.5 GHz			13		
	to the input and output)	f = 2.0 GHz			11.5		1.2
		f = 2.4 GHz			11.5		
		f = 4.0 GHz			13		
		f = 5.0 GHz			12.5		
		f = 6.0 GHz			12		
$P_{1\ dB}$	Output Power at 1 dB Gain Compression	f = 0.9 GHz	dBm		0.8		
	(measured with 50 Ω presented	f = 1.5 GHz			0.9		
	to the input and output)	f = 2.0 GHz			0.9		1.1
		f = 2.4 GHz			1.0		
		f = 4.0 GHz			1.4		
		f = 5.0 GHz			1.3		
		f = 6.0 GHz			1.2		

MGA-85563 Electrical Specifications, continued, T_C = 25°C, Z_O = 50 Ω, V_d = 3 V, and using default of no external resistor at the R_{bias} pin

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.	Std. Dev.[3]
$VSWR_{in}$	Input VSWR[2]				2.5:1		
$VSWR_{out}$	Output VSWR[2]				1.3:1		
ISOL	Isolation	f = 0.9 – 3.0 GHz f = 3.0 – 6.0 GHz	dB		37 30		0.6
I_d	Device Current		mA		15	20	1.9

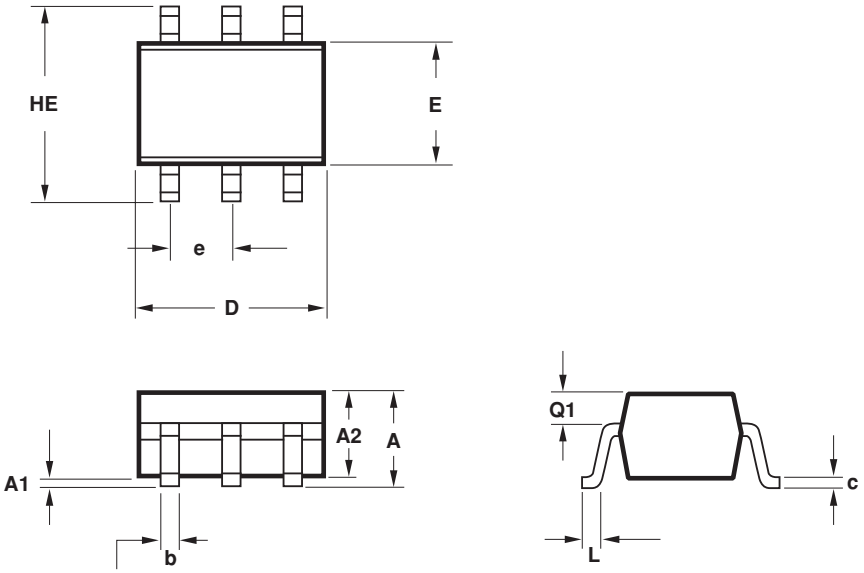
Notes:
1. Guaranteed specifications are 100% tested in the circuit of Figure 1.
2. Measured using the final test circuit shown below at f = 2 GHz.
3. Standard Deviation number is based on measurement of at least 500 parts from three non-consecutive wafer lots during the initial characterization of this product, and is intended to be used as an estimate for distribution of the typical specification.

MGA-85563 Final Test Circuit, T_C = 25°C, Z_O = 50 Ω



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

Part Number Ordering Information

Part Number	No. of Devices	Container
MGA-85563-TR1	3000	7" Reel
MGA-85563-TR2	10000	13" Reel
MGA-85563-BLK	100	antistatic bag
MGA-85563-TR1G	3000	7" Reel
MGA-85563-TR2G	10000	13" Reel
MGA-85563-BLKG	100	antistatic bag

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