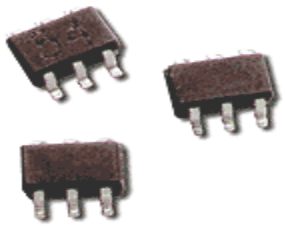
MGA-81563

3V Driver Amplifier, 14dBm P1dB, Low Noise, 0.1-6GHz, SOT363(SC-70)

Description

Lead (PB) Free
RoHS 6 fully compliant

Lifecycle status: Active



Features

The MGA-81 is a 3V part with 14dBm P1dB. It is housed in the miniature SOT-363 package and designed for 3V driver amplifier applications. Bias: 3V, 42mA; Gain = 12dB; NF = 2.8dB; P1dB = 14.8dBm; IP3i = 11dB all at 2GHz.

MGA-81563

0.1–6 GHz 3 V, 14 dBm Amplifier

Data Sheet

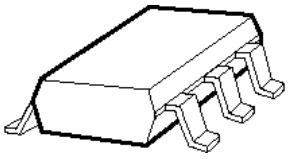
Description

Avago's MGA-81563 is an economical, easy-to-use GaAs MMIC amplifier that offers excellent power and low noise figure for applications from 0.1 to 6 GHz. Packaged in an ultra-miniature SOT-363 package, it requires half the board space of a SOT-143 package.

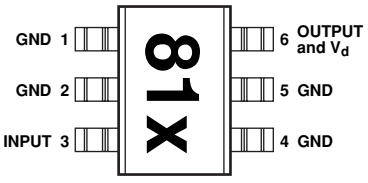
The output of the amplifier is matched to 50Ω (better than 2.1:1 VSWR) across the entire bandwidth. The input is partially matched to 50Ω (better than 2.5:1 VSWR) below 4 GHz and fully matched to 50Ω (better than 2:1 VSWR) above. A simple series inductor can be added to the input to improve the input match below 4 GHz. The amplifier allows a wide dynamic range by offering a 2.7 dB NF coupled with a +27 dBm Output IP_3.

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

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



Pin Connections and Package Marking



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

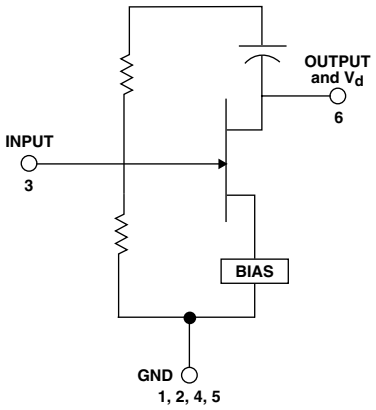
Features

- Lead-free Option Available
- +14.8 dBm P_{1dB} at 2.0 GHz
  +17 dBm P_{sat} at 2.0 GHz
- Single +3V Supply
- 2.8 dB Noise Figure at 2.0 GHz
- 12.4 dB Gain at 2.0 GHz
- Ultra-miniature Package
- Unconditionally Stable

Applications

- Buffer or Driver Amp for PCS, PHS, ISM, SATCOM and WLL Applications
- High Dynamic Range LNA

Simplified Schematic



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-81563 Absolute Maximum Ratings

Symbol	Parameter	Units	Absolute Maximum[1]
V_d	Device Voltage, RF Output to Ground	V	6.0
V_{gd}	Device Voltage, Gate to Drain	V	-6.0
V_{in}	Range of RF Input Voltage to Ground	V	+0.5 to -1.0
P_{in}	CW RF Input Power	dBm	+13
T_{ch}	Channel Temperature	°C	165
T_{STG}	Storage Temperature	°C	-65 to 150

Thermal Resistance[2]:
$\theta_{ch-c} = 220°C/W$

Notes:
1. Permanent damage may occur if any of these limits are exceeded.
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.)

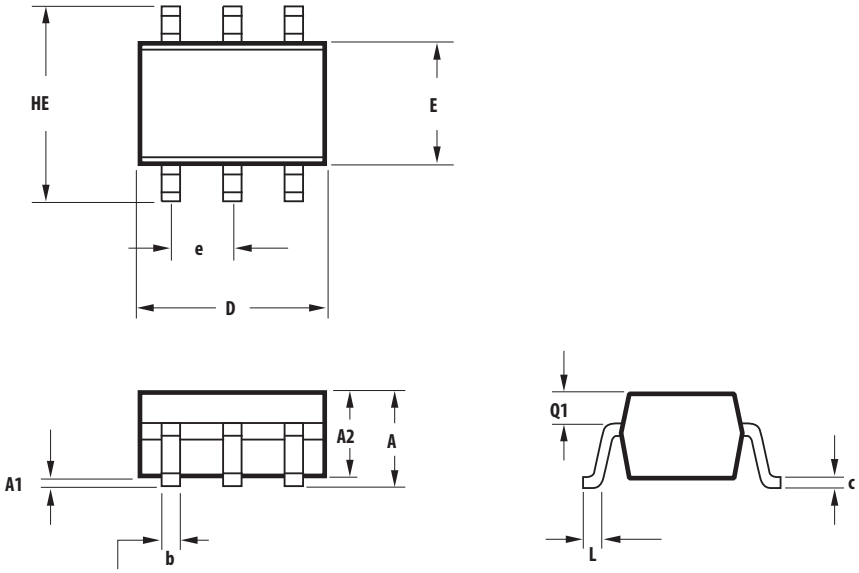
MGA-81563 Electrical Specifications, TC = 25°C, ZO = 50 Ω, Vd = 3 V

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.	Std Dev[2]
Gtest	Gain in test circuit[1]	f = 2.0 GHz		10.5	12.4	14.5	0.44
NFtest	Noise Figure in test circuit[1]	f = 2.0 GHz			2.8	3.8	0.21
NF50	Noise Figure in 50 Ω system	f = 0.5 GHz	dB		3.1		0.21
		f = 1.0 GHz			3.0		
		f = 2.0 GHz			2.7		
		f = 3.0 GHz			2.7		
		f = 4.0 GHz			2.8		
		f = 6.0 GHz			3.5		
|S21|2	Gain in 50 Ω system	f = 0.5 GHz	dB		12.5		0.44
		f = 1.0 GHz			12.5		
		f = 2.0 GHz			12.3		
		= 3.0 GHz			11.8		
		f = 4.0 GHz			11.4		
		f = 6.0 GHz			10.2		
$P_{1\ dB}$	Output Power at 1 dB Gain Compression	f = 0.5 GHz	dBm		15.1		0.86
		f = 1.0 GHz			14.8		
		f = 2.0 GHz			14.8		
		f = 3.0 GHz			14.8		
		f = 4.0 GHz			14.8		
		f = 6.0 GHz			14.7		
IP_3	Output Third Order Intercept Point	f = 2.0 GHz	dBm		+27		1.0
$VSWR_{in}$	Input VSWR	f = 2.0 GHz			2.7:1		
$VSWR_{out}$	Output VSWR	f = 2.0 GHz			2.0:1		
I_d	Device Current		mA	31	42	51	

Notes:
1. Guaranteed specifications are 100% tested in the circuit in Figure 10 in the Applications Information section.
2. 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.

Package Dimensions

Outline 63 (SOT-363/SC-70)



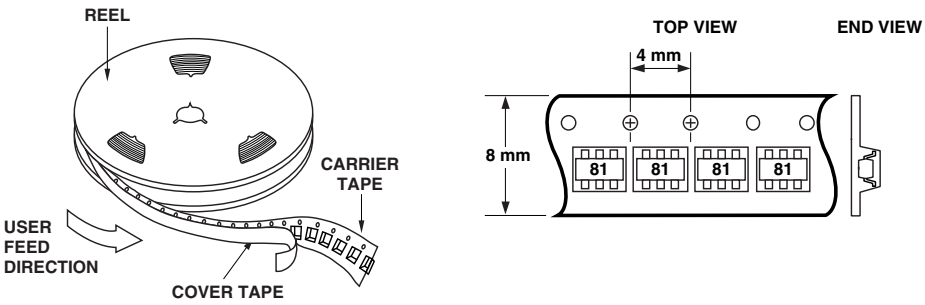
SYMBOL	DIMENSIONS (mm)	
	MIN.	MAX.
E	1.15	1.35
D	1.80	2.25
HE	1.80	2.40
A	0.80	1.10
A2	0.80	1.00
A1	0.00	0.10
Q1	0.10	0.40
e	0.650 BCS	
b	0.15	0.30
c	0.10	0.20
L	0.10	0.30

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.

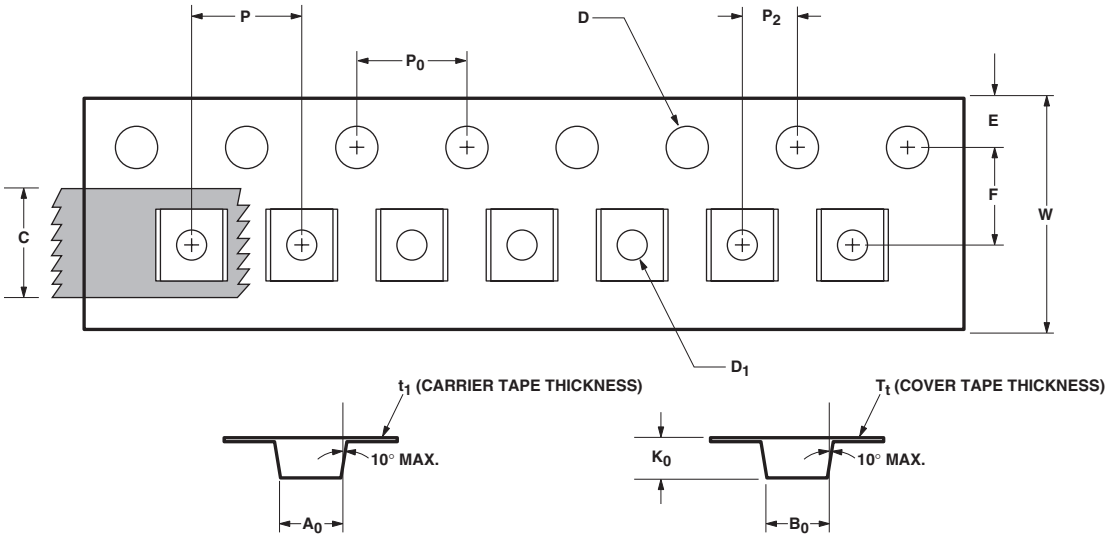
Part Number Ordering Information

Part Number	No. of Devices	Container
MGA-81563-TR1G	3000	7" Reel
MGA-81563-TR2G	10000	13" Reel
MGA-81563-BLKG	100	antistatic bag

Device Orientation



Tape Dimensions and Product Orientation for Outline 63



DESCRIPTION		SYMBOL	SIZE (mm)	SIZE (INCHES)
CAVITY	LENGTH	A_0	2.40 ± 0.10	0.094 ± 0.004
	WIDTH	B_0	2.40 ± 0.10	0.094 ± 0.004
	DEPTH	K_0	1.20 ± 0.10	0.047 ± 0.004
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 + 0.25	0.039 + 0.010
PERFORATION	DIAMETER	D	1.55 ± 0.10	0.061 + 0.002
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	8.00 + 0.30 - 0.10	0.315 + 0.012
	THICKNESS	t_1	0.254 ± 0.02	0.0100 ± 0.0008
COVER TAPE	WIDTH	C	5.40 ± 0.10	0.205 + 0.004
	TAPE THICKNESS	T_t	0.062 ± 0.001	0.0025 ± 0.0004
DISTANCE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002

AVAGO TECHNOLOGIES