

RMLA3565-58

Wideband Low Noise MMIC Amplifier

PRELIMINARY INFORMATION

Description

The Raytheon RMLA3565-58 is a single bias wideband low noise MMIC amplifier that meets the following specifications over the 3.5 - 6.5 GHz frequency range. The MMIC requires no external matching circuits no external gate bias supply. This device uses Raytheon's advanced 0.25 μm PHEMT process to provide low noise, high linearity and low current..

Features

- ◆ 18.0 dB Gain
- ◆ 1.35 dB Noise Figure
- ◆ Single Positive Bias
- ◆ Small Outline Metal Base Quad Plastic Package



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Positive Drain DC Voltage	V_{dd}	6.5	V
RF Input Power (from 50W source)	$P_{IN}(CW)$	0	dBm
Drain Current	I_{dd}	110	mA
Case Operating Temperature	T_{case}	-40 to 100	°C
Storage Temperature Range	$T_{storage}$	-40 to 110	°C
Soldering Temperature	T_{solder}	220	°C
Thermal Resistance		77.5	°C/W

Electrical Characteristics¹

Parameter	Min	Typ	Max	Unit
Frequency Range	3.5		6.5	GHz
Gain (Small Signal) ²	17.0	18.0		dB
Gain Variation vs Temp		-0.013		dB/°C
Noise Figure ³				
3.5 - 5 GHz		1.7	1.9	dB
5 - 6.5 GHz		1.3	1.4	dB

Parameter	Min	Typ	Max	Unit
Input/Output Return Loss		-10.0	-5.0	dB
Power Out, P-1dB	8.0	9.0		dBm
IP3 @ 5.5GHz, -8dBm Out		21.0		dBm
I _{dd}		70.0	90.0	mA
V _{dd}	3.0	4.0	6.0	V

Notes:

1. Operated at 25 °C and V_{dd}=4.0V, 50 Ω system
2. Pin = -20 dBm, Freq 2.5 - 6.5 GHz
3. Data de-embedded from fixture loss

Characteristic performance data and specifications are subject to change without notice.

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Application Information

CAUTION: THIS IS AN ESD SENSITIVE DEVICE

The following briefly describes a procedure for evaluating the high efficiency PHEMT amplifier packaged in a surface mount package. It may be noted that the chip is a fully monolithic single ended two stage amplifier for 3.5 to 6.5 GHz applications. Figure 1 shows the functional block diagram of the packaged product.

Test Fixture

Figure 2 shows the outline and pin-out descriptions for the packaged device. A typical test fixture schematic showing external bias components is shown in figure 3. Figure 4 shows typical layout of an evaluation board corresponding to the schematic diagram. A typical performance obtained from the test fixture is shown in figure 5. The following should be noted:

- (1) Package pin designations are as shown in figure 2.
- (2) Vd is the Drain Voltage (positive) applied at the pins of the package
- (3) Vdd is the positive supply voltage at the evaluation board terminal

Figure 1
Functional Block Diagram

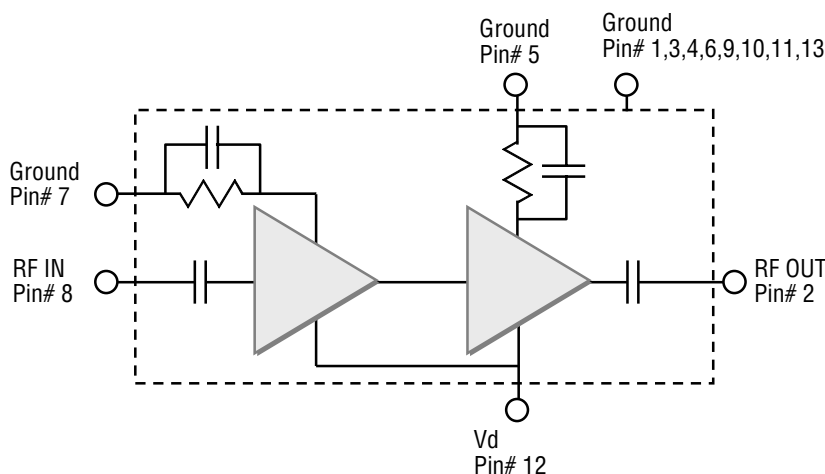
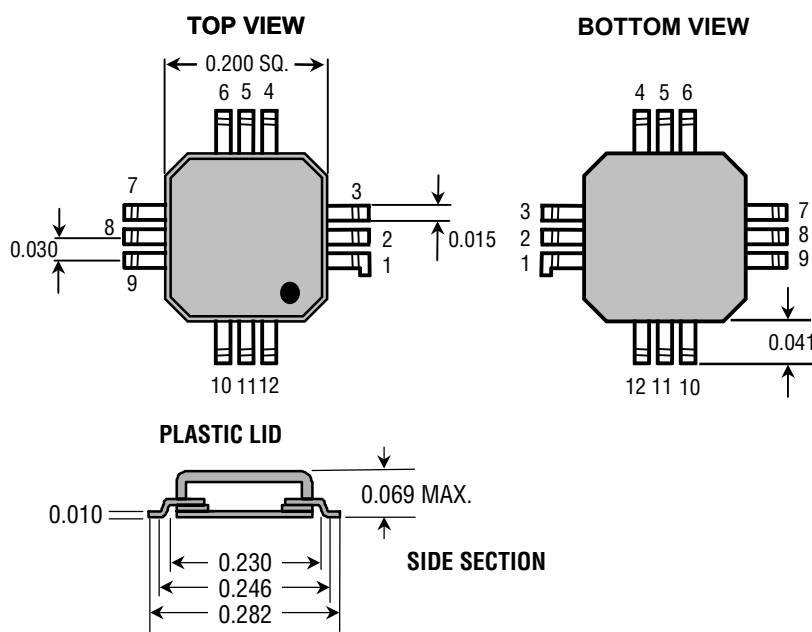


Figure 2
Outline Dimensions

Dimensions in inches



Pin#	Description
1	GND
2	RF Out
3	GND
4	GND
5	GND
6	GND
7	GND
8	RF In
9	GND
10	GND
11	GND
12	Vd
13	GND (Package Base)

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Figure 3
Schematic for a Typical
Test Evaluation Board
(RMLA3565-58-TB)

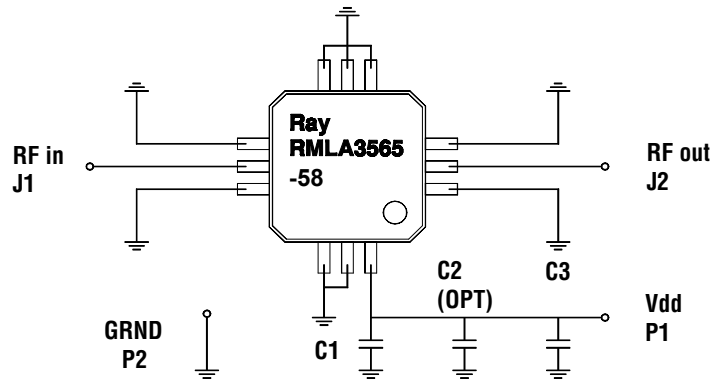
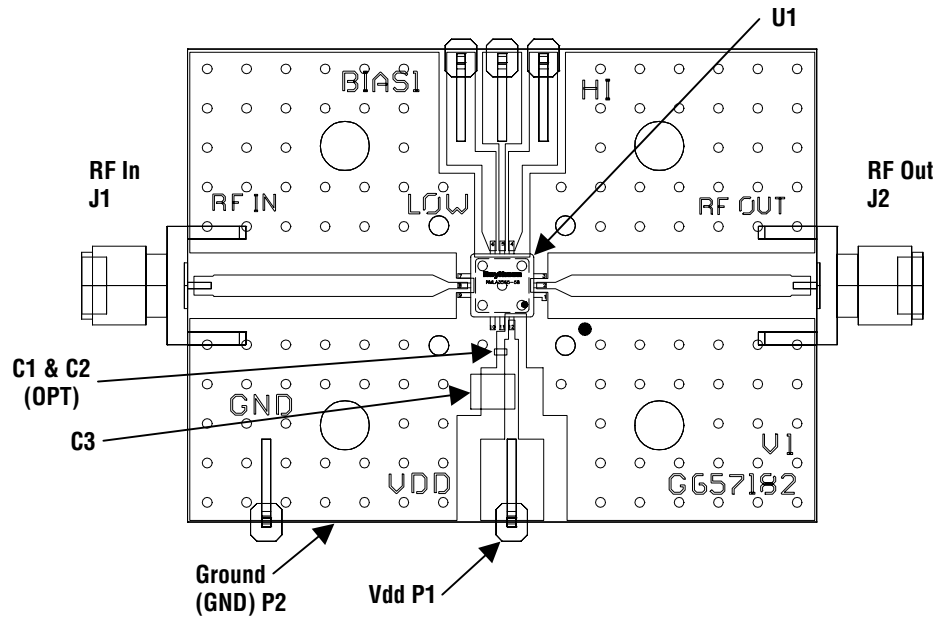


Figure 4
Layout and Assembly of
Test Evaluation Board
(RMLA3565-58-TB)



Test Procedure
for the evaluation board
(RMLA3565-58-TB)

The following sequence of procedure must be followed to properly test the power amplifier:

- Step 1:** Turn off RF input power.
- Step 2:** Use GND terminal of the evaluation board for DC supplies.
- Step 3:** Apply drain supply voltages of +4.0 V to evaluation board terminal Vdd.
- Step 4:** After the bias condition is established, RF input signal may now be applied.
- Step 5:** Follow turn-off sequence of:
 - (i) Turn off RF Input Power
 - (ii) Turn down and off Vdd

Parts List
for Test Evaluation Board
(RMLA3565-58-TB)

Part	Value	EIA Size	Vendor(s)
C1	330 pF	.04" x .02"	AVX, Murata, Novacap,
C2	1000 pF	.04" x .02"	AVX, Murata, Novacap
C3	4.75 uF	.14"x .11"	Sprague, ATC, AVX, Murata,
U1	RMLA3565-58	.28" x .28" x .07	Raytheon
P1, P2	Terminal		Samtec
J1, J2	SMA Connectors		E.F. Johnson
Board	RO4003(Rogers)	1.99x1.50x.032	Raytheon

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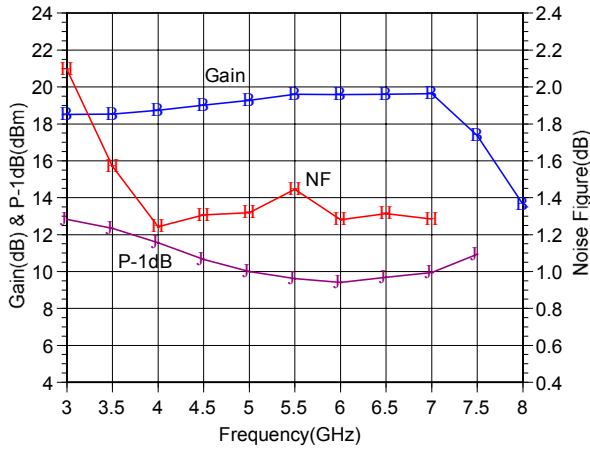
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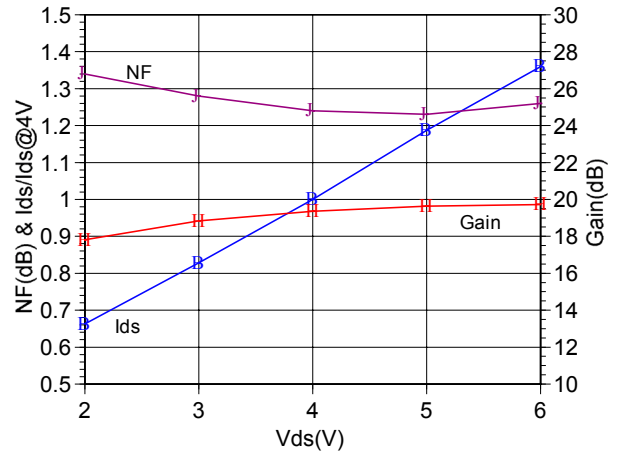
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Performance Data

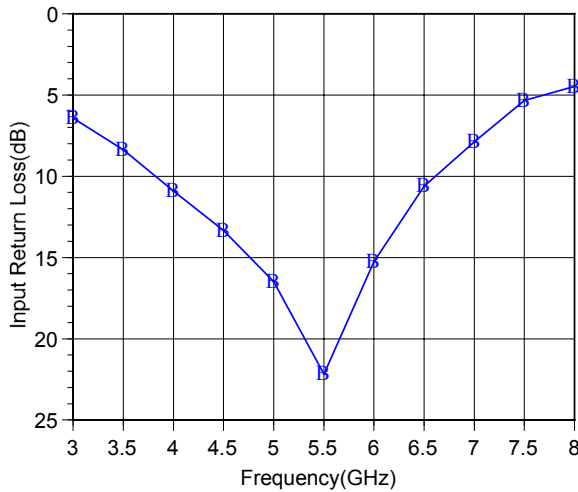
Gain, Power, and Noise Figure
Vdd=4.0V, Idd=65.5mA



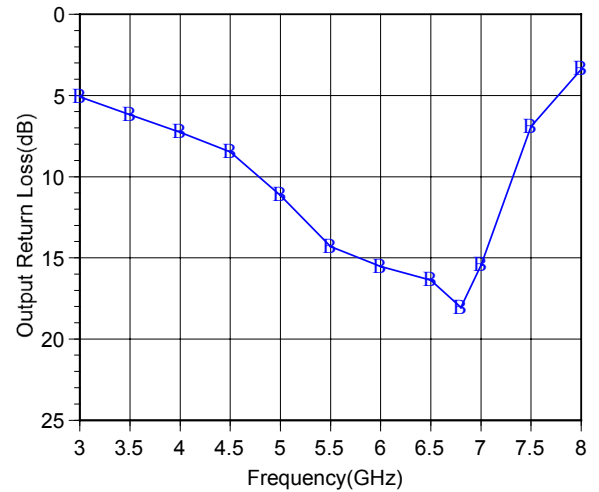
Noise Figure, Gain, & Idd vs. Vdd
Frequency = 5.0GHz



Input Return Loss
Vdd=4.0V, Idd=65.5mA



Output Return Loss
Vdd=4.0V, Idd=65.5mA



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