Raytheon

RMPA2450-58
2.4-2.5 GHz GaAs MMIC Power Amplifier

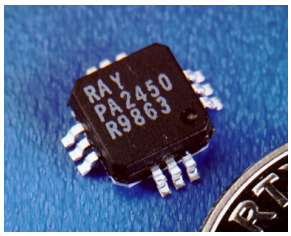
PRODUCT INFORMATION

Description

The Raytheon RMPA2450-58 is a fully monolithic power amplifier in a surface mount package for use in wireless applications in the 2.4 to 2.5 GHz ISM frequency band. The amplifier may be biased for linear, class AB or class F for high efficiency applications. On-chip matching components allow operation in a 50-Ohm system with no external matching components. The MMIC chip design utilizes Raytheon's 0.25 μm power PHEMT process.

Features

- 35% Power Added Efficiency
- 31 dBm Output Power (P1dB) at Vd=+7V
- 28 dBm Output Power (P1dB) at Vd= +5V
- No external RF matching components
- Small Package Outline: 0.28" x 0.28" x 0.07"
- Thermal Resistance (Channel to Case): 33°C/Watt



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Positive Drain DC Voltage	Vd1,Vd2	+8	Volts
Negative Gate DC Voltage	Vg1,Vg2	-5	Volts
Simultaneous Drain to Gate Voltage	Vd-Vg	+10	Volts
RF Input Power (from 50Ω source)	PIN	+10	dBm
Drain to Source Current	Ids	575	mA
Gate Current	Ig	5	mA
Channel Temperature	Tch	150	°C
Operating Case Temperature	TCase	-40 to 100	°C
Storage Temperature Range	TStg	-40 to 125	°C

Electrical Characteristics
(At 25°C, Zo=50 Ohms, Unless Otherwise Noted)

Parameter	Min	Typ	Max	Unit
Frequency Range	2400	2450	2500	MHz
Gain [1, 2, 4]		30		dB
Output Power, P1dB [1,4]		28		dBm
Assoc. Power Added Efficiency		35		%
Output Power, P1dB [3]		31		dBm
Assoc. Power Added Efficiency		33		%

Parameter	Min	Typ	Max	Unit
Drain Current (Idd1+Idd2)			550	mA
Gate Current (Igg1+Igg2)			5	mA
Input Return Loss (50Ω)	7.5			dB

Notes:

1. Idq=360 mA, Vd1=Vd2=4.8V
2. Pin= -3 dBm,
3. Vd1=Vd2= +7V
4. Production Testing includes Gain, Output Power (P1dB) and Input Return Loss at Vd1=Vd2=4.8V, Vg1=Vg2= -0.5V (nominal) , adjusted for Idq=360 mA, Pin= -3 dBm and at F=2.45 GHz. Other Parameters are guaranteed by Design Validation Testing.

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

Raytheon RF Components
362 Lowell Street
Andover, MA 01810

RMPA2450-58
2.4-2.5 GHz GaAs MMIC Power Amplifier

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 amplifier for ISM band applications. Figure 1 shows the functional block diagram of the packaged product.

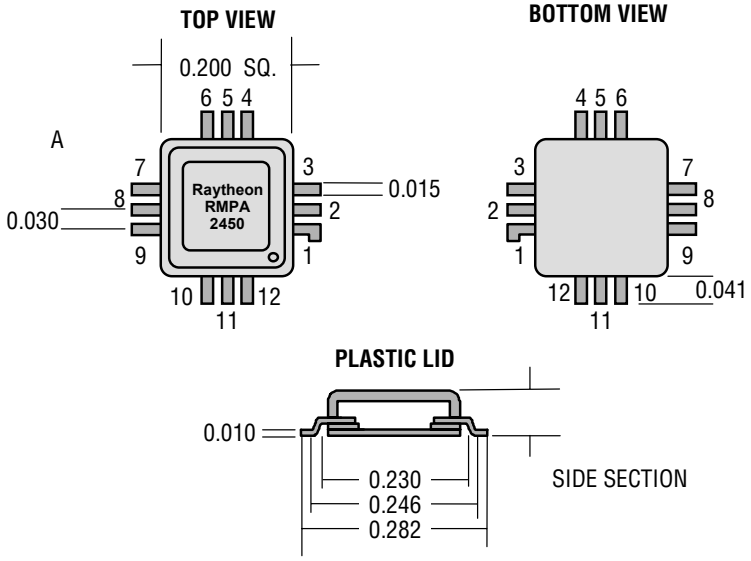
Test Fixture

Figure 1 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. The following should be noted:

(1) Package pin designations are as shown in figure 2.
(2) Vg1, Vg2 are the Gate Voltages (negative) applied at the pins of the package
(3) Vgg1=Vgg2=Vgg is the negative supply voltage at the evaluation board terminal
(4) Vd1, Vd2 are the Drain Voltages (positive) applied at the pins of the package
(5) Vdd1=Vdd2=Vdd is the positive supply voltage at the evaluation board terminal

Figure 1
Package Outline and Pin Designations

Dimensions in inches



Pin #	Description
1	GND
2	RF Out
3	GND
4	Vd2
5	Vd1
6	GND
7	GND
8	RF In
9	GND
10	Vg1
11	Vg2
12	GND
13	GND (PACKAGE BASE)

Figure 2
Functional Block Diagram of Packaged Product

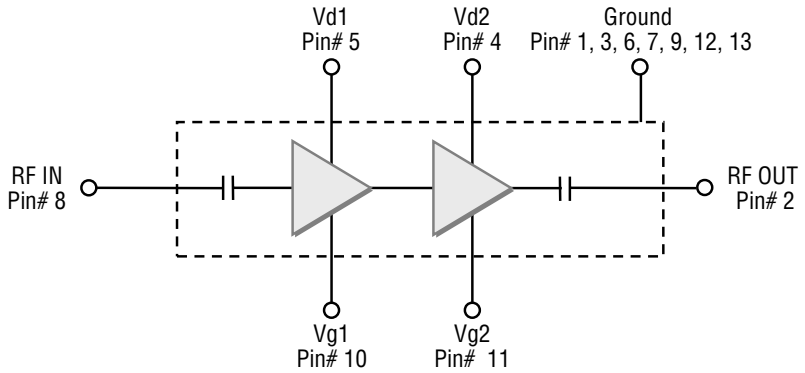


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Figure 3
Schematic for a Typical Test Evaluation Board (RMPA2450-58-TB)

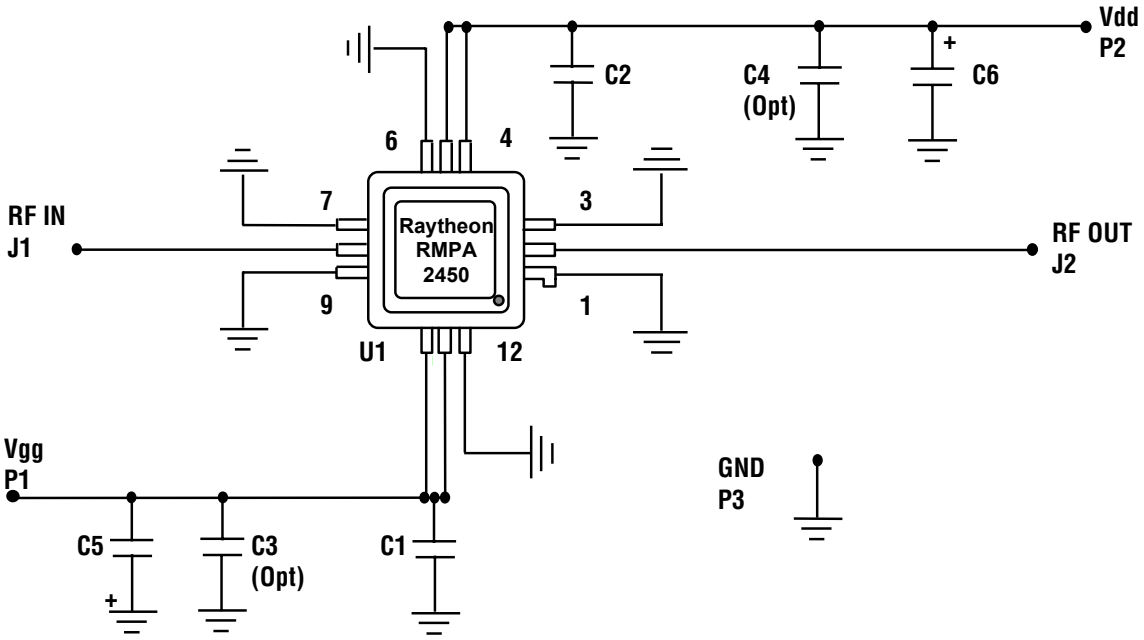
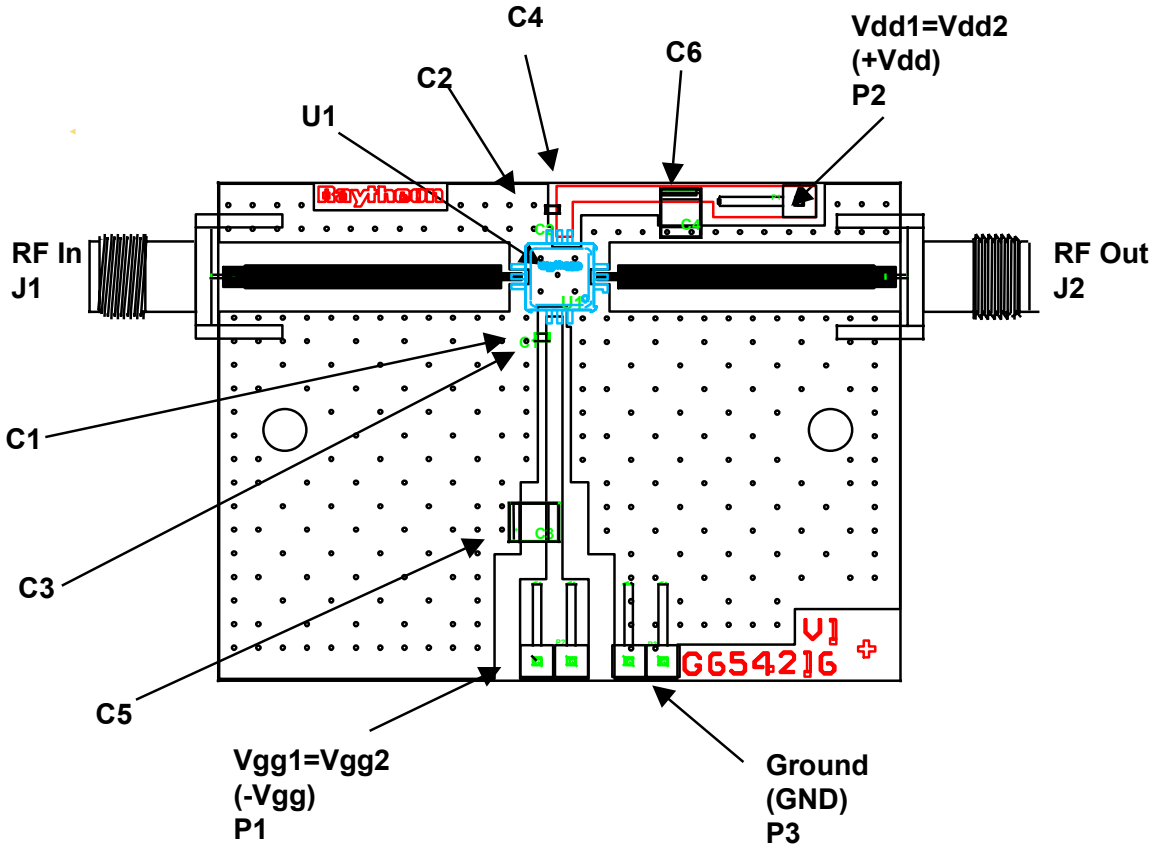


Figure 4
Layout and Assembly of Test Evaluation Board (RMPA2450-58-TB)



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Test Procedure
for the evaluation board
(RMPA2450-58-TB)

CAUTION: LOSS OF GATE VOLTAGES (VG1, VG2) WHILE DRAIN VOLTAGES (VD1,VD2) ARE PRESENT MAY DAMAGE THE AMPLIFIER.

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. Apply gate supply voltages of typical -0.5 V to evaluation board terminals Vgg.

Step 3: Apply drain supply voltages of +4.8 V to evaluation board terminals Vdd. Adjust gate supply voltage, if needed, to set the desired quiescent bias currents Idq (or to the values as shown on the data summary accompanying the product samples).

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
(iii) Turn down and off Vgg

PARTS LIST
for Test
Evaluation Board
(RMPA2450-58-TB),
G654220

Part	Value	Size (L"xW")	Vendors
C1, C2	330 pF	.04" x .02"	AVX, Murata, Novacap,
C3, C4	1000 pF	.04" x .02"	AVX, Murata, Novacap
C5, C6	4.75 uF	.14" x .11"	Sprague, ATC, AVX, Murata,
U1	RMPA2450-58	.28" x .28" x .07	Raytheon
P1, P2, P3	Terminals		Samtec
J1, J2	SMA Connectors		E.F. Johnson
Board	FR4		Raytheon Dwg# G654216

Raytheon

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