

Keywords: DECT,Power Amplifier,PA,1.9GHz,1905MHz,1905 MHz,DECT PA,DECT power amplifier

## APPLICATION NOTE 3249

# 1.9GHz DECT Power Amplifier Delivers +27dBm from 3.6V at 41% PAE

Jun 25, 2004

*Abstract: The MAX2242 is an ultra-low cost silicon bipolar power amplifier (PA) with integrated bias-circuitry, logic-level shutdown and power detector. When optimized for DECT applications in the 1.9GHz frequency band, the MAX2242 PA delivers +27dBm output power from 3.6V at a PAE of 41%, with 27dB of power gain. Output power can be increased to +29dBm when operated from a 4.5V power supply.*

The MAX2242 is an ultra-low-cost, silicon, bipolar power amplifier (PA) with integrated bias-circuitry, logic-level shutdown and power detector. The PA is packaged in the ultra-small UCSP package (1.5mm x 2.0mm). When optimized for DECT applications in the 1.9GHz frequency band, the PA delivers +27dBm output power from 3.6V at a PAE of 41%, with 27dB of power gain. Output power can be increased to +29dBm when operated from a 4.5V power supply. Refer to Table 1 for the performance of the PA over supply voltage and frequency variations. Refer to Table 2 for a summary of PA harmonic suppression versus supply voltage. Refer to **Figure 1** for a summary of PA Output Power versus Input Power and Supply Voltage Variations.



[Click here for an overview of the wireless components used in a typical radio transceiver.](#)

**Table 1. MAX2242 Output Power and Supply Current (Input Power = 0dBm)**

V <sub>CC</sub> (V)	1880MHz		1905MHz		1930MHz	
	P <sub>OUT</sub> (dBm)	I <sub>CC</sub> (mA)	P <sub>OUT</sub> (dBm)	I <sub>CC</sub> (mA)	P <sub>OUT</sub> (dBm)	I <sub>CC</sub> (mA)
3.24	26.1	325	26.3	324	26.4	322
3.60	26.8	352	27.0	350	27.1	348
4.50	28.9	443	29.0	442	29.1	437

**Table 2. MAX2242 Harmonic Suppression Versus Supply Voltage (f = 1905MHz, Input Power = 0dBm)**

V <sub>CC</sub> (V)	2x(dBc)	3x(dBc)	4x(dBc)	5x(dBc)	6x(dBc)
3.24	-37.0	-52.0	-54.3	-43.2	-47.0
3.60	-36.8	-52.0	-55.3	-42.7	-47.2
4.50	-36.2	-52.7	-57.7	-42.2	-59.2

## MAX2242 1.9GHz DECT Output Power vs Input Power

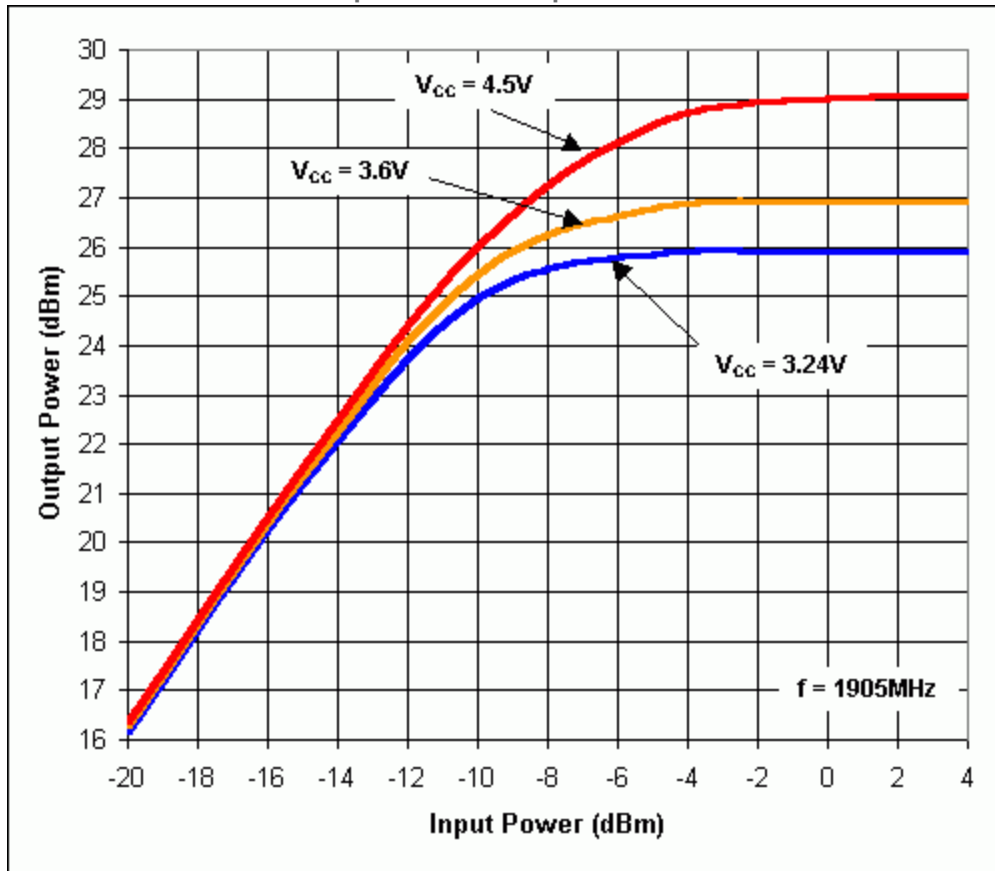


Figure 1. MAX2242 1.9GHz DECT output power versus input power.

The MAX2242 PA uses a 3-stage amplifier design and requires input, interstage and output matching components for optimum performance. Refer to **Figure 2** for a schematic of the required matching components. Because the input of the PA is internally biased, a DC-Block is required at the input of the device. A two-element LC match optimizes the input return loss for 1.9GHz. A small amount of series inductance is required on VCC1 and VCC2 to optimize the matching between stages. For VCC1, this is accomplished with a series 1.8nH inductor, and a short length of transmission line. For VCC2, this is accomplished with a short length of transmission line. The output stage requires a pull-up inductor for DC bias. A series-L and a shunt-C are required for optimizing the output power to the load. The series-L element is achieved with a short length of transmission line and a series 0W which provides approximately 0.5nH of inductance. The exact amount of inductance for the interstage and output matching will vary with your board layout, board thickness and dielectric constant. Refer to Figure 2 for component values and **Figure 3** for the location of the VCC1, VCC2 bypass capacitors and the output shunt capacitor that sets the amount of inductance for these traces on the MAX2242 EV kit.

The MAX2242 EV kit is available for purchase, and the layout files for the MAX2242 EV kit are available by request.

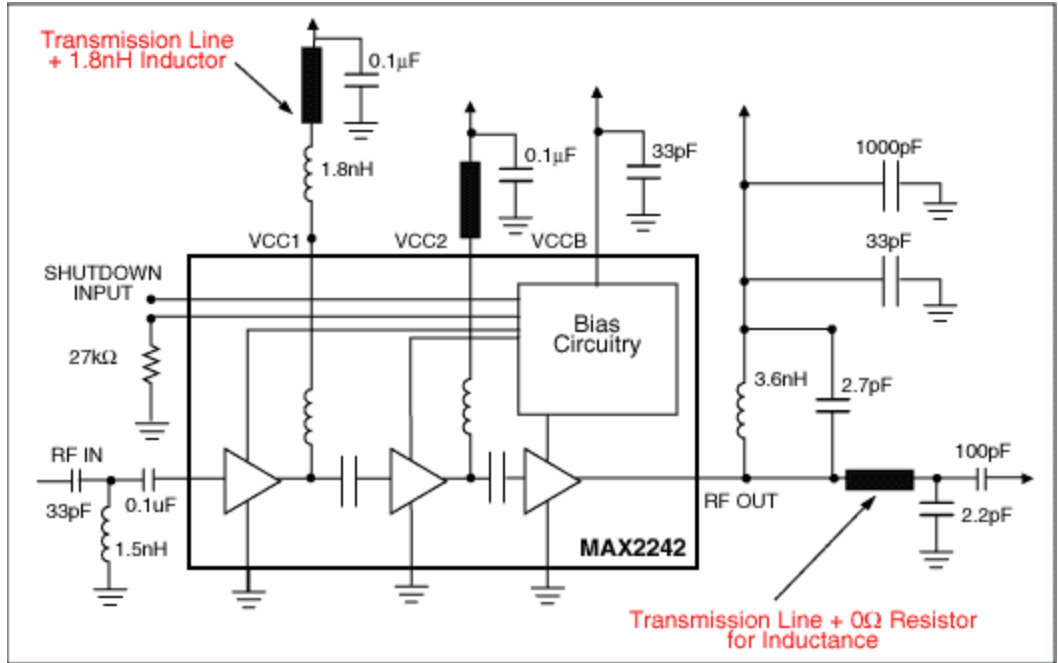


Figure 2. MAX2242 1.9GHz DECT schematic.

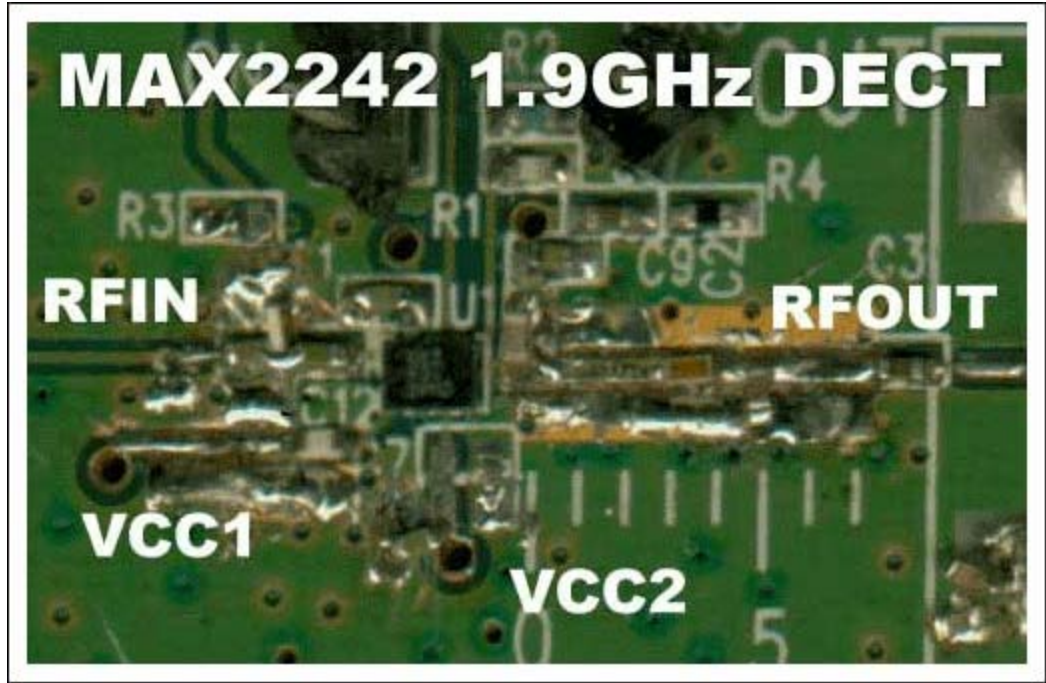


Figure 3. MAX2242 1.9GHz DECT EV kit component locations.

Related Parts	
<a href="#">MAX2242</a>	2.4GHz to 2.5GHz Linear Power Amplifier

**More Information**

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

---

Application Note 3249: <http://www.maximintegrated.com/an3249>

APPLICATION NOTE 3249, AN3249, AN 3249, APP3249, Appnote3249, Appnote 3249

Copyright © by Maxim Integrated Products

Additional Legal Notices: <http://www.maximintegrated.com/legal>