

**2.3 – 2.5GHz Power Amplifier & Low Noise Amplifier***Preliminary***■ General Description**

The GW5540 is an InGaP/GaAs Heterojunction Bipolar Transistor (HBT) IC in a QFN $2.0 \times 2.0 - 12$ leads plastic package. The power amplifier is implemented as a two-stage monolithic microwave integrated circuit (MMIC), with active bias and output pre-matching. The low noise amplifier is implemented as a one-stage monolithic microwave integrated circuit (MMIC), but external matching circuit is required.

The GW5540 is designed to operate in 2.3 – 2.5GHz frequency range, compatible with 802.11b/g wireless LAN system with high power. Power gain of 30dB is obtained with a low quiescent current of 80mA.

The GW5540 power amplifier operate at 802.11g mode (OFDM 64QAM, 54Mbps), it provides a low EVM (Error-Vector magnitude) of 3% at +20dBm linear output power, and consumes 135mA total DC current.

The GW5540 low noise amplifier offset 16dB gain, 1.5dB NF and $P_{1dB} = 2\text{dBm}$ at 5.8mA of DC current.

■ Features

- 2.3 – 2.5GHz Operation
- PA Quiescent Current 80mA
- PA Small Signal Gain 30dB
- PA Total Current 135mA for POUT=20dBm OFDM
- PA EVM ~3 % 54Mbps / 64QAM at POUT=20dBm
- LNA Gain ~ 16 dB
- LNA Noise Figure ~ 1.5dB
- RF Input/Output matched to 50 Ω
- Small Footprint: $2.0 \times 2.0\text{mm}$

■ APPLICATION

- IEEE 802.11b/g Wireless LAN System
- 2.4GHz ISM Band Application
- 2.4GHz Cordless Phones
- WLAN Pre-n applications

■ Electrical Characteristics

TX test conditions: $V_{CC} = 3.3\text{V}$, $V_{ref} = 2.73\text{V}$, $I_{CQ} = 80\text{mA}$, $T_A = 25^\circ\text{C}$

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2.3	-	2.5	GHz
EVM @ POUT < 20dBm	802.11g OFDM 64 QAM		3.0		%
Output P_{1dB}	1dB Gain compression		26		dBm
Total Current @ POUT = 20dBm	802.11g OFDM 64 QAM EVM = 2.5%		135		mA
Pout for 11g Spectral mask	802.11g OFDM 64 QAM		25		dBm
Quiescent Current			80		mA
Bias Control Reference Current	At $I_{CQ} = 80\text{mA}$		1.15		mA
Small Signal Gain	$P_{in} = -30\text{dBm}$		30		dB
Power Gain @ POUT = 20dBm			30		dB
Gain Flatness	2.3 – 2.5GHz		± 0.2		dB
Input Return Loss	$P_{in} = -30\text{dBm}$		10		dB
Output Return Loss	$P_{in} = -30\text{dBm}$		10		dB
Second Harmonic	POUT = 20dBm		-45		dBc
Third Harmonic	POUT = 20dBm		-50		dBc
Total Current @ POUT = 23dBm	802.11b 11Mbps CCK		190		mA
2nd Side Lobe @ 22dBm			-50		dBc
Ramp-On Time			100		ns

- Notes: 1. All measurements made in 50 Ω system, unless otherwise specified.
2. All measured data was obtained on a 10mil FR4 evaluation board without heat sink.