

Features

- Frequency Range 4.9 GHz to 5.4 GHz
- Linear P_{OUT} Typically 18 dBm
- Gain Typically 17 dB
- V_{CC} 3.1 V to 3.5 V
- Package: QFN 16

Benefits

- Biasing Control Extends Battery Life Time
- AC Input and Output Coupling Saves External Capacitors
- Output Matching Requires Only One External Inductor
- Very Suitable for PCMCIA Cards Type 1 (Thickness 3.3 mm)

Electrostatic sensitive device.
Observe precautions for handling.



Description

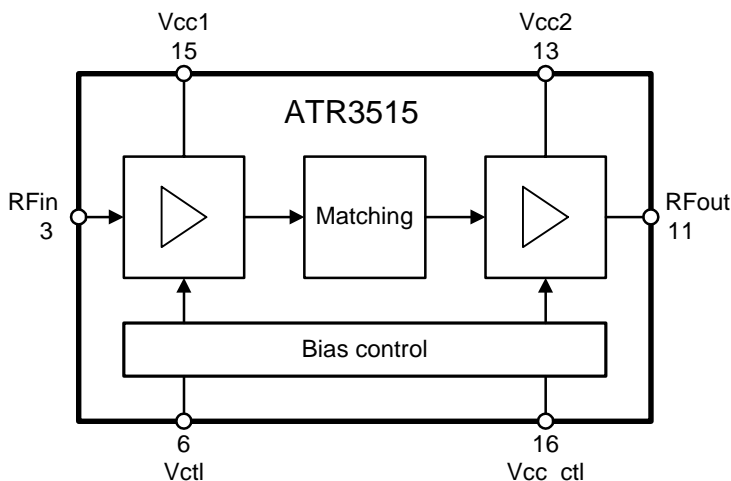
Process

The 5-GHz power amplifier is designed in Atmel's Silicon-Germanium (SiGe) process and provides excellent noise performance as well as good power-added efficiency.

Circuitry

The PA consists of a 2-stage amplifier with a linear output power of 18 dBm. The output stage was realized using an open-collector structure. The IC features 50- Ω input matching. Power-up/down and output level are controlled at bias control Pin 6 (Vctl).

Figure 1. Block Diagram



5-GHz WLAN Power Amplifier for 802.11a

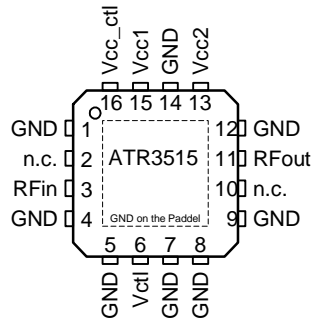
ATR3515

Preliminary



Pin Configuration

Figure 2. Pinning QFN 16



Pin Description

Pin	Symbol	Function
1	GND	Ground
2	n.c.	Not connected
3	RFin	RF input
4	GND	Ground
5	GND	Ground
6	Vctl	Power-up/biasing control voltage
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	n.c.	Not connected
11	RFout	RF output
12	GND	Ground
13	Vcc2	Supply voltage for PA stage
14	GND	Ground
15	Vcc1	Supply voltage for driver stage
16	Vcc_ctl	Supply voltage for biasing control
Paddle	–	Ground

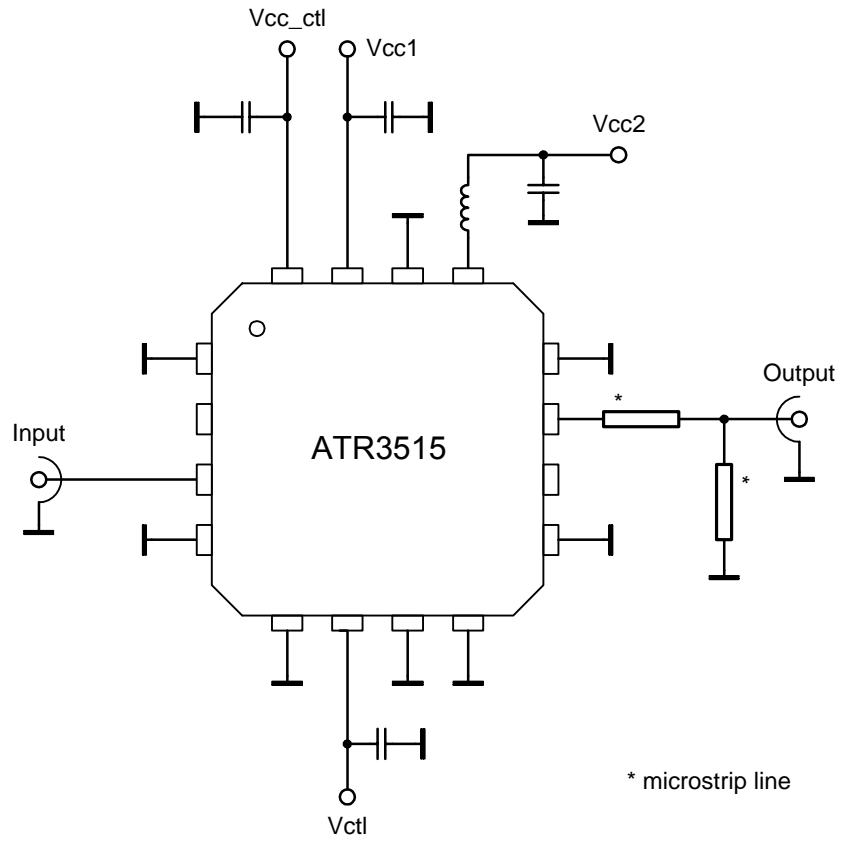
Electrical Characteristics

$V_{CC} = 3.3\text{ V}$, $T_{amb} = 25^{\circ}\text{C}$, unless otherwise specified

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Frequency range		f	4900		5400	MHz
Ambient temperature range		T_{amb}	-25		75	$^{\circ}\text{C}$
Supply voltage		V_{CC}	3.1	3.3	3.5	V
Linear output power	Single tone signal	P_{lin}		18		dBm
P1dB output power	Single tone signal	P1dB		23		dBm
Control voltage range	PA operating mode	V_{ctl}	1.5		1.9	V
	Power down	V_{ctl}			0.2	V
Turn on/off time	'ON' is the time that ICC returns to normal and 'OFF' is the time the current needs to decrease to 10% of normal mode.	$t_{on/off}$		500	600	ns
Input and output return loss	With external matching			-12	-8	dB
Spectrum mask ⁽¹⁾	at ± 11 MHz offset from carrier				-22	dBr
	at ± 20 MHz offset from carrier				-30	dBr
	at ± 30 MHz offset from carrier				-42	dBr
Error Vector Magnitude ⁽¹⁾		EVM		2		%
Reverse isolation		ISO_r	30	33		dB
Output power saturation	for reference	P_{sat}		24		dBm
Power added efficiency	at operation point for 18 dBm output power ⁽²⁾	PAE		12		%
Current consumptoin	at operation point for 18 dBm output power ⁽³⁾	I_{cc}		160	200	mA
Gain linear		G_l		17		dB
Gain deviation	Within 200 MHz frequency band	G_d	-1,5		+1.5	dB

- Notes:
1. OFDM signal according to 802.11a spec with $P_{out} = 18\text{ dBm}$ at 54 Mbps.
 2. Due to the linearity requirements in an OFDM system, the power amplifier operates in the linear mode of class-A .
 3. The current consumption of the PA can be controlled by the Pin Vctl. For lower output power demand, the current can be reduced, while the power gain remains nearly constant.

Figure 3. Application Circuit

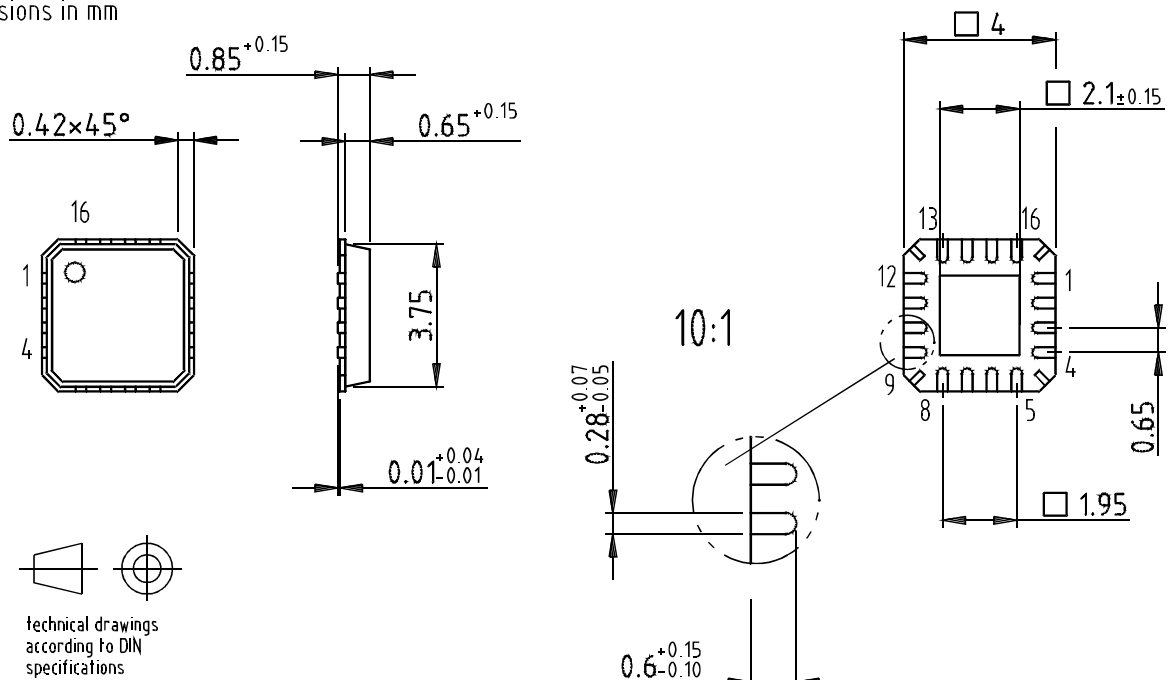


Ordering Information

Extended Type Number	Package	Remarks
ATR3515-PES	QFN 16	Tube, MOQ 750
ATR3515-PEQ	QFN 16	Taped and reeled, MOQ 6000

Package Information

Package: QFN 16 - 4x4
 Exposed pad 2.1x2.1
 (acc. JEDEC OUTLINE No. MO-220)
 Dimensions in mm



Drawing-No.: 6.543-5076.01-4
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 Assembly Amkor



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