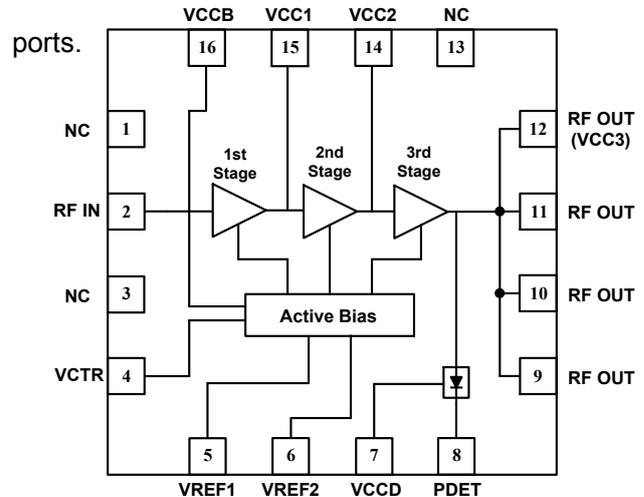


Features

- 1.8~2.8GHz Frequency Range
- 3.3V~5.0V Supply Voltage
- 30dB Gain (Typ.)
- 34.5dBm P1dB @Supply Voltage=5V
- 3.0% EVM WLAN @Pout=29dBm, Supply Voltage =5V
- 2.0% EVM WLAN @Pout=28dBm, Supply Voltage=5V
- 210mA Quiescent Current (ICQ)
- >20dB Input Return Loss (|S11|)
- Integrated Output Power Detector
- ESD protection all ports above 1000V HBM, forward and reverse voltage



Functional Block Diagram

Product Description

The YP3035W is a three stage linearized power amplifier optimized for 1.8-2.7GHz applications (it needs different matching circuit for different frequency range), especially 802.11b/g/n WLAN applications in the 2.4GHz band. The device is manufactured on an advanced InGaP Heterojunction Bipolar Transistor (HBT) process. The amplifier provides a typical gain of 30 dB and P1dB power of 34.5dBm, typical bias condition is 5V at 210 mA. The YP3035W is assembled in a 16-pin, 4×4mm², QFN package. It is internally integrated with ESD protection circuitry on all

Applications

- IEEE 802.11b/g/n WLAN
- 2.4GHz ISM Wireless Equipment
- LTE
- 1980-2010MHz Satellite Communications
- WiBro 2.3 GHz to 2.4 GHz Applications
- WiMAX 2.5 GHz to 2.7 GHz Applications

Ordering Information

- YP3035W High Linearity Power Amplifier
- YP3035WE-1 2.1 to 2.2GHz Evaluation Board and 5PCS Samples
- YP3035WE-2 2.4 to 2.5GHz Evaluation Board and 5PCS Samples
- YP3035WE-3 2.5 to 2.7GHz Evaluation Board and 5PCS Samples



Pin Description

Pin No.	Symbol	Description
2	RF IN	RF input
4	VCTR	Power on/off control voltage
5	VREF1	Bias current control voltage for stage1 & 2
6	VREF2	Bias current control voltage for stage3
7	VCCD	Supply voltage for power detector
8	PDET	Output power detect
9,10,11,12	RF OUT /VCC3	RF output/ Supply voltage for stage3
14, 15	VCC2, VCC1	Supply voltage for stage2, stage1
16	VCCB	Supply voltage for bias
1, 3, 13	NC/GND	No connection or ground
PKG Base	GND	Ground connection



Caution! ESD sensitive device.

ESD Rating: Class1C
 Value: Passes $\geq 1000V$ min.
 Test: Human Body Model (HBM)
 Standard: JEDEC Standard JESD22-A114

ESD Rating: Class IV
 Value: Passes $\geq 1000V$ min.
 Test: Charged Device Model (CDM)
 Standard: JEDEC Standard JESD22-C101

MSL Rating: Level 3 at +260 °C convection reflow
 Standard: JEDEC Standard J-STD-020

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Input RF Power	RF IN	+8	dBm
Supply Voltage	VCC1,VCC2,VCC3,VCCB,VCCD	-0.5 to +6.0	V
Reference Voltage	VREF1, VREF2	-0.5 to +3.0	V
Operating Ambient Temperature	T _{OP}	-40 to +85	°C
Storage Temperature	T _{ST}	-40 to +150	°C

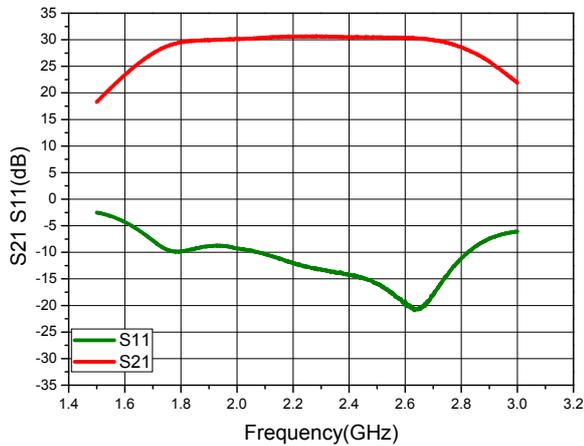
Electrical Specifications

Parameter	Specification			Unit	Condition
	Min	Typ.	Max.		
WLAN IEEE802.11b/g/n					VCC1= VCC2= VCC3=VCCB=+5.0V, ICQ=450mA, T _{OP} =+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power, P _{out} @1dB Compression	34.5	35	35.5	dBm	@2.40GHz
Gain, S ₂₁	29	30	31	dB	@2.40GHz
EVM		3.0		%	@P _{out} =+29dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		2.0		%	@P _{out} =+28dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VREF1		2.75		V	
Reference Voltage 2, VREF2		2.65		V	
Quiescent Current, ICQ		210		mA	Total, ICQ= ICQ1+ ICQ2+ ICQ3
Reference Current, IREF		5		mA	Total Current of VREF1+VREF2
Stage1 Quiescent Current, ICQ1		30		mA	
Stage2 Quiescent Current, ICQ2		750		mA	
Stage3 Quiescent Current, ICQ3		115		mA	

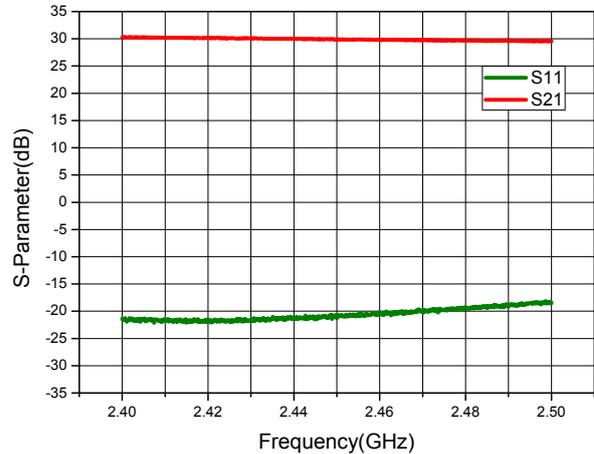
Typical Performance

(VCC1=VCC2=VCC3=VCCB=+5V, VREF1=+2.85V, VREF2=+2.73V, T_{OP}=+25°C as measured on the evaluation board, unless otherwise noted)

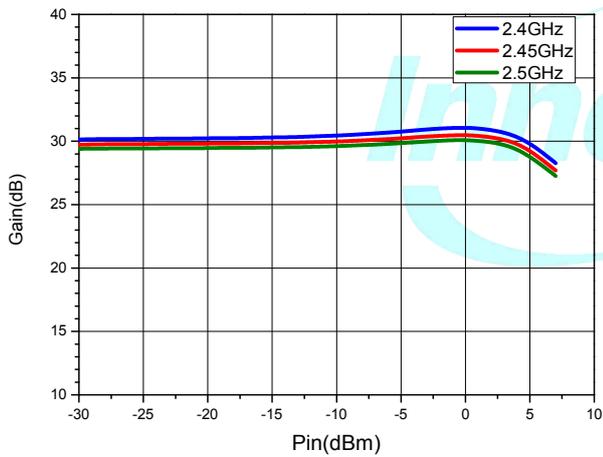
Broadband Gain & Return Loss



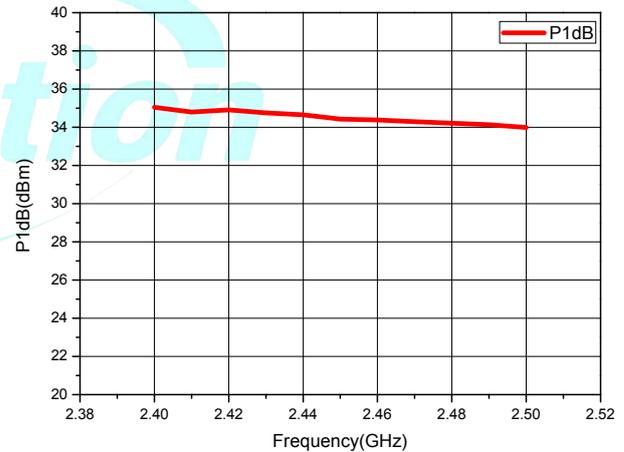
Narrowband Gain & Return Loss



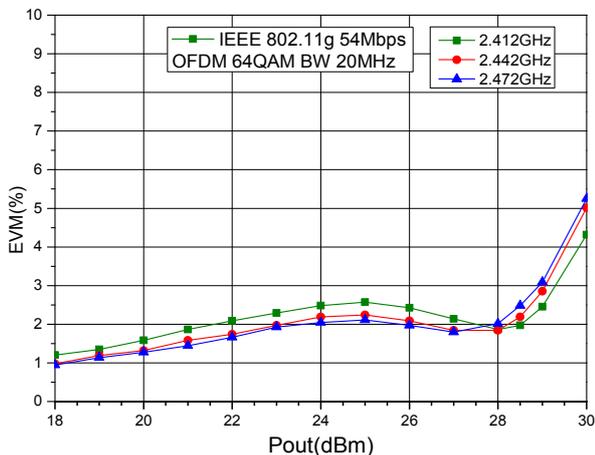
Power Gain vs. Input Power



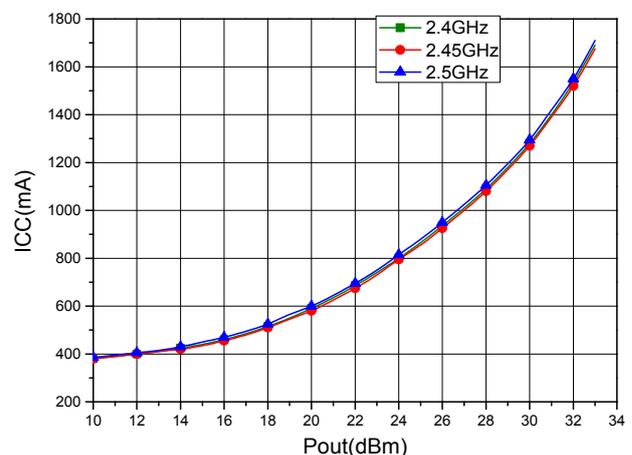
P1dB vs. Frequency



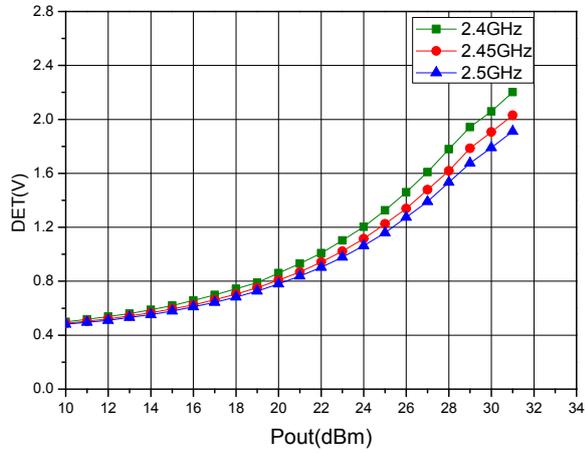
EVM vs. Output Power vs. Frequency



ICC vs. Output Power vs. Frequency

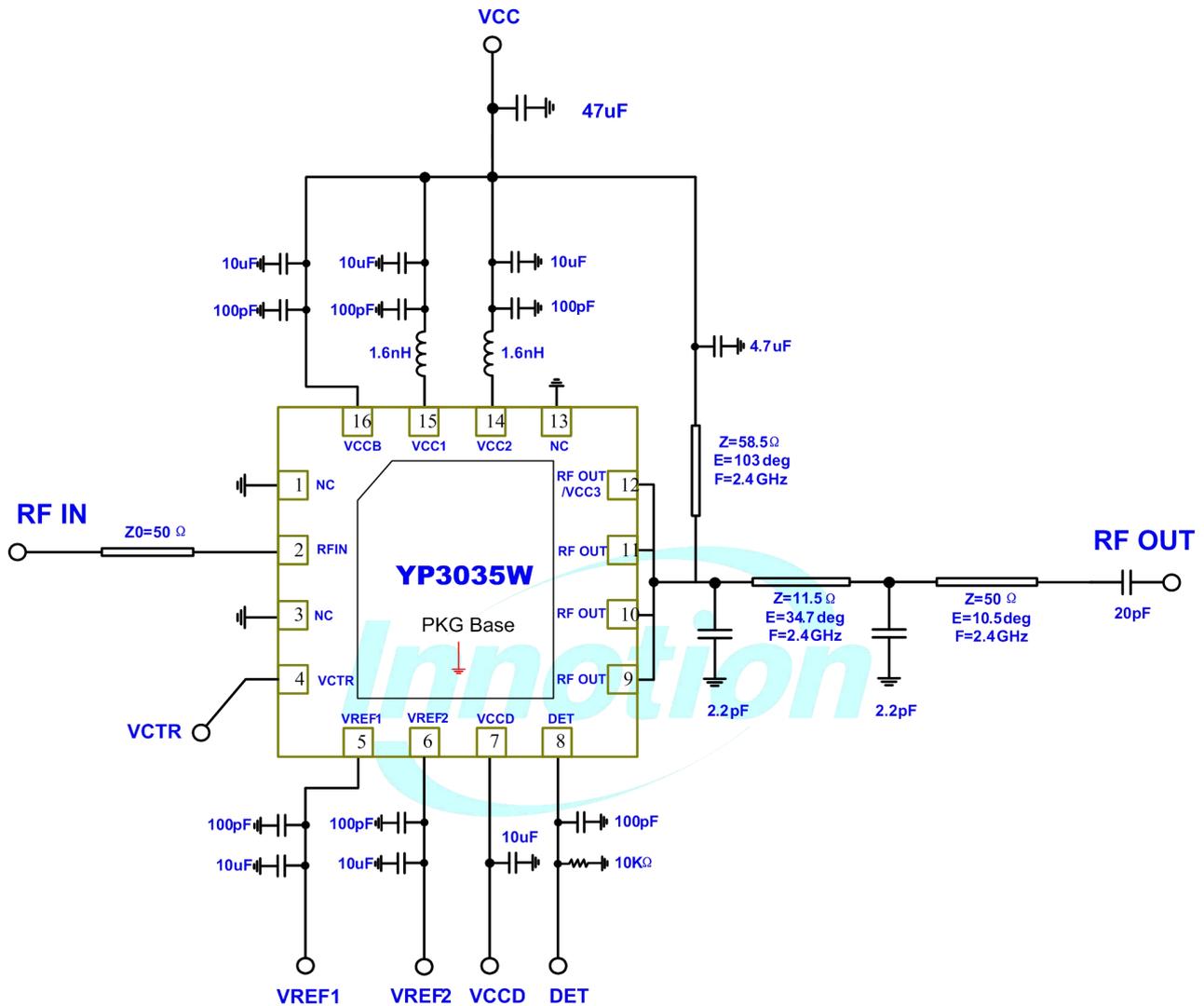


Power Detector (DET) vs. Pout



Evaluation Board Schematic for WLAN

(VCC1=VCC2=VCC3=VCCB=+5V, VREF1=+2.85V, VREF2=+2.73V, T_{OP}=+25°C as measured on the evaluation board, unless otherwise noted)



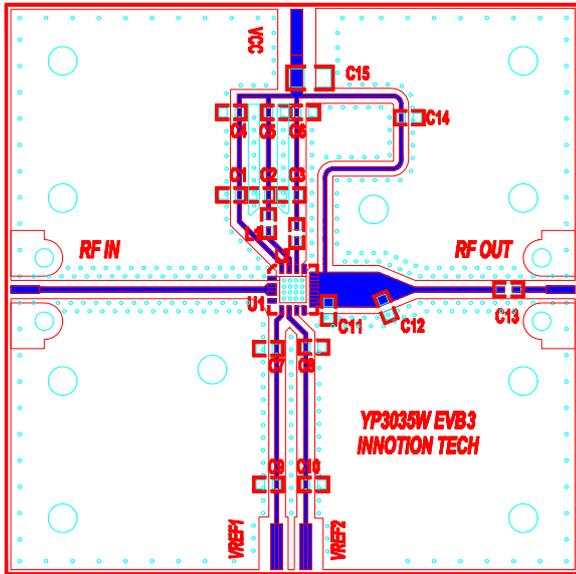
Notes:

1. Pin4 (VCTR) is power down pin. Apply >2.5 V_{DC} to power down the three power amplifier stages. Apply 0V_{DC} to power up. If function is not desired, pin4 may be connected to GND.
2. Pin7, 8 are active power detection circuit ports, if function is not desired, pin7, 8 may be connected to GND.

Evaluation Board Layout

Board Size 50mm×50mm, Board Thickness 1mm, Board Material FR-4 ($\epsilon_r=4.5$)

Evaluation Board Top View



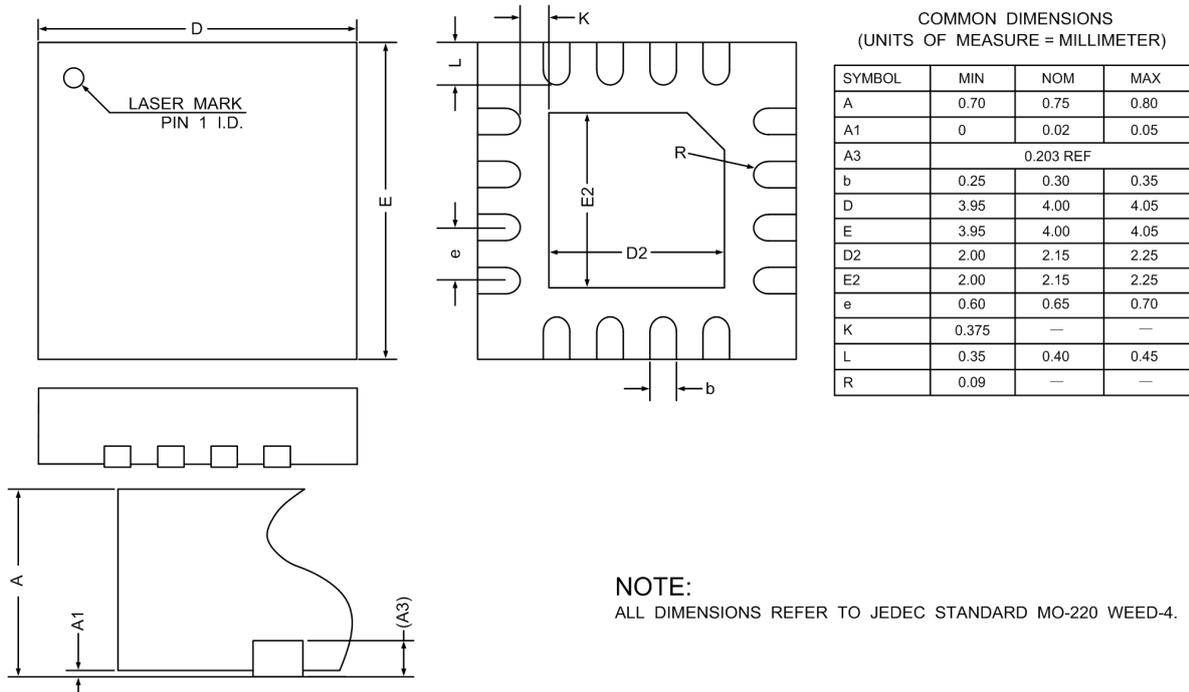
Layer Detail Physical Characteristics

Cross Section	Name	Thickness	Material	ϵ_r
Via14	RFS	1 oz	Cu	--
	Core 1	0.23 mm	FR-4	4.5
	RFGND	1 oz	Cu	--
			FR-4	4.5
	PCS	1 oz	Cu	--
			FR-4	4.5
	GND	1oz	Cu	--

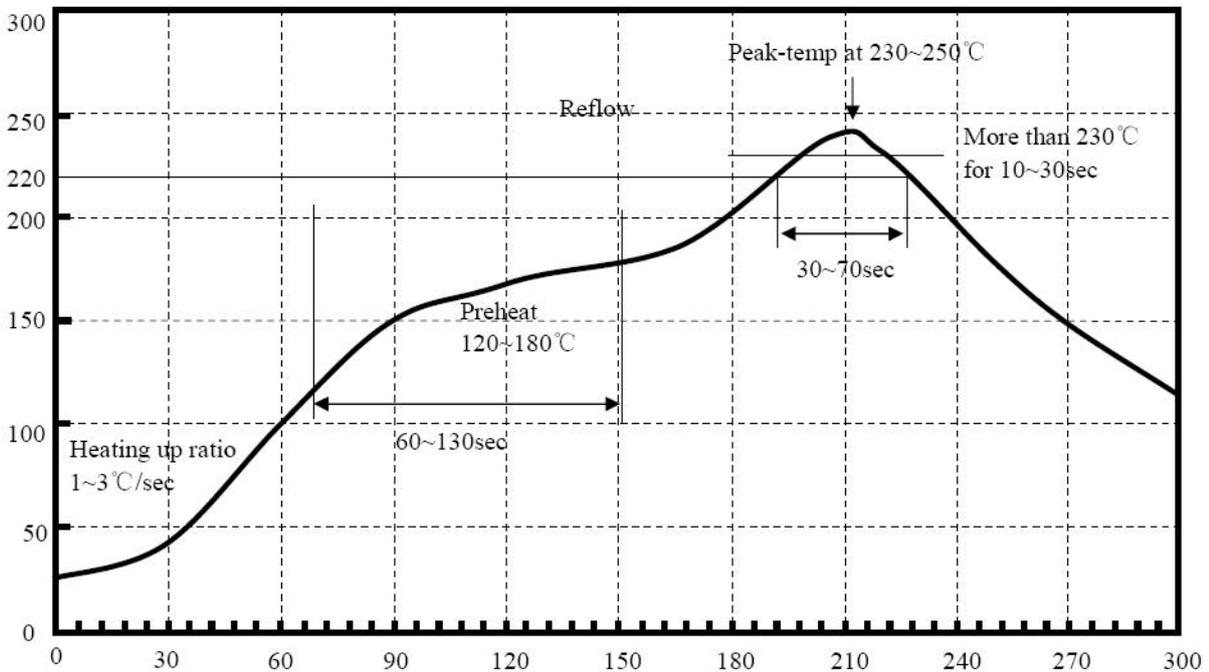
Table1. Circuit Component Designations and Values

Component	Description	Manufacturer
L1, L2	1.6nH Inductor	ATC
C1, C2, C3, C7, C8	100pF Chip Capacitor	TDK
C4, C5, C6, C9, C10	10uF Chip Capacitor	TDK
C11, C12	2.2pF Chip Capacitor	ATC
C13	20pF Chip Capacitor	TDK
C14	4.7uF Chip Capacitor	TDK
C15	47uF Chip Capacitor	AVX

Packaging Diagram



Recommended Solder Temperature



Recommended Temperature

Sn95.5Ag4.0Cu0.5