DESCRIPTION

The RTC6671 power amplifier (PA) is designed to operate in 5GHz ISM band, compatible with 802.11a wireless LAN system with high power, high gain. The Amplifier consists of 3 gain stages with inter-stage matching, build-in input matching network, and a power detector for close loop power control operation. In 802.11a mode (OFDM 64QAM, 54Mbps), it provides a low EVM (Error-Vector magnitude) of 3% at +18dBm linear output power. The device is packaged in a tiny industry-standard 16-lead surface mount package QFN16 3x3.

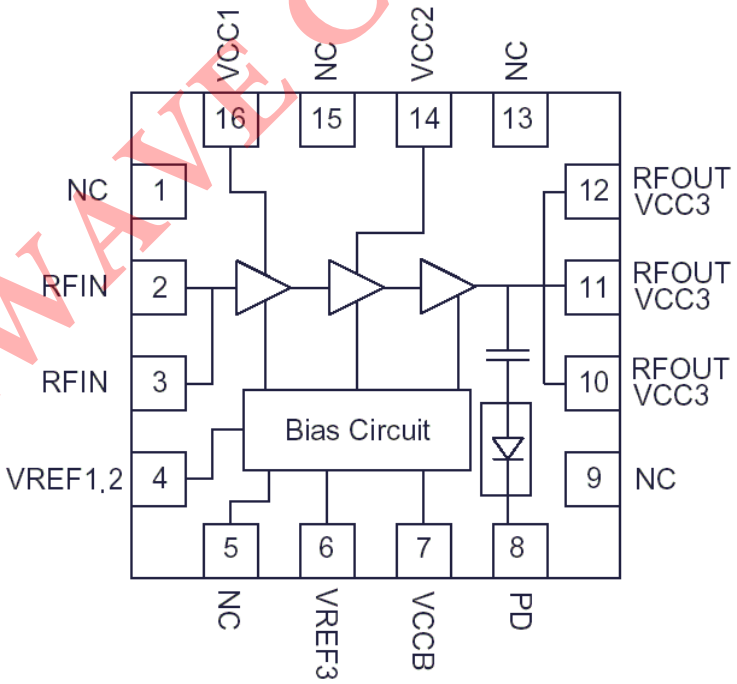
FEATURE

- 3.3V Power Supply
- Maximum Linear Output Power for 11a usage : +18 dBm (54Mbps OFDM 64 QAM)
- Small signal gain : 28dB
- On-chip input matching
- Operation ambient temperature: -40 ~ +85 °C
- Lead(Pb)-free, RoHS compliant packaging

APPLICATION

- IEEE 802.11a Wireless LAN System
- 5GHz ISM Band Application
- 5GHz Cordless Phones
- High Power WLAN applications

PINOUT (top view)



PIN FUNCTION DESCRIPTION

PIN	FUNCTION	DESCRIPTION
1,5,9,13,15	NC	Not connected
2	RFIN	RF input. Input matching network is built on chip.
3	RFIN	Same as pin 2
4	VREF1,2	Bias Control voltage of power stage-1 and stage-2, via R1 to 2.9V. Pin 4,6 can be used to control PA on/off.
6	VREF3	Bias Control voltage of power stage-3, via R2 to 2.9V. Pin 4,6 can be used to control PA on/off.
7	VCCB	Power supply for bias circuit, typically 3.3V
8	PD	Detector output voltage for output power index
10,11,12	RFOUT/VCC3	RF output. Power supply for power stage-3, typically 3.3V
14	VCC2	Power supply for power stage-2, typically 3.3V
16	VCC1	Power supply for power stage-1, typically 3.3V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNITS
Supply Voltage	-0.5 to +5.0	V
Reference Voltage(Vref)	0.0 to +4.0	V
Input RF Level	+5	dBm
Operating Ambient Temperature	-40 to +85	℃
Storage Temperature	-40 to +150	℃

※**Caution !** ESD Sensitive Device

DC ELECTRICAL CHRACTERISTICS

T=25℃, Vcc=3.3V

PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
Supply Voltages					
VCC1		3.0	3.3	4.2	Volts
VCC2		3.0	3.3	4.2	Volts
VCC3		3.0	3.3	4.2	Volts
VREF1,2	R1=0 ohm		2.9		Volts
VREF3	R2 =0 ohm		2.9		Volts
Supply Currents					
Icc1 + Icc2 + Icc3 (for 802.11A usage)	Quiescent (no RF) Pout= 18 dBm		105 160		mA
Ioff	Standby current		0.05		uA
Iref1,2	Quiescent (no RF)		1.2		mA
Iref3	Quiescent (no RF)		1.2		mA

POWER DETECTOR

T=25℃, Vcc=3.3V, Freq=5.4GHz, Vref=2.9V

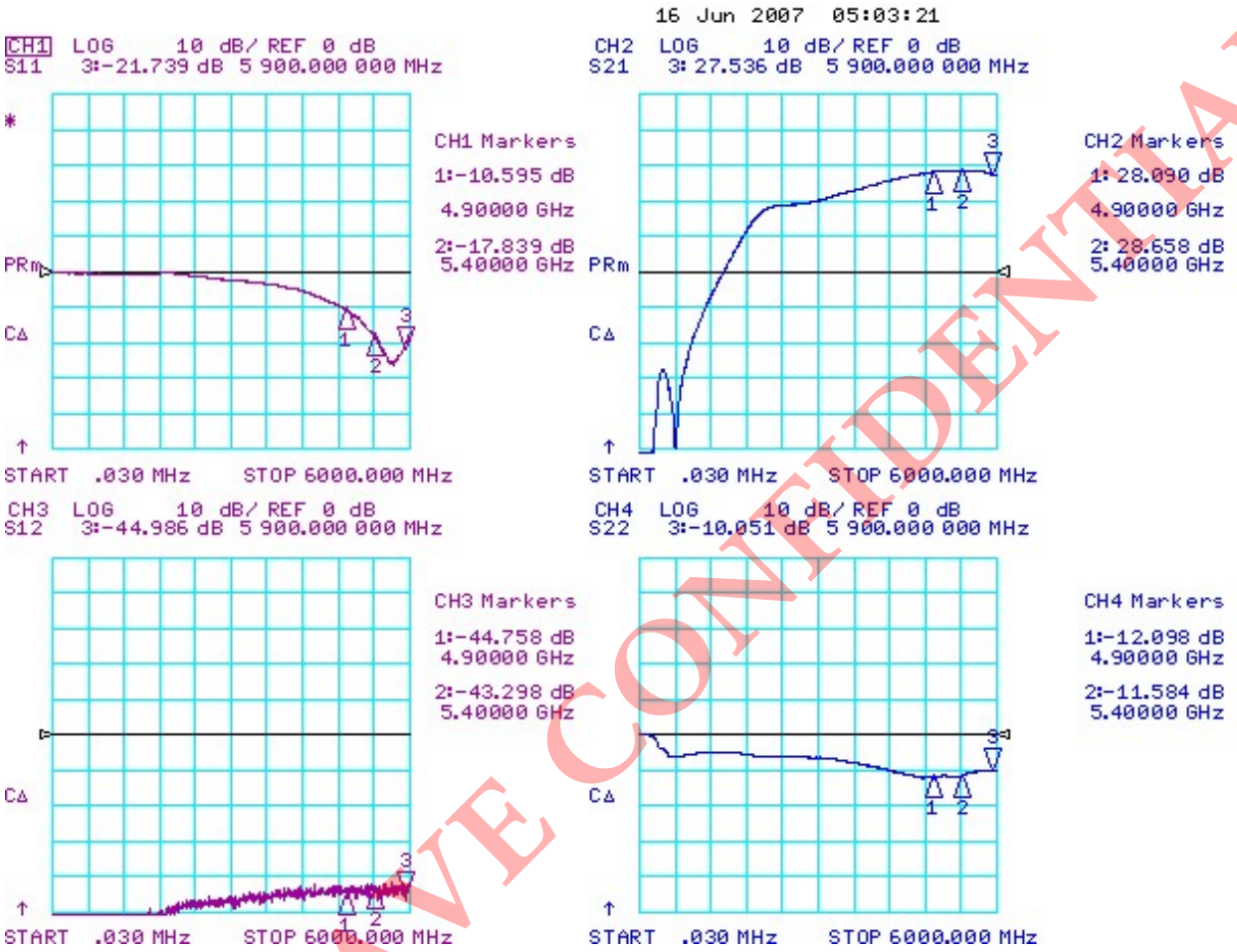
PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
Vpd	Power detector voltage @ Pout=no RF		0.73		Volts
Vpd	Power detector voltage @ Pout=12 dBm		1.02		Volts
Vpd	Power detector voltage @ Pout=15 dBm		1.20		Volts
Vpd	Power detector voltage @ Pout=18 dBm		1.45		Volts
PD Resolution	PD Slope @Pout=15dBm		70		mV/dB

AC ELECTRICAL CHRACTERISTICS

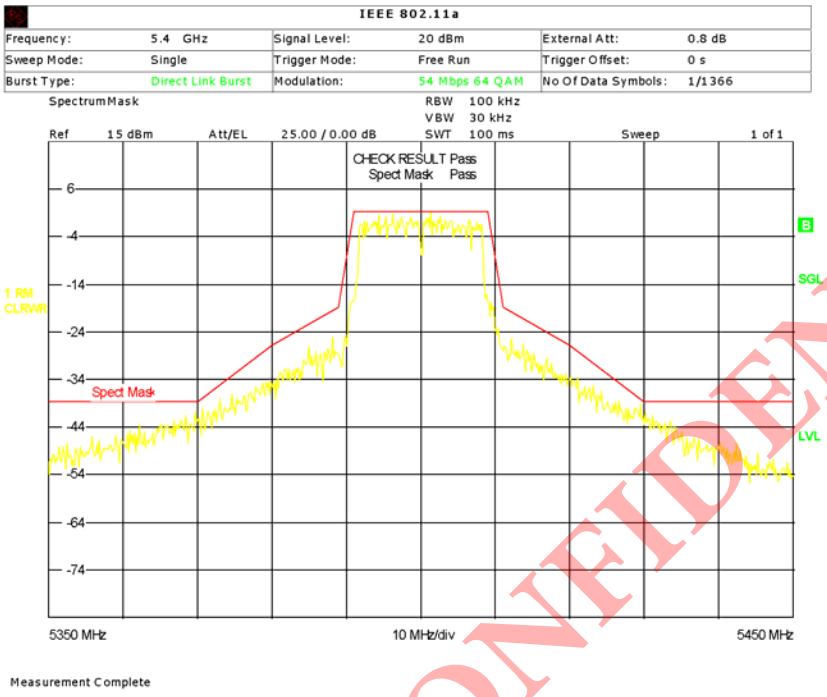
T=25℃, Vcc=3.3V, Freq=5.4GHz

PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
Frequency Range		4.9	5.4	5.9	GHz
Linear efficiency	Measured @ P1dB		33.5		%
Small Signal Gain	Pin= -20dBm	27.5	28	28.6	dB
P1dB	1dB Gain compression		26		dBm
Linear Pout for 11a usage	802.11a OFDM 64 QAM EVM = 3%		18		dBm
Pout for 11a Spectral mask	802.11a OFDM 64 QAM		22		dBm
Gain Flatness	within band		<2		dB
Input return loss			-10		dB
Output return loss			-10		dB
2f, 3f, 4f harmonics	CW signal, Pout = 18 dBm			-40	dBc
t_{on} (ramp-on time)	Rise time for 10% to 90% Pout		<100		ns

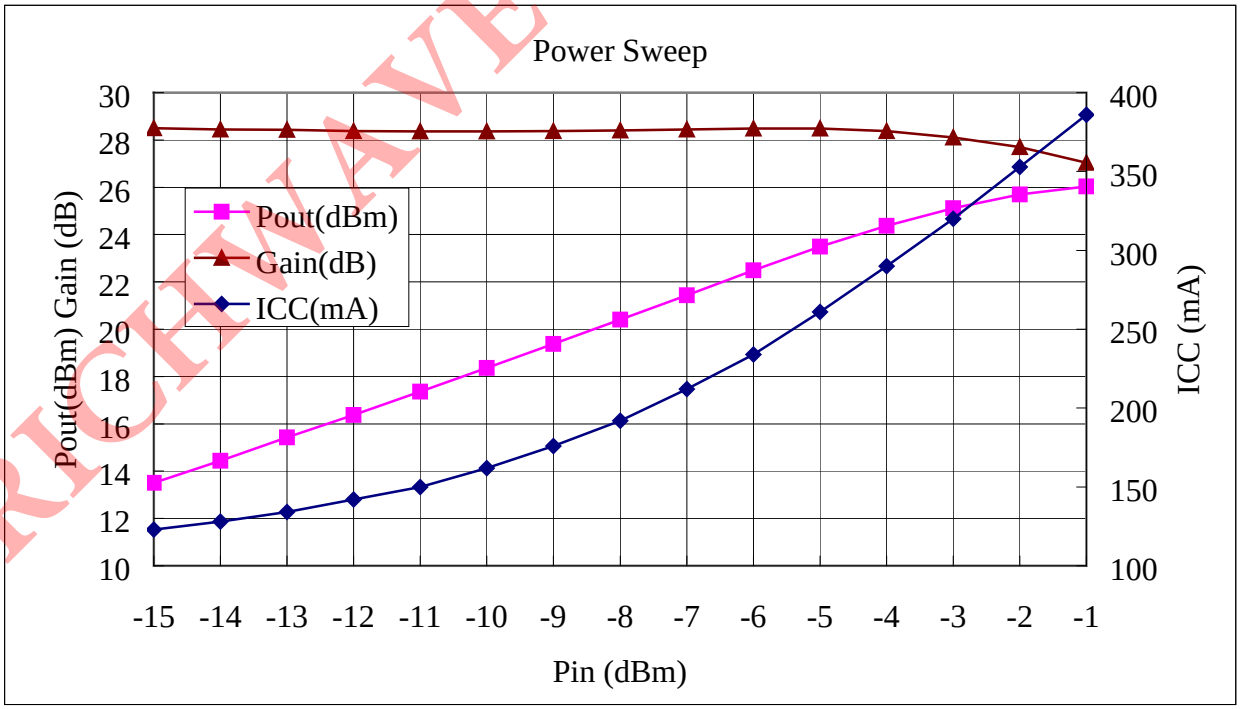
S-PARAMETER



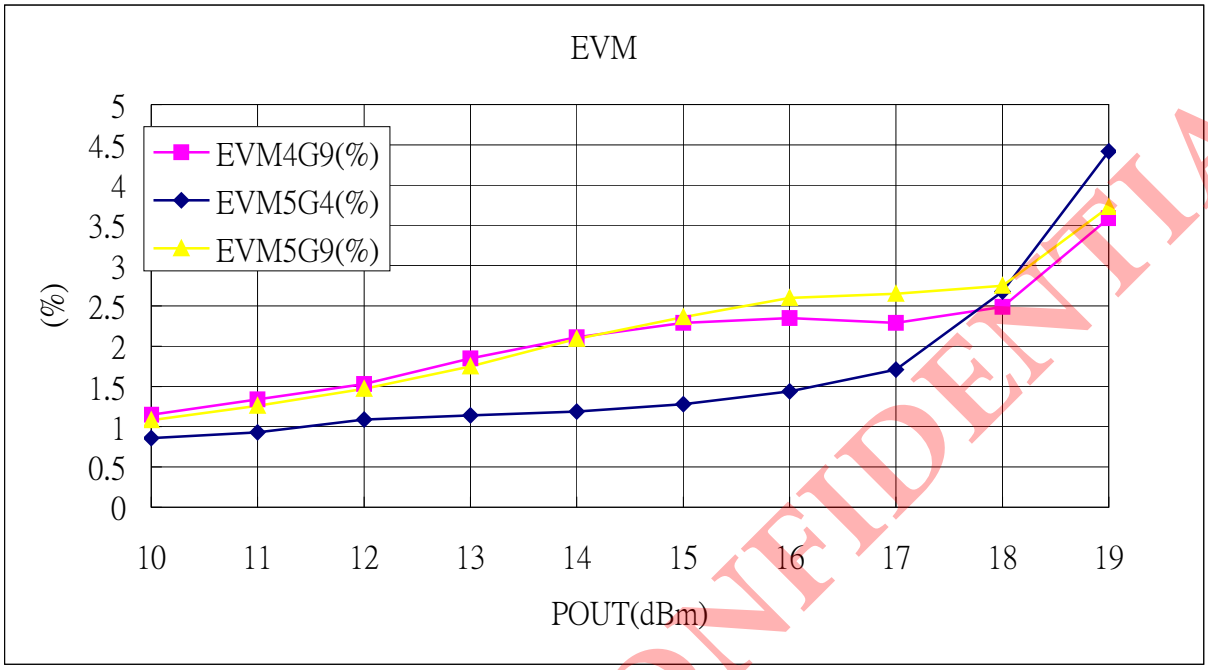
802.11a Spectral Mask (54Mbps OFDM) at Pout = 22 dBm

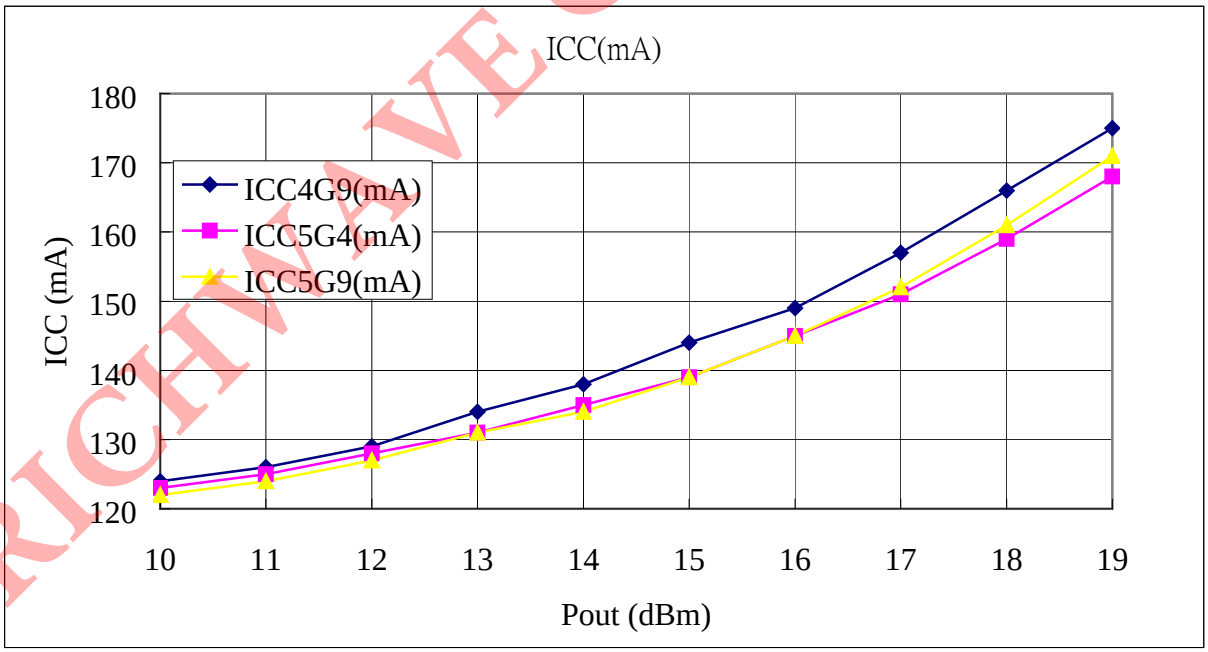


Gain and Pout vs. Pin (CW)



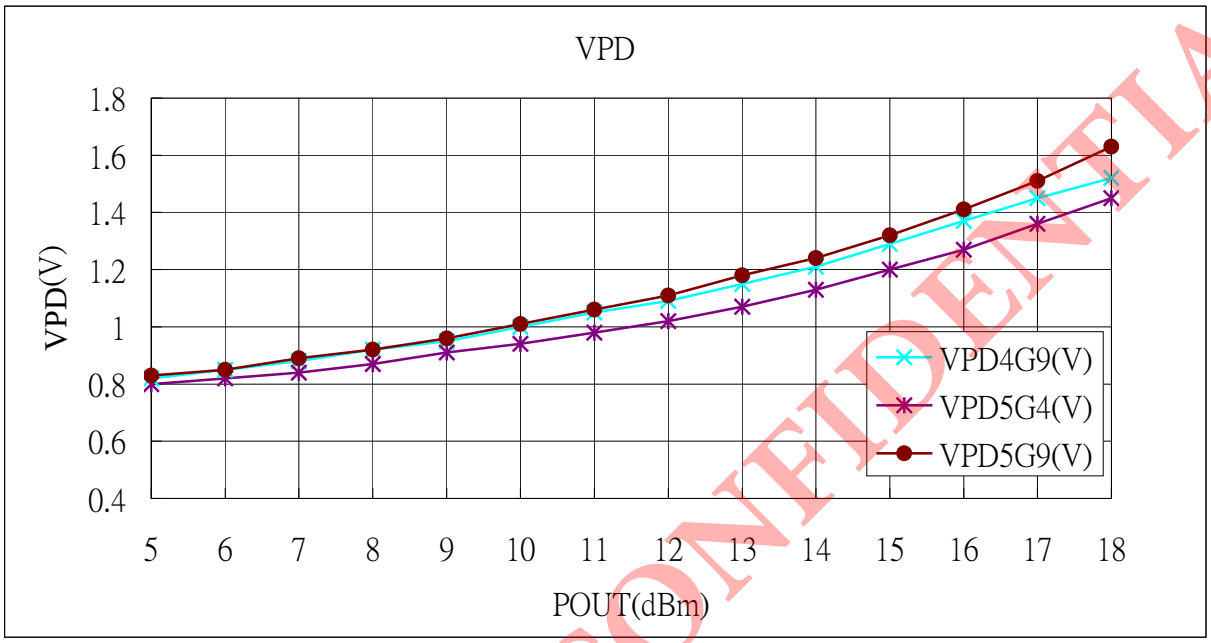
EVM and ICC vs. Pout(OFDM)



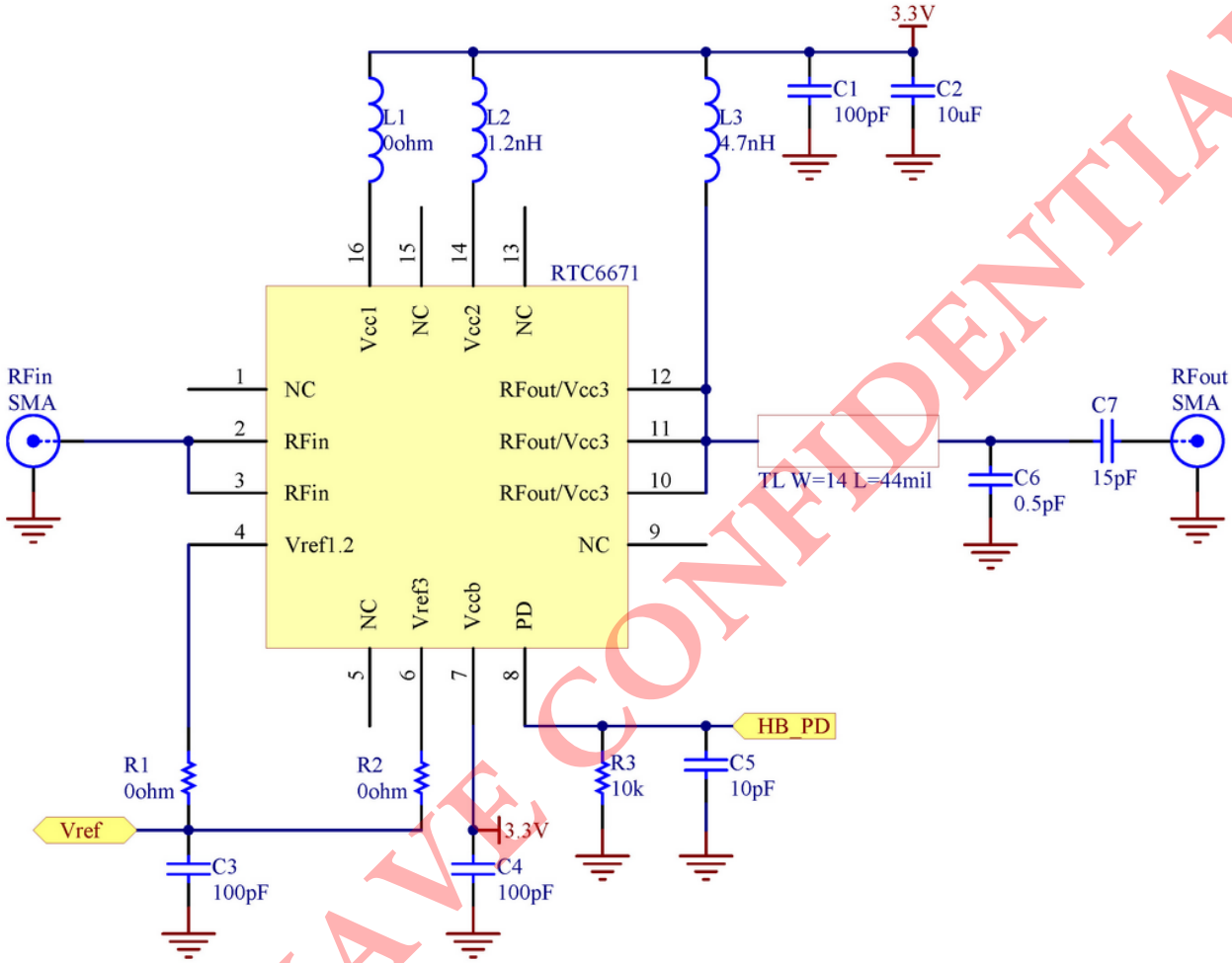


POWER DETECTOR

T=25℃, Vcc=3.3V, Vref=2.9V

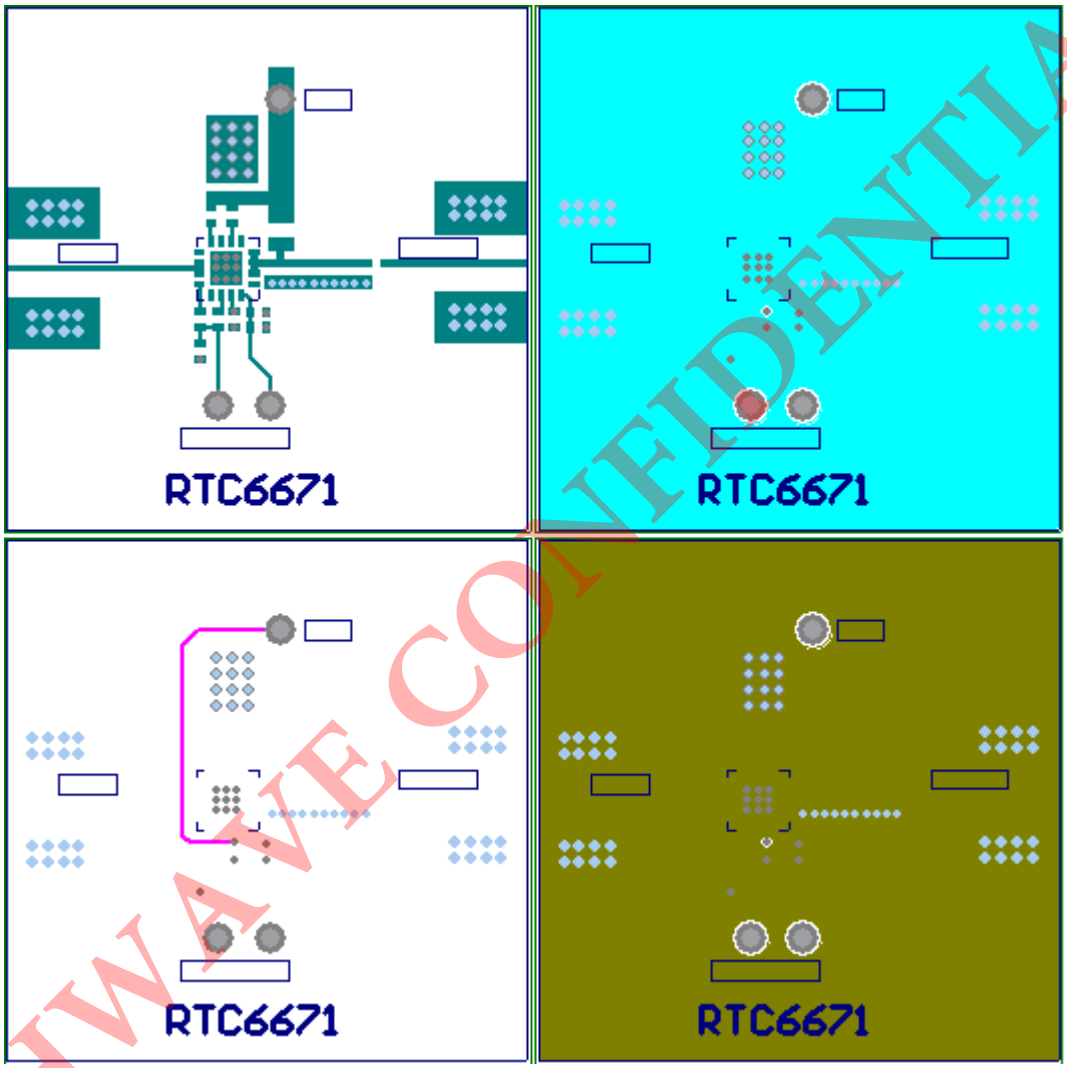


Evaluation Board Schematic :



EVB LAYOUT :

Top Layer MidLayer1
MidLayer2 Bottom Layer

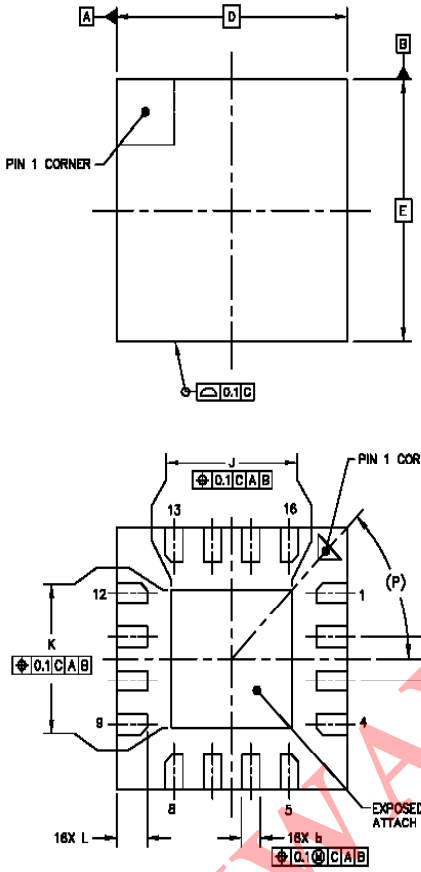


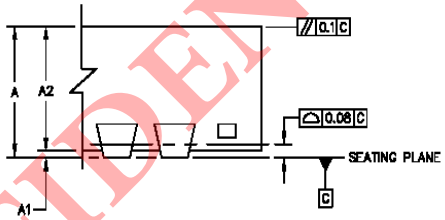
Note : 1. VCC1, VCC2, VCC3 and VCCB are connected together and applied to 3.3V. VREF1, 2 and VREF3 can be connected together and applied to the other 2.9V.

2. The evaluation board is 4-layer PCB using FR4 material. The thickness between top layer and MidLayer1 layer (GND) is 8 mil. If the PCB thickness is changed, 50Ω transmission line dimension needs to be re-calculated.

Package

Quad Flat No-Lead Plastic Package (QFN16 3x3)





DETAIL G
VIEW ROTATED 90° CLOCKWISE

DIM	MIN	NOM	MAX
A	0.85	0.95	1
A1	0	0.035	0.05
A2	0.85	0.9	0.95
b	0.2	0.25	0.3
D		3 BSC	
E		3 BSC	
e		0.5 BSC	
J	1.47	1.57	1.67
K	1.47	1.57	1.67
L	0.35	0.4	0.45
P		45° REF	

NOTES
1.0 COPLANARITY APPLIES TO LEADS, CORNER LEADS AND DIE ATTACH PAD.