

3.6V 0.5W RF Power Amplifier IC for 2.4 GHz ISM ITT2301AF

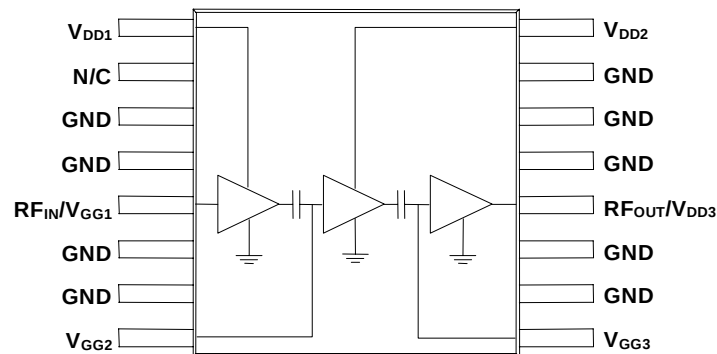
PRELIMINARY

Applications

2.4 GHz ISM
Cordless Phones
Cordless PBX
Radio/Wireless Local Loop (RLL/WLL)

Features

- Single Positive Supply
- 100% Duty Cycle
- 1.2:1 Input VSWR
- 2300 to 2600 MHz Operation
- 16 Pin TSSOP Plastic Package
- Accommodates 5.5 V Charging Condition
- Self-Aligned MSAG®-Lite MESFET Process



Single Supply
2400 MHz
100% Duty Cycle
45% PAE

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 1, 12, 16)	V _{DD}	5.5	Vdc
RF Input Power	P _{IN}	3	mW
Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-40 to +150	°C

ELECTRICAL CHARACTERISTICS V_{DD}= 3.6 V, P_{IN}= +0 dBm, T_A=25 °C, Output externally matched to 50 Ω

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	<i>f</i>	2400		2500	MHz
Output Power, <i>f</i> = 2450 MHz	P _{OUT}		26		dBm
Power Added Efficiency, <i>f</i> = 2450 MHz	η		45		%
Drain Current	I _{DD}		270		mA
Harmonics	2 <i>f</i> ₀ 3 <i>f</i> ₀		-35 -45		dBc dBc
Input VSWR	—		1.2:1		—
Off Isolation (V _{DD} =0 V)	—		40		dB
Thermal Resistance (Junction of 3 rd stage FET to solder point of pin 13)	R _{TH J-S}			51	°C/W
Load Mismatch (V _{DD} = 5.5 V, VSWR = 8:1, P _{IN} = +0 dBm)	—	No Degradation in Power Output			
Stability (P _{IN} = 0 dBm, V _{DD} = 0-5.5 V, Load VSWR = 5:1)	—	All non-harmonically related outputs more than 60 dB below desired signal			

Specifications Subject to Change Without Notice

902200 D, December 1999



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TYPICAL CHARACTERISTICS

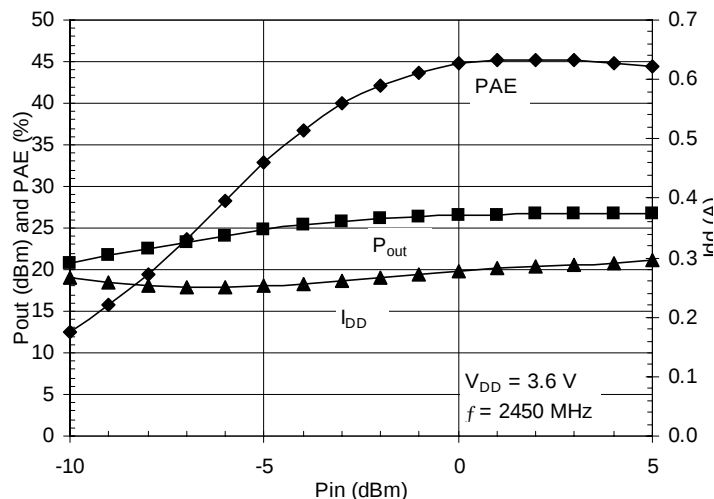


Figure 1. Output power, drain current and efficiency vs. input power

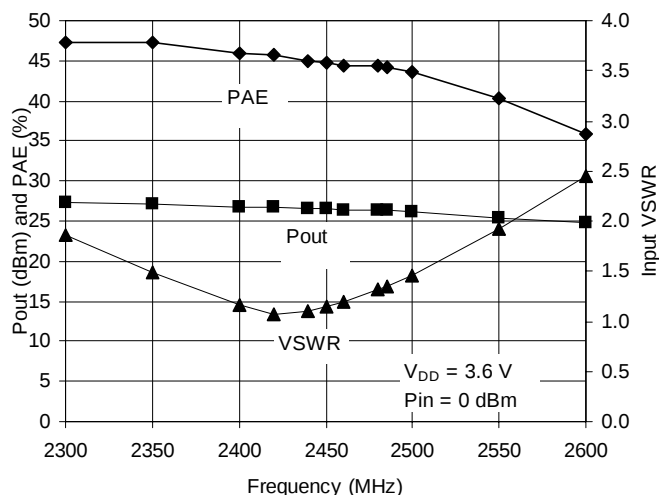


Figure 2. Output power, efficiency and input VSWR vs. frequency

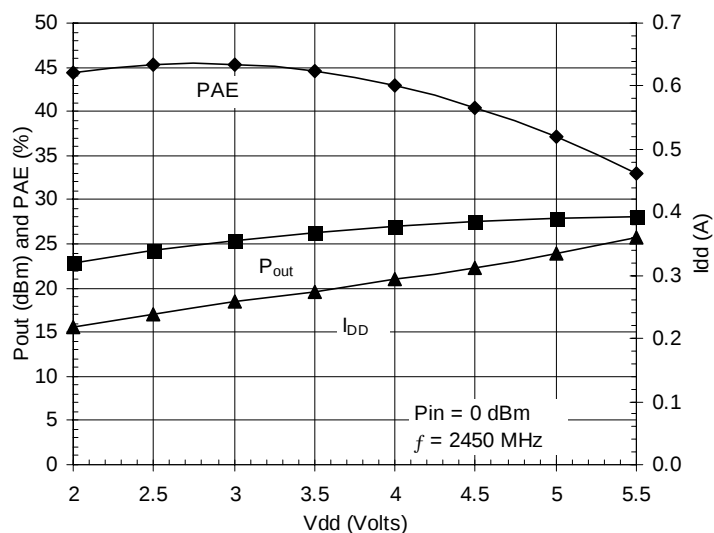


Figure 3. Output power, drain current and efficiency vs. supply voltage

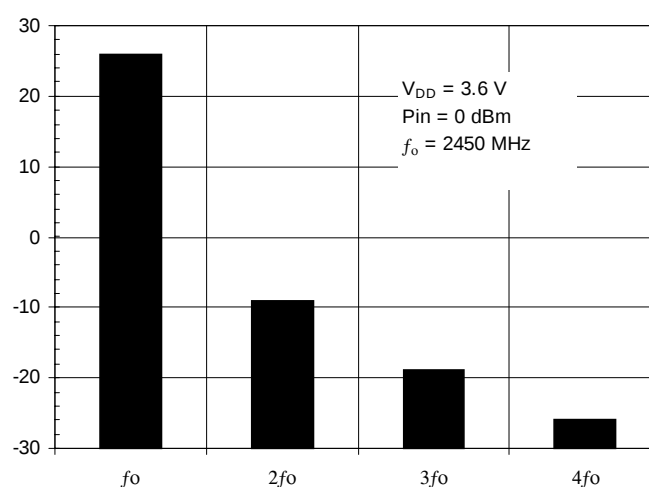


Figure 4. Harmonics

APPLICATION INFORMATION

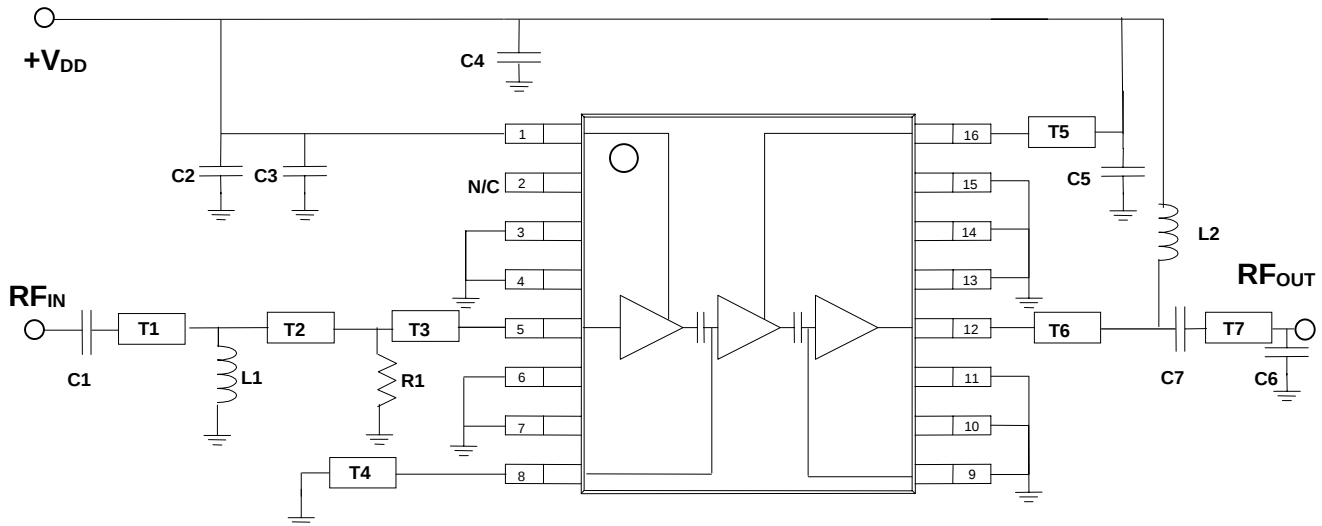


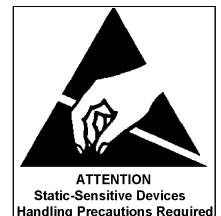
Figure 5. Evaluation Board Schematic

List of components:

C1 = 2.2 pF multilayer ceramic chip capacitor (Dielectric Labs C11AH2R2B8TXL)
 C2 = C4 = C5 = 10 pF multilayer ceramic chip capacitor (Dielectric Labs C11AH100J5TXL)
 C3 = 100 pF multilayer ceramic chip capacitor (Dielectric Labs C11AH101K5TXL)
 C6 = 1.0 pF multilayer ceramic chip capacitor (Dielectric Labs C11AH1R0B5TXL)
 C7 = 3.0 pF multilayer ceramic chip capacitor (Dielectric Labs C11AH3R0C5TXL)
 L1 = 1.5 nH chip inductor (Toko TKS235CTND)
 L2 = 27 nH chip inductor (Coilcraft 1008CS-270XKBB)
 R1 = 300 Ω chip resistor (P300ECT-ND)

T1 = 0.12" of 50 Ω grounded coplanar waveguide (60 mil GETEK board)
 T2 = 0.14" of 50 Ω grounded coplanar waveguide (60 mil GETEK board)
 T3 = 0.09" of 50 Ω grounded coplanar waveguide (60 mil GETEK board)
 T4 = 0.11" of 75 Ω grounded coplanar waveguide (60 mil GETEK board)
 T5 = 0.09" of 75 Ω grounded coplanar waveguide (60 mil GETEK board)
 T6 = 0.08" of 50 Ω grounded coplanar waveguide (60 mil GETEK board)
 T7 = 0.08" of 50 Ω grounded coplanar waveguide (60 mil GETEK board)

Component layout and printed circuit board drawing for RF IC evaluation board are shown in Figure 6.



MECHANICAL DATA

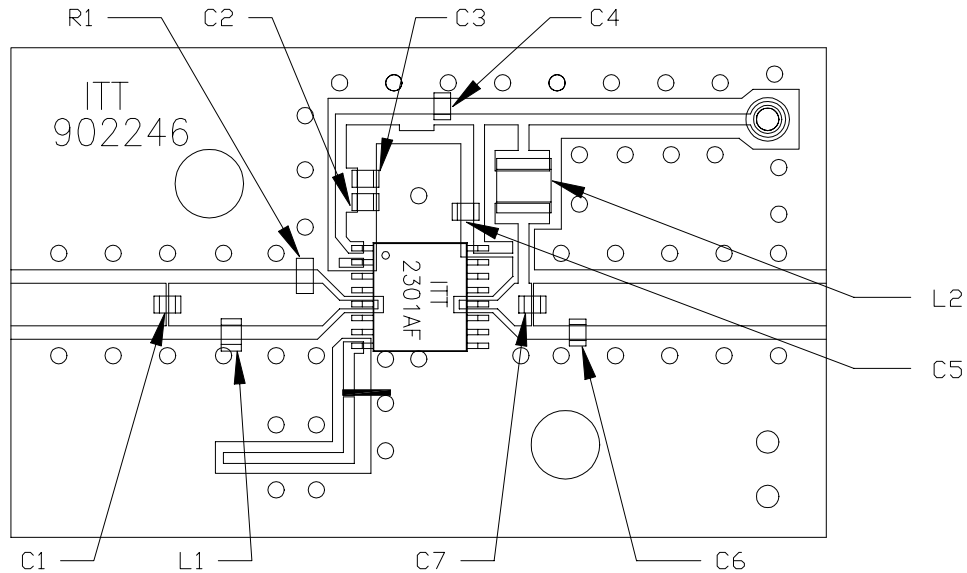


Figure 6. Component layout and printed circuit drawing for evaluation board.

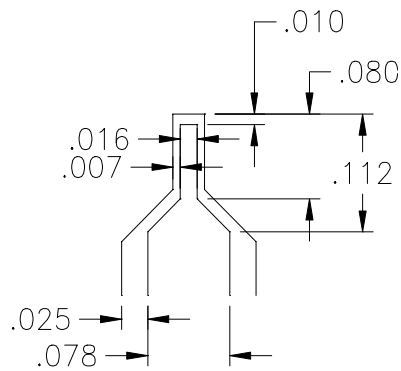


Figure 7. 50 Ω Lead Transition. (Units in Inches)