

3.6V 1.2W RF Power Amplifier IC for N-PCS/ISM900 ITT2104AF

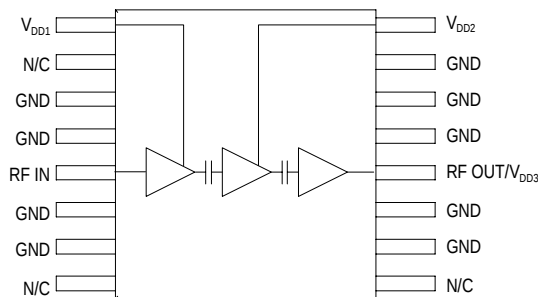
PRELIMINARY

Applications

Two-Way Paging
Wireless Modems
Cordless Telephones
Telemetry
900 MHz ISM

Features

- Single Positive Supply
- 16 Pin TSSOP Plastic Package
- Class AB Bias
- 800 -1000 MHz Operation
- 50 Ω Input Impedance
- Single Capacitor Output Match
- Self-Aligned MSAG[®]-Lite MESFET Process
- Guaranteed Stability and Ruggedness



Typical 3.6 Volt Performance

30.8 dBm Power Output
30.8 dB Power Gain
60% Drain Efficiency (output stage FET)
45% Power Added Efficiency
-36 dBc 2nd Harmonic
-54 dBc 3rd Harmonic

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

Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 1, 12, 16)	V _{DD}	5	Vdc
RF Input Power	P _{IN}	4	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_S=40 °C (Note 1), Output externally matched to 50 Ω System.

Characteristic	Symbol	Typical	Unit
Frequency Range	f	900 to 942	MHz
Output Power	P _{OUT}	1.2	W
Power Gain (P _{OUT} =30.8 dBm)	G _P	30.8	dB
Power Added Efficiency (P _{OUT} =30.8 dBm)	η	45	%
Harmonics (P _{OUT} =30.8 dBm)	2f _o	-36	dBc
	3f _o	-54	dBc
Input VSWR (P _{OUT} =30.8 dBm)	—	1.4:1	—
Thermal Resistance (Junction of 3 rd stage FET to solder point of pin 13)	R _{TH J-S}	47	°C/W
Load Mismatch (V _{DD} = 4.6 V, P _{IN} = +3 dBm, VSWR = 8:1)	—	No Degradation in Power Output	
Stability (P _{IN} = -15 to +3 dBm, V _{DD} = 3.6, 4.6 V, T _S = -40 to +100 °C, Load VSWR = 8:1)	—	All non-harmonically related outputs more than 60 dB below desired signal	

Note 1: T_S is the temperature measured at the soldering point of pin 13, mounted on 60 mil GETEK evaluation board in a free air condition with ambient room temperature T_A=25 °C. The electrical data presented herein was taken with the evaluation board shown in Figures 1 and 6, under room temperature conditions and CW operation, unless otherwise specified.



APPLICATION INFORMATION

+V_{DD} (+3.6V)

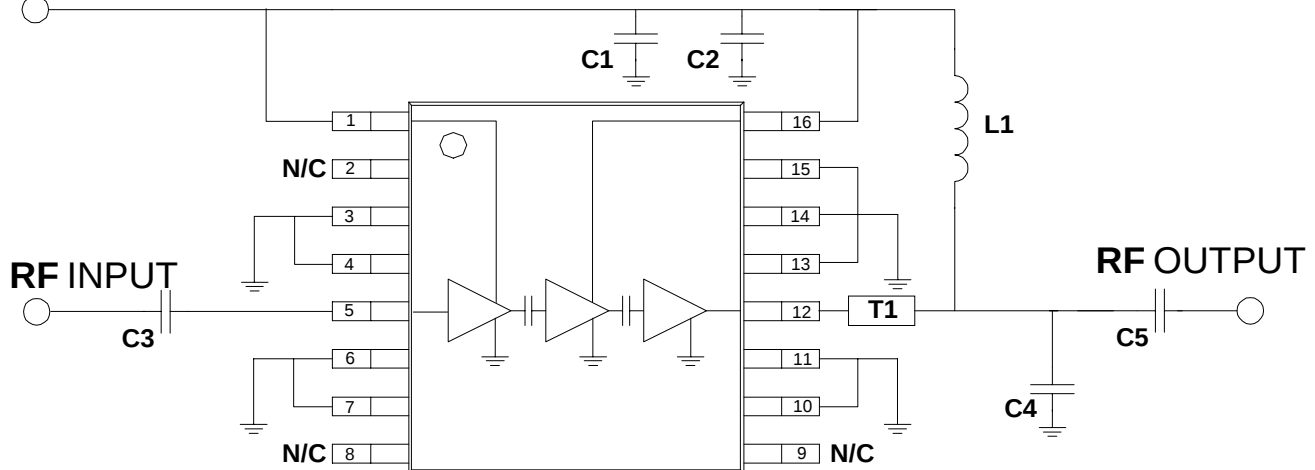
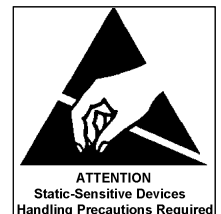


Figure 1. Evaluation Board Schematic

List of components:

- C1 = 0.1μF Kemet multilayer ceramic chip capacitor (C1206C104K5RAC)
- C2 = 4700 pF Kemet multilayer ceramic chip capacitor (C0805C472K5RAC)
- C4 = 7.5 pF DLI multilayer ceramic chip capacitor (C11AH7R5B5TXL)
- C3 = C5 = 100 pF DLI multilayer ceramic chip capacitor (DC Block; C11AH101K5TXL)
- L1 = 39 nH Coilcraft chip inductor (1008CS.390XMBB)
- T1 = 0.13" 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.

TYPICAL CHARACTERISTICS

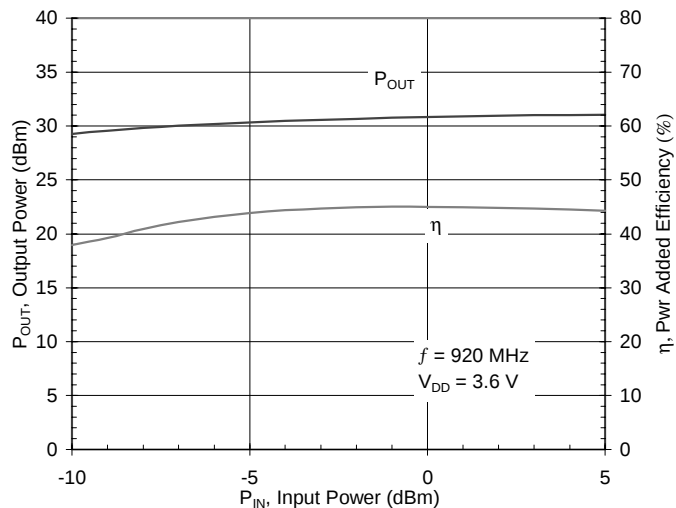


Figure 2. Output power and efficiency vs. input power

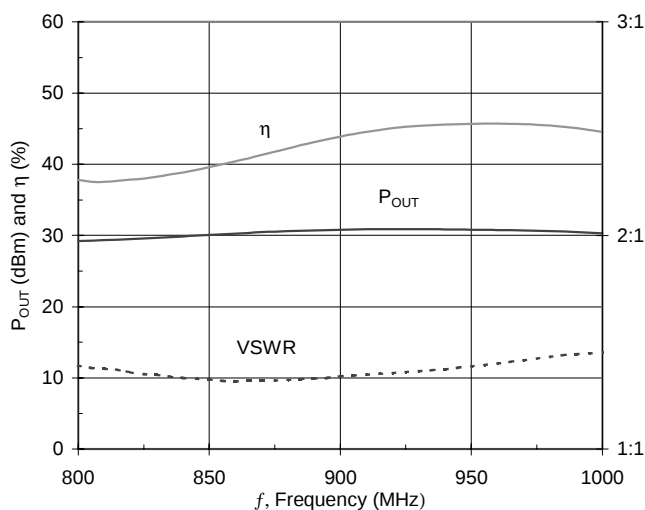


Figure 3. Output power, efficiency and input VSWR vs. frequency

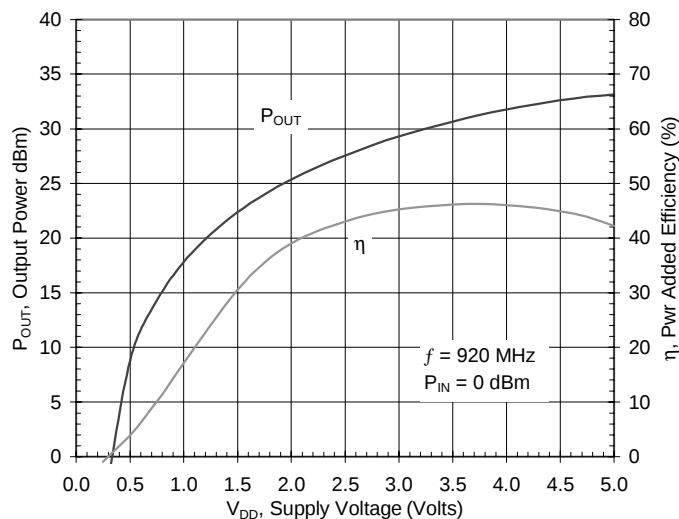


Figure 4. Output power and efficiency vs. supply voltage

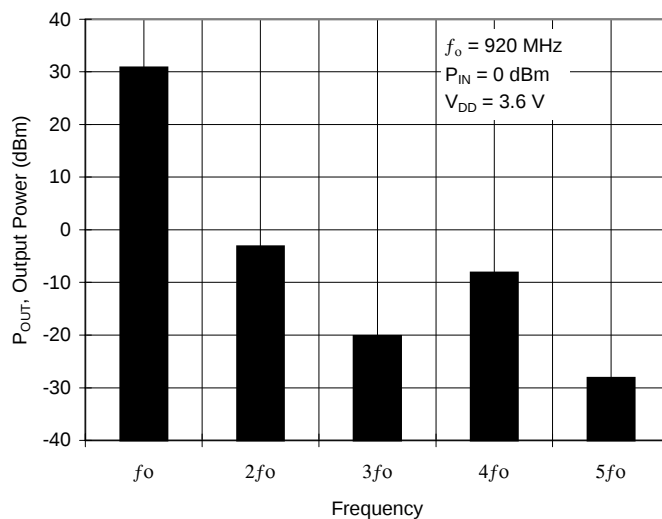
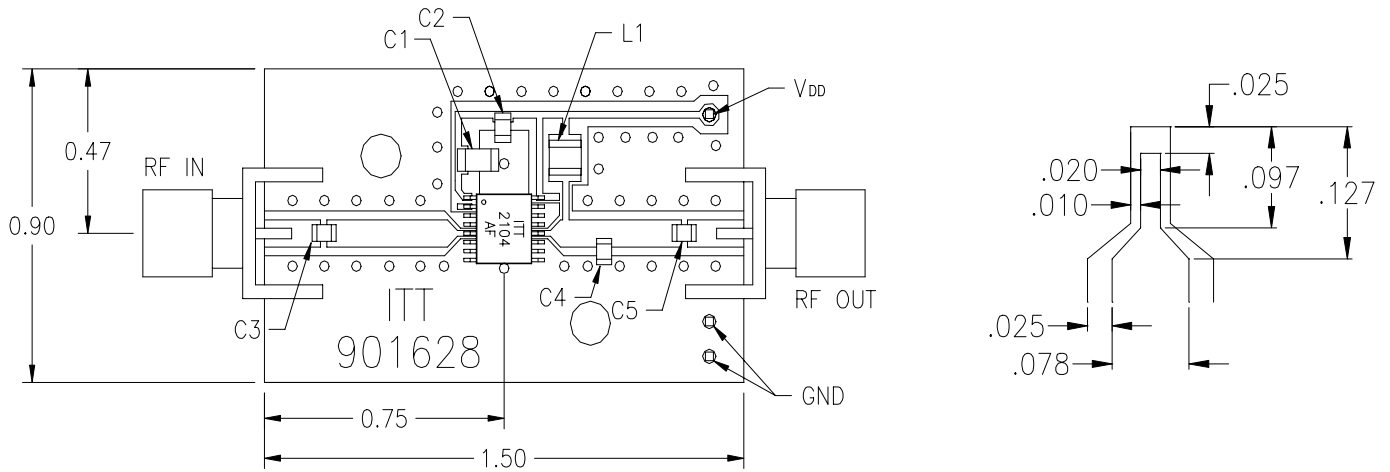


Figure 5. Harmonics

MECHANICAL DATA



Top view

50Ω lead transition

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

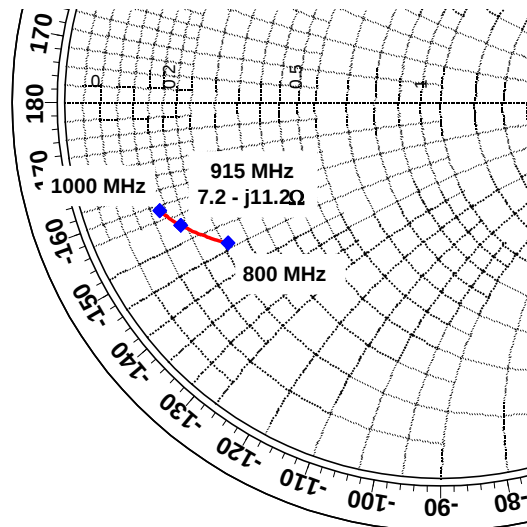


Figure 7. Output match impedance (as seen from pin 12)