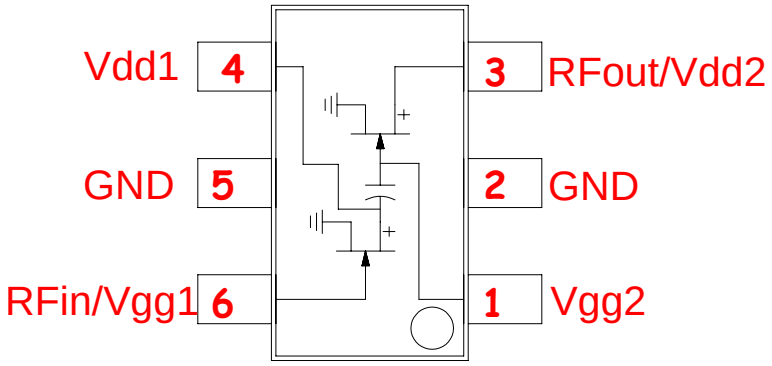
3.0V 100mW RF Power Amplifier IC for Bluetooth — PRELIMINARY
ITT2305AK

FEATURES

- 20 dB Gain – dramatically increases range of your low power bluetooth devices
- Single 3.0V positive supply – operates over a wide range of supply voltages
- Extremely small size – 6 pin SOT plastic package – 3 mm x 1.75 mm body size
- Output power easily controllable via V_{DD1}
- 45% Power Added Efficiency
- 100% Duty Cycle
- 2000 to 2900 MHz Operation
- Self-Aligned MSAG®-Lite MESFET Process



Description

The ITT2305AK is an RF power amplifier based on GaAsTEK's Self-Aligned MSAG® MESFET Process. This product is designed for use in 2.4 GHz ISM products as a booster for high power Bluetooth devices. Output power can be controlled to meet Bluetooth requirements via varying input power or the voltage on V_{DD1}.

Maximum Ratings (T_A = 25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	5.5	V
RF Input Power	P_{IN}	10	mW
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-40 to +150	°C

ELECTRICAL CHARACTERISTICS V_{DD1}= 2.5 V, V_{DD2} =3V, P_{IN}= +0 dBm, Duty Cycle = 100 %, T_A=25 °C

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	f	2400		2500	MHz
Output Power, f = 2450 MHz	P_{OUT}		20		dBm
Power Added Efficiency, f = 2450 MHz	η		45		%
Harmonics	$2f$, $3f$, $4f$		-27		dBc
Input VSWR	—		1.5		:1
Off Isolation (V_{DD}=0 V)	S_{21}		-25		dB
Thermal Resistance, junction to soldering point (pin 2)	R_{TH}		180		°C/W
Load Mismatch (V_{DD} = 5.5 V, VSWR = 8:1, P_{IN} = 0 dBm)	—	No Degradation in Power Output			
Stability (P_{IN} = 0dBm, V_{DD} = 0-5.5 V, Load VSWR = 5:1, fixed phases)	—	All non-harmonically related outputs more than 60 dB below desired signal			

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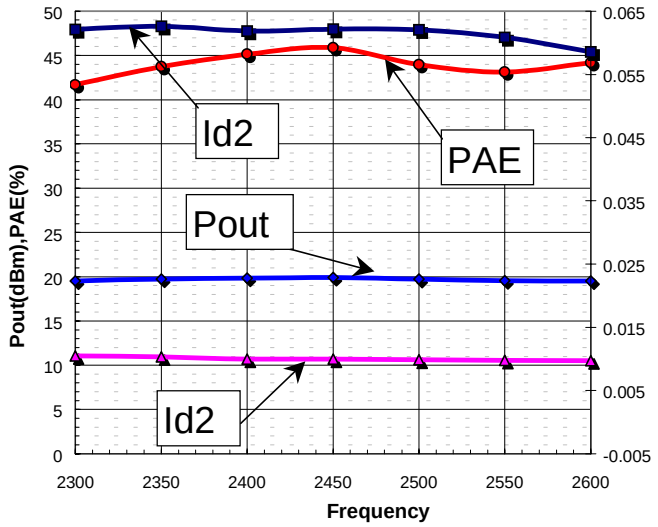

Figure 1. Output Power, Drain Currents and Efficiency vs. Frequency

V_{DD2}=3V , V_{DD1}=2.5V, P_{IN}=0dBm

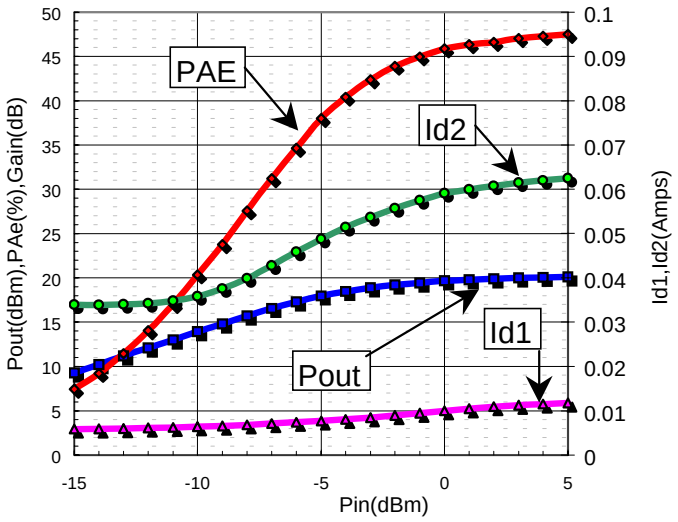

Figure 2. Output Power, Drain Currents and Efficiency vs. Input Power

V_{DD2}=3V , f=2450MHz, V_{DD1}=2.5V

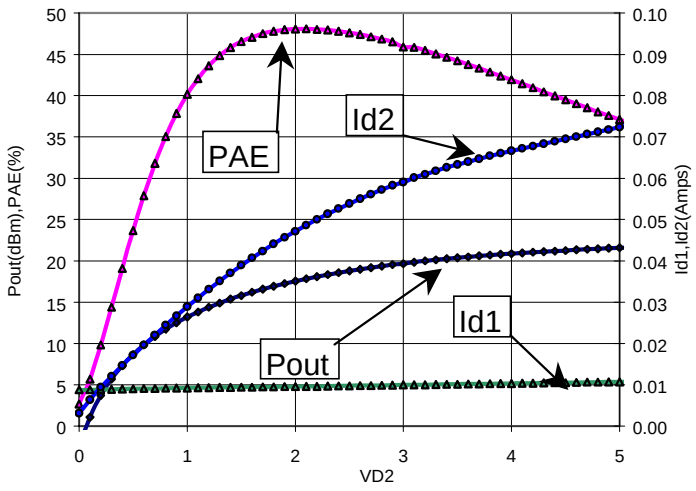

Figure 3. Output Power, Drain Currents and Efficiency vs. Supply Voltage

P_{IN}=0dBm , f=2450MHz, V_{DD1}=2.5V

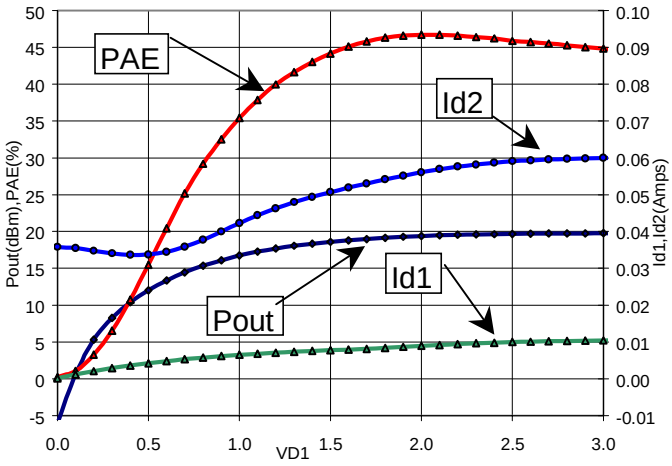

Figure 4 Output Power, Drain Currents and Efficiency vs. V_{DD1} for Power Control

P_{IN}=0dBm , f=2450MHz, V_{DD2}=3V

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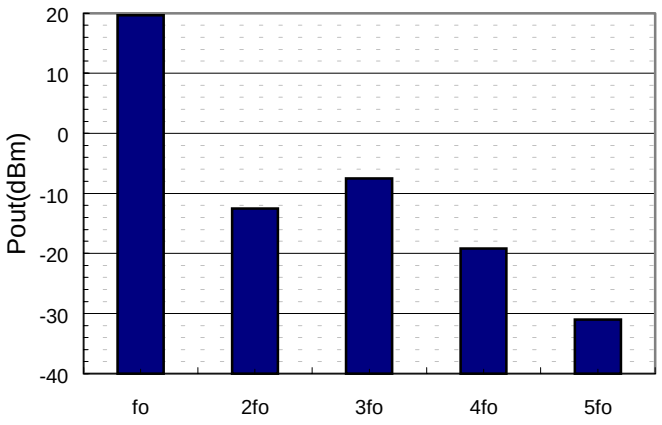

Figure 5. Harmonics

P_{IN}=0dBm , f_0=2450MHz, V_{DD1}=2.5V, V_{DD2}=3V

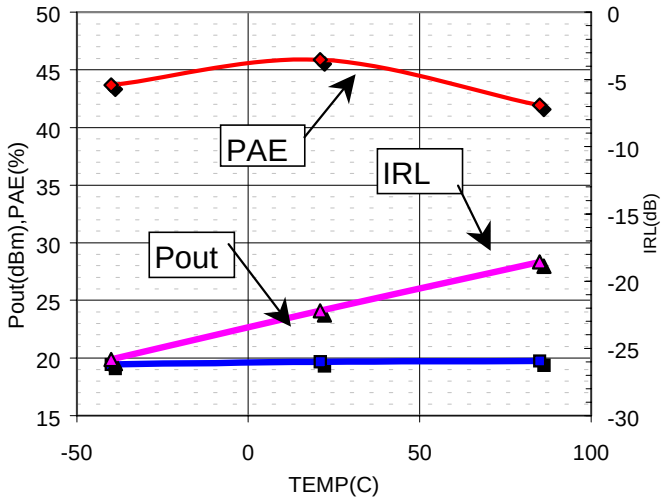

Figure 6. Output Power, Input return Loss and Efficiency vs. Temperature

P_{IN}=0dBm , f=2450MHz, V_{DD1}=2.5V, V_{DD2}=3V

MECHANICAL DATA:

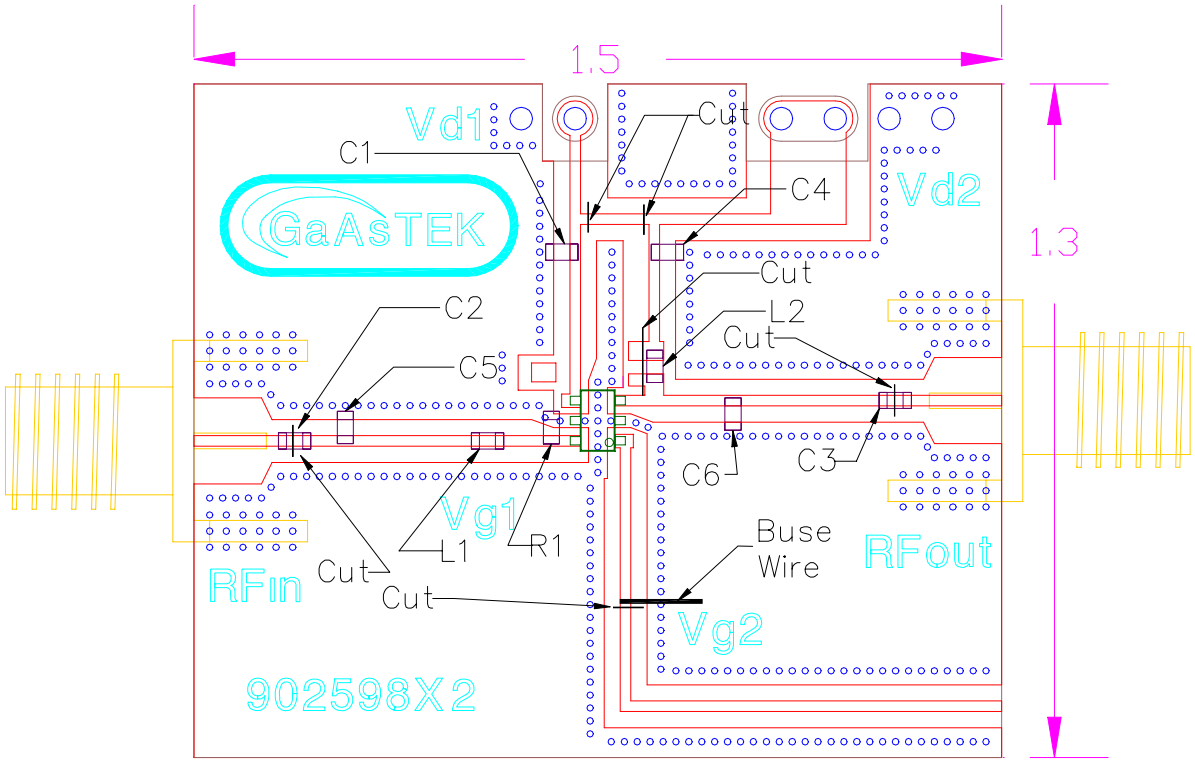

Figure 7. Component layout and printed circuit drawing for evaluation board.

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APPLICATION INFORMATION:

List of Componets:

C1=100pF Dielectric Labs 300-213
C2=C3=100pF 0603 Murata
C4=4700pF 0603 Murata GRM36X7R472K25AB
C5=1.5pF 0603 Dielectric Labs CO6CF0R5B50U
C6=0.5pF 0805 Dielectric Labs
R1=210Ohm 0603 DigiKey P210HCT-ND
L1=2.7nH 0603 CoilCraft TRS2356CT-ND
L2=22nH 0603 CoilCraft 0603CS-22NXJBB

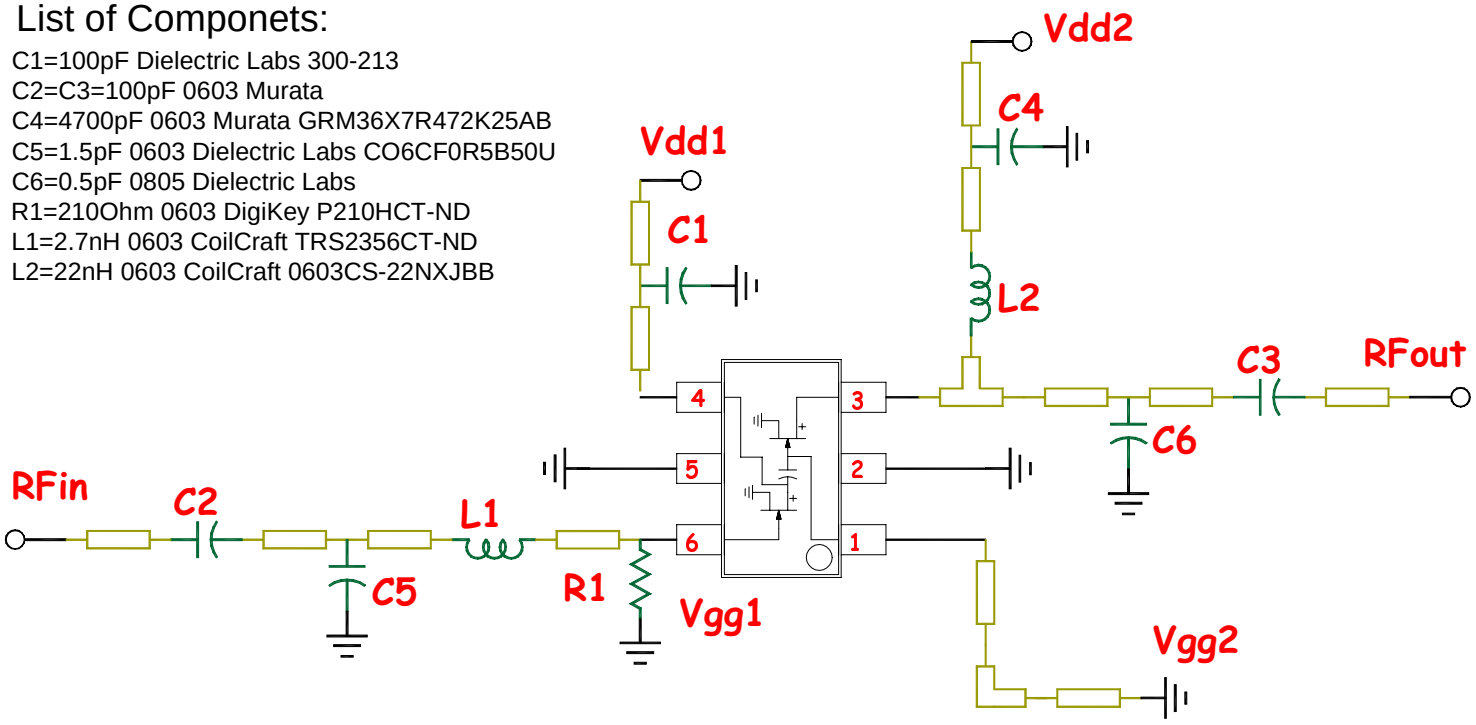

Figure 8. Evaluation Board Schematic

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