

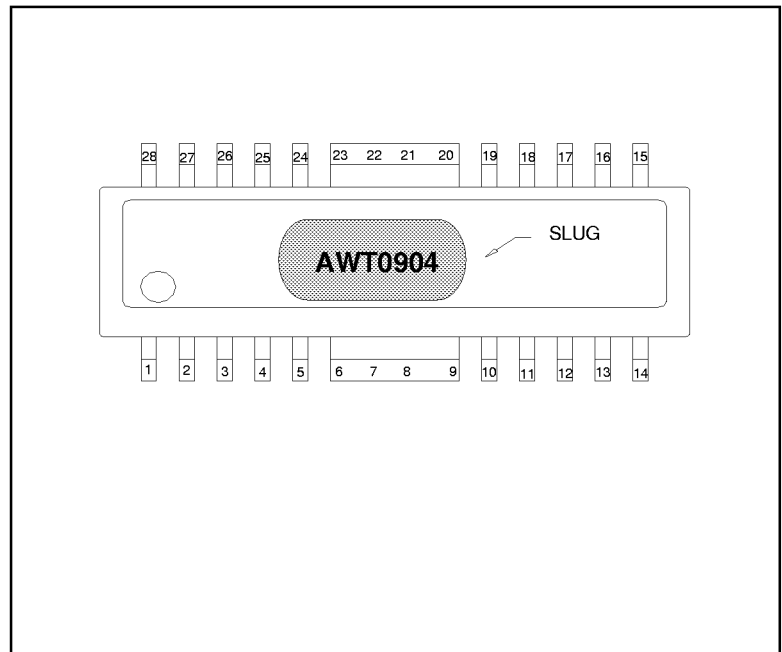
900 MHz Band GSM GaAs Power Amplifier IC

DESCRIPTION

The AWT0904 is a monolithic Power Amplifier IC suited for GSM cellular telephone Applications

FEATURES

- Single Supply
- High Output Power
- High Efficiency
- Low Harmonics
- Built-in Pulse Shaping
- Small Size
- 28 Pin SSOP Plastic Package.
- Surface Mount Package
- 50Ω Input Impedance
- Low Cost



1. Maximum Ratings

Static sensitive electronic devices. Do not operate or store near strong electrostatic, fields. Take proper ESD precautions.

Pin	Rating	Notes
Pin 2 - RF _{IN}	+ 10 dBm max., ± 7.5 V max.	
Pin 3 - V _{REF}	+ 5 V max., 0 V min.	If V _{REF} is kept high and not pulsed, the amplifier may draw very high currents and permanent damage may occur.
Pin 4 - V _{DB}	+7.5 V max., 0 V min.	
Pin 5 - V _{SS_IN}	N/A	Do not apply voltage to this pin. If V _{SS_IN} is not between - 3 V and - 5 V (with V _{GEN} = 4.8 V), the amplifier may not work properly.

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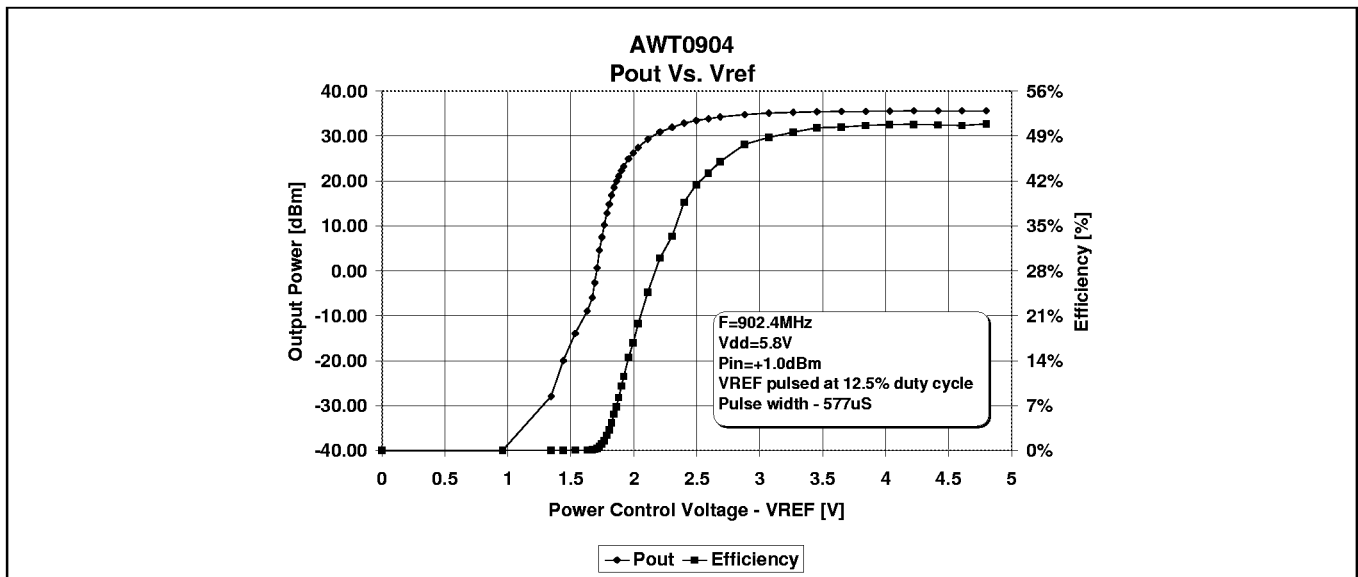
Pin	Rating	Notes
Pin 11, Pin 12	N/A	Do not apply voltage to these pins.
Pin 13 - V_{GEN}	+7.5 V max., 0 V min.	V_{GEN} must be turned on before any of the drain supplies.
Pin 16 - V_{D2}	+7.5 V max., 0 V min.	
Pin 19 - V_{D3B}	+7.5 V max., 0 V min.	
Pin 24- V_{D3A}	+7.5 V max., 0 V min.	
Pin 27 - V_{D1}	+7.5 V max., 0 V min.	

2. ELECTRICAL CHARACTERISTICS:

($P_{in} = 1\text{dBm}$, $V_{DS} = + 5.8V_{DC}$, $V_{GEN} = + 4.8 V_{DC}$, Pulsed @ 577 $\mu\text{S}/12.5\%$ Duty Cycle, $T_c = 25^\circ\text{C}$, 50 Ω Input & 50 Ω external output match)

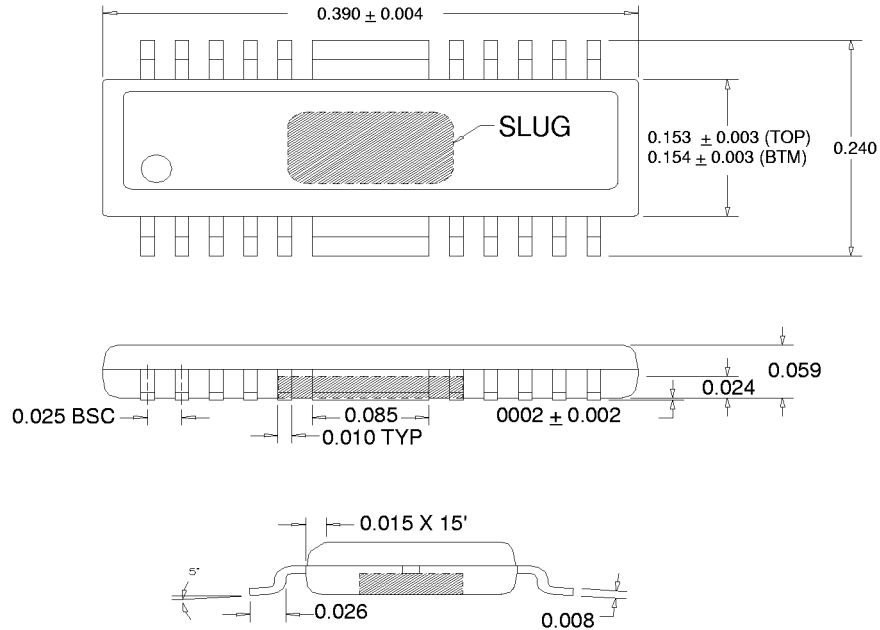
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	PARAMETER
Frequency	f_o	890		915	MHz
Power Output	P_{out}		35		dBm
Power Added Efficiency	PAE		50		%
Gain			33		dB
Harmonics (@ 35 dBm)	2fo - 4fo		- 35		dBc
Stability: - 80 dBc, all spurious outputs relative to desired signal			6:1		VSWR load, all phase angles, ($P_{out} \leq 35$ dBm) $V_{DS} = +5.8.0V$, $Z_s = 50\Omega$
Input Return Loss	$R_{tn_{IN}}$		12		dB
Operating Range	T_c	- 20		+ 70	$^\circ\text{C}$
DC/DC Converter Current	I_{GEN}		3		mA
Pulse Control	I_{REF}		3		mA

3. DATA



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4. Case Outline and Pin Description



PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION
1	GND	RF and DC Ground	15	GND	RF and DC Ground
2	RF _{IN}	RF power input, DC blocked	16	V _{D2}	Second stage drain supply (5.8 V)
3	V _{REF}	Output Power control, Should be set to level that corresponds to the desired output power . Pulse control voltage (V _{REF} , 0 to 4V)	17	GND	RF and DC Ground
4	V _{DB}	Bias circuit Supply (+5.8V, 2-3 ma)	18	N/C	Not Connected
5	V _{SS_IN}	Negative Supply (-4V) generated by the dc/dc converter	19	V _{D3B}	3rd stage drain supply (5.8V) and RF out
6,7,8,9	GND	RF and DC Ground (The "Batwing")	20,21,22,23	GND	RF and DC ground (the "BATWING")
10	V _{SS_OUT}	The output of the DC/DC converter providing the negative voltage	24	V _{D3A}	3rd stage drain supply (5.8V) and RF out
11,12		Pump capacitor (C5) which is part of the dc/dc converter circuit.	25	N/C	Not Connected
13	V _{GEN}	DC/DC converter positive supply	26	GND	RF and DC ground
14	V _{GEN} GND	AC and DC ground for the dc/dc converter .If possible should be grounded through a separate via hole .	27	V _{D1}	1st stage drain supply (5.8 V)
			28	GND	RF and DC Ground

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5. Recommended Operating Procedure on the Evaluation Board

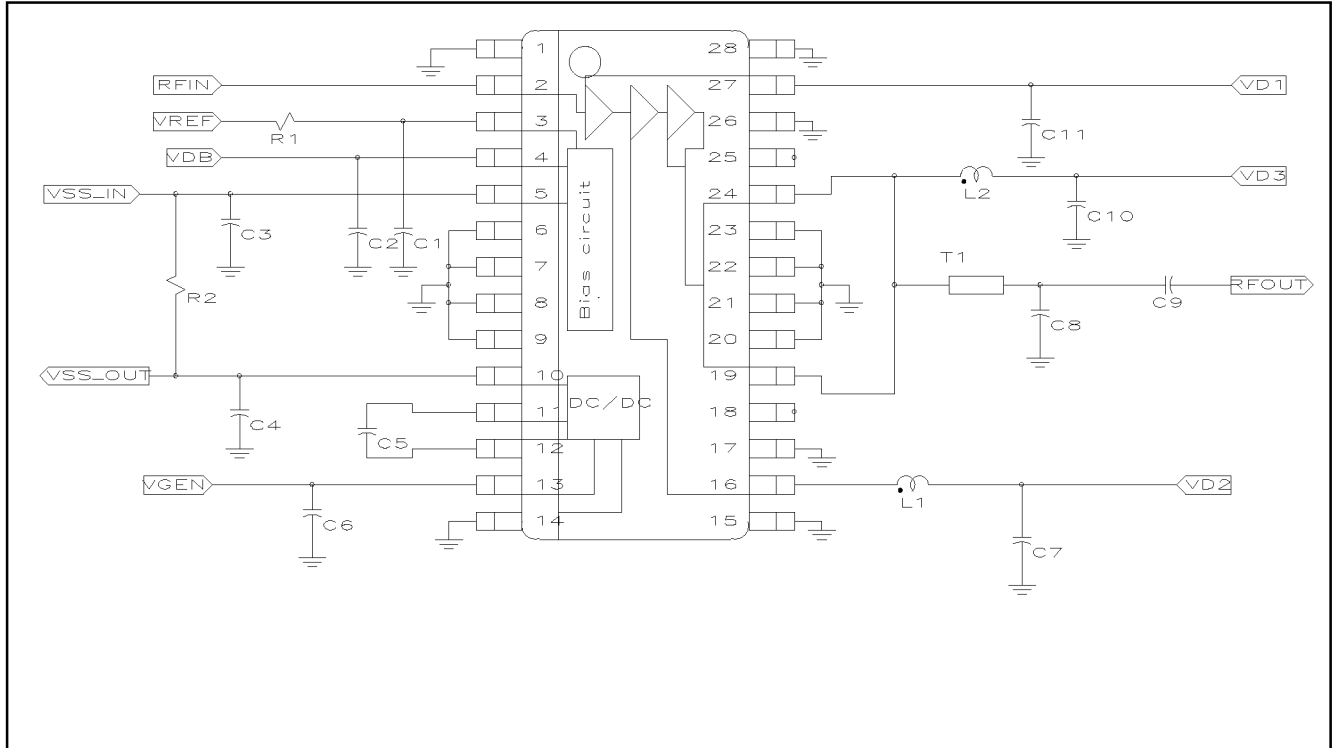
Power Up

- A. Begin by setting all power supplies to zero volts, and input power to zero dBm.
- B. Make sure that the input RF power is turned off.
- C. Turn on V_{GEN} (Pin 13) to + 4.8V
- D. Check the voltage @ V_{SS_IN} (pin 5) to see if it is between -5 V and - 3 V. If not, check the alignment of the device in the test fixture. Voltage at pin 5 must be between - 5 V and - 3 V before going to next step.
- E. Turn on V_{D1} (Pin 27), V_{D2} (Pin 16), V_{D3} (Pins 19 and 24) and V_{DB} (Pin 4) which are tied together on the fixture, and set to +5.8 V. Little drain current should be flowing at this time ($I_{DD} < 5$ mA).
- F. Turn RF on and adjust input power to 1.0 dBm.
- G. Turn V_{REF} on using the pulsed scheme of GSM. Adjust pulse amplitude of V_{REF} to achieve desired output power (≤ 35 dBm). V_{REF} should be no lower than 0 V and no higher than +4 V. Use an oscilloscope to measure V_{REF} on the V_{REF} package pin (3) rather than using the display of the pulse generator. The reason being the pulse generator may have a 50Ω output impedance while the impedance of V_{REF} pin is high. This causes the voltage on V_{REF} pin to be almost twice as high as the readout on the pulse generator.

Power Down

To power down the device follow the above procedure in reverse order .

6. AWT0904 TEST CIRCUIT



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Component	Value	Type
C1	Not Used	
C2	33nF	0402
C3, C4, C6	1uF	0805
C5	100nF	0805
C7, C10, C11	470pF	0402
C8	7pF	0805
C9	470pF	0805
L1	6.8n	0603
L2	18n	Coil Craft 1008
R1	200	0603
R2	10	0603
T1	Z0 = 25Ω	Microstrip

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