AWT0908

TX POWER MMIC
Advanced Product Information
Rev 0

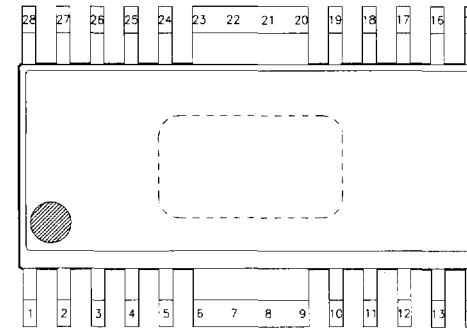
900 MHz Band GSM GaAs Power Amplifier IC

DESCRIPTION

The AWT0908X is a monolithic Power Amplifier IC suited for GSM cellular telephone Applications

FEATURES

High Output Power
High Efficiency
Single Supply
Low Harmonics
Built in Pulse Shaping
Small Size
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}	+ 12 dBm max.,	
Pin 3 - V_{REF}	+ 5V 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 - VdB	+7.5V max., 0 V min.	
Pin 5 - V_{SSIN}	N/A	Do not apply voltage to this pin. If V_{SSIN} is not between - 4V and - 4.5V (with V_{GEN} = 4.8V), the amplifier may not work properly.

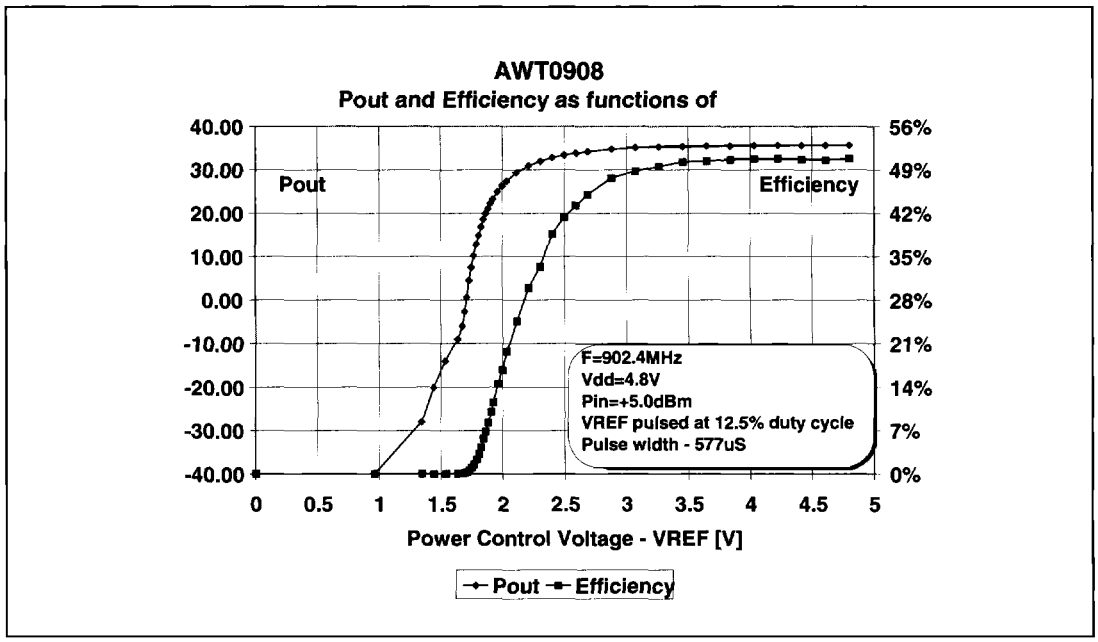
Pin	Rating	Notes
Pin 10 V_{SS}OUT	N/A	Do not apply voltage to these pin
Pin 11, Pin 12	N/A	Do not apply voltage to these pins.
Pin 13 - V_{GEN}	+7.5 V max. 0 V min.	V_{GEN} must be turned on before any of the drain supplies.
Pin 16 - D2	+7.5 V max.,0 V min.	
Pin19 - D3B	+7.5 V max.,0 V min.	
Pin 24- D3A	+7.5 V max.,0 V min.	
Pin 27 - D1	+7.5 V max.,0 V min.	

2. ELECTRICAL CHARACTERISTICS:

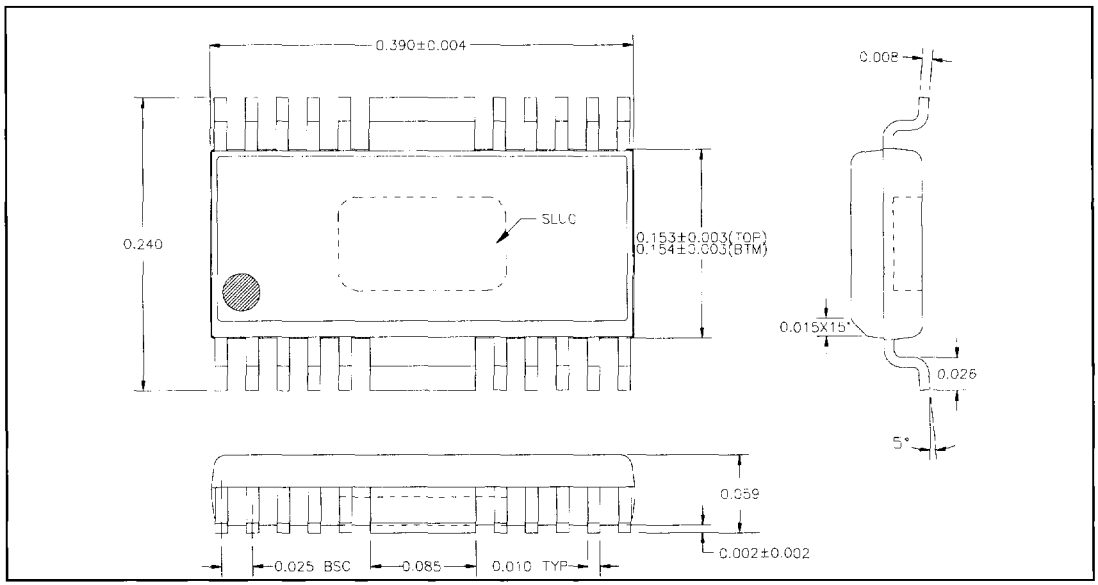
(Pin $\leq$ +7 dBm, V_{DS} = + 4.8V_{DC}, V_{GEN} = + 4.8 V_{DC}, Pulsed @ 577 µS/12.5% Duty Cycle, Tc= 25^{0}C, 50Ω Input & 50Ω external output match)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	PARAMETER
Frequency	fo	880		915	MHz
Power Output @ V_{REF} < 3.7 V	Pout		35		dBm
Power Added Efficiency	PAE		50		%
Harmonics (@ 35 dBm)	2fo 3rd		- 38 - 28		dBc
Stability: - 80 dBc, all spurious outputs relative to desired signal			6:1		VSWR load, all phase angles, (P_{OUT} <= 35dBm) V_{DS} = +4.8.0V, Zs = 50 Ω
Input Return Loss	R_{tnIN}		12		dB
Isolation			- 40		dBm
DC/DC Converter Current	I_{GEN}		5.5		mA
Pulse Control	I_{REF}			2	mA
Operating Range	Tc	- 20		+ 70	^{0}C

3. **DATA**



4. **Case Outline and Pin Description**



Pin	Signal	Description
1	GND	RF and DC Ground
2	RF_{IN}	RF power input, DC blocked
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 4 V)
4	V_{DB}	Bias circuit Supply (+ 4.8 V, 5 ma)
5	$V_{SS\ IN}$	Negative Supply (-4.5V) generated by the dc/dc converter
6,7,8,9	GND	RF and DC Ground (The "Batwing")
10	$V_{SS\ OUT}$	The output of the dc/dc converter providing the negative voltage
11,12		Pump capacitor (C5) which is part of the dc/dc converter circuit.
13	V_{GEN}	DC/DC converter positive supply
14	GND	AC and DC ground for the dc/dc converter .If possible should be grounded through a separate via hole .
15	GND	RF and DC ground.
16	V_{D2}	The open drain of the second amplifier stage
17	GND	RF and DC Ground
18	N/C	Not Connected
19	V_{D3B}	3rd stage drain supply (4.8V) and RF out
20,21,22,23	GND	RF and DC ground (the "BATWING")
24	V_{D3A}	3rd stage drain supply (4.8V) and RF out
25	N/C	Not Connected
26	GND	RF and DC ground
27	V_{D1}	1st stage drain supply (4.8V)
28	GND	RF and DC Ground

5. Recommended Operating Procedure on the Evaluation Board

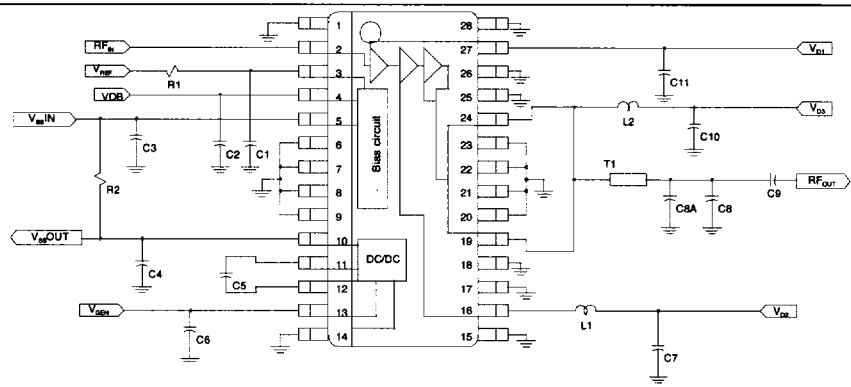
Power Up

A. Begin by setting all power supplies to zero volts.
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 -4.5 V and - 4.0V if voltage is not ,check the pin alignment.
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 + 4.8V. Little drain current should be flowing at this time (I_{DD} < 5 mA).
F. Turn RF on and adjust input power to 5 dBm.
G. Turn V_{REF} on using the pulsed scheme of GSM. Adjust Pulse V_{REF} to desired output power (< = 35 dBm). No lower than 0 V and no higher than +3.7 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 for that is that 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. AWT0908 TEST CIRCUIT



PIN	SIGNAL
1	GND
2	RF_{IN}
3	V_{REF}
4	V_{DB}
5	$V_{BAT}IN$
6	GND
7	GND
8	GND
9	GND
10	$V_{BAT}OUT$
11	CA
12	CB
13	V_{GEN}
14	GENGND
15	GND
16	V_{D2}
17	GND
18	GND
19	V_{D1B}
20	GND
21	GND
22	GND
23	GND
24	V_{D3A}
25	GND
26	GND
27	V_{D1}
28	GND

COMPONENTS

COMP.	VALUE	TYPE
C2	10N	0805
C3,C4,C6	1UF	0805
C5	100N	0603
C7,C10,C11	470P	0805
C8A	2.0P	0603
C9	33P	0805
C1	NOT USED	
C8	7P	0805
L1	6.8N	0805
L2	10N	C.C.1008
T1	W=80MIL	L=330MIL
R1	47	0603
R2	10	0603

1. Turn V_{GEN} on first (+4.8V)
2. Apply + 4.8 V to VD1, VD2, VDB
3. Apply +4.8 V to V_{D3}
4. Pulse V_{REF} between 0 V and 3.7 V