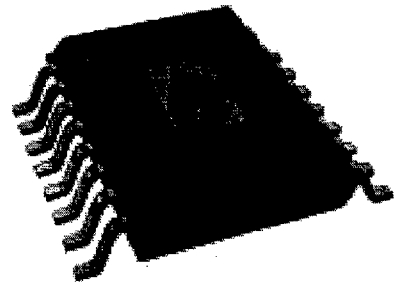
ANADIGICS®

AWT924S10
TX POWER MMIC
Advanced Product Information
Rev. 1

GSM/DCS DUAL BAND GaAs POWER AMPLIFIER IC

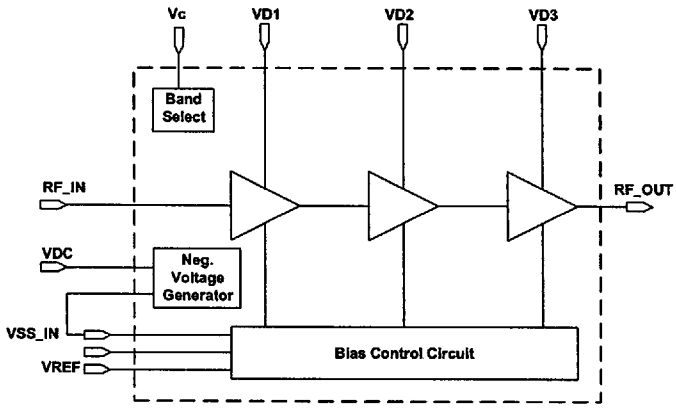
DESCRIPTION

The AWT924 is a monolithic GaAs Power Amplifier. It can be used in the following dual band handset applications: GSM900/DCS1800.



S10
16-SSOP
16 Pin Plastic Package with Heat Slug

BLOCK DIAGRAM



MAXIMUM RATINGS

PIN	SIGNAL	MAX RATING	PIN	SIGNAL	MAX RATING
1	V_{D1}	+7 V_{DC}	6	V_{SS}	-7 V_{DC}(*)
2	RF_{IN}	+15 dBm	7	V_{DC}	+7 V_{DC}
3	V_C	+7 V_{DC}	9	V_{D2}	+7 V_{DC}
4	V_{REF}	+5 V_{DC}	12,13	V_{D3} / RF_{OUT}	+7 V_{DC}
5	V_{DB}	+7 V_{DC}	-	-	-

Notes:
1. (*) Negative voltage of - 3.5 V at least must be present at this pin
2. Operating temperature: - 20 to 90°C
3. Storage temperature: -55 to 100°C

ELECTRICAL CHARACTERISTICS — GSM (1)

Pin = +6.0 dBm, f = 890 - 915 MHz, V_{DB}=V_{D1}=V_{D2}=V_{D3} = +4.8 V, V_{SS} = -4 V, V_C = 0, Tc = 25°C, Zo = 50Ω

Parameter	Symbol	Min	Typ	Max	Unit
Frequency	fo	890	-	915	MHz
Saturated Output Power	PSAT	34.5	35	-	dBm
Power Added Efficiency @ Psat -.2 dB	PAE	-	50	-	%
Harmonic (2) 2nd 3rd	 - -	-	 33 46	-	dBc
Isolation @ V_{REF} = 0.5V	-	-	-45	-	dBm
Statbility: -80 dBc, all spurious outputs relative to desired signal	-	-	6:1	-	VSWR load, all phase angles Zs = 50 ohm
Power Control Current VREF = +0.5V to +3.5V	I_{REF}	-	1	-	mA
Input Return Loss (1)	-	-	9.0	-	dB
RX Noise (3)	-	-	-	-90	dBm

Notes:
1. As measured in ANADIGICS test fixture under pulsed operation (PW = 577µS, DC = 1:8).
2. Measured @ P_{OUT} = 34.7 dBm.
3. Noise in RX Frequency band @ bandwidth = 30 KHz, frx = 935 - 960 MHz.

ELECTRICAL CHARACTERISTICS — DCS1800 (1)

Pin = +6.0 dBm, f = 1710 - 1785 MHz, V_{DB}=V_{D1}=V_{D2}=V_{D3} = +4.8 V, V_{SS} = -4 V, V_C =4.8V, Tc = 25°C, Zo = 50Ω

Parameter	Symbol	Min	Typ	Max	Unit
Frequency	fo	1710	-	1785	MHz
Saturated Output Power	PSAT	32	32.5	-	dBm
Power Added Efficiency @ Psat -.2 dB	PAE	-	40	-	%
Harmonic (2) 2nd 3rd	 - -	 - -	 36 46	 - -	dBc
Isolation @ V_{REF} = 0.5V	-	-	-35	-	dBm
Statbility: -80 dBc, all spurious outputs relative to desired signal	-	-	4:1	-	VSWR load, all phase angles Zs = 50 ohm
Power Control Current V_{REF} = +0.5V to +3.5V	I_{REF}	-	1	-	mA
Input Return Loss (1)	-	-	14	-	dB
RX Noise (3)	-	-	1	-82	dBm

Notes:
1. As measured in ANADIGICS test fixture under pulsed operation (PW = 577µS, DC = 1:8).
2. Measured @ 32.0 dBm.
3. Noise in RX frequency band @ bandwidth = 30 KHz. frx = 1805-1880 MHz.

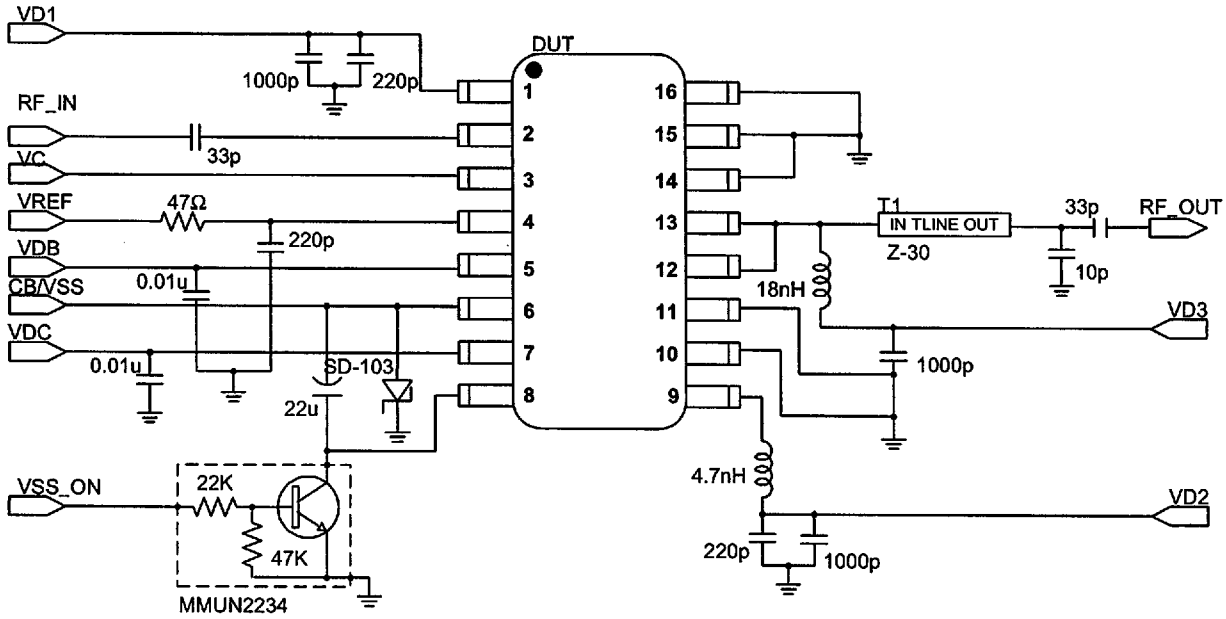
RECOMMENDED OPERATING PROCEDURE ON THE EVALUATION BOARD

Power Up:
Dual supply operation, (for Single Supply operation, please contact ANADIGICS).

a) Begin by setting all power supplies to zero volts.
b) Make sure that the input RF power is turned off.
c) Apply –4.0 V to V_{SS} (Pin 6)
d) Apply +4.8 V to V_{DB} V_{D1}, V_{D2} and V_{D3}.
e) Set V_C to 0.0 Volts for GSM operation or set V_C to 4.8 Volts for DCS operation.
f) Apply +6 dBm of RF power to pin 2 for GSM/DCS operation.
g) Apply a positive pulse train for GSM and DCS operation to V_{REF} (pin 4). Adjust pulse amplitude for desired output power.

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

AWT924 GSM PA TEST FIXTURE SCHEMATIC



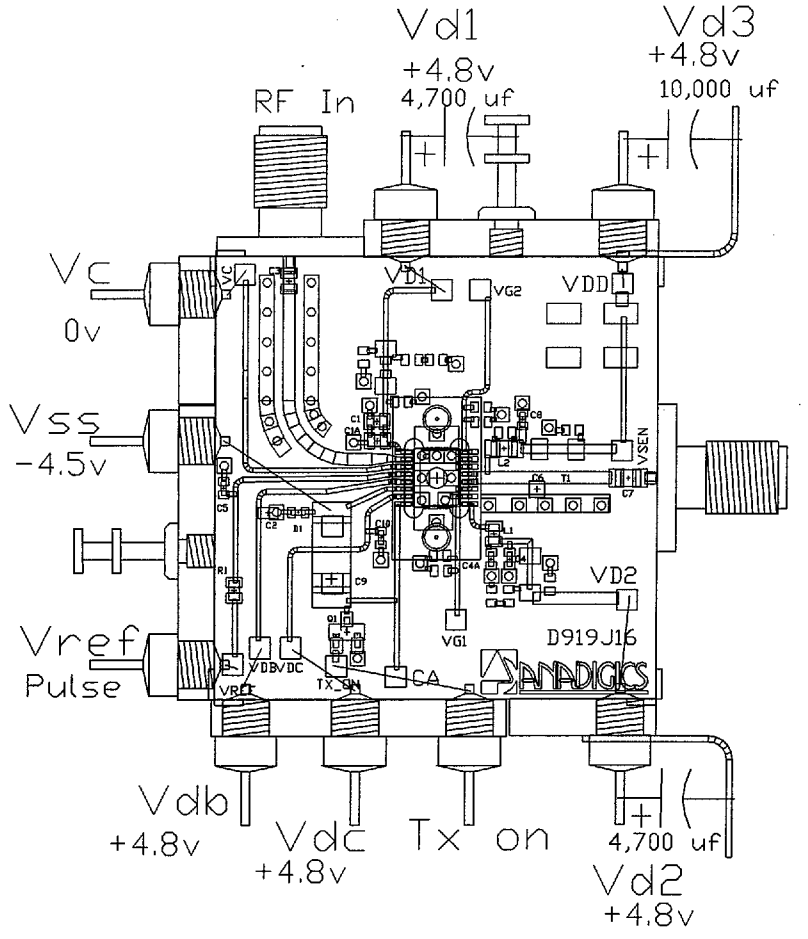
PIN	SIGNAL	DESCRIPTION
1	V_{D1}	1st stage drain supply (+ 4.8 V)
2	RF_{IN}	RF input power
3	V_C	Control voltage for band selection (0V-GSM, 3.0V – DCS)
4	V_{REF}	Bias control
5	V_{DB}	Bias circuit supply
6	C_B/V_{SS}	Negative supply connection
7	V_{DC}	Change pump suppy
8	C_A	Change pump capacitor connection
9	V_{D2}	2nd stage drain supply (+ 4.8 V)
10	GND	RF and DC ground
11	GND	RF and DC Ground
12,13	RF_{OUT} / V_{D3}	RF output and DC input for 3d stage
14	GND	RF and DC Ground
15	GND	RF and DC Ground
16	N/C	

GSM900 TEST FIXTURE

Turn on sequence:

1. Apply negative voltage (VSS = 4.5V), before applying positive voltage to drains.
2. Set VC to 0.0V for GSM operation.
3. Apply positive voltage (+4.8V) to VDB, VD1, VD2, VD3 pins.
4. Pulse VREF on and adjust for desired output power level.

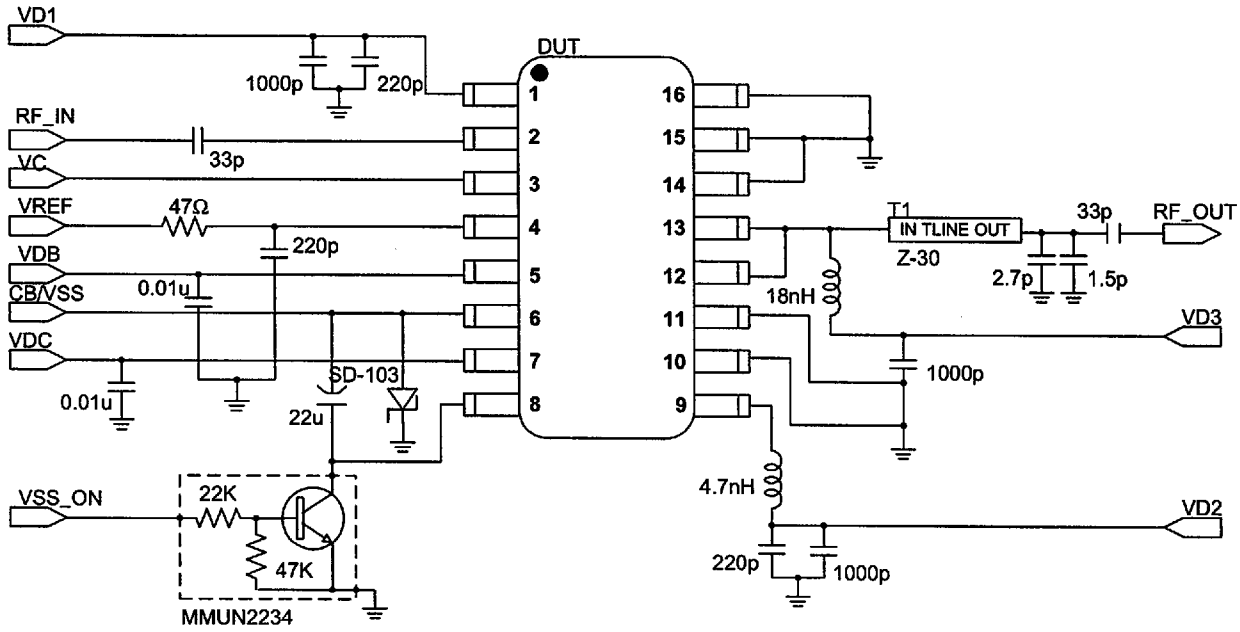
Turn off sequence in reverse order of above



GSM operation

REF	DESCRIPTION	SIZE
C1	1000 pf	0603
C1A	220 pF	0603
C2	0.01 uf	0603
C3	33 pF	0805
C4	1000 pF	0603
C4A	220 pf	0603
C5	220 pF	0603
C6	10.0 pF	ATC
C7	33 pF	0805
C8	1000 pF	0603
C9	22 uf	Tant
C10	.01 uf	0603
R1	47 ohms	0603
L1	4.7 nh	LL1608
L2	18 nh	1008
D1	SD-103	
Q1	MMUN2234	

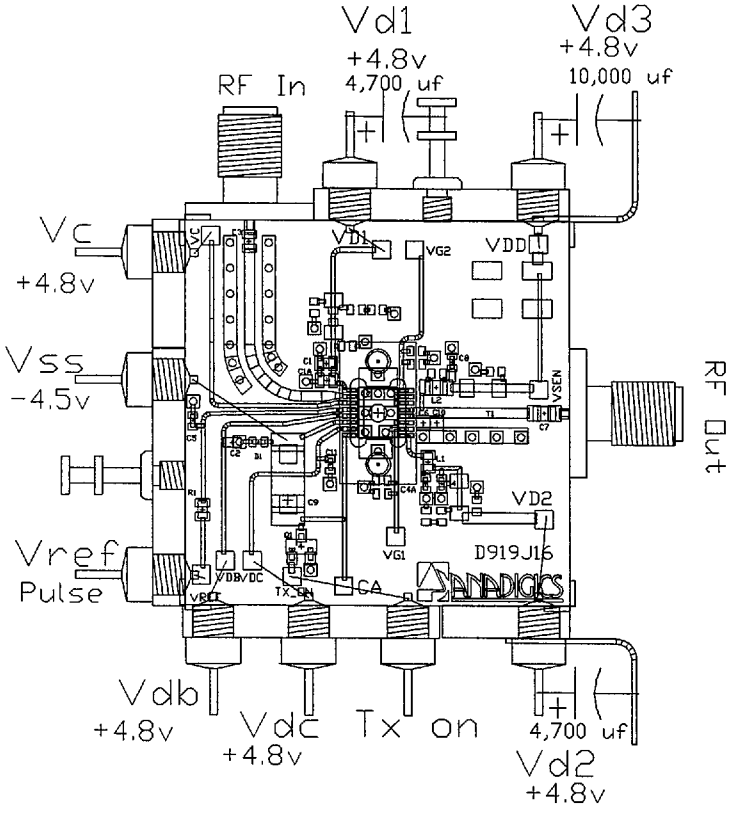
DCS PA TEST FIXTURE SCHEMATIC



Turn on sequence:

1. Apply negative voltage (VSS = 4.5V), before applying positive voltage to drains.
2. Set VC to +4.8V for DCS operation.
3. Apply input power.
4. Apply positive voltage (+4.8V) to VDB, VD1, VD2, VD3 pins.
5. Pulse VREF on and adjust for desired output power level.

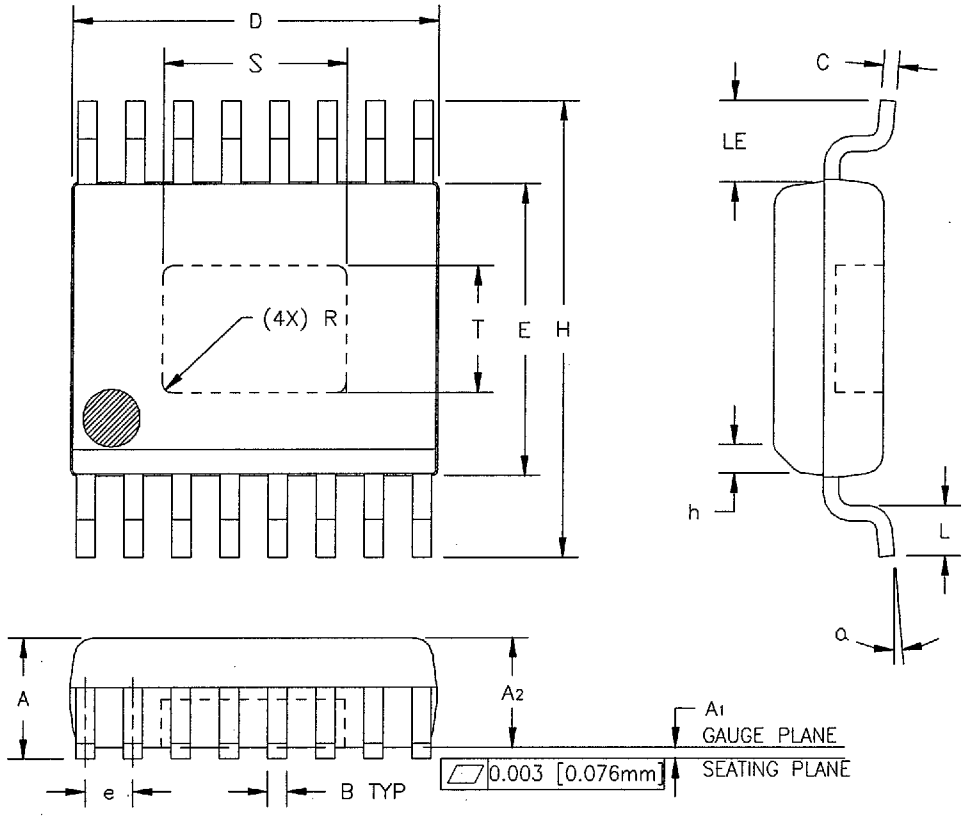
Turn off sequence in reverse order of above.



DCS operation

REF	DESCRIPTION	SIZE
C1	1000 pf	0603
C1A	220 pF	0603
C2	0.01 uf	0603
C3	33 pF	0805
C4	1000 pF	0603
C4A	220 pf	0603
C5	220 pF	0603
C6	2.7 pF	ATC
C7	33 pF	0805
C8	1000 pF	0603
C9	22 uf	Tant
C10	1.5 pF	ATC
C11	0.01 uF	0603
R1	47 ohms	0603
L1	4.7 nh	LL1608
L2	18 nh	1008
D1	SD-103	
Q1	MMUN2234	

CASE OUTLINE AND PIN DESCRIPTION



SYMBOL	INCHES		MILLIMETERS		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	0.053	0.068	1.35	1.73	
A1	0.000	0.004	0.00	0.10	6
A2	0.052	0.064	1.32	1.63	
B	0.008	0.012	0.20	0.30	
C	0.006	0.009	0.15	0.23	
D	0.191	0.196	4.85	4.98	2
E	0.147	0.157	3.73	3.99	3
e	0.025 BSC		0.63 BSC		4
H	0.228	0.246	5.79	6.25	
h	0.014	0.016	0.36	0.41	
L	0.016	0.040	0.41	1.02	
LE	0.036	0.049	0.91	1.25	
α	0°	8°	0°	8°	
S	0.070	0.100	1.78	2.54	5
T	0.040	0.070	1.02	1.78	5
R	0.015 REF.		0.38 REF.		5

NOTES:

1. CONTROLLING DIMENSION: INCHES
2. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 0.006 [0.15mm] PER SIDE.
3. DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED 0.010 [0.25mm] PER SIDE.
4. MAXIMUM LEAD TWIST/SKEW TO BE 0.002 [0.05mm]
5. DIMENSION "S", "T" AND "R" INDICATE EXPOSED SLUG AREA.
6. A1 STAND OFF IS MEASURED FROM BOTTOM OF HEAT SLUG TO THE SEATING PLANE.

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