ALT6526

Multi-Band LTE/CDMA/WCDMA/HSPA Power Amplifier

DATA SHEET - Rev 2.5

FEATURES

- LTE, WCDMA/HSPA & CDMA/EVDO Applications
- High Output Power
  - ≥ +27.3 dBm in LTE
  - ≥ +28.6 dBm in WCDMA (R99)
  - ≥ +27.5 dBm in CDMA (RC1)
- High Efficiency
  - 40% in high power mode (WCDMA mode)
- Low profile 5 mm x 7 mm x 0.9 mm package
- 2 input ports, 5 output ports, all matched to 50 Ω impedance
- Integrated voltage regulator
- Built-in Directional Coupler
- Internal DC block on IN/OUT RF ports
- Low leakage in shutdown mode
- ESD Protection on all pins
- RoHS-compliant package, MSL-3, 260°C

22 Pin 5 mm x 7 mm x 0.9 mm Surface Mount Module

APPLICATIONS

- LTE, WCDMA/HSPA handsets and data devices operating in UMTS Bands 1, 2, 3, 4, 5, 8, 9,10, 18, 19, 20, 25, and 26
- CDMA/EV-DO handsets and data devices operating in Band Class 0, 1, 4, 6, 8, 10, 14G and 15

PRODUCT DESCRIPTION

The ALT6526 Power Amplifier module is designed for 3G/4G handsets, smartphones, modems and modules operating in LTE, WCDMA/HSPA and CDMA/EVDO modes. The module includes separate InGaP HBT amplifier chains - one to support 850/900 bands, the other for 1700/1900/2100MHz bands. An innovative design allows the module to switch output among as many as 5 different frequency bands. Both the input and output RF ports are internally matched to 50 Ω. The ALT6526 offers improved efficiency and low quiescent current, and includes integrated daisy chained couplers to simplify board design and layout.

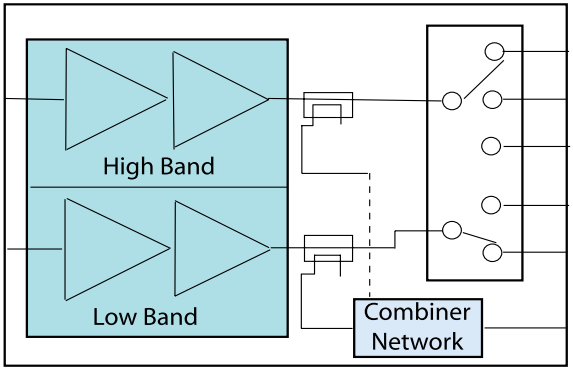


Figure 1: Block Diagram

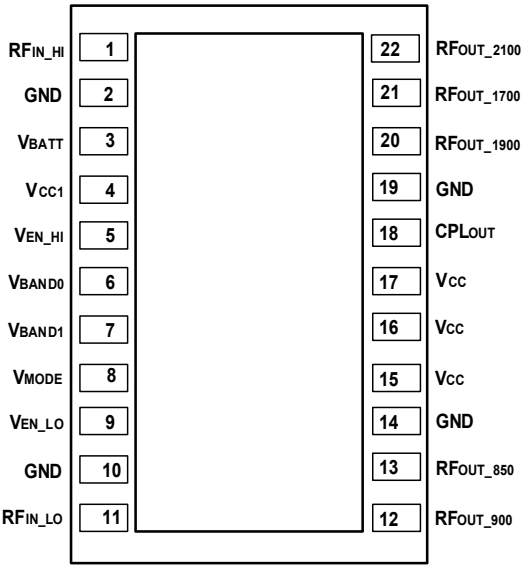


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	RF_{IN_HI}	RF Input for 1700/1800/1900 MHz Bands	12	RF_{OUT_900}	RF Output for 900 MHz Band
2	GND	Ground	13	RF_{OUT_850}	RF Output for 850 MHz Band
3	V_{BATT}	Battery Voltage	14	GND	Ground
4	V_{CC1}	Supply Voltage	15	V_{CC}	Supply Voltage
5	V_{EN_HI}	Enable Voltage for High Bands	16	V_{CC}	Supply Voltage
6	V_{BAND0}	Low Band Select Voltage	17	V_{CC}	Supply Voltage
7	V_{BAND1}	High Band Select Voltage	18	$CPL_{\_OUT}$	Coupler Output Port
8	V_{MODE}	Mode Control Voltage	19	GND	Ground
9	V_{EN_LO}	Enable Voltage for Low Bands	20	RF_{OUT_1900}	RF Output for 1900 MHz Band
10	GND	Grounds	21	RF_{OUT_1700}	RF Output for 1700 MHz Band
11	RF_{IN_LO}	RF input for 850/900 MHz Bands	22	RF_{OUT_2100}	RF Output for 2100 MHz Band

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (V_{BATT}, V_{CC}, V_{CC1})	0	+5	V
Control Voltages (V_{MODE}, $V_{BAND0/1}$)	0	+3.5	V
Enable Voltages (V_{EN_HI}, V_{EN_LO})	0	+3.5	V
Input RF power (RF_{IN_HI}, RF_{IN_LO})	-	+10	dBm
Storage temperature	-40	+150	°C

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Table 3: DC Operating Parameters

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Supply Voltage (V_{CC} & V_{CC1})	+0.7	+3.3	+4.35	V	
Supply Voltage (V_{BATT})	+2.9	+3.3	+4.35	V	
Control Voltages (V_{MODE}, $V_{BAND0/1}$)	+1.35 0	+1.8 -	+3.1 +0.4	V	Select High State Select Low State
Enable Voltage (V_{EN_HI}, V_{EN_LO})	+1.35 0	+1.8 -	+3.1 +0.4	V	Select High State Select Low State
Mode Control Current	-	<0.1	0.12	mA	through V_{MODE} pin, V_{MODE} = +1.8 V
Enable Current	-	<0.1	0.12	mA	through V_{EN_HI}, V_{EN_LO}
BAND Control Current	-	<0.1	0.12	mA	through V_{BAND0} or V_{BAND1} pins
BATT Current	-	2.3	5	mA	through V_{BATT} pin, V_{MODE} = +1.8 V
Leakage Current (total)	-	<5	11	µA	V_{BATT} = +4.5 V, V_{CC} = +4.5 V, Shutdown Mode (All V_{BATT} & V_{CC} Pins)

Table 4: RF Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency (f)	816	-	849	MHz	UMTS Band 5, 19, BC 0, BC 10
	814	-	862		UMTS Band 18, 20, 26
	880	-	915		UMTS Band 8
	1710	-	1785		UMTS Band 3, 4, 9, 10, BC 4, 8, 15
	1850	-	1915		UMTS Band 2 & 25, BC 1 & 14G
	1920	-	1980		UMTS Band 1, BC 6
Output Power (UMTS)				dBm	
R99, HPM	+28.0 (1)	+28.6	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
HSPA (MPR = 0), HPM (2)	+26.9 (1)	+27.5	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
LTE (MPR = 0), HPM (3)	+26.8 (1)	+27.4	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
R99, HPM	+10.0 (1)	+10.6	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
HSPA (MPR = 0), LPM (2)	+9.0 (1)	+9.6	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
LTE (MPR = 0), LPM (3)	+9.0 (1)	+9.6	-		UMTS Band 1, 3, 4, 5, 9, 10, 19
LTE (MPR = 0), HPM (3)	+26.7	+27.3	-		UMTS Band 18, 20, 26
LTE (MPR = 0), LPM (3)	+9.0	+9.6	-		UMTS Band 18, 20, 26
R99, HPM	+28.4 (1)	+29.0	-		UMTS Band 2, 25
HSPA (MPR = 0), HPM (2)	+27.3 (1)	+27.9	-		UMTS Band 2, 25
LTE (MPR = 0), HPM (3)	+27.1 (1)	+27.7	-		UMTS Band 2, 25
R99, LPM	+10.0 (1)	+10.6	-		UMTS Band 2, 25
HSPA (MPR = 0), LPM (2)	+9.0 (1)	+9.6	-		UMTS Band 2, 25
LTE (MPR = 0), LPM (3)	+9.0 (1)	+9.6	-		UMTS Band 2, 25
R99, HPM	+28.1 (1)	+28.7	-		UMTS Band 8
HSPA (MPR = 0), HPM (2)	+27.0 (1)	+27.6	-		UMTS Band 8
LTE (MPR = 0), HPM	+26.9 (1)	+27.5	-		UMTS Band 8
R99, LPM	+10.0 (1)	+10.6	-		UMTS Band 8
HSPA (MPR = 0), LPM (2)	+9.0 (1)	+9.6	-		UMTS Band 8
LTE (MPR = 0), LPM	+9.0 (1)	+9.6	-		UMTS Band 8
CDMA Output Power				dBm	
CDMA2000 (RC1), HPM	+27.1 (1)	+27.7	-		Band Class 4, 6, 8, 15
CDMA2000 (RC1), LPM	+9.0 (1)	+9.6	-		
CDMA2000 (RC1), HPM	+26.9 (1)	+27.5	-		Band Class 0, 10
CDMA2000 (RC1), LPM	+9.0 (1)	+9.6	-		
CDMA2000 (RC1), HPM	+27.5 (1)	+28.1	-		Band Class 1, 14G
CDMA2000 (RC1), LPM	+9.0 (1)	+9.6	-		
Case Temperature (T_C)	-40	-	+105	°C	

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

Notes:
(1) For operations at 3.2 V or 105 °C, P_{OUT} is derated by 0.6 dB.
(2) 3GPP TS 34.121-1, Rec .8 Table C 11.1.3 subtest 1.
(3) LTE waveform characteristics: up to 20 MHz BW, QPSK, RB = 18.

Table 4a: Electrical Specifications - Band 1 (2100 MHz) LTE Operation (RB = 12, START = 0, QPSK) (+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = +1.8 V, V_{BAND0} = V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS		
					P_{OUT}	V_{CC}	V_{MODE}
Gain	25 - 9	28.5 19 13	32.5 - 16	dB	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
E-UTRA at ± 10 MHz offset	- - -	-38 -41 -40	-34 - -34	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR1 at ± 7.5 MHz offset (1)	- - -	-39 -40 -41	-36 - -36	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR2 at ± 12 MHz offset	- - -	-60 -60 -60	-40 - -40	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
Efficiency (1)	30.5 -	36 3.5	- -	%	+27.4 dBm +9.6 dBm	3.3 V 3.3 V	0 V +1.8 V
Quiescent Current	-	40	-	mA	through V_{CC1} + V_{CC} pins, V_{MODE} = 1.8 V		
Noise in Receive Band	-	-135	-	dBm/Hz	2110 - 2170 MHz		
GPS Noise	-	-137	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
ISM Noise	-	-145	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
Out of Band Gain Rx Band GPS Band ISM Band	 - - -	 G - 2.8 G - 2.4 G - 8	 - - -	dB	G = In-band Gain		
Harmonics $2f_O$ $3f_O$, $4f_O$	 - -	 -42 -50	 -30 -35	dBc			
Input Impedance	-	-	2:1	VSWR			
Suprious Output Level (all spurious outputs)	-	-	-70	dBc	See note 2.		
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over full operating range		
Coupling factor	-	27.5	-	dB			

Table 4b: Electrical Specifications - Band 1 (2100 MHz) WCDMA Operation (R99 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = +1.8 V, V_{BAND0} = V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
ACLR1 at 5 MHz offset (1)	- -	-41 -40	-37 -37	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
ACLR2 at 10 MHz offset	- -	-55 <-60	-48 -48	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
Efficiency (1)	35 -	41 4	- -	%	+28.6 dBm +10.6 dBm	0 V 1.8 V

Table 4c: Electrical Specifications - Band Class 6 (2100 MHz) CDMA 2000 Operation (RC-1 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = +1.8 V, V_{BAND0} = V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
Adjacent Channel Power (1) at ± 1.25 MHz offset Primary Channel BW = 1.23 MHz	- -	-51 -51	-46.5 -46.5	dBc	+27.7 dBm +9.6 dBm	0 V 1.8 V
Alternate Channel Power (1) at ± 1.98 MHz offset Primary Channel BW = 1.23 MHz	- -	-57 <-60	-54 -54	dBc	+27.7 dBm +9.6 dBm	0 V 1.8 V

Notes (Applicable to Tables 4a, 4b and 4c):
(1) ACLR and Efficiency measured at 1950 MHz.
(2) P_{OUT} < +28.7 dBm, In-band load VSWR < 5:1, Out-of-band load VSWR < 10:1. Applies over all operating conditions.

Table 5a: Electrical Specifications - Band 2/25 (1900 MHz) LTE Operation (RB = 12, START = 0, QPSK) (+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND1} = +1.8 V, V_{BAND0} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS		
					P_{OUT}	V_{CC}	V_{MODE}
Gain	25.5 - 10	28.5 20 13.5	32 - 16.5	dB	+27.7 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
E-UTRA at ± 10 MHz offset	- - -	-38 -42 -40	-34 - -34	dBc	+27.7 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR1 at ± 7.5 MHz offset (1)	- - -	-39 -43 -41	-36 - -36	dBc	+27.7 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR2 at ± 12 MHz offset	- - -	-60 -60 -60	-40 - -40	dBc	+27.7 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
Efficiency (1)	30.5 -	36 3.5	- -	%	+27.7 dBm +9.6 dBm	3.3 V 3.3 V	0 V +1.8 V
Quiescent Current	-	40	-	mA	through V_{CC1} + V_{CC} pins, V_{MODE} = 1.8 V		
Noise in Receive Band	-	-135	-	dBm/Hz	1930 - 1990 MHz		
GPS Noise	-	-137	-	dBm/Hz	P_{OUT} ≤ 27.7 dBm		
ISM Noise	-	-149	-	dBm/Hz	P_{OUT} ≤ 27.7 dBm		
Out of Band Gain Rx Band GPS Band ISM Band	 - - -	 G - 0.5 G - 0.8 G - 8	 - - -	dB	G = In-band Gain		
Harmonics 2f_O 3f_O, 4f_O	 - -	 -40 -46	 -35 -35	dBc			
Input Impedance	-	-	2:1	VSWR			
Suprious Output Level (all spurious outputs)	-	-	-70	dBc	See note 2		
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over full operating range		
Coupling factor	-	29	-	dB			

Table 5b: Electrical Specifications - Band 2/25 (1900 MHz) WCDMA Operation (R99 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND1} = +1.8 V, V_{BAND0} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
ACLR1 at 5 MHz offset (1)	- -	-41 -40	-37 -37	dBc	+29.0 dBm +10.6 dBm	0 V 1.8 V
ACLR2 at 10 MHz offset	- -	-53 <-60	-48 -48	dBc	+29.0 dBm +10.6 dBm	0 V 1.8 V
Efficiency (1)	35 -	40 4	- -	%	+29.0 dBm +10.6 dBm	0 V 1.8 V

Table 5c: Electrical Specifications - Band Class 1 (1900 MHz) CDMA2000 Operation (RC-1 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND1} = +1.8 V, V_{BAND0} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
Adjacent Channel Power (1) at ± 1.25 MHz offset Primary Channel BW = 1.23 MHz	- -	-52 -51	-46.5 -46.5	dBc	+28.1 dBm +9.6 dBm	0 V 1.8 V
Alternate Channel Power (1) at ± 1.98 MHz offset Primary Channel BW = 1.23 MHz	- -	-57 <-60	-54 -54	dBc	+28.1 dBm +9.6 dBm	0 V 1.8 V

Notes (Applicable to Tables 5a, 5b and 5c):
(1) ACLR and Efficiency measured at 1882.5 MHz.
(2) Pout ≤ 27.7 dBm, In-band load VSWR < 5:1, Out-of-band load VSWR ≤ 10:1. Applies over all operating conditions

Table 6a: Electrical Specifications - Band 3/4 (1700 MHz) LTE Operation (RB = 12, START = 0, QPSK)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND0} = +1.8 V, V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS		
					P_{OUT}	V_{CC}	V_{MODE}
Gain	26 - 9	28.5 18 13	32.5 - 16	dB	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
E-UTRA at ± 10 MHz offset	- - -	-38 -39 -40	-34 - -34	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR1 at ± 7.5 MHz offset (1)	- - -	-39 -40 -41	-36 - -36	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR2 at ± 12 MHz offset	- - -	-60 -60 -60	-40 - -40	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
Efficiency (1)	30.5 -	36 3.5	- -	%	+27.4 dBm +9.6 dBm	3.3 V 3.3 V	0 V +1.8 V
Quiescent Current	-	40	-	mA	through V_{CC1} + V_{CC2} pins, V_{MODE} = 1.8 V		
Noise in Receive Band	- -	-135 -142	- -	dBm/Hz	1805 - 1880 MHz 2110 - 2155 MHz		
GPS Noise	-	-134	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
ISM Noise	-	-149	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
Out of Band Gain Rx Band (B3) Rx Band (B4) GPS Band ISM Band	 - - - -	 G G - 2 G - 1 G - 10	 - - - -	dB	G = In-band Gain		
Harmonics 2f_O 3f_O, 4f_O	 - -	 -42 -55	 -30 -35	dBc	P_{OUT} ≤ +27.4 dBm		
Input Impedance	-	2:1	-	VSWR			
Suprious Output Level (all spurious outputs)	-	-	-70	dBc	See note 2.		
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over full operating range		
Coupling factor	-	28.5	-	dB			

Table 6b: Electrical Specifications - Band 3/4 (1700 MHz) WCDMA Operation (R99 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND0} = +1.8 V, V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
ACLR1 at 5 MHz offset (1)	- -	-41 -40	-37 -37	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
ACLR2 at 10 MHz offset	- -	-55 <-60	-48 -48	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
Efficiency (1)	35 -	41 4	- -	%	+28.6 dBm +10.6 dBm	0 V 1.8 V

Table 6c: Electrical Specifications - Band Class 8 (1700 MHz) CDMA Operation (RC-1 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND0} = +1.8 V, V_{BAND1} = 0 V, V_{EN_LO} = 0 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
Adjacent Channel Power (1) at ± 1.25 MHz offset Primary Channel BW = 1.23 MHz	- -	-52 -52	-46.5 -46.5	dBc	+27.7 dBm +9.6 dBm	0 V 1.8 V
Alternate Channel Power (1) at ± 1.98 MHz offset Primary Channel BW = 1.23 MHz	- -	-57 <-60	-54 -54	dBc	+27.7 dBm +9.6 dBm	0 V 1.8 V

Notes (Applicable to Tables 6a, 6b and 6c):
(1) ACLR and Efficiency measured at 1747.5 MHz.
(2) P_{OUT} < +28.6 dBm; In-band load VSWR < 5:1; Out-of-band load VSWR < 10:1; Applies over all operating conditions.

Table 7a: Electrical Specifications - Band 5 (850 MHz) LTE Operation (RB = 12, START = 0, QPSK)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = 0 V, V_{BAND1} = V_{BAND0} = +1.8 V, V_{EN_LO} = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS		
					P_{OUT}	V_{CC}	V_{MODE}
Gain	25.5 - 10	28 17 13	31.5 - 16.5	dB	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
E-UTRA at ± 10 MHz offset	- - -	-38 -41 -40	-34 - -34	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR1 at ± 7.5 MHz offset (1)	- - -	-39 -42 -40	-36 - -36	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR2 at ± 12 MHz offset	- - -	-60 -60 -60	-40 - -40	dBc	+27.4 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
Efficiency (1)	30.5 -	35 4	- -	%	+27.4 dBm +9.6 dBm	3.3 V 3.3 V	0 V +1.8 V
Quiescent Current	-	35	-	mA	through V_{CC1} + V_{CC} pins, V_{MODE} = 1.8 V		
Noise in Receive Band	-	-132 -136	- -	dBm/Hz	741 - 821 MHz (2) 862 - 894 MHz		
GPS Noise	-	-158	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
ISM Noise	-	-160	-	dBm/Hz	P_{OUT} ≤ 27.4 dBm		
Out of Band Gain Rx Band GPS Band ISM Band	 - - -	 G - 0.7 G - 40 G - 50	 - - -	dB	G = In-band Gain		
Harmonics 2f_O 3f_O, 4f_O	 - -	 -44 -50	 -35 -35	dBc	P_{OUT} ≤ +27.4 dBm		
Input Impedance	-	2:1	-	VSWR			
Suprious Output Level (all spurious outputs)	-	-	-70	dBc	See note 3.		
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over full operating range		
Coupling factor	-	27.5	-	dB			

Table 7b: Electrical Specifications - Band 5 (850 MHz) WCDMA Operation (R99 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = 0 V, V_{BAND1} = V_{BAND0} = +1.8 V, V_{EN_LO} = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
ACLR1 at 5 MHz offset (1)	- -	-41 -41	-37 -37	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
ACLR2 at 10 MHz offset	- -	-57 <-60	-48 -48	dBc	+28.6 dBm +10.6 dBm	0 V 1.8 V
Efficiency (1)	34 -	39 4	- -	%	+28.6 dBm +10.6 dBm	0 V 1.8 V

Table 7c: Electrical Specifications - Band Class 0/10 (850 MHz) CDMA2000 Operation (RC-1 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = 0 V, V_{BAND1} = V_{BAND0} = +1.8 V, V_{EN_LO} = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
Adjacent Channel Power (1) at ± 885KHz offset Primary Channel BW = 1.23 MHz	- -	-51 -50	-46.5 -46.5	dBc	+27.5 dBm +9.6 dBm	0 V 1.8 V
Alternate Channel Power (1) at ± 1.98 MHz offset Primary Channel BW = 1.23 MHz	- -	-60 <-63	-57 -57	dBc	+27.5 dBm +9.6 dBm	0 V 1.8 V

Notes (Applicable to Tables 7a, 7b and 7c):
(1) ACLR and Efficiency measured at 833 MHz.
(2) TS36.101, Table 7.3.1-2
(3) P_{OUT} < +28.6 dBm, In-band load VSWR < 5:1, Out-of-band load VSWR < 10:1. Applies over all operating conditions.

Table 8a: Electrical Specifications - Band 8 (900 MHz) LTE Operation (RB = 12, START = 0, QPSK) (+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND1} = V_{BAND0} = 0 V, V_{EN_LO} = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS		
					P_{OUT}	V_{CC}	V_{MODE}
Gain	25.5 - 9.5	28 17 12.5	31.5 - 16	dB	+27.5 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
E-UTRA at ± 10 MHz offset	- - -	-38 -39 -39	-34 - -34	dBc	+27.5 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR1 at ± 7.5 MHz offset (1)	- - -	-39 -40 -41	-36 - -36	dBc	+27.5 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
ACLR2 at ± 12 MHz offset	- - -	-60 -60 -60	-40 - -40	dBc	+27.5 dBm +3 dBm +9.6 dBm	3.3 V 0.7 V 3.3 V	0 V 0 V +1.8 V
Efficiency (1)	30.5 -	35 4	- -	%	+27.5 dBm +9.6 dBm	3.3 V 3.3 V	0 V +1.8 V
Quiescent Current	-	35	-	mA	through V_{CC1} + V_{CC} pins, V_{MODE} = 1.8 V		
Noise in Receive Band	-	-136	-	dBm/Hz	925 - 960 MHz		
GPS Noise	-	-160	-	dBm/Hz	P_{OUT} ≤ 27.5 dBm		
ISM Noise	-	-160	-	dBm/Hz	P_{OUT} ≤ 27.5 dBm		
Out of Band Gain Rx Band GPS Band ISM Band	 - - -	 G - 0.5 G - 30 G - 50	 - - -	dB	G = In-band Gain		
Harmonics 2fo 3fo, 4fo	 - -	 -42 -50	 -30 -35	dBc	P_{OUT} ≤ +27.5 dBm		
Input Impedance	-	-	2:1	VSWR			
Suprious Output Level (all spurious outputs)	-	-	-70	dBc	See note 2.		
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	Applies over full operating range		
Coupling factor	-	27.5	-	dB			

Table 8b: Electrical Specifications - Band 8 (900 MHz) WCDMA Operation (R99 Waveform)
(+25 °C, V_{BATT} = V_{CC} = +3.3 V, V_{EN_HI} = V_{BAND1} = V_{BAND0} = 0 V, V_{EN_LO} = 1.8 V)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS	
					P_{OUT}	V_{MODE}
ACLR1 at 5 MHz offset (1)	- -	-41 -40	-37 -37	dBc	+28.7 dBm +9.6 dBm	0 V 1.8 V
ACLR2 at 10 MHz offset	- -	-56 <-60	-48 -48	dBc	+28.7 dBm +9.6 dBm	0 V 1.8 V
Efficiency (1)	34 -	39 4	- -	%	+28.7 dBm +9.6 dBm	0 V 1.8 V

Notes (Applicable to Tables 8a and 8b):
(1) ACLR and Efficiency measured at 897.5 MHz.
(2) P_{OUT} < +28.7 dBm, In-band load VSWR < 5:1, Out-of-band load VSWR < 10:1. Applies over all operating conditions.

LOGIC PROGRAMMING

Table 9: Logic Interface Specifications

MODE OF OPERATION	V_{EN_HI}	V_{EN_LO}	V_{BAND0}	V_{BAND1}	V_{MODE}
UMTS Band 1, CDMA BC 6	High	Low	Low	Low	X
UMTS Band 2 & 25 CDMA BC 1, 6, 14G	High	Low	Low	High	X
UMTS Band 3, 4, 9, 10 CDMA BC 4, 8, 15	High	Low	High	Low	X
UMTS Band 5, 18, 19, 20, 26 BC 0, 10	Low	High	High	High	X
UMTS Band 8	Low	High	Low	Low	X
Standby Mode	Low	Low	X	X	X
Shutdown Mode	Low	Low	Low	Low	X
High Power Mode (HPM)	X	X	X	X	Low
Low Power Mode (LPM)	X	X	X	X	High

APPLICATION INFORMATION

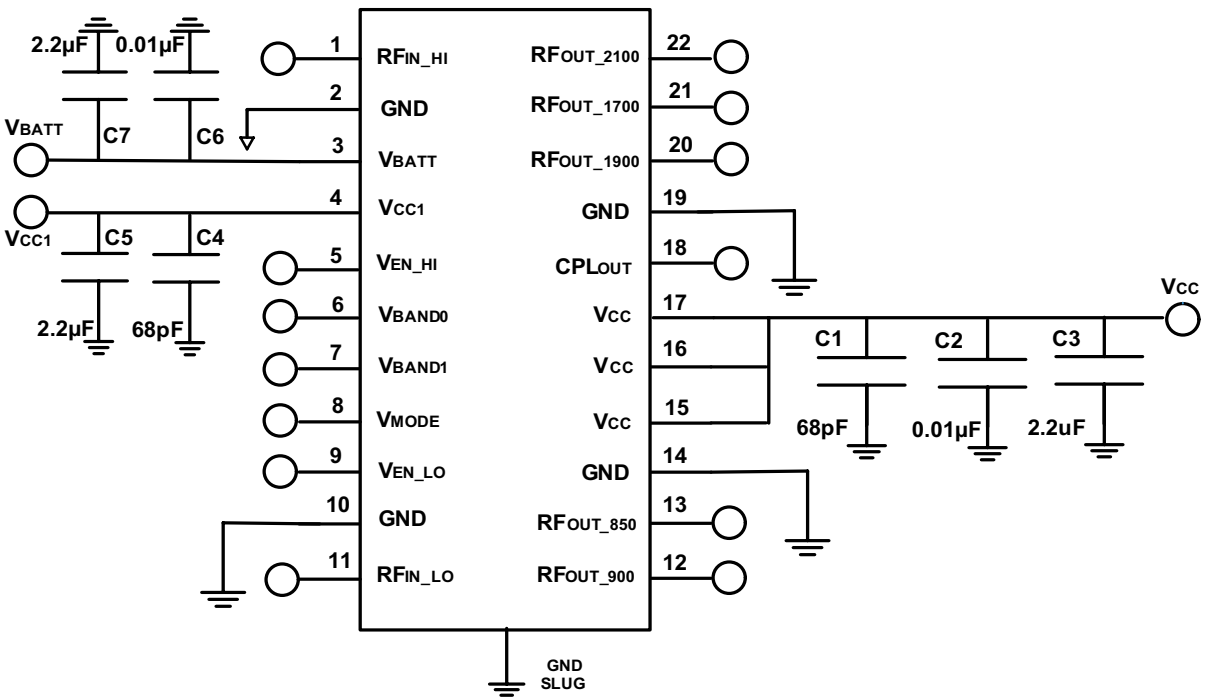
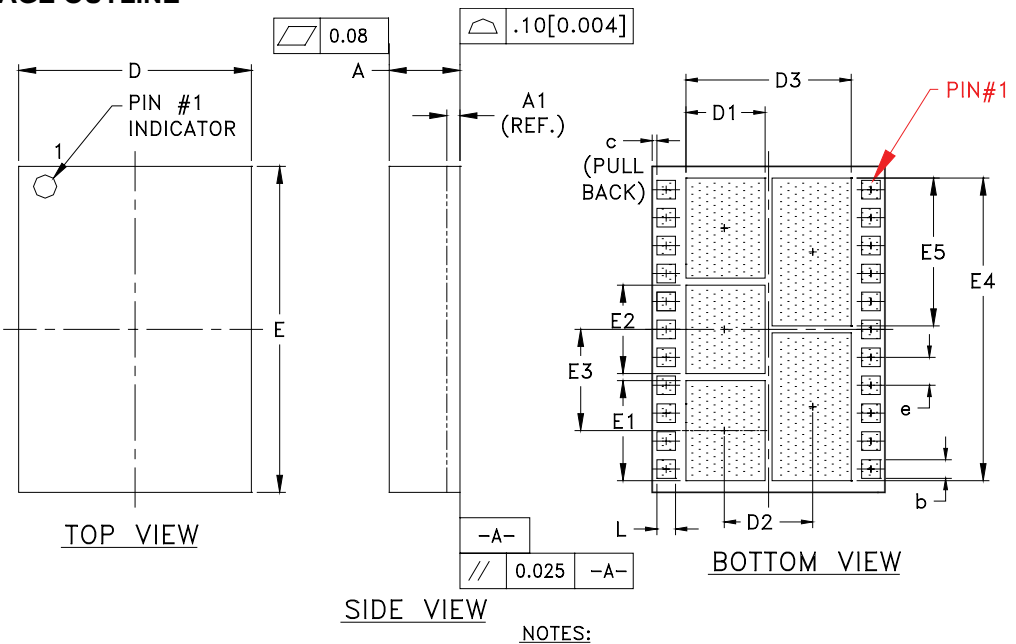


Figure 3: Evaluation Board

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.874	0.904	0.994	0.034	0.036	0.039	–
A1	–	0.304	–	–	0.012	–	–
b	0.350	0.400	0.450	0.014	0.016	0.018	3
c	–	0.100	–	–	0.004	–	–
D	4.880	5.000	5.120	0.192	0.197	0.202	–
D1	1.575	1.625	1.675	0.062	0.064	0.066	3
D2	1.725	1.775	1.825	0.068	0.070	0.072	3
D3	3.350	3.400	3.450	0.132	0.134	0.136	3
E	6.880	7.000	7.120	0.271	0.276	0.280	–
E1	2.100	2.150	2.200	0.083	0.085	0.087	3
E2	1.850	1.900	1.950	0.073	0.075	0.077	3
E3	2.125	2.175	2.225	0.084	0.086	0.088	3
E4	6.450	6.500	6.550	0.254	0.256	0.258	3
E5	3.125	3.175	3.225	0.123	0.125	0.127	3
e		0.600			0.024		3
L	0.350	0.400	0.450	0.014	0.016	0.018	3

NOTES:

1. CONTROLLING DIMENSIONS: MILLIMETERS
2. UNLESS SPECIFIED TOLERANCE=±0.076[0.003].
3. ACTUAL PAD SIZE AND LOCATION WILL VARY WITHIN MIN. AND MAX. DIMENSIONS ACCORDING TO SPECIFIC LAMINATE DESIGN.
4. PITCH MEASUREMENT (e) TAKEN CENTERLINE TO CENTERLINE OF SOLDER MASK OPENINGS.
5. UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.

Figure 4: Package Outline - 22 Pin 5 mm x 7 mm x 0.9 mm Surface Mount Module

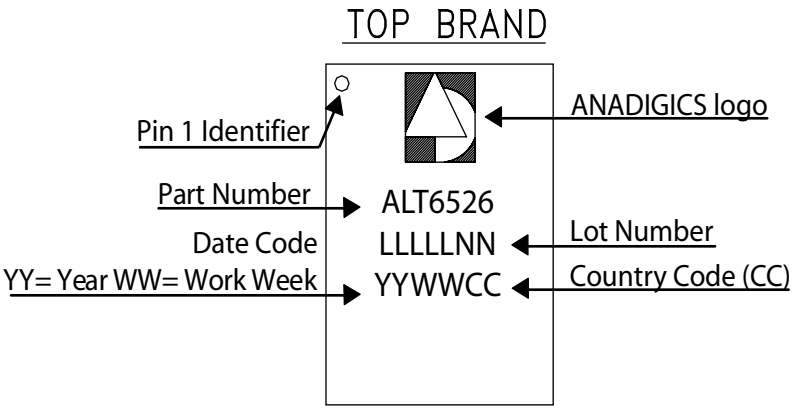


Figure 5: Branding Specification

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
ALT6526P8	-40 °C to +105 °C	RoHS Compliant 22 Pin 5 mm x 7 mm x 0.9 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
ALT6526P9	-40 °C to +105 °C	RoHS Compliant 22 Pin 5 mm x 7 mm x 0.9 mm Surface Mount Module	Partial Tape and Reel

ANADIGICS
141 Mount Bethel Road
Warren, New Jersey 07059, U.S.A.
Tel: +1 (908) 668-5000
Fax: +1 (908) 668-5132

URL: http://www.anadigics.com

IMPORTANT NOTICE

ANADIGICS, Inc. reserves the right to make changes to its products or to discontinue any product at any time without notice. The product specifications contained in Advanced Product Information sheets and Preliminary Data Sheets are subject to change prior to a product's formal introduction. Information in Data Sheets have been carefully checked and are assumed to be reliable; however, ANADIGICS assumes no responsibilities for inaccuracies. ANADIGICS strongly urges customers to verify that the information they are using is current before placing orders.

WARNING

ANADIGICS products are not intended for use in life support appliances, devices or systems. Use of an ANADIGICS product in any such application without written consent is prohibited.