AWT6264R

2.3-2.7 GHz Mobile WiMAX
Power Amplifier Module
Data Sheet

FEATURES

- InGaP HBT Technology
- +25 dBm Linear Output Power
- 32 dB Gain
- 2.5 % EVM QPSK 1/2 CTC, 16 QAM OFDMA Modulation
- High Efficiency
- Integrated Output Power Detector
- Integrated Step Attenuator
- Low Leakage Current in Shutdown Mode
- Optimized for a 50 Ω System
- Low Profile Miniature Surface Mount Package; RoHS Compliant

M49 Package
10 Pin 4 mm x 4 mm x 1 mm
Surface Mount Module

APPLICATIONS

- Mobile WiMAX Data Cards and Terminals that Support the IEEE 802.16e (2005) Standard

PRODUCT DESCRIPTION

The AWT6264R meets the stringent linearity and output power requirements of the Mobile WiMAX high speed data system. The device is manufactured on an advanced InGaP HBT MMIC technology offering state-of-the-art reliability, temperature stability, and ruggedness. A shutdown mode with low leakage current increases talk and standby time, and an integrated step attenuator enables gain control. The self-contained 4 mm x 4 mm x 1 mm surface mount package incorporates matching networks optimized for output power, efficiency, and linearity in a 50 Ω system.

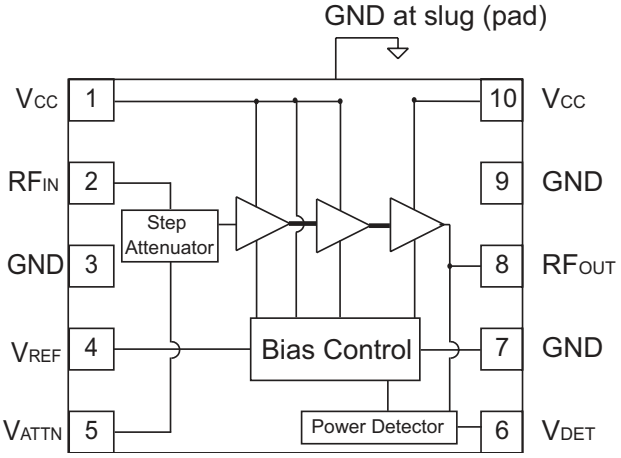


Figure 1: Block Diagram

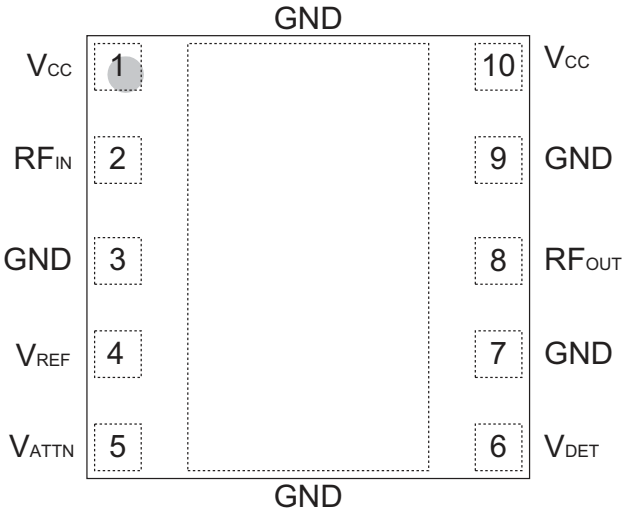


Figure 2: Pinout (X-ray Top View)

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	V_{CC}	Supply Voltage
2	RF_{IN}	RF Input
3	GND	Ground
4	V_{REF}	Reference Voltage
5	V_{ATTN}	Attenuator Control Voltage
6	V_{DET}	Detector Output Voltage
7	GND	Ground
8	RF_{OUT}	RF Output
9	GND	Ground
10	V_{CC}	Supply Voltage

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (V_{CC})	0	+5	V
Reference Voltage (V_{REF})	0	+3.0	V
Attenuator Control Voltage (V_{ATTN})	0	+3.7	V
RF Input Power (P_{IN})	-	0	dBm
ESD Rating Human Body Model(1) Charged Device Model(2)	 250 1000	 - -	 V V
MSL Rating(3)	3	-	
Storage Temperature (T_{STG})	-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.

Notes:
(1) JEDEC Class 1A.
(2) JEDEC Class IV*.*
(3) 260 °C Peak Reflow.

Table 3: Operating Ranges

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Operating Frequency (f)	2300	-	2700	MHz	
Supply Voltage (V_{CC})	+3.0	+3.3	+4.2	V	
Reference Voltage (V_{REF})	+2.80 0	+2.85 -	+2.90 +0.5	V	PA "on" PA "shut down"
Attenuator Control Voltage (V_{ATTN}) Logic High Logic Low	 +2.3 0	 - -	 +3.7 +0.7	 V	 Attenuator Enabled Attenuator Disabled
RF Output Power (P_{OUT})	-	+25	-	dBm	
Case Temperature (T_C)	-10	-	+85	°C	

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

Table 4: Electrical Specifications - 16 QAM PUSC
(T_C = +25 °C, V_{CC} = +3.3 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain (2)	29	32	35	dB	
Attenuation	21	23	28	dB	V_{ATTN} = 2.5 V
SEM (1), (2) @ offset A @ offset B @ offset C @ offset D @ offset E @ offset F	 - - - - - -	 -21.5 -18.7 -20.7 -26.3 -34 39.5	 -13 -13 -19 -25 -29.4 -37	dBm	10 MHz Channel Bandwidth WiMAX Forum Band Class 3A MRPT
Power-Added Efficiency (1), (2)	21	24	-	%	
Collector Current (I_{CC}) (1), (2)	-	398	450	mA	
EVM (2)	-	2.5	3.5	%	
Thermal Resistance (R_{jc}) (3)	- -	14.6 16.8	- -	°C/W	V_{CC} = +3.3 V V_{CC} = +4.2 V
Power Detector Output @ 25 dBm	-	1.25	-	V	RL (Load Resistor) = 100K Ω
Quiescent Current (Icq)	70	106	140	mA	
V_{REF} Current	-	3.8	5	mA	through V_{REF} pin
Leakage Current	-	1	5	mA	V_{CC} = +4 V, V_{REF} = 0 V
Harmonics $2f_O$, $4f_O$ $3f_O$	 - -	 -60 -55	 -45 -45	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-60	dBc	P_{OUT} < +25 dBm In-band load VSWR < 5:1 Out-of-band load VSWR < 10:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	V_{CC} = +4 V, P_{IN} = 0 dBm Applies over full operating temperature range

Notes:
(1) Measured at 2500 MHz.
(2) P_{OUT} = +25 dBm.
(3) Use only V_{CC2} (pin 10) current when calculating device junction temperature.

Table 5: Electrical Specifications - QPSK 1/2 CTC, Zone = AMC 4:2
(T_C = +25 °C, V_{CC} = +3.3 V, V_{REF} = +2.85 V, 50 Ω system)

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain[2]	29	32	35	dB	
Attenuation	21	23	28	dB	V_{ATTN} = 2.5 V
Spectrum Mask [1], [2] @ 5 MHz @ 6 MHz @ 11 MHz @ 20 MHz	 - - - -	 -33 -31 -40 -55	 - - - -50	dBc	 Res BW 100 kHz Res BW 1 MHz Res BW 1 MHz Res BW 1 MHz
Power-Added Efficiency [1], [2]	21	24	-	%	
Collector Current (I_{CC})[1], [2]	-	398	450	mA	
EVM[2]	-	2.5	4	%	
Power Detector Output @ 25 dBm	-	1.25	-	V	RL (Load Resistor) = 100K □
Quiescent Current (Icq)	70	106	140	mA	
V_{REF} Current	-	3.8	5	mA	through V_{REF} pin
Leakage Current	-	1	5	µA	V_{CC} = +4 V, V_{REF} = 0 V
Harmonics 2fo, 4fo 3fo	 - -	 -60 -55	 -45 -45	dBc	
Input Impedance	-	-	2:1	VSWR	
Spurious Output Level (all spurious outputs)	-	-	-60	dBc	$P_{OUT} \leq$ +25 dBm In-band load VSWR < 5:1 Out-of-band load VSWR < 10:1 Applies over all voltage and temperature operating ranges
Load mismatch stress with no permanent degradation or failure	8:1	-	-	VSWR	V_{CC} = +4 V, P_{IN} = 0 dBm Applies over full operating temperature range

Notes:
(1) Measured at 2500 MHz.
(2) P_{OUT} = +25 dBm

APPLICATION INFORMATION

To ensure proper performance, refer to all related Application Notes.

Shutdown Mode

The power amplifier may be placed in a shutdown mode by applying logic low levels (see Operating Ranges table) to the V_{REF} voltage.

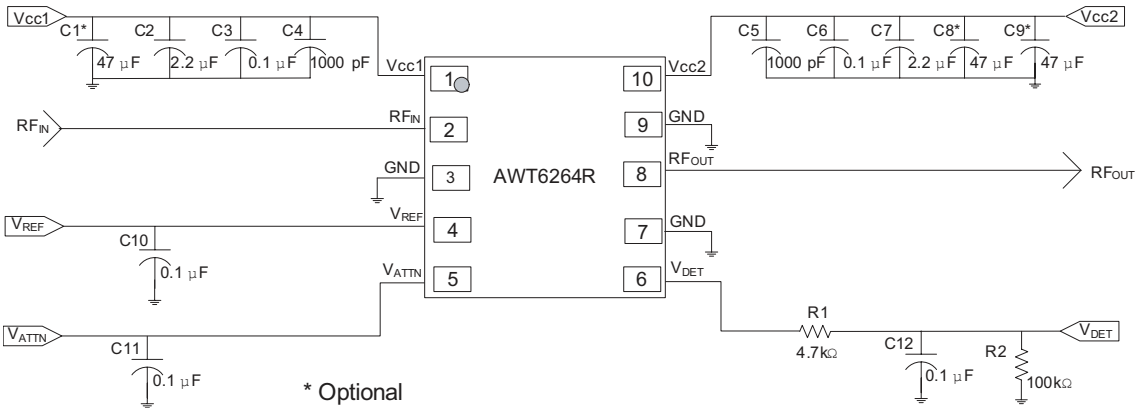
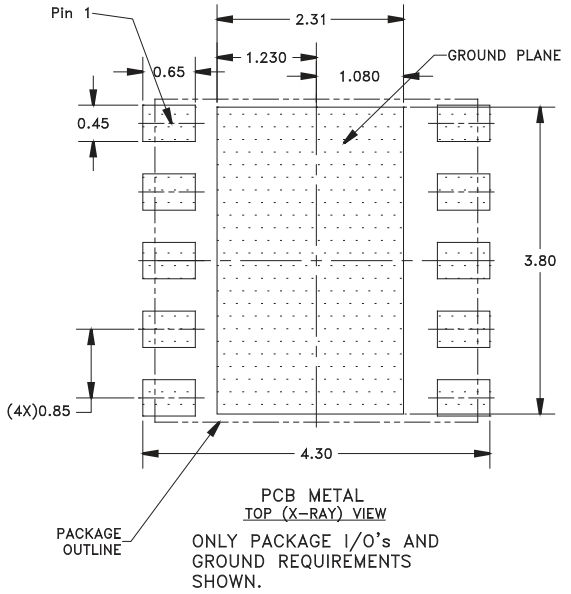


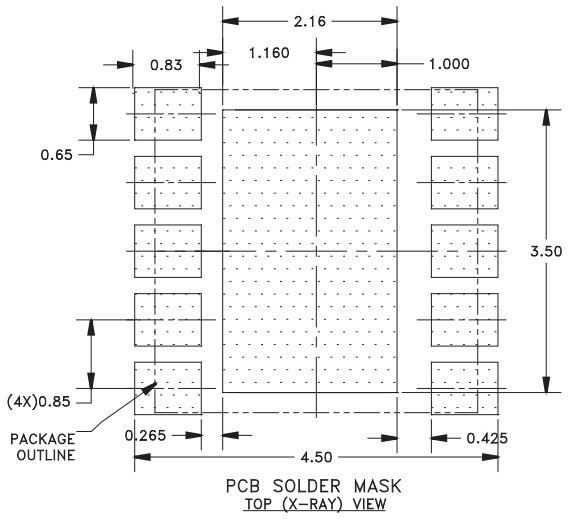
Figure 3: Application Circuit Schematic



NOTES:

(1) UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.

(2) DIMENSIONS IN MILLIMETERS.



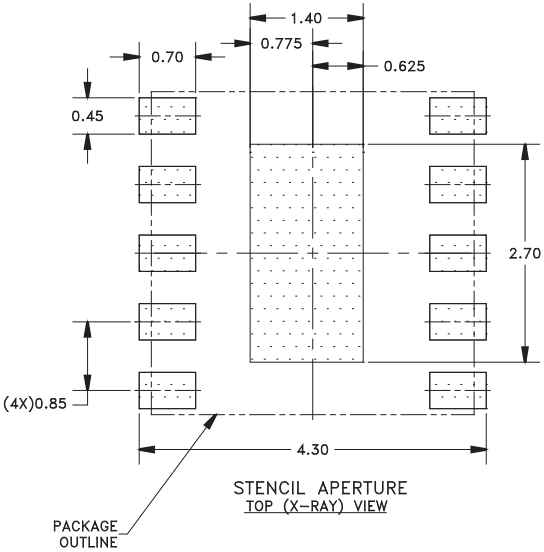
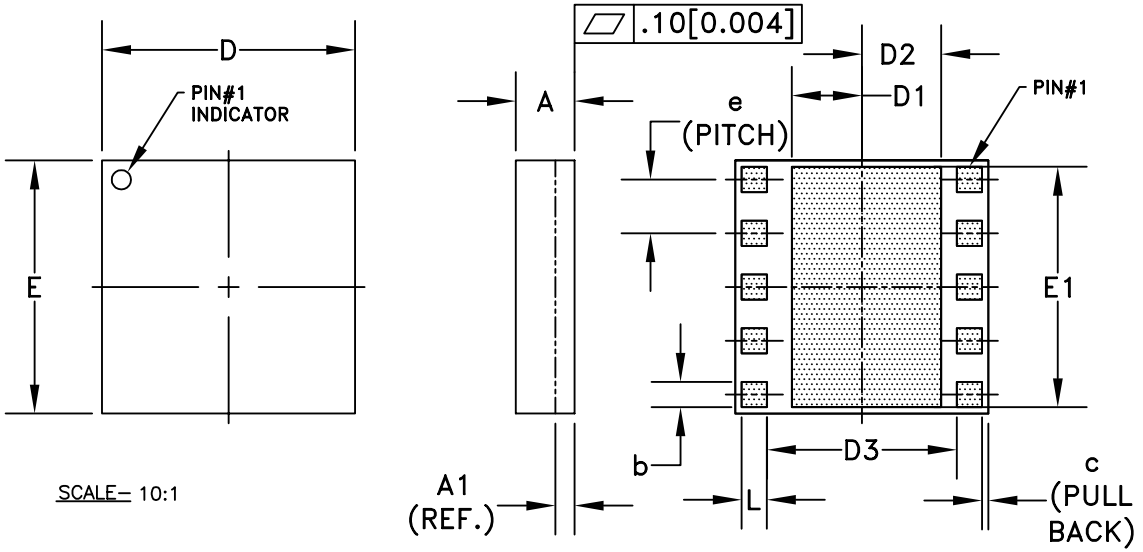


Figure 4: PCB Footprint

PACKAGE OUTLINE



SYMBOL	MILLIMETERS			INCHES			NOTE
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	
A	0.85	0.93	1.01	0.033	0.037	0.040	–
A1	0.27 (REF.)			0.011(REF.)			–
b	0.35	0.40	0.45	0.014	0.016	0.018	3
c	–	0.10	–	–	0.004	–	–
D	3.88	4.00	4.12	0.152	0.157	0.162	–
D1	1.055	1.105	1.155	0.042	0.044	0.045	–
D2	1.205	1.255	1.305	0.047	0.049	0.051	–
D3	2.95	3.00	3.05	0.116	0.118	0.120	–
E	3.88	4.00	4.12	0.152	0.157	0.162	–
E1	3.75	3.80	3.85	0.148	0.150	0.152	–
e		0.85			0.033		3
L	0.35	0.40	0.45	0.014	0.016	0.018	3

NOTES:

1. CONTROLLING DIMENSIONS IN MILLIMETERS.
2. UNLESS SPECIFIED, TOLERANCE=±0.076[0.003].
3. SIGNAL PADS SHOWN UNIFORM SIZE FOR REFERENCE ONLY. ACTUAL SIZE AND LOCATION WILL VARY WITHIN MIN. AND MAX. DIMENSIONS ACCORDING TO THE PRODUCT DESIGN.
4. GROUND PADS SHOWN UNIFORM SIZE FOR REFERENCE ONLY. ACTUAL SIZE AND LOCATION ARE REFERENCE ONLY.
5. PITCH MEASUREMENTS (e) TAKE CENTERLINE TO CENTERLINE OF SOLDERMASK OPENINGS.
6. UNLESS SPECIFIED DIMENSIONS ARE SYMMETRICAL ABOUT CENTER LINES SHOWN.
7. LAMINATE CONTROL DRAWING SPECIFIED BY PRODUCT DESIGN.

Figure 5: M49 Package Outline - 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module

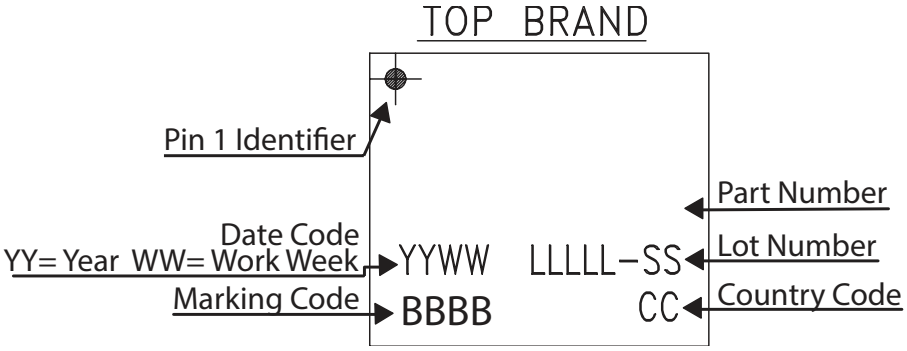


Figure 6: Branding Specification

COMPONENT PACKAGING

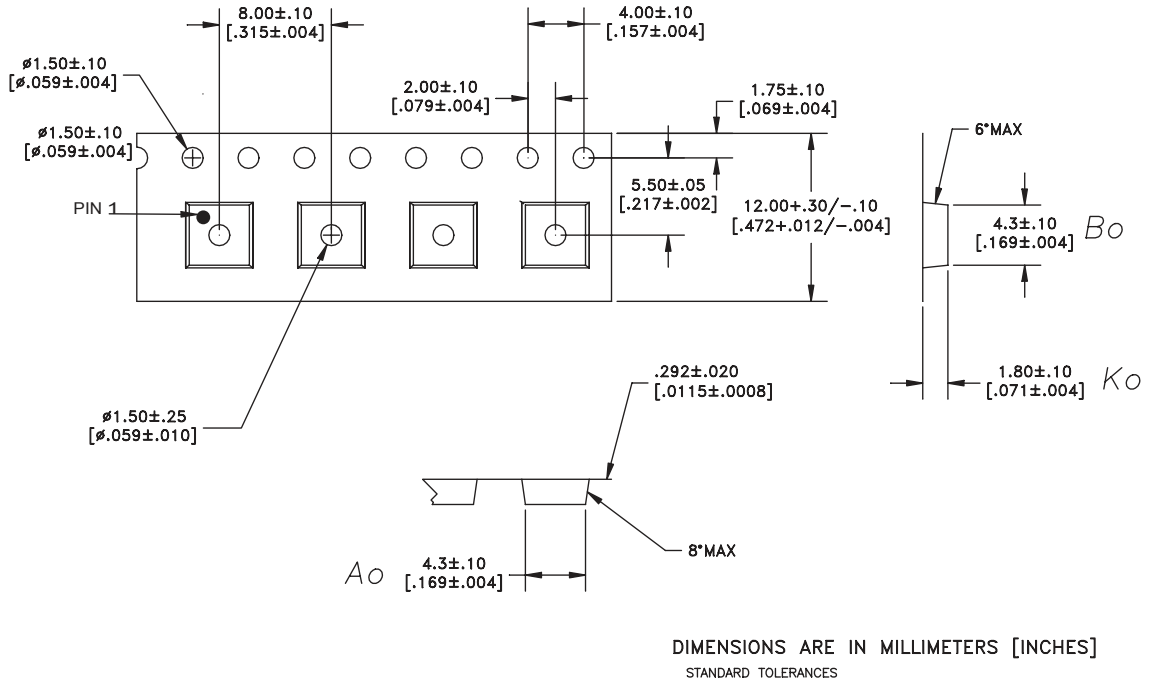


Figure 7: Tape & Reel Packaging

Table 6: Tape & Reel Dimensions

PACKAGE TYPE	TAPE WIDTH	POCKET PITCH	REEL CAPACITY	MAX REEL DIA
4 mm x 4 mm x 1 mm	12 mm	8 mm	2500	13"

ORDERING INFORMATION

ORDER NUMBER	TEMPERATURE RANGE	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT6264RM49P7	-10 °C to +85 °C	RoHS-compliant 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module	Loose in Bag
AWT6264RM49P8	-10 °C to +85 °C	RoHS-compliant 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module	Tape and Reel, 2500 pieces per Reel
AWT6264RM49P9	-10 °C to +85 °C	RoHS-compliant 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module	Partial Reel

NOTES

Skyworks Solutions, Inc.
Phone [781] 376-3000 • Fax [781] 376-3100 • sales@skyworksinc.com • www.skyworksinc.com