



# SKYWORKS®

## AWM6268

### 2.5-2.7 GHz Mobile WiMAX/LTE Power Amplifier Module

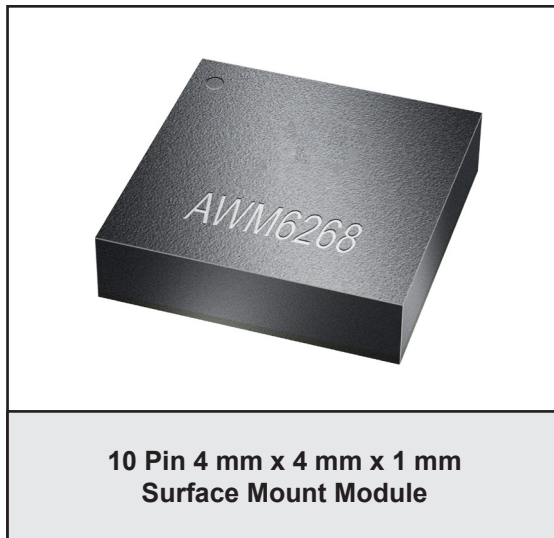
Data Sheet

#### FEATURES

- InGaP HBT Technology
- +26 dBm WiMAX Linear Output Power
- +28 dBm LTE Linear Output Power
- 31 dB Gain
- 2.5 % EVM QPSK 1/2 CTC, 16 QAM OFDMA Modulation
- High Efficiency
- Integrated Step Attenuator
- Low Leakage Current in Shutdown Mode
- Optimized for a 50 Ω System
- Low Profile Miniature Surface Mount Package; RoHS Compliant

#### APPLICATIONS

- Mobile WiMAX Data Cards, Handsets and Terminals
- LTE Data Cards, Handsets and Terminals



#### PRODUCT DESCRIPTION

The AWM6268 meets the stringent linearity and output power requirements of Mobile WiMAX and LTE consumer products. 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.

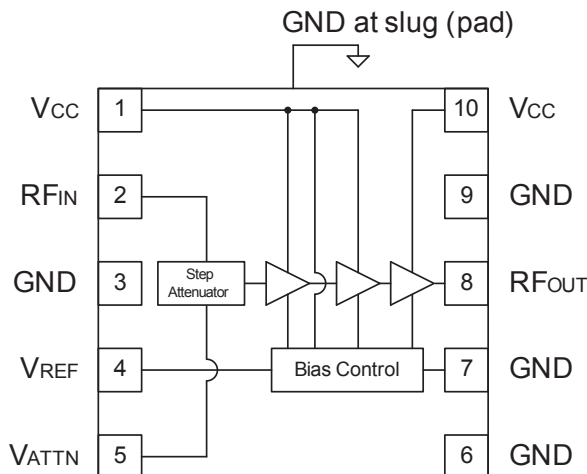
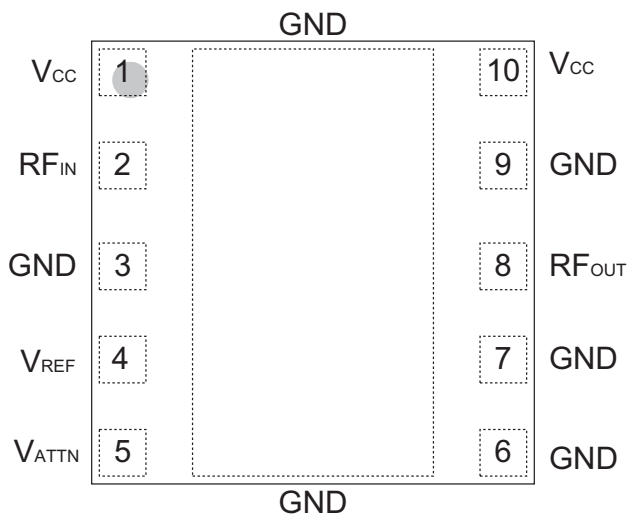


Figure 1: Block Diagram



**Figure 2: Pinout (X-ray Top View)**

**Table 1: Pin Description**

PIN	NAME	DESCRIPTION
1	V <sub>CC</sub>	Supply Voltage
2	RF <sub>IN</sub>	RF Input
3	GND	Ground
4	V <sub>REF</sub>	Reference Voltage
5	V <sub>ATTN</sub>	Attenuator Control Voltage
6	GND	Ground
7	GND	Ground
8	RF <sub>OUT</sub>	RF Output
9	GND	Ground
10	V <sub>CC</sub>	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 <sup>(1)</sup>	250	-	V
Charged Device Model <sup>(2)</sup>	1000	-	V
MSL Rating <sup>(3)</sup>	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)	2500	-	2700	MHz	
Supply Voltage ( $V_{CC}$ )	+3.0	+3.4	+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	+2.3	-	+3.7	V	Attenuator Enabled Attenuator Disabled
Logic Low	0	-	+0.7		
RF Output Power ( $P_{OUT}$ )	- -	+26 -	- +28	dBm	WiMAX Operation LTE Operation
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 - WiMAX Operation = 16 QAM PUSC**  
**(T<sub>C</sub> = +25 °C, V<sub>CC</sub> = +3.4 V, V<sub>REF</sub> = +2.85 V, 50 Ω system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain <sup>(2)</sup>	29	31	35	dB	
Attenuation	20	23	27	dB	V <sub>ATTN</sub> = 2.5 V
SEM <sup>(1), (2)</sup> @ offset A @ offset B @ offset C @ offset D @ offset E @ offset F	- - - - - -	-21.5 -18.7 -20.7 -26.3 -32.0 -38.5	-13.0 -13.0 -19.0 -25.0 -29.4 -37.0	dBm	10 MHz Channel Bandwidth WiMAX Forum Band Class 3A MRRT
Power-Added Efficiency <sup>(1), (2)</sup>	21	25	-	%	
Collector Current (I <sub>CC</sub> ) <sup>(1), (2)</sup>	320	470	550	mA	
EVM <sup>(2)</sup>	-	2.5	4.0	%	
Quiescent Current (I <sub>Q</sub> )	70	95	130	mA	
V <sub>REF</sub> Current	-	3.8	5	mA	through V <sub>REF</sub> pin
Leakage Current	-	1	5	μA	V <sub>CC</sub> = +4 V, V <sub>REF</sub> = 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 <sub>OUT</sub> < +26 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 <sub>CC</sub> = +4 V, P <sub>IN</sub> = 0 dBm Applies over full operating temperature range

## Notes:

(1) Measured at 2600 MHz.

(2) P<sub>OUT</sub> = +26 dBm

**Table 5: Electrical Specifications - LTE Operation = 10 MHz QPSK 12 RB (Start = 0)**  
**(T<sub>C</sub> = +25 °C, V<sub>CC</sub> = +3.3 V, V<sub>REF</sub> = +2.85 V, 50 Ω system)**

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Gain <sup>(1)</sup>	-	31	-	dB	
UTRA ACLR1 <sup>(1), (2)</sup>	-	-38	-	dBc	
UTRA ACLR2 <sup>(1), (2)</sup>	-	-60	-	dBc	
Power-Added Efficiency <sup>(1), (2)</sup>	-	33	-	%	
Collector Current <sup>(1), (2)</sup>	-	580	-	mA	

Notes:

(1) Defined at +28 dBm output power.

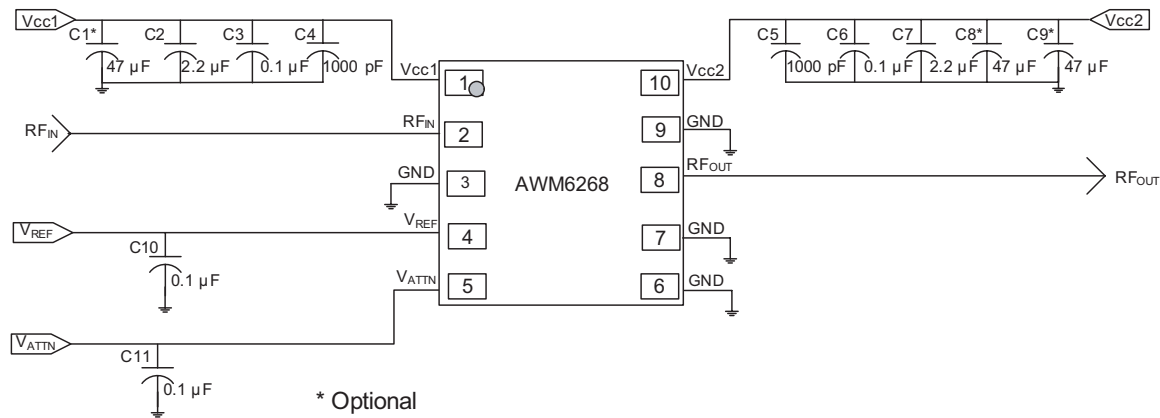
(2) Defined at 2.6 GHz.

**APPLICATION INFORMATION**

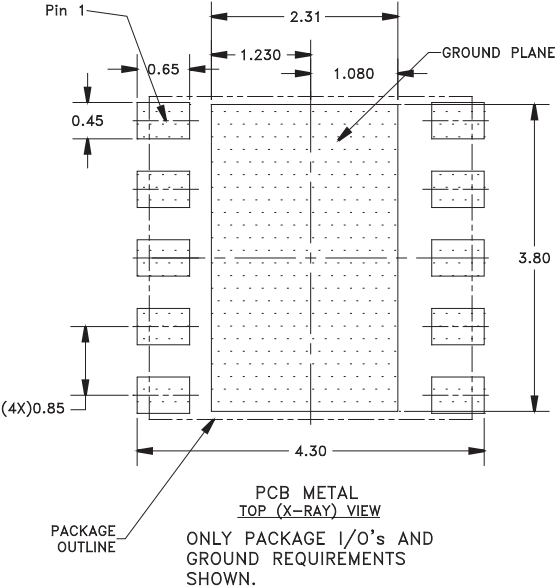
To ensure proper performance, refer to all related Application Notes.

**Shutdown Mode**

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



**Figure 3: Application Circuit Schematic**



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

(2) DIMENSIONS IN MILLIMETERS.

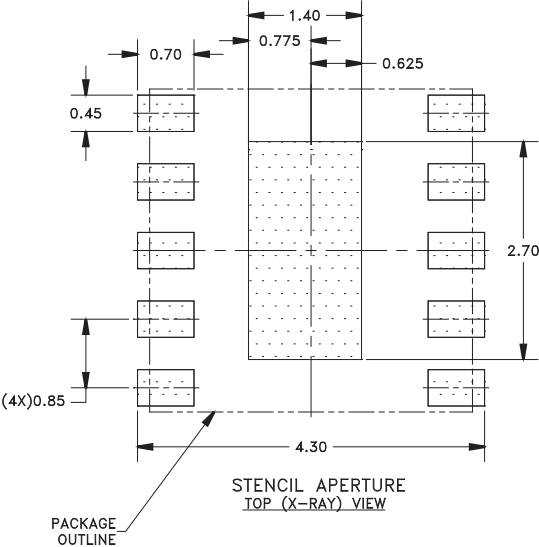
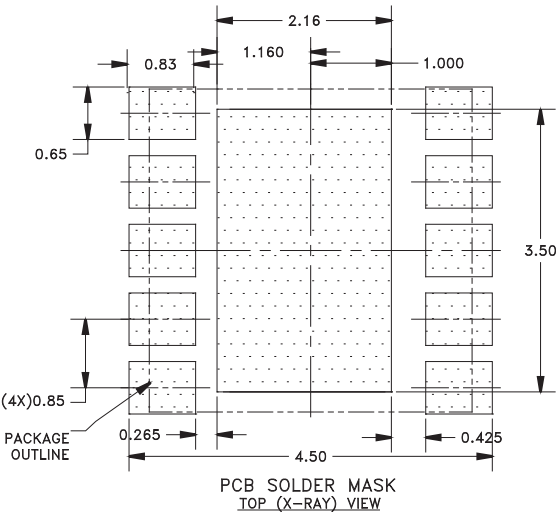
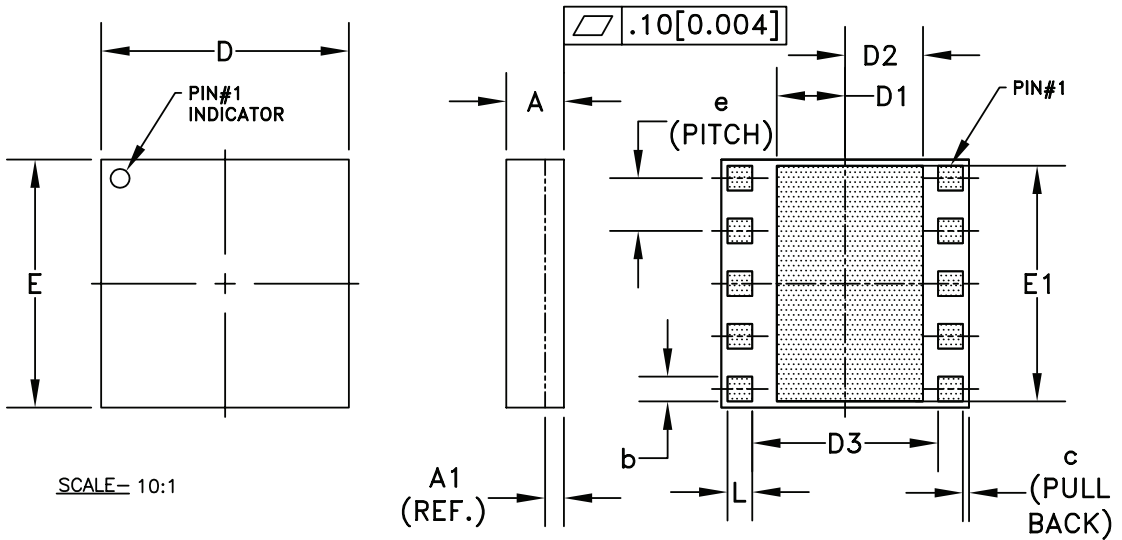


Figure 4: PCB Footprint

PACKAGE OUTLINE



SCALE= 10:1

S <sub>W</sub> D <sub>Q</sub>	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: Package Outline - 10 Pin 4 mm x 4 mm x 1 mm Surface Mount Module

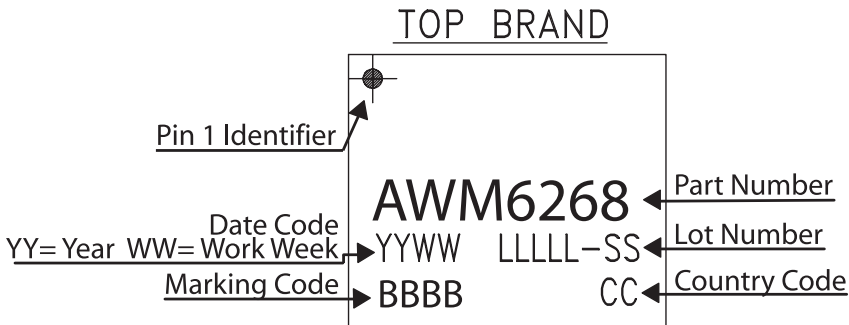
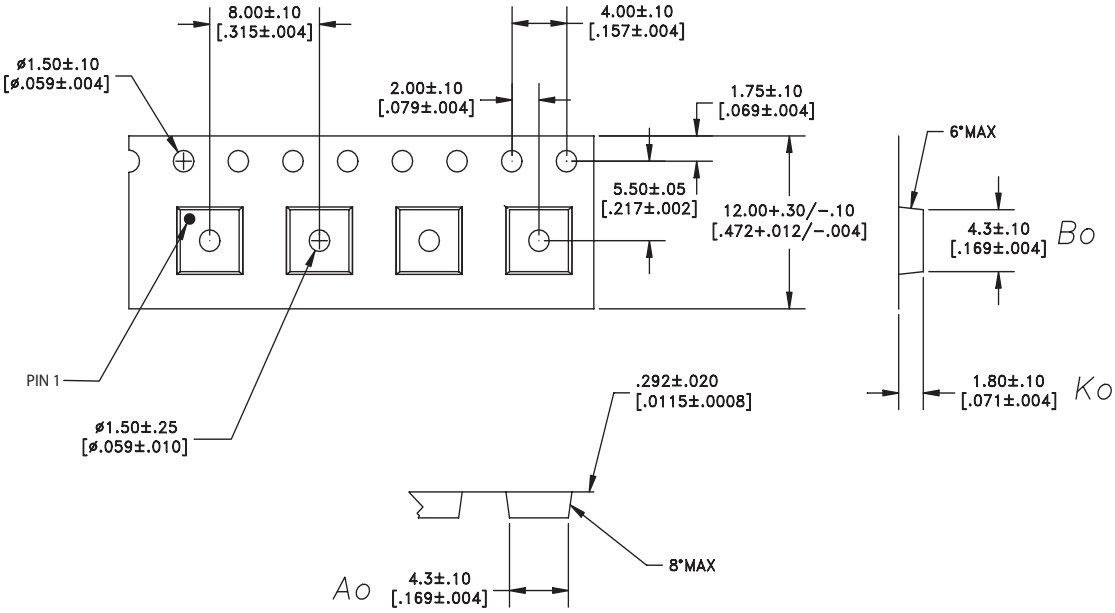


Figure 6: Branding Specification



COMPONENT PACKAGING



DIMENSIONS ARE IN MILLIMETERS [INCHES]  
STANDARD TOLERANCES

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
AWM6268P8	-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

NOTES

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