ASW216

5 ~ 4000 MHz MMIC Amplifier

Features

- 14 dB Gain at 900 MHz
- 20 dBm P1dB at 900 MHz
- 37.5 dBm OIP3 at 900 MHz
- 2.2 dB NF at 900 MHz
- MTTF > 100 Years
- Single Supply

Description

The ASW216, a power amplifier MMIC, has a high linearity, high gain, and high efficiency over a wide range of frequency, being suitable for use in both receiver and transmitter of telecommunication systems up to 4 GHz. The amplifier is available in a SOT89 package and passes through the stringent DC, RF, and reliability tests.

RoHS-compliant

Package Style: SOT89

Typical Performance

(Supply Voltage = +4.5 V, T_A = +25 °C, Z_0 = 50 Ω)

Parameters	Units	Typical	
Frequency	MHz	900	2000
Gain	dB	14.0	11.8
S11	dB	-14	-14
S22	dB	-15	-14
Output IP3[1)]	dBm	37.5	38.0
Noise Figure	dB	2.2	2.4
Output P1dB	dBm	20	20
Current	mA	80	80
Device Voltage	V	+4.5	+4.5

1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ.	Max
Testing Frequency	MHz		900	
Gain	dB	13	14	
S11	dB		-14	
S22	dB		-15	
Output IP3	dBm	36.0	37.5	
Noise Figure	dB		2.2	2.6
Output P1dB	dBm	19	20	
Current	mA	70	80	110
Device Voltage	V		+4.5	

Absolute Maximum Ratings

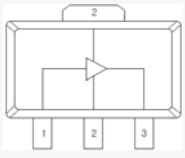
Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6 V
Operating Junction Temperature	+150 °C
Input RF Power (CW, 50 Ω matched)*	25 dBm
Thermal Resistance	83 °C/W

Please find the max. input power data from http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf

Application Circuit

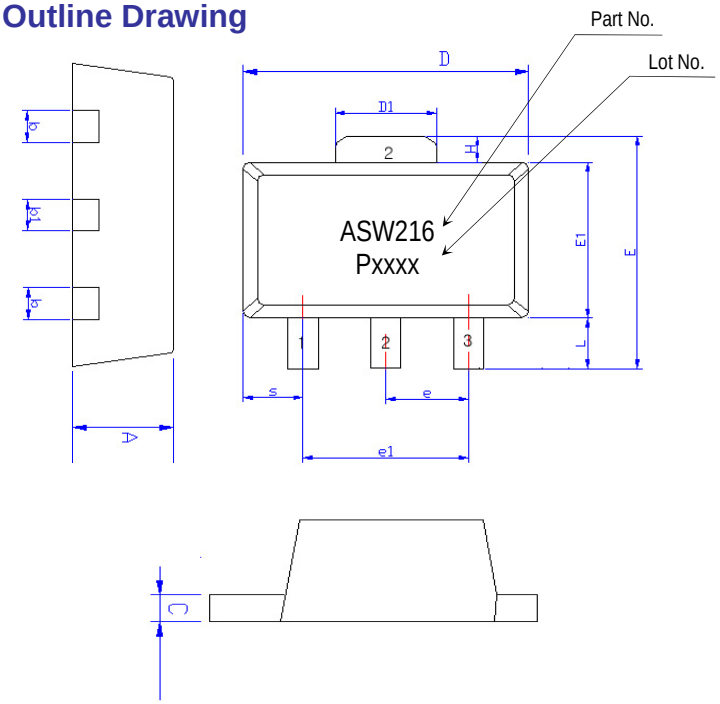
- 500 ~ 3500 MHz

Pin Configuration



Pin No.	Function
1	RF IN
2	GND
3	RF OUT & Bias

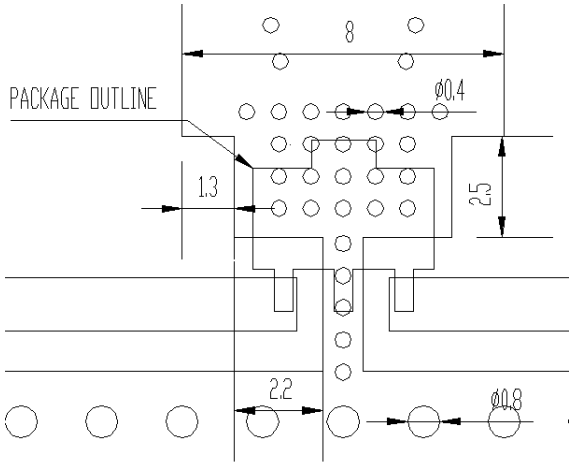
Outline Drawing



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
L	0.89	1.04	1.20
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
C	0.38	0.40	0.43
D	4.40	4.50	4.60
D1	1.40	1.60	1.75
E	3.64	---	4.25
E1	2.40	2.50	2.60
e1	2.90	3.00	3.10
H	0.35	0.40	0.45
S	0.65	0.75	0.85
e	1.40	1.50	1.60

Pin No.	Function
1	RF IN
2	GND
3	RF OUT & Bias

Mounting Recommendation (In mm)



Note: 1. The number and size of ground via holes in a circuit board is critical for thermal and RF grounding considerations.
2. We recommend that the ground via holes be placed on the bottom of the lead pin 2 and exposed pad of the device for better RF and thermal performance, as shown in the drawing at the left side.

ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1B
	Voltage Level: 550 V
MM	Class A
	Voltage Level: 50 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)

Level 3 at 260 °C reflow

APPLICATION CIRCUIT

Wide Band

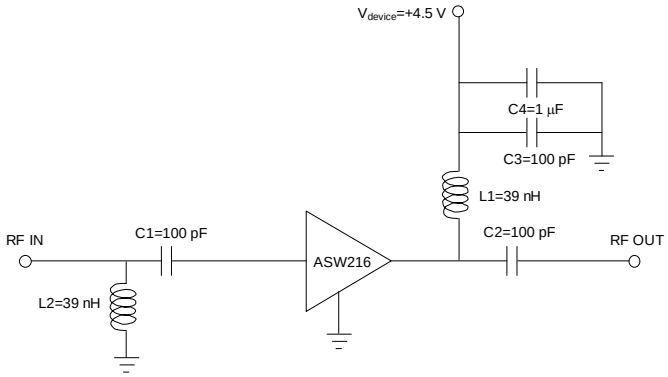
500 ~ 3500 MHz

+4.5 V / +3 V

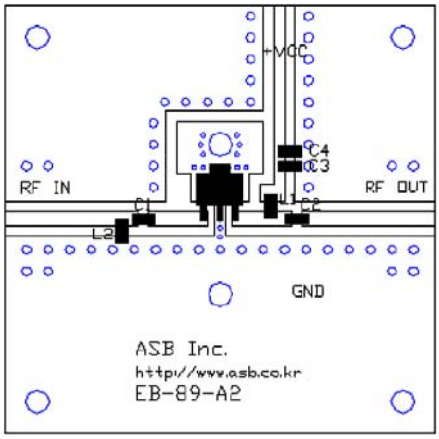
Frequency (MHz)	900	2000	900	2000
Magnitude S21 (dB)	14.0	11.8	13.0	11.0
Magnitude S11 (dB)	-14	-14	-12	-10
Magnitude S22 (dB)	-15	-14	-15	-12
Output P1dB (dBm)	20	20	16	15
Output IP3[1)] (dBm)	37.5	38.0	23.0	24.0
Noise Figure (dB)	2.2	2.4	2.2	2.4
Device Voltage (V)	+4.5		+3	
Current (mA)	80		35	

1) OIP3 is measured with two tones at an output power of +5 dBm/tone(at 4.5V) / -5 dBm/tone(at 3V) separated by 1 MHz.

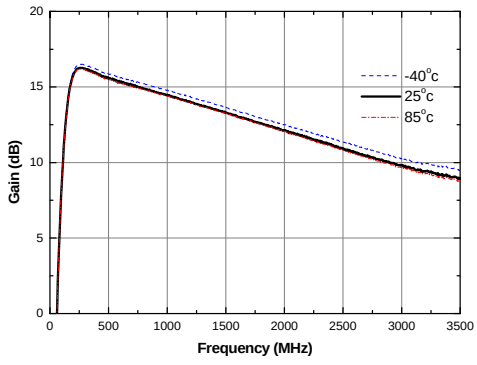
Schematic

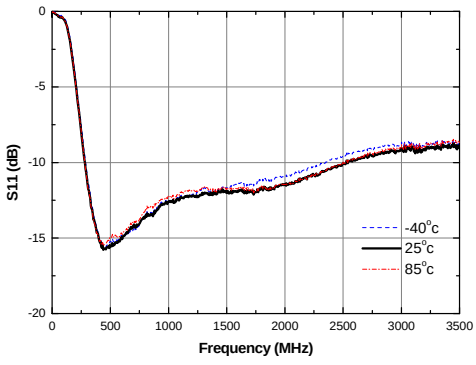


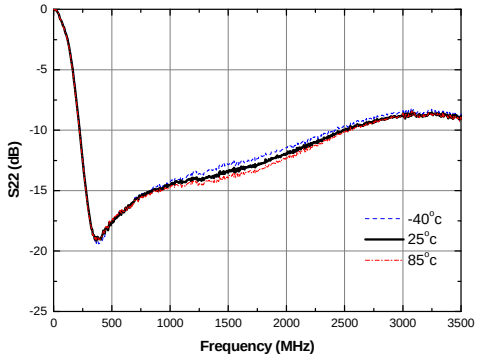
Board Layout (FR4, 40x40 mm², 0.8T)

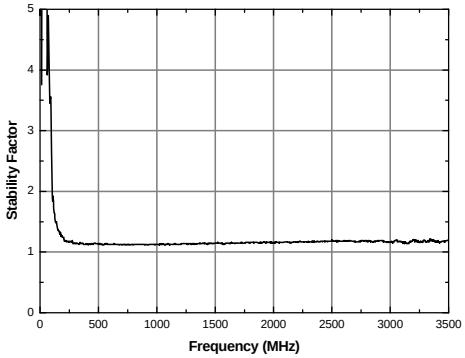


S-parameters & K-factor

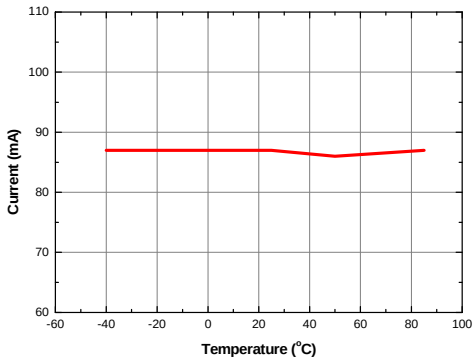




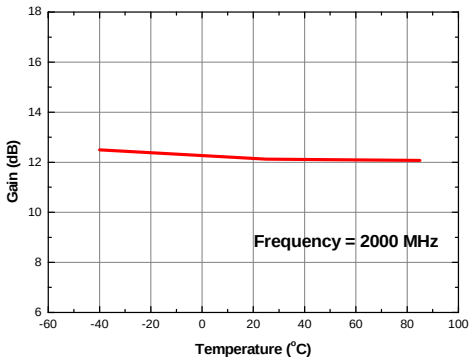




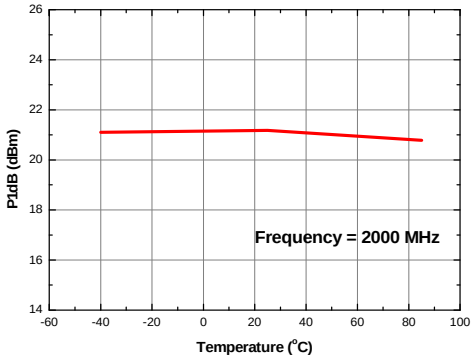
Current vs. Temperature



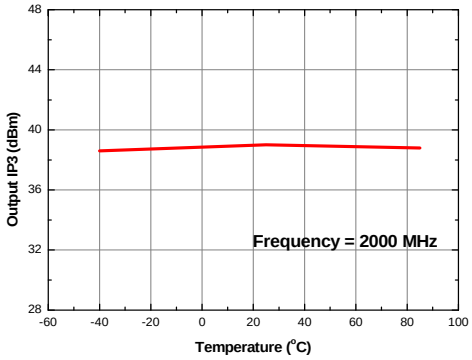
Gain vs. Temperature



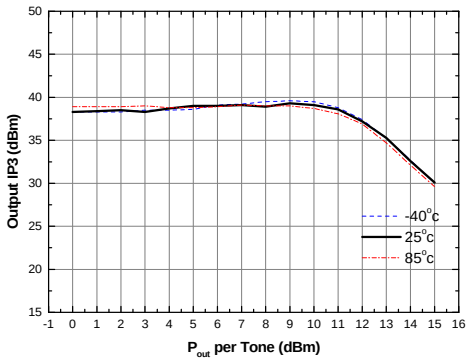
P1dB vs. Temperature



Output IP3 vs. Temperature



Output IP3 vs. Tone Power (Frequency = 2000 MHz)



Performance with varying V_{DEVICE}

V_{DEVICE} (V)	Current (mA)	Freq. (MHz)	Gain (dB)	S11 (dB)	S22 (dB)	OIP3[1)] (dBm)	P1dB (dBm)	NF (dB)
+4.50	81	900	14.1	-14.5	-18.0	37.9	20.6	2.05
		2000	11.6	-13.9	-12.5	38.0	19.7	2.33
+4.20	66	900	14.0	-14.3	-18.1	36.0	19.7	2.12
		2000	11.6	-13.7	-12.1	36.0	18.8	2.35
+3.75	49	900	13.8	-14.0	-18.1	31.9	17.8	2.17
		2000	11.4	-13.4	-12.4	32.3	17.3	2.30
+3.20	35	900	13.4	-13.3	-17.7	26.0	15.8	2.24
		2000	11.1	-12.9	-12.3	27.5	15.1	2.23

1) OIP3 is measured with two tones at an output power of +5 dBm/tone separated by 1 MHz.

Recommended Soldering Reflow Profile