

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.

Typical Performance

(Supply Voltage = +4.5 V, T_A = +25 °C, Z₀ = 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

The operation of this device in excess of any of these limits may cause permanent damage.

* Refer to the max. input RF power data at http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf. The max. input RF power, in principle, depends upon application frequency, matching circuit, and device voltage.

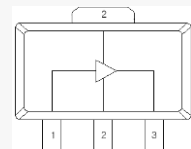


Package Style: SOT89

Application Circuit

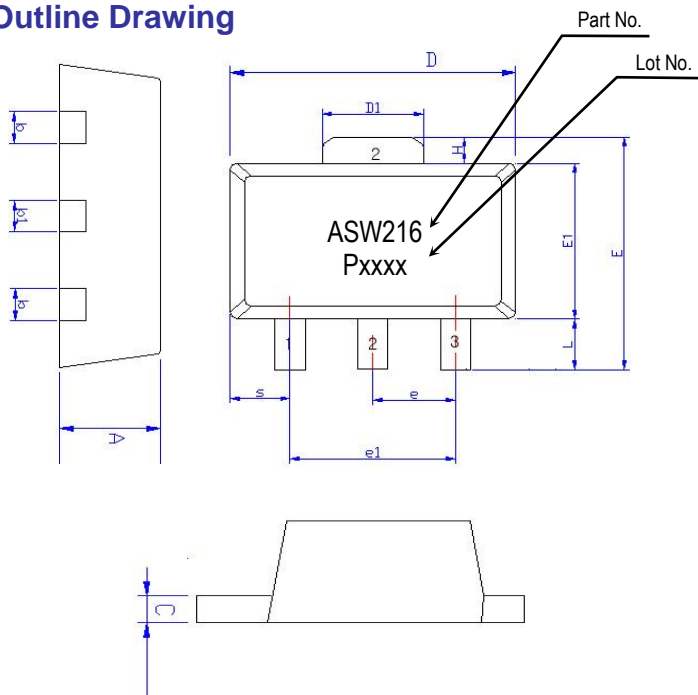
- 500 ~ 3500 MHz

Pin Configuration



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

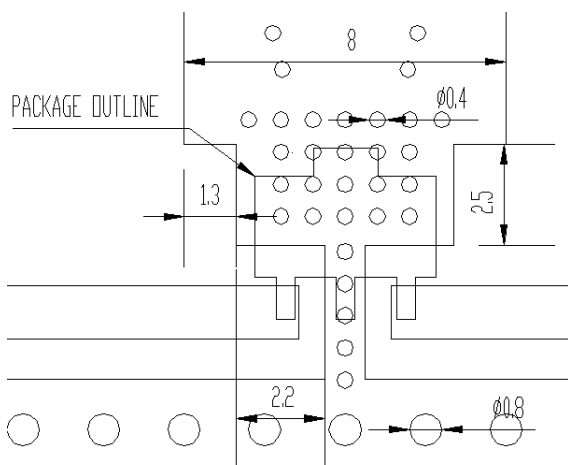
Outline Drawing



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: Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Moisture Sensitivity Level (MSL)

Level 3 at 260 °C reflow

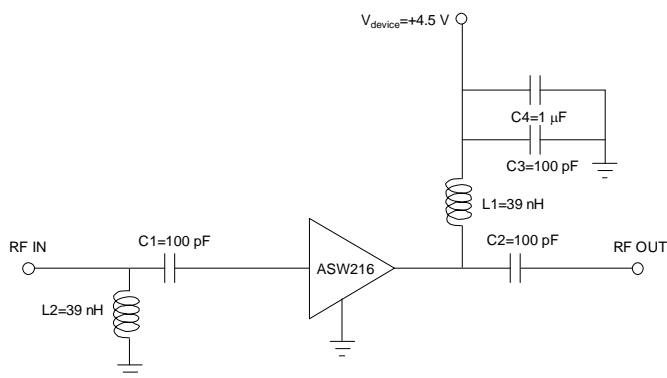
APPLICATION CIRCUIT

Wide Band
500 ~ 3500 MHz
+4.5 V / +3 V

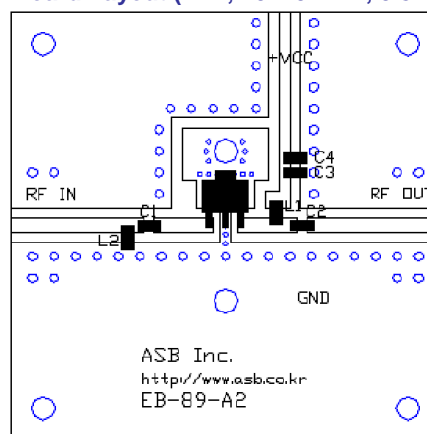
Frequency (MHz)	900	2000	900	2000
Magnitude S21 (dB)	14.0	11.8	13.0	11.0
Magnitude S11 (dB)	-14	-14	-12	-10
Magnitude S22 (dB)	-15	-14	-15	-12
Output P1dB (dBm)	20	20	16	15
Output IP3 ¹⁾ (dBm)	37.5	38.0	23.0	24.0
Noise Figure (dB)	2.2	2.4	2.2	2.4
Device Voltage (V)	+4.5		+3	
Current (mA)	80		35	

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.

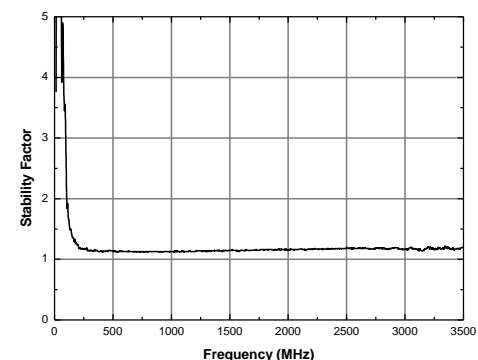
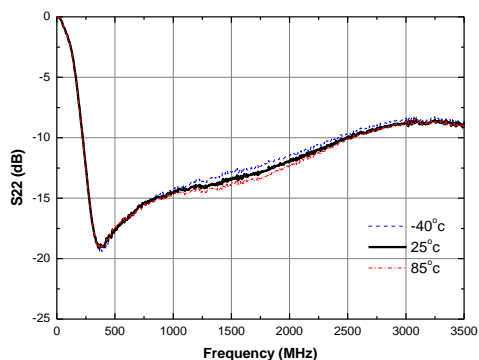
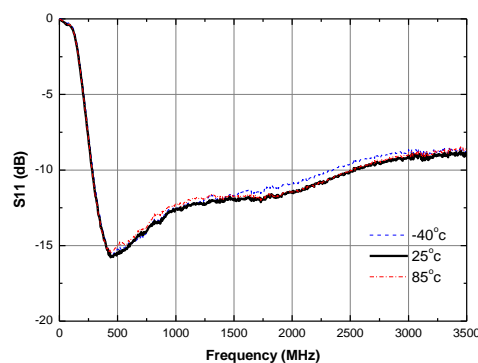
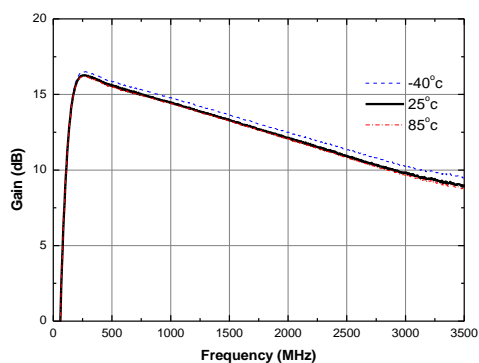
Schematic



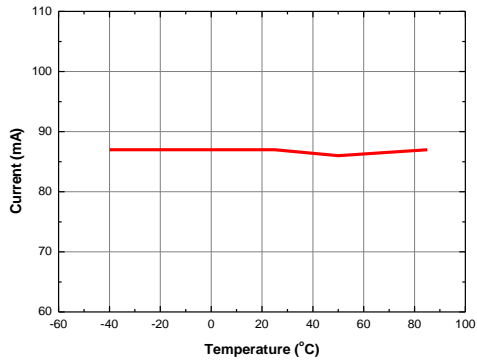
Board Layout (FR4, 40x40 mm², 0.8T)



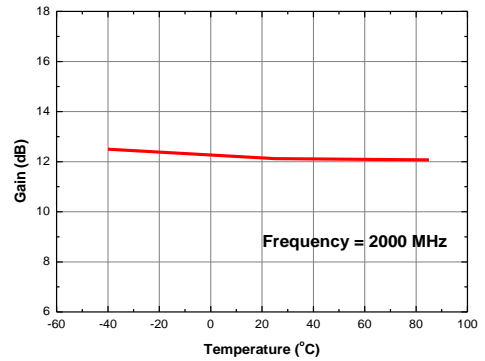
S-parameters & K-factor



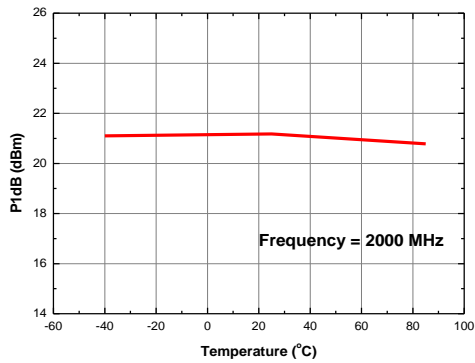
Current vs. Temperature



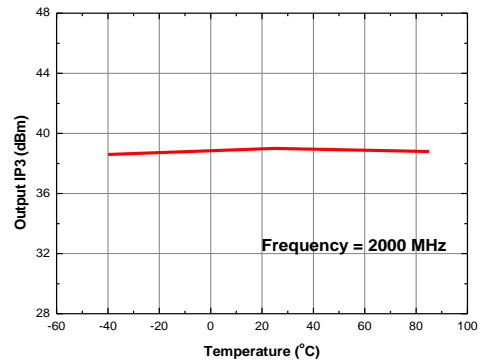
Gain vs. Temperature



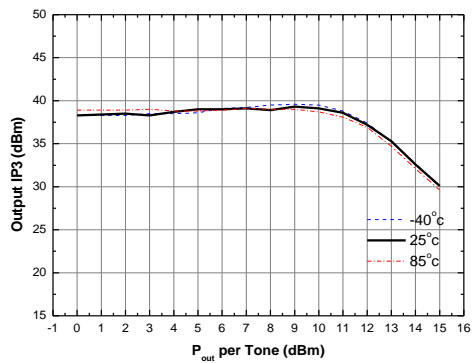
P1dB vs. Temperature



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

