

Features

- 16.3 dB Gain at 2000 MHz
- 21 dBm P1dB
- 38 dBm Output IP3
- 3.1 dB NF
- MTTF > 100 Years
- Single Supply
- Minimal External Components

Description

The AWB389, a gain block 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. It has an active bias network for stable current over temperature and process variation. The amplifier is available in a SOT89 package and passes through the stringent DC, RF, and reliability tests



Package Style: SOT89

Typical Performance

(Supply Voltage = +5 V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$)

Parameters	Units	Typical	
Frequency	MHz	900	2000
Gain	dB	18.0	16.3
S11	dB	-12.0	-11.0
S22	dB	-11.0	-10.0
Output IP3 ¹⁾	dBm	41	38
Noise Figure	dB	2.5	3.1
Output P1dB	dBm	22	21
Current	mA	125	125
Device Voltage	V	+5	+5

1) OIP3 is measured with two tones at an output power of +9 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ.	Max
Testing Frequency	MHz		2000	
Gain	dB	15.7	16.3	
S11	dB	-9	-11.0	
S22	dB	-8	-10.0	
Output IP3	dBm	30	38	
Noise Figure	dB		3.1	3.3
Output P1dB	dBm	20	21	
Current	mA	118	125	138
Device Voltage	V		+5	

Absolute Maximum Ratings

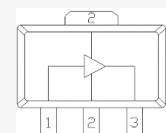
Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+7 V
Operating Junction Temperature	+150 °C
Input RF Power (Continuous)*	+22 dBm
Thermal Resistance	50 °C/W

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

Applications

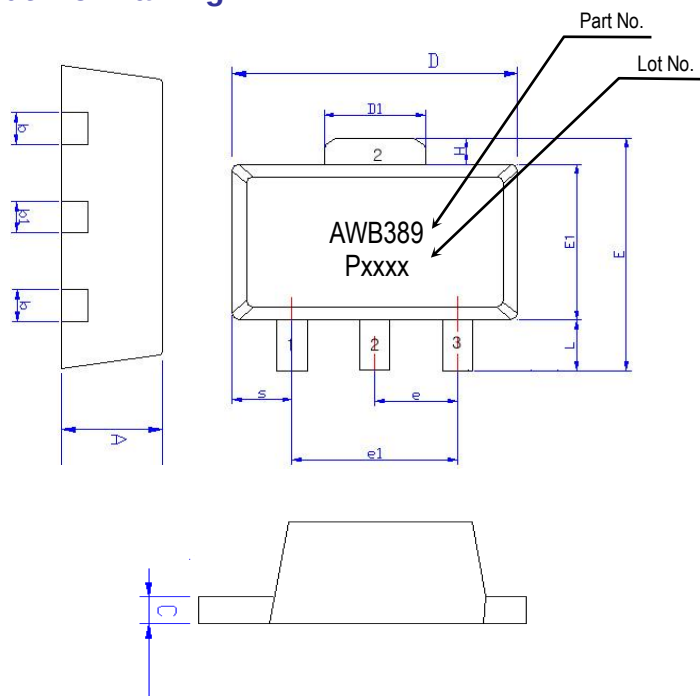
- SMATV (800 ~ 2200 MHz)
- Wide Band (100 ~ 1300 MHz)

Pin Configuration



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

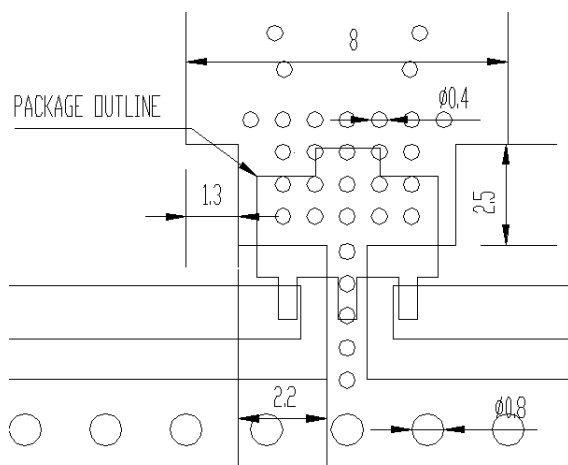
Outline Drawing



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

SMATV

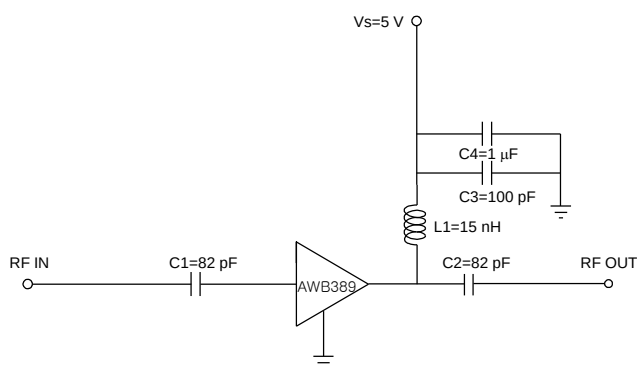
800 ~ 2200 MHz

+5 V

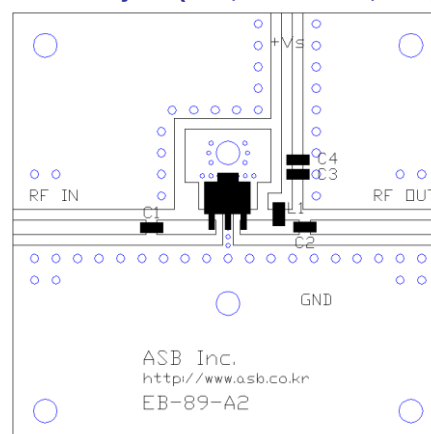
Frequency (MHz)	900	2000
Magnitude S21 (dB)	18.0	16.3
Magnitude S11 (dB)	-12.0	-11.0
Magnitude S22 (dB)	-11.0	-10.0
Output P1dB (dBm)	22	21
Output IP3 ¹⁾ (dBm)	41	38
Noise Figure (dB)	2.5	3.1
Device Voltage (V)	+5	+5
Current (mA)	125	125

1) OIP3 is measured with two tones at an output power of +9 dBm/tone separated by 1 MHz.

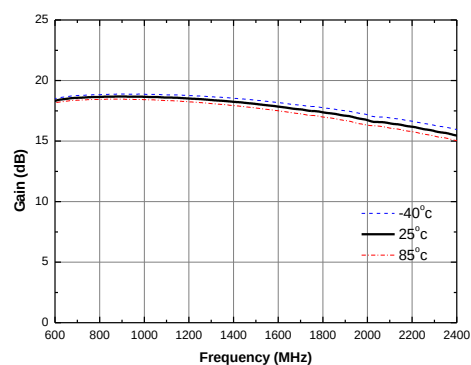
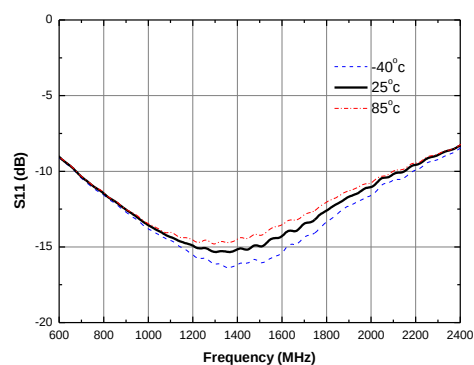
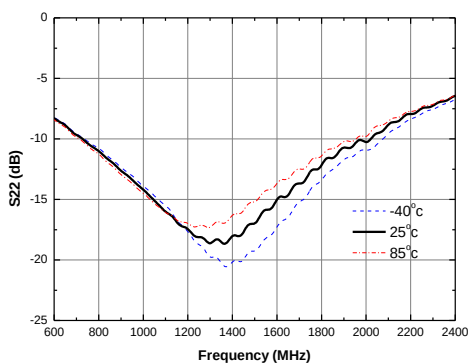
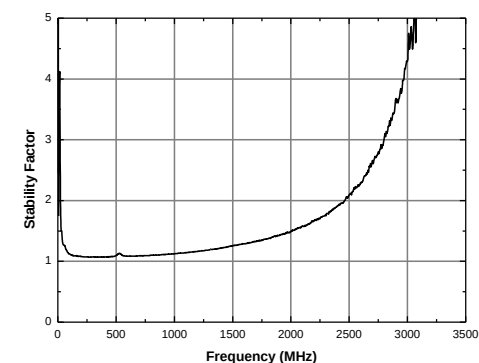
Schematic



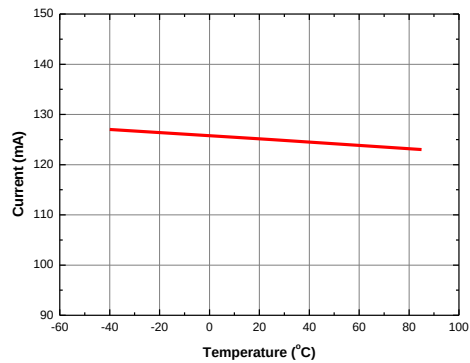
Board Layout (FR4, 40x40 mm², 0.8T)



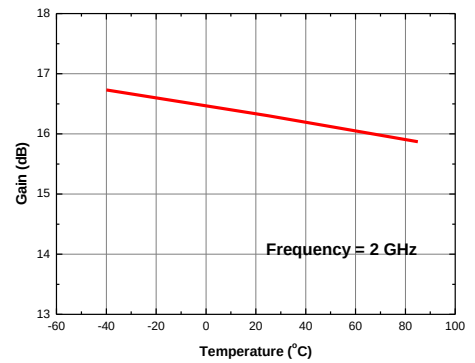
S-parameters & K-factor



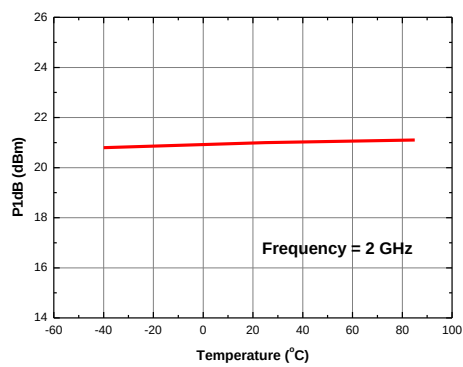
Current vs. Temperature



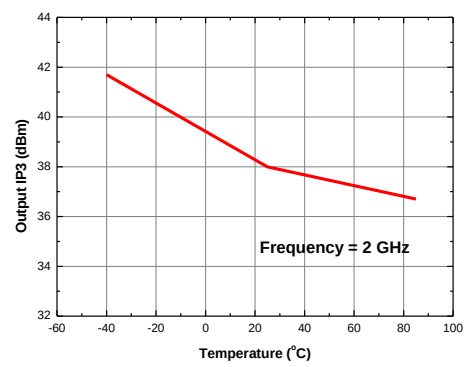
Gain vs. Temperature



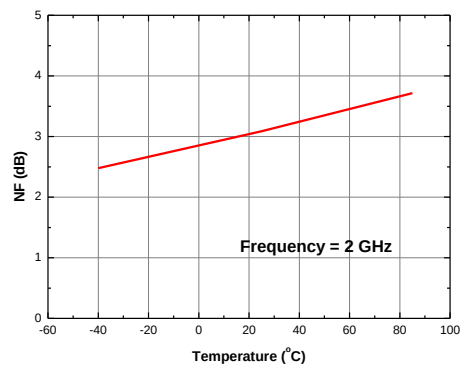
P1dB vs. Temperature



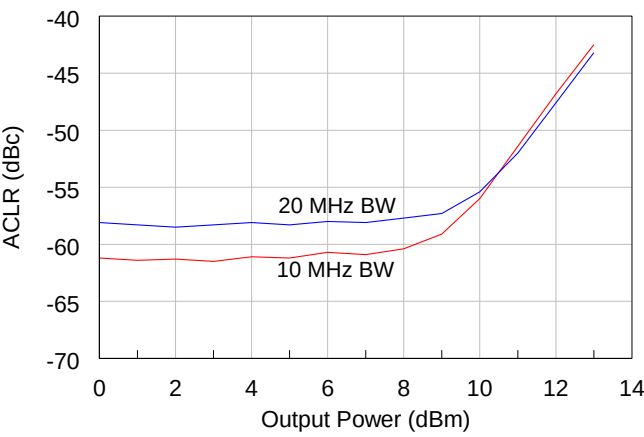
Output IP3 vs. Temperature



NF vs. Temperature

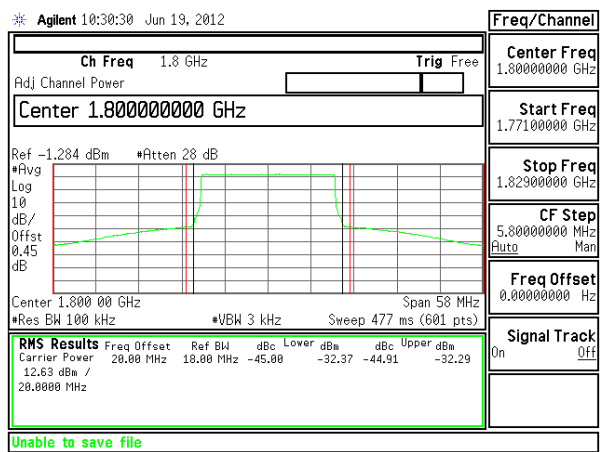


LTE ACLR – 10 MHz & 20 MHz



1) Test Source : LTE_FDD_test model 3.1, BW: 10 MHz & 20 MHz, Test Frequency: 1.8 GHz

LTE ACLR – 20 MHz



2) Test Source : LTE_FDD_test model 3.1, BW: 20 MHz, Test Frequency: 1.8 GHz

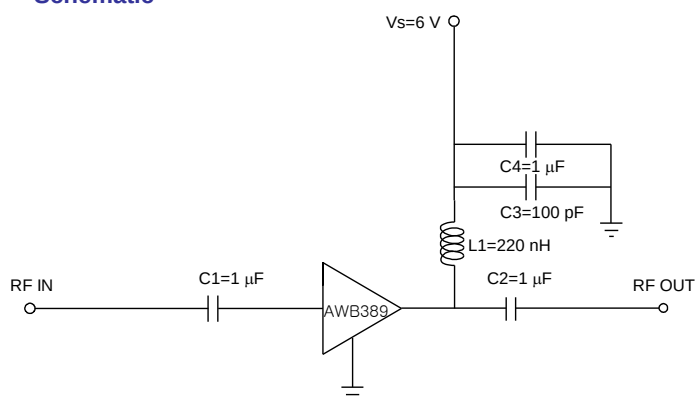
APPLICATION CIRCUIT

Wide Band
100 ~ 1300 MHz
+6 V

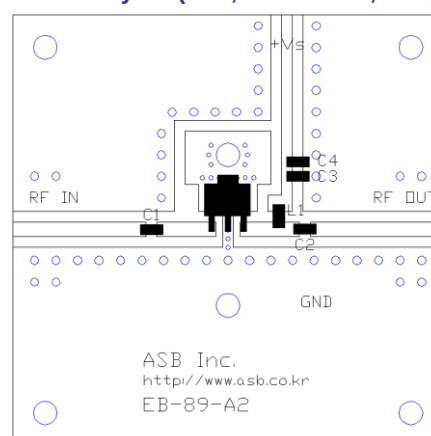
Frequency (MHz)	100	1300
Magnitude S21 (dB)	19.5	18.0
Magnitude S11 (dB)	-12.0	-12.0
Magnitude S22 (dB)	-16.0	-10.0
Output P1dB (dBm)	24	24
Output IP3 ¹⁾ (dBm)	41	41
Noise Figure (dB)	2.5	2.7
Device Voltage (V)	+6	+6
Current (mA)	155	155

1) OIP3 is measured with two tones at an output power of +9 dBm/tone separated by 1 MHz.

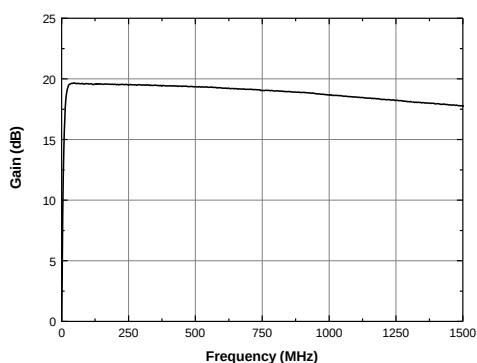
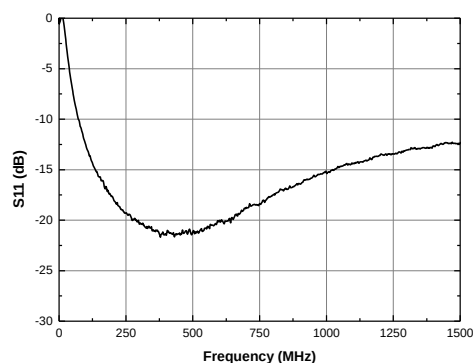
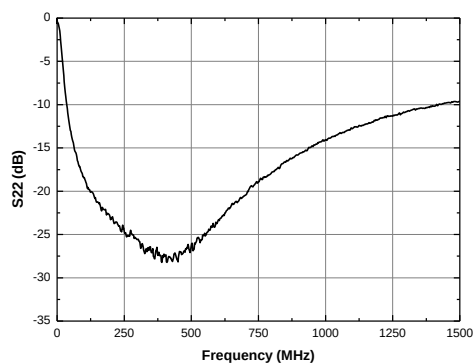
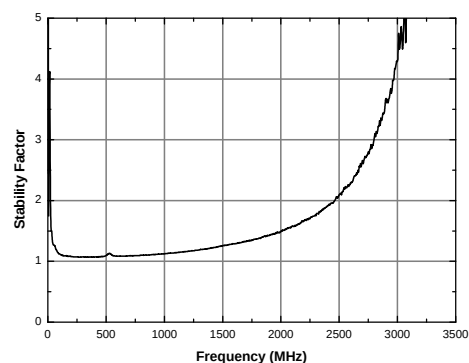
Schematic



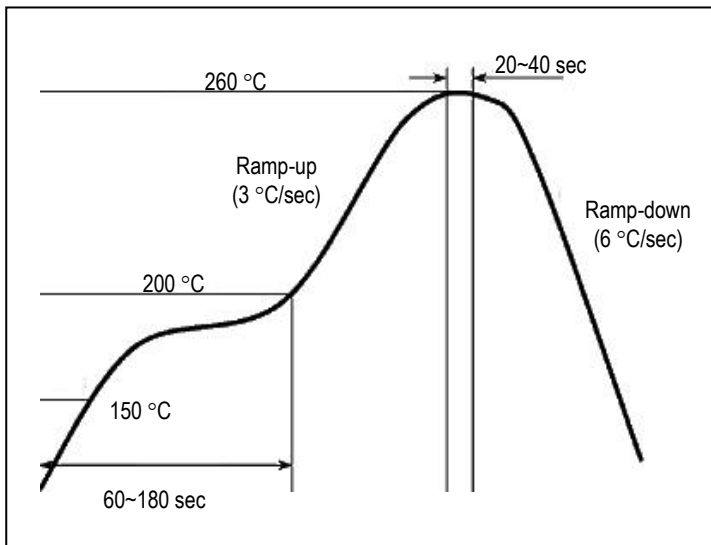
Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



Recommended Soldering Reflow Profile



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