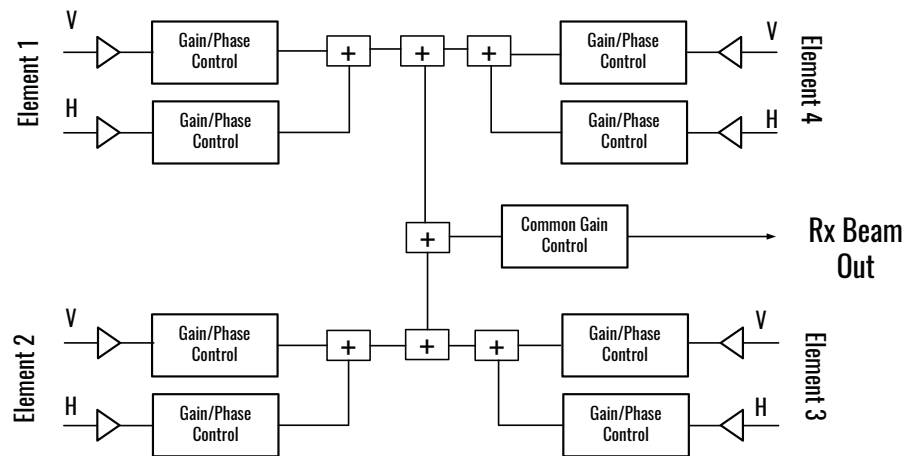


## Product Features

- 17.7 - 20.2 GHz operation
- Supports 4 dual pol radiating elements
- Flexible polarization (RHCP, LHCP, linear)
- 22 dB coherent gain\*
- 3.4 dB NF
- 5 bit phase control (LSB=11.25°)
- 5 bit gain (LSB=0.5 dB, DR=15.5 dB)
- Temperature sense
- 7x7 mm QFN
- +1.8 V operation
- 0.3 W DC power

## Block Diagram



## Applications

Satellite communications terminals

## General Description

The AWS-0102 is a highly integrated silicon quad core IC intended for satellite communications applications. The device supports four dual polarization radiating elements with full programmable polarization flexibility. The device provides 22 dB of gain with a noise figure of 3.4 dB. Additional features include gain compensation over temperature and temperature reporting. The chip features ESD protection on all pins, operates from a +1.8V supply, and is packaged in a 56 lead 7x7 mm QFN for easy installation in planar phased array antennas.

\*Note: Coherent gain (CG) is the RF gain with all Rx input ports energized and is most useful for assessing RF power handling in the beam forming network. Electronic gain (EG) is the RF gain exclusive of the 8:1 sum and is most useful for cascaded NF and gain calculation. The total gain of the antenna aperture can be calculated from  $EG + 10 \cdot \log(n)$ , where  $n$  is the number of antenna elements in the array. Single path gain (SPG) is the RF gain with only one input port energized. This is representative of the RF gain measured in a 2 port measurement system, such as with the Developer's Kit.

$CG = SPG + 18 \text{ dB} = EG + 9 \text{ dB}$  for a quad IC



**Anokiwave, Inc.**  
11236 El Camino Real  
San Diego, CA 92130

Rev. V8P

www.anokiwave.com  
1-858-792-9910  
info@anokiwave.com

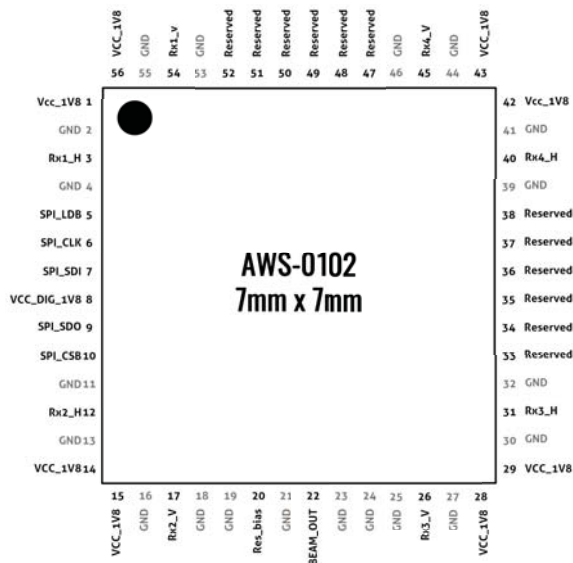
## Product Overview

## Specifications

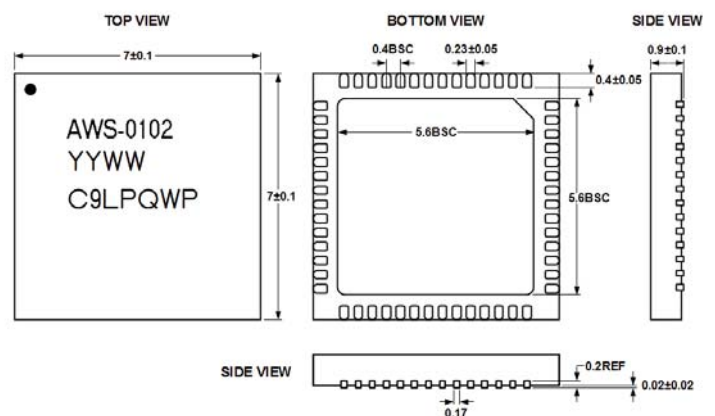
Parameter	Nominal Performance	Units
<b>General</b>		
Frequency	17.7 - 20.2	GHz
# Elements	4	-
<b>Beam Steering</b>		
Phase Bits	5	
Phase LSB	11.25	degrees
RMS Phase Error	5	deg RMS
Amplitude Bits	5	-
Amplitude LSB	0.5	dB
Amplitude Dynamic Range	15.5	dB
RMS Amplitude Error	0.25	dB RMS

Parameter	Nominal Performance	Units
<b>Receive Mode</b>		
Coherent Channel Gain	+22	dB
Noise Figure	+3.4	dB
IIP3	-35	dBm
<b>Other</b>		
Supply Voltage	+1.8	V
Telemetry	Temperature	-
DC Power	0.3	W
Operating Range	-40 to +85	°C
Package Size	56 lead 7x7 (PQFN)	mm
Additional Features	ESD Protection on all pins	-

## Package and Pin Out



SPI<sub>rx</sub> -Serial command and telemetry reporting



1. All dimensions are in millimeters.
2. Die pad 5.8X5.8mm has 5.6X5.6mm exposed pad size.
3. JEDEC STANDARD MO-220.
4. This part is lead-free and is compliant with the RoHS directive.

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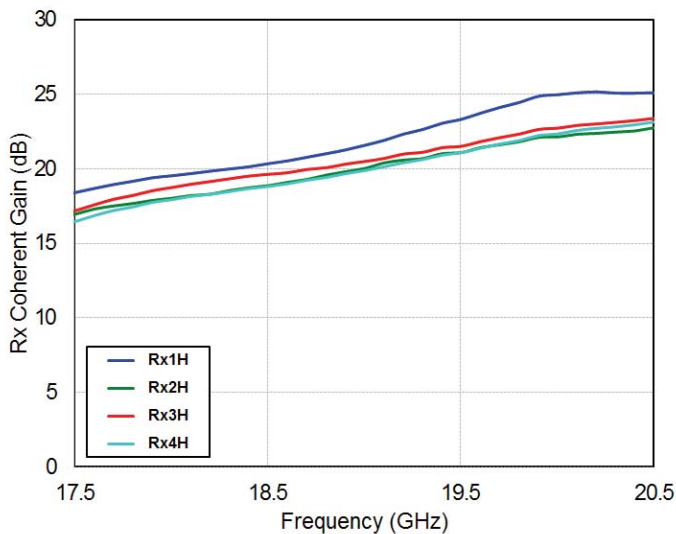
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1-858-792-9910  
info@anokiwave.com

## Product Overview

### Data

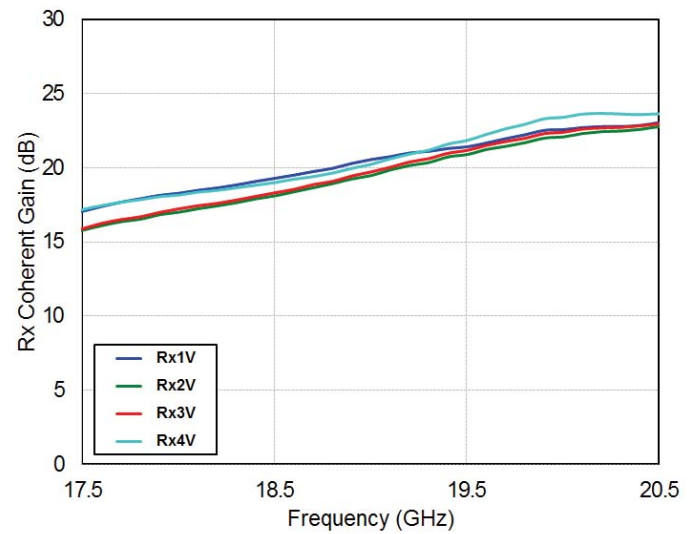
#### Rx Horizontal Coherent Gain vs. Frequency

Temp = +25°C, Vs = +1.8V



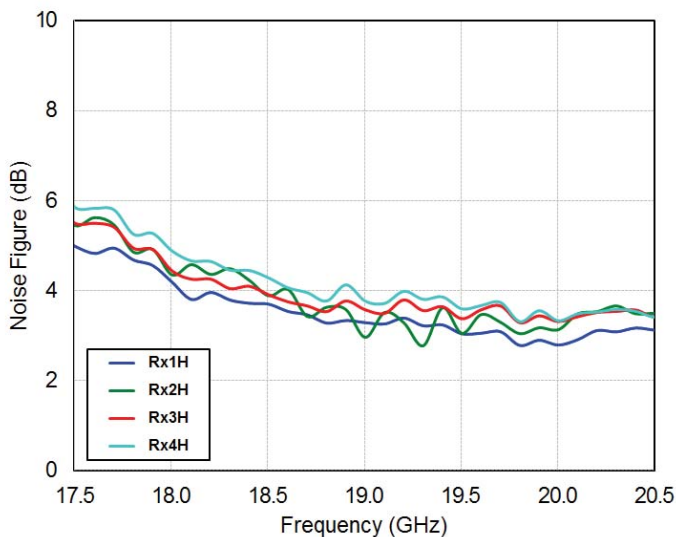
#### Rx Vertical Coherent Gain vs. Frequency

Temp = +25°C, Vs = +1.8V



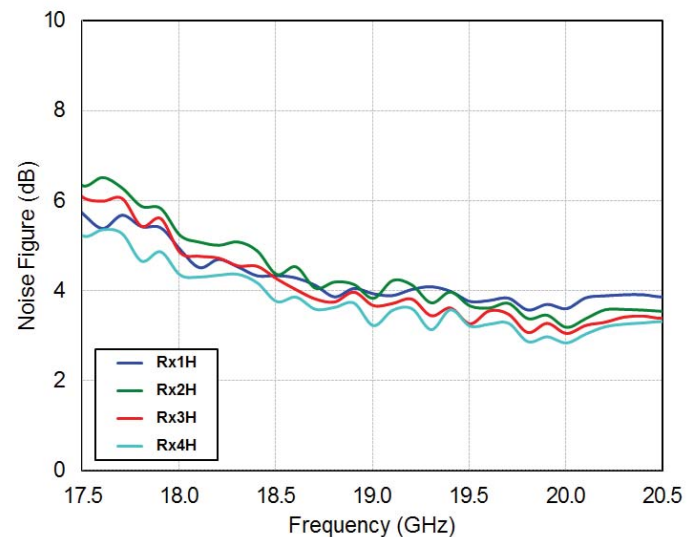
#### Rx Horizontal Noise Figure vs. Frequency

Temp = +25°C, Vs = +1.8V



#### Rx Vertical Noise Figure vs. Frequency

Temp = +25°C, Vs = +1.8V



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