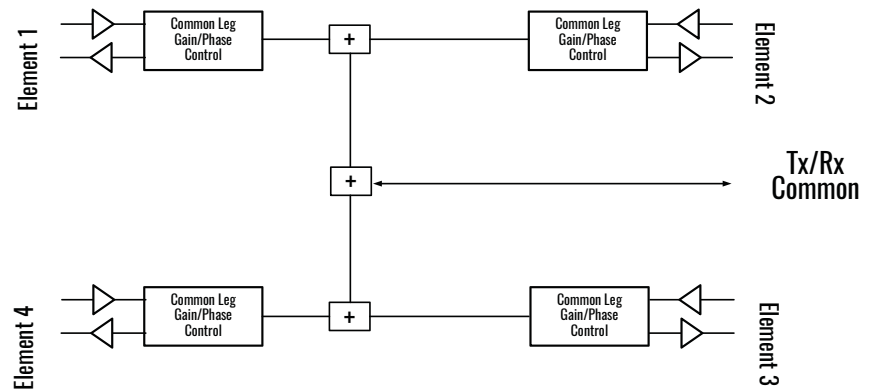


Product Features

- 8-11 GHz operation
- Supports 4 radiating elements
- Single beam Rx
- Single beam Tx
- +15 dBm Tx OP1dB
- +21 dB Tx gain
- +7 dB Rx coherent gain*
- 14 dB Rx NF
- +7 dBm Rx IIP3
- 6 bit phase control (LSB=5.625°)
- 6 bit gain control (LSB=0.5dB)
- Fast beam steering
- 7x7 mm QFN
- +1.8 V operation
- 1.8 W DC Tx mode/1.3W DC Rx mode

Block Diagram



Applications

Commercial and Weather RADARs, 5G Communications

General Description

The AWS-0105 is a highly integrated silicon quad core IC intended for RADAR and 5G phased array applications. The device supports four radiating elements, single beam transmit, and single beam receive and includes all requisite beam steering controls for 6 bit phase and gain control. The device provides 21 dB gain and +15 dBm output power during transmit mode and 7 dB gain and +7 dBm IIP3 during receive mode. Additional features include gain compensation over temperature, temperature reporting, and fast beam switching using eight on-chip beam weight storage registers. The device features ESD protection on all pins, operates from +1.8 V, 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 4:1 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.

$CG = SPG + 12 \text{ dB} = EG + 6 \text{ dB}$ for a quad IC



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Rev. V10A

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X-Band Silicon RADAR Quad Core IC

AWS-0105

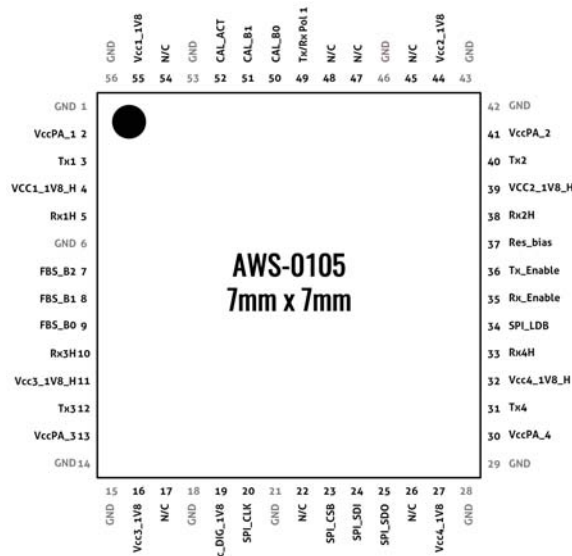
Product Overview

Specifications

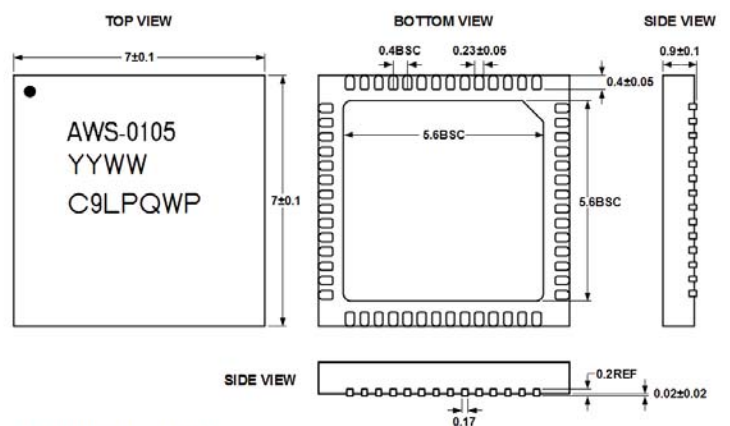
| Parameter | Nominal Performance | Units |
|-------------------------|---------------------|---------|
| General | | |
| Frequency | 8-11 | GHz |
| # Elements | 4 | - |
| Tx # Beams | Single | - |
| Rx # Beams | Single | - |
| Supply Voltage | +1.8 | V |
| Beam Steering | | |
| Phase Bits | 6 | |
| Phase LSB | 5.625 | degrees |
| RMS Phase Error | 3 | deg RMS |
| Amplitude Bits | 6 | - |
| Amplitude LSB | 0.5 | dB |
| Amplitude Dynamic Range | 31.5 | dB |
| RMS Amplitude Error | 0.5 | dB RMS |

| Parameter | Nominal Performance | Units |
|-----------------------|---|-------|
| Transmit Mode | | |
| Channel Gain | +21 | dB |
| Tx Output P1dB | +15 | dBm |
| Receive Mode | | |
| Coherent Channel Gain | +7 | dB |
| Noise Figure | 14 | dB |
| IIP3 | +7 | dBm |
| Other | | |
| Telemetry | Temperature, Tx output power | - |
| DC Power Tx Mode | 1.8 | W |
| DC Power Rx Mode | 1.3 | W |
| Operating Range | -40 to +85 | °C |
| Package Size | 56 lead 7x7 (PQFN) | mm |
| Additional Features | Eight beam weight registers for storage for fast beam switching | - |

Package and Pin Out



SPI_{rx} -Serial command and telemetry reporting
FBS_{rx} -Fast beam steering address select



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

This part is lead-free and is compliant with the RoHS directive



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