

DESCRIPTION

Sanland's AL415 is a flat gain, high linearity, ultra-low noise amplifier in a micro 2.0 x 2.0 x 0.75mm³ 8-pin DFN package . The LNA provides a gain flatness of 2dB (peak to peak) over a broadband of 3 to 6GHz. At 5.5 GHz, the amplifier typically provides 21.6 dB gain, +35.5 dBm OIP3 at a 56mA bias setting, and 0.95 dB noise figure. The LNA can be biased from a single positive supply ranging from 3.3 to 5 volts. The device is housed in a green/RoHS-compliant industry-standard 2x2 mm package.

The AL415 is internally matched using a high performance E-pHEMT process and only requires five external components for operation from a single positive supply: an external RF choke and blocking/bypass capacitors and a bias resistor going to pin 1. This LNA integrates a shut-down biasing capability to allow for operation in TDD applications.

KEY FEATURES

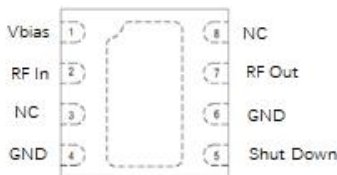
- 0.6-6 GHz Operational Bandwidth
- Ultra low noise figure, 0.95 dB NF @ 5.5 GHz
- Bias adjustable for linearity optimization
- 33.5 dBm OIP3 at 65mA IDD
- Integrated shutdown control pin with 1.8V TTL logic
- Maintains OFF state with high Pin drive
- +3V TO +5V supply, does not require -Vgg

Major Applications

- 4.5G, 5G Massive MIMO
- Repeaters / DAS
- Mobile Infrastructure
- LTE-U / LAA
- L-band, S-band, C-band radios
- General Purpose Wireless
- TDD or FDD systems



Pin Assignment



Pin Details

Pin Number	Name	Description
1	VBIAS	Bias voltage for input gate. External resistor sets current consumption.
2	RF in	RF input. DC blocking capacitor required.
3,8	N/C	No connection. May be connected to ground with no change in performance.
4,6	GND	GrouND. Connected to ground .
5	Shut Down	
7	RFOUT/ VDD	RF output. Apply VDD through RF choke inductor. DC blocking capacitor required.

Absolute Maximum Ratings

Parameter	Rating	Unit
DC Power Supply	+7	V
Quiescent supply current	90	mA
RF Input Power	30	dBm
Operating Temperature	-40 to +105	°C
Storage Temperature	-65 to +150	°C
Operation beyond any one of these limits may cause permanent damage.		

Thermal Data

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Thermal resistance		45		°C/W	
Channel temperature @ +85 °C reference (package heat slug)		101		°C	VDD = 5 V, IDQ = 65mA, no RF applied, dissipated power=0.325W
Test Conditions : VDD = 5 V, TA = +25 °C, PIN = -25 dBm, Characteristic Impedance [ZO] = 50 Ω, Unless Otherwise Noted.					

Important Note:

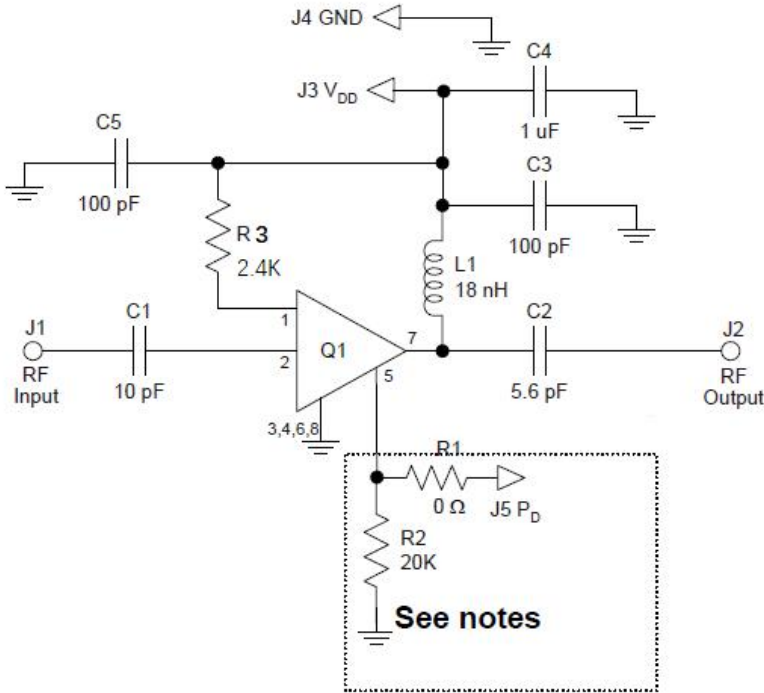
The information provided in this datasheet is deemed to be accurate and reliable only at present time. Sanland Technology Corp. reserves the right to make any changes to the specifications in this datasheet without prior notice.



Caution: ESD Sensitive
Appropriate precaution in handling, packaging
And testing devices must be observed.

700 to 1000 MHz Optimized Tuning

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
RF Specifications					
NF		0.9		dB	4.5 GHz, includes Evaluation Board loss
S21		20.5		dB	4.5 GHz
S11		11.4		dB	4.5 GHz
S22		15.8		dB	4.5 GHz
S12		35.4		dB	4.5 GHz
OIP3		+33.5		dBm	4.5 GHz, $\Delta f = 1$ MHz, PIN = -25 dBm/tone
OP1dB		+19		dBm	850MHz
DC Specifications					
VDD		5		V	
IDQ		65		mA	Set with external resistor
Test Conditions : VDD = 5 V, TA = +25 °C, PIN = -25 dBm, Characteristic Impedance [ZO] = 50 Ω , Unless Otherwise Noted					

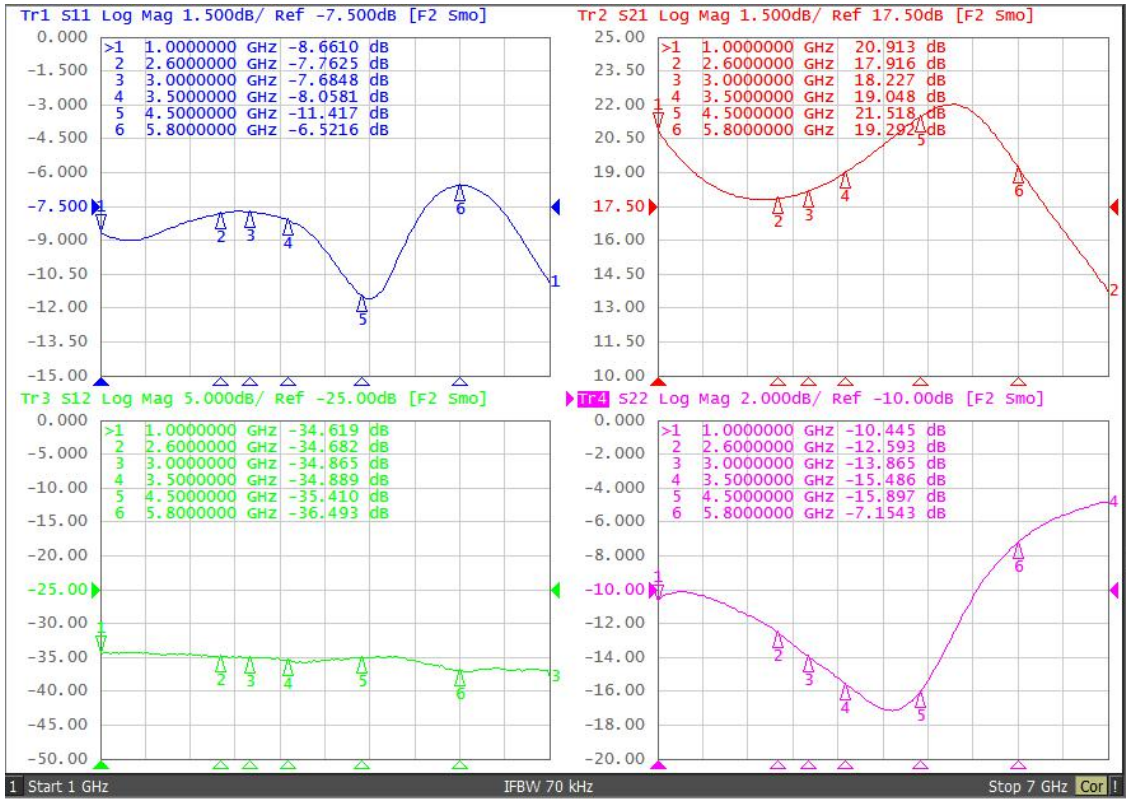


Notes:

For TDD Applications: R1=20K&R2=0K.

For FDD Applications: R1=20K 'OR' Pin 5 tied to ground. R2=DNP/Omitted.

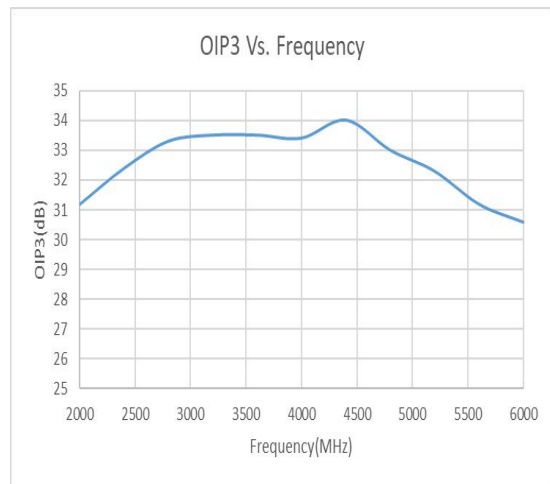
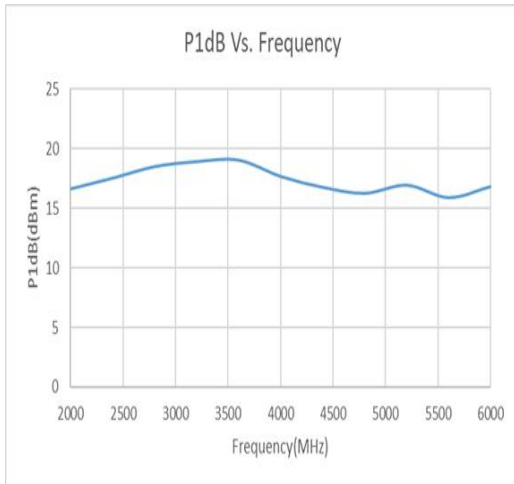
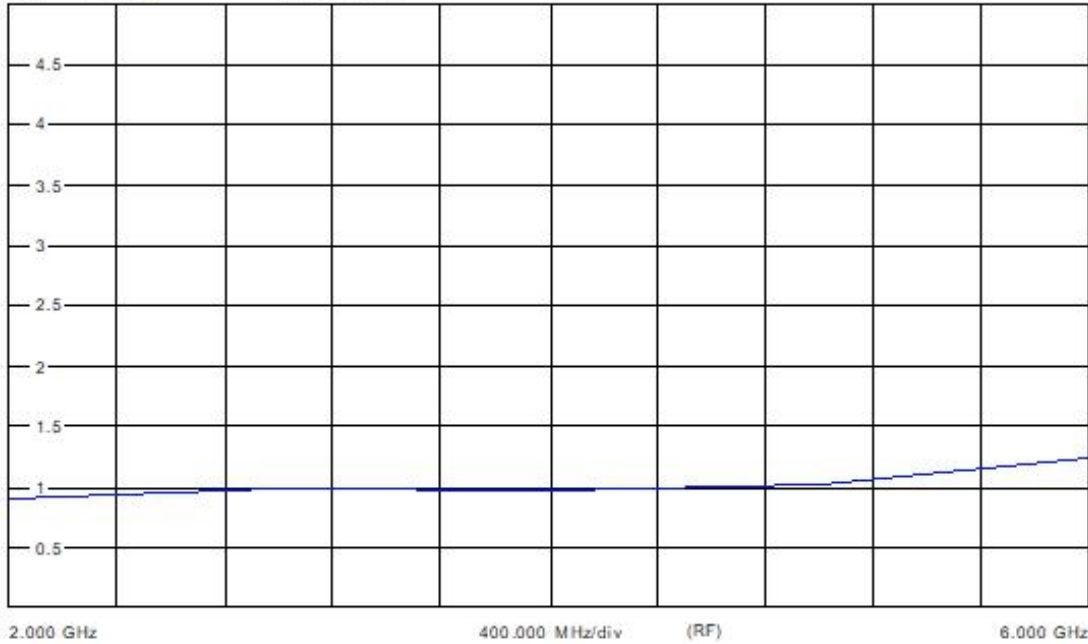
Component	Description	Value	Size	Manufacturer	Part Number
L1	Inductor	18nH	0402	Coilcraft	
C1	Capacitor	10pF	0402	Murata	
C2	Capacitor	5.6pF	0402	Murata	
R3	Resistor	2.4kΩ	0402	Kamaya	
C3,C5	Capacitor	100pF	0402	Murata	
C4	Capacitor	1uF	0402	Murata	

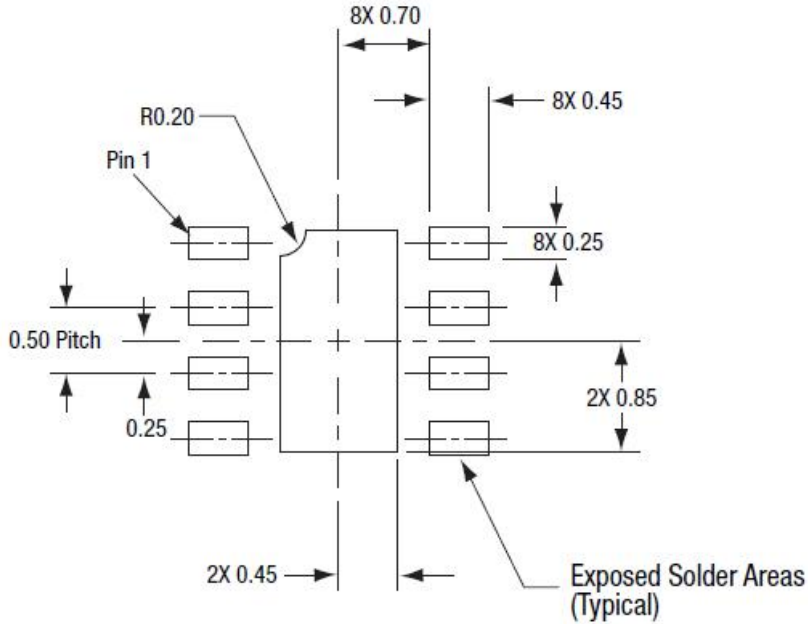


Noise Figure

Ref -30 dBm

SWT 100 ms

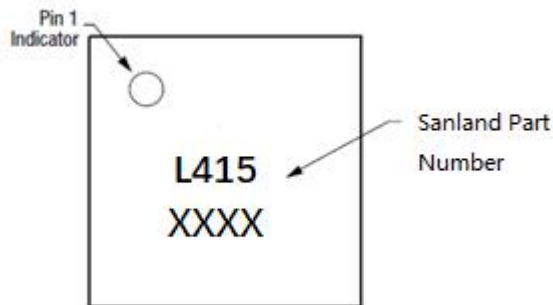




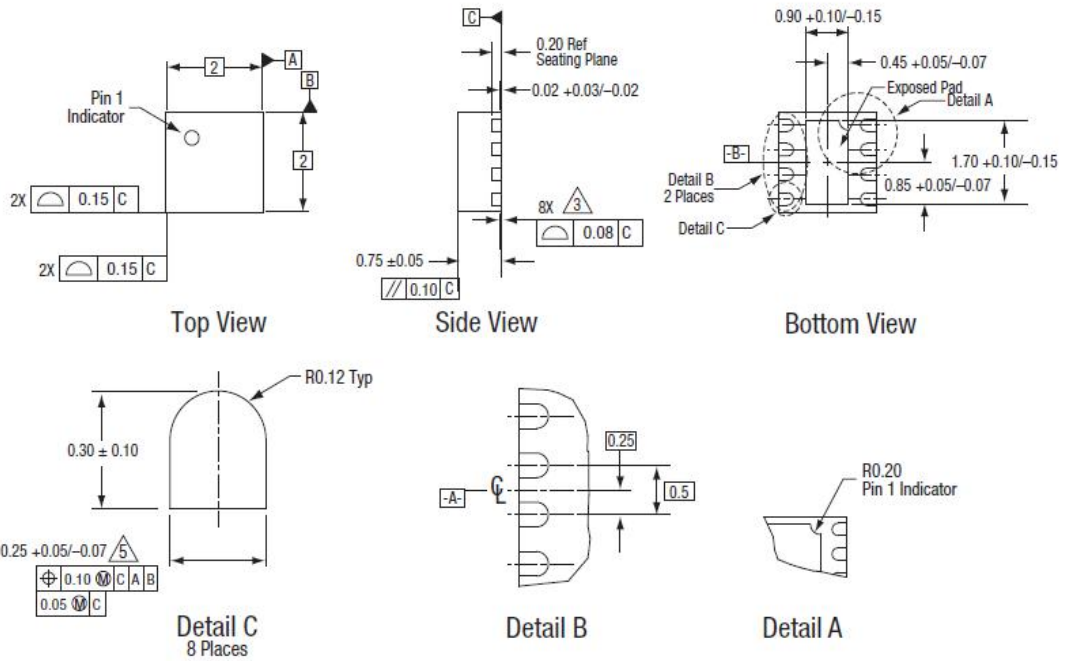
All dimensions are in millimeters

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PCB Layout Footprint (Top View)



Typical Part Markings (Top View)

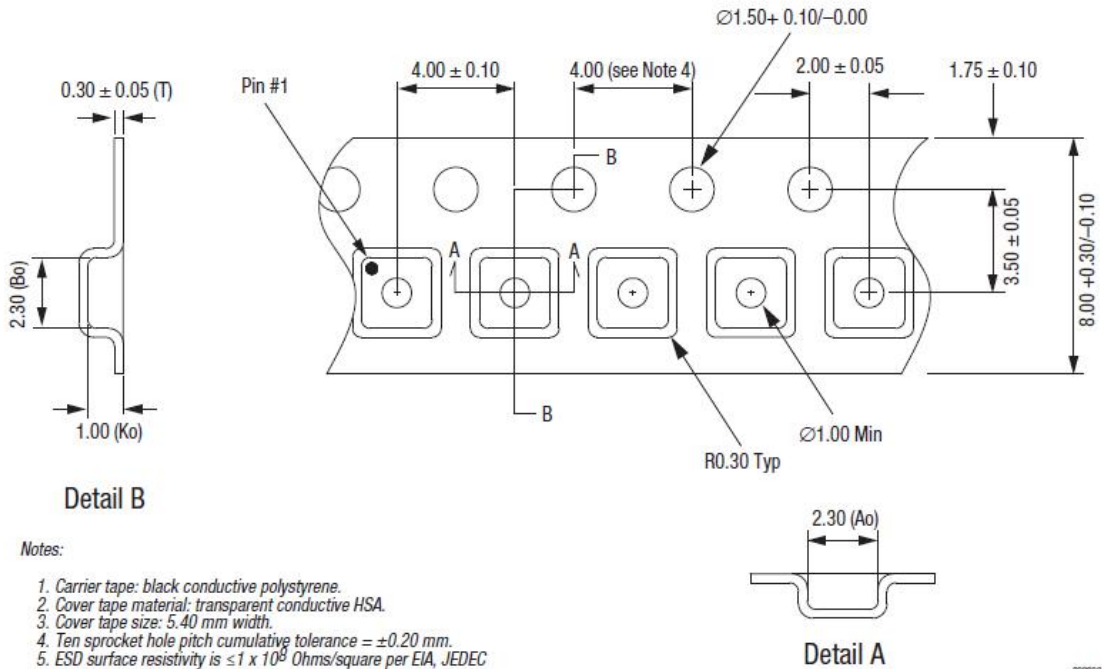


Notes:

1. All measurements are in millimeters.
2. Dimensions and tolerances according to ASME Y14.5M-1994.
3. Coplanarity applies to the exposed heat sink ground pad as well as the terminals.
4. Plating requirement per source control drawing (SCD) 2504.
5. Dimension applies to metallized terminal and is measured between 0.15 mm and 0.30 mm from terminal tip.

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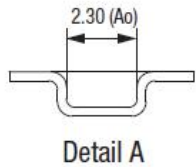
Package Dimensions



Detail B

Notes:

1. Carrier tape: black conductive polystyrene.
2. Cover tape material: transparent conductive HSA.
3. Cover tape size: 5.40 mm width.
4. Ten sprocket hole pitch cumulative tolerance = ±0.20 mm.
5. ESD surface resistivity is $\leq 1 \times 10^9$ Ohms/square per EIA, JEDEC tape and reel specification.
6. Ao and Bo measurement point to be 0.30 mm from bottom pocket.
7. All measurements are in millimeters.



Detail A

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Tape and Reel Dimensions