

# Coaxial Low Noise Amplifier

## ZKL-33ULN-S+

50Ω    0.4 to 3.0 GHz



CASE STYLE: BY493

### The Big Deal

- Ultra Low Noise Figure, 0.36 dB typ. at 0.9 GHz
- High Dynamic Range
- Small connectorized package

### Product Overview

The ZKL-33ULN-S+ (RoHS compliant) uses Mini-Circuits' E-PHEMT technology to offer very high gain with a combination of ultra low noise figure over a broad frequency range and high OIP3. Housed in a rugged shielded package with class 3A ESD rating and internal voltage regulator, this amplifier supports a wide variety of applications requiring moderate power output, low distortion and 50 ohm matched input/output ports.

### Key Features

Feature	Advantages
Ultra Low Noise Figure, 0.36 dB at 0.9 GHz	Outstanding world class noise figure performance.
High OIP3 vs. DC power consumption +36 dBm typical at 0.9 GHz	Combination of Low Noise and High OIP3 make this model ideal for use in a Low Noise Receiver Front End (RFE)
Small Size, 1.38" x 1.5"	The small size and construction enable the ZKL-33ULN-S+ to be used in extremely compact connectorized applications.



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### Features

- Low Noise Figure, 0.36 dB typ. at 0.9 GHz
- High OIP3, +36 dBm at 0.9 GHz typ.
- High Pout, P1dB, +18 dBm typ. at 0.9 GHz typ.
- High Gain, 35.0 dB at 0.9 GHz typ.

### Applications

- Base station infrastructure
- Portable Wireless
- LTE
- GPS
- GSM
- Airborne radar



Generic photo used for illustration purposes only

CASE STYLE: BY493

Connectors	Model
SMA	ZKL-33ULN-S+

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

### Electrical Specifications at 25°C and 5.0 V unless noted

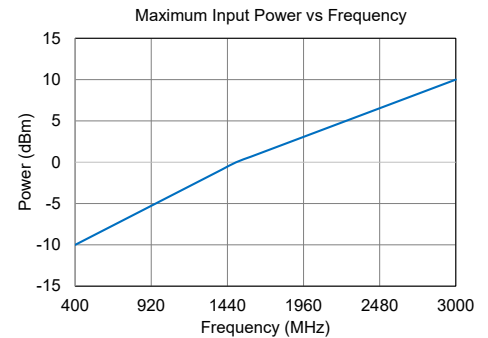
Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.4		3.0	GHz
Noise Figure	0.4		0.29	0.70	dB
	0.9		0.36		
	1.5		0.50		
	2.0		0.68		
	3.0		1.44		
Gain	0.4	33	47	37	dB
	0.9		35		
	1.5		27		
	2.0		22		
	3.0		15		
Output Power @ 1 dB compression	0.4	17	18.0		dBm
	0.9		18.0		
	1.5		18.0		
	2.0		18.0		
	3.0		13.5		
Output IP3	0.4	34	34		dBm
	0.9		36		
	1.5		37		
	2.0		38		
	3.0		36		
Input VSWR	0.4		1.28		:1
	0.9		1.25		
	1.5		1.41		
	2.0		1.33		
	3.0		1.34		
Output VSWR	0.4		1.65		:1
	0.9		1.29		
	1.5		1.12		
	2.0		1.05		
	3.0		1.25		
Active Directivity (Isolation-Gain)	0.4-3.0		8		dB
DC Supply Voltage		—	5.0	—	V
Supply Current		—	100	150	mA

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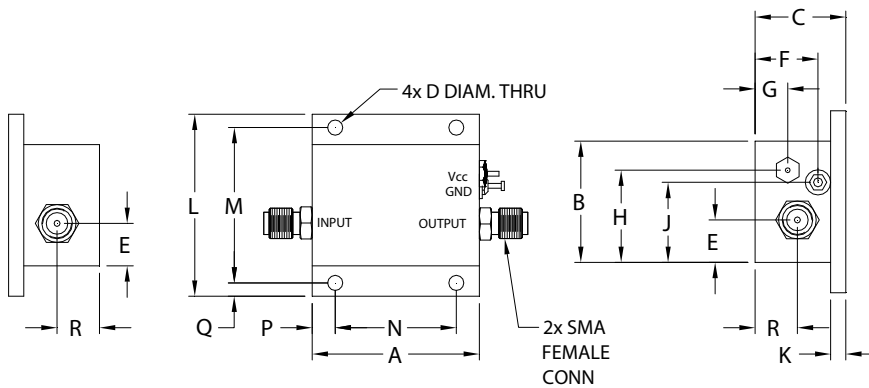
## Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case
Storage Temperature	-55°C to 100°C
DC Voltage	5.5 V
Input RF Power (no damage)	From 400 MHz to 1500 MHz: -10 dBm to 0 dBm From 1500 MHz to 3000 MHz: 0 dBm to +10 dBm
Power Consumption	0.75 W

Permanent damage may occur if any of these limits are exceeded.



## Outline Drawing



**!** NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminal. See Application Note. [AN-40-010](#).

## Outline Dimensions (inch/mm)

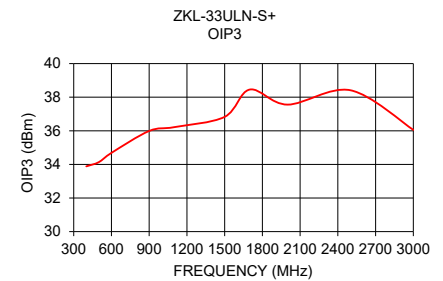
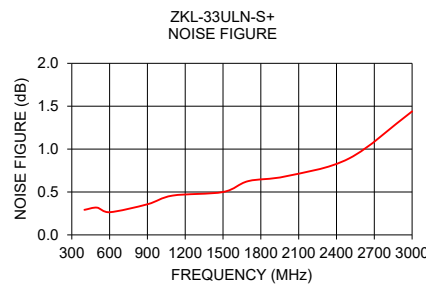
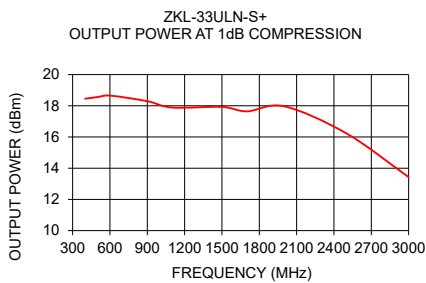
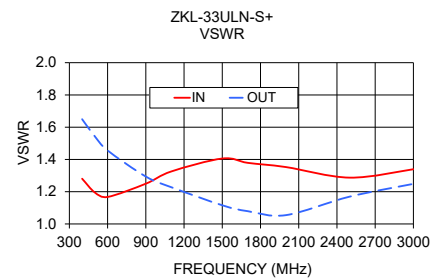
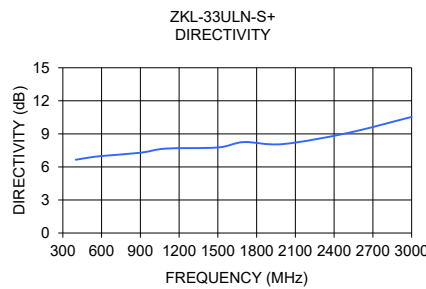
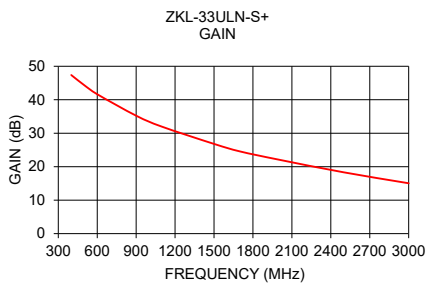
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
1.38	1.00	.75	.125	.35	.52	.27	.76	.66	.125	1.50	1.281	1.000	.19	.11	.35	grams
35.05	25.40	19.05	3.18	8.89	13.21	6.86	19.30	16.76	3.18	38.10	32.54	25.40	4.83	2.79	8.89	40

# Typical Performance Data/Curves

# ZKL-33ULN-S+

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FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		POUT at 1dB COMPR. (dBm)	NOISE FIGURE (dB)	OUTPUT IP3 (dBm)
			IN	OUT			
400	47.4	6.7	1.28	1.65	18.5	0.3	33.9
500	44.4	6.8	1.19	1.54	18.6	0.3	34.1
600	41.6	7.0	1.17	1.46	18.7	0.3	34.7
900	35.2	7.3	1.25	1.29	18.3	0.4	36.0
1100	31.9	7.7	1.33	1.23	17.9	0.5	36.2
1500	26.8	7.8	1.41	1.12	17.9	0.5	36.8
1700	24.6	8.3	1.38	1.08	17.6	0.6	38.5
2000	22.1	8.1	1.35	1.05	18.0	0.7	37.6
2500	18.3	9.1	1.29	1.17	16.2	0.9	38.4
3000	15.0	10.5	1.34	1.25	13.4	1.4	36.1



## Additional Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)

