Avantek Products

Ultra Low Noise Narrowband Amplifier 950 to 1250 MHz

Technical Data

ACT-120923

Features

- **Ultra Low Noise Figure: 1.2 dB (Typ)**
- **Narrow Frequency Range: 950 to 1250 MHz**
- **Internal Voltage Regulator**
- **Available With High Reliability Screening**
- **Removable Connectors**

Applications

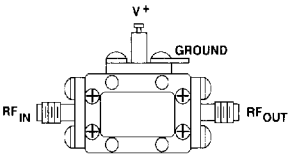
- **RF/IF Front Ends**
- **Low Signal Level Amplification**
- **Satellite Communications Systems**
- **Navigation and Avionics Systems (GPS, DME, TACAN, IFF, JTIDS, and more)**

Description

The ACT-120923 is a GaAs FET input, ultra low noise, narrowband amplifier using a single-ended, multi-stage design with lossless feedback and an internal voltage regulator. A custom thin-film matching network provides optimum performance over the 950 to 1250 MHz frequency range. It is packaged in a laser-welded, hermetically-sealed case with field-replaceable SMA connectors. Without connectors it is suitable for microstrip mounting.

Pin Configuration

AX-2



(See Section 5 for detailed case drawings.)

Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+15 dBm
Operating Case Temperature	–55 to +125°C
Storage Temperature	–62 to +150°C
"R" Series Burn-In Temperature	+125°C

Thermal Characteristics[1]

θ_{jc}	105°C/W
Active Transistor Power Dissipation	250 mW
Junction Temperature Above Case Temperature	27°C

Note 1: For further information, see Reliability Screening, Section 6.

Weight: (typical) 35 grams (with connectors),
(typical) 28 grams (without connectors)

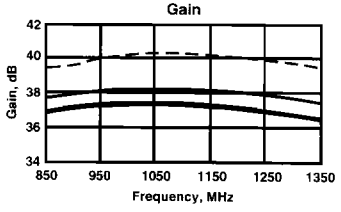
Electrical Specifications

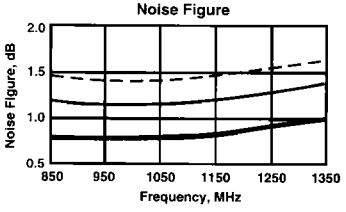
(Measured in 50 Ω system @ +12 VDC nominal unless otherwise noted)

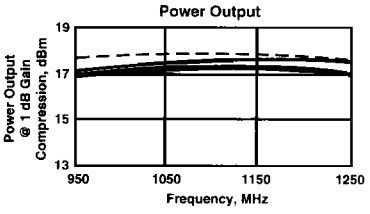
Symbol	Characteristic	Typical	Guaranteed Specifications		Unit
		T_C = 25°C	T_C = 0 to 50°C	T_C = –55 to +85°C	
BW	Frequency Range	950-1250	950-1250	950-1250	MHz
GP	Small Signal Gain (Min.)	37.0	35.5	35.0	dB
—	Gain Flatness (Max.)	±0.3	±0.5	±0.7	dB
NF	Noise Figure (Max.)	1.2	1.5	1.7	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+16.0	+14.0	+13.0	dBm
—	Input VSWR (Max.)	1.5:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.5:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+26.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+26.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+32.0	—	—	dBm
—	Operating Voltage	+12 to +15	—	—	V
I_D	DC Current	95	—	—	mA

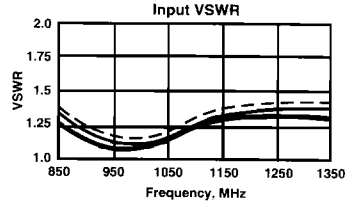
Typical Performance Over Temperature (@ +12 VDC unless otherwise noted)

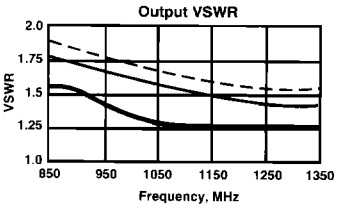
Key: +25°C ——— +85°C — — -55°C ———

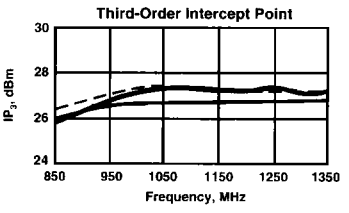


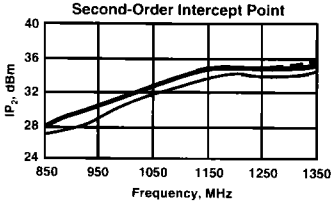


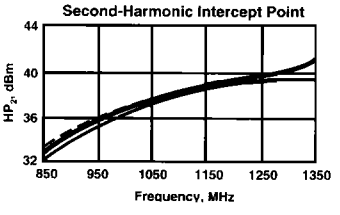












Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

S-Parameters **Bias = 12 Volts, Current = 93 mA**

FREQ	S_{11}		S_{21}		S_{12}		S_{22}		K	GPDEL	PHASE
GHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang	Factor	ns	DEG
.40	.91	119.35	20.58	8.95	–47.21	159.02	.72	148.55	1.01	1.94	
.50	.80	98.39	27.79	–51.32	–47.49	81.74	.57	119.38	1.71	1.73	
.60	.66	67.03	33.14	–115.96	–44.48	–178.41	.46	96.34	1.10	2.42	
.70	.40	37.13	35.76	–173.33	–53.88	–172.99	.37	76.63	5.31	1.42	
.80	.19	18.48	36.74	135.53	–51.84	120.98	.29	60.75	2.65	1.23	
.90	.11	137.19	37.72	92.06	–48.33	–69.98	.24	51.26	2.56	1.16	2.96
1.00	.02	176.28	37.54	49.48	–55.95	–61.92	.20	40.30	4.34	1.38	–1.36
1.10	.07	–169.19	38.12	9.25	–49.10	48.66	.18	35.26	2.29	1.26	–3.34
1.20	.11	158.53	37.81	–26.74	–44.05	175.09	.17	28.15	1.21	1.05	–1.08
1.30	.14	170.11	37.66	–61.10	–47.29	16.31	.16	17.63	1.63	.76	2.82
1.40	.15	168.62	37.49	–95.98	–48.90	–79.06	.14	8.01	2.13	1.12	
1.50	.12	169.84	36.93	–127.52	–54.65	–94.87	.13	5.00	28.82	.63	
1.60	.16	176.33	36.51	–163.89	–47.32	–75.77	.11	4.95	1.93	.96	
1.70	.23	178.95	35.89	165.77	–46.19	140.61	.13	8.50	1.96	.56	
1.80	.29	168.14	34.87	130.88	–56.36	–154.43	.16	4.96	7.79	.90	
1.90	.34	157.31	33.13	99.55	–52.23	140.36	.18	–4.16	3.95	.63	
2.00	.37	148.54	32.39	69.29	–53.98	–164.83	.20	–17.10	5.60	.99	
2.10	.36	137.59	30.95	40.71	–47.02	–99.84	.23	–31.19	3.33	.83	
2.20	.37	128.25	29.17	14.70	–50.38	–119.76	.24	–45.43	4.96	.52	
2.30	.36	119.25	27.23	–10.00	–48.14	–144.94	.25	–59.87	4.66	.26	
2.40	.40	115.28	25.96	–29.16	–55.28	–155.78	.26	–68.98	11.99	–.11	
2.50	.38	112.74	24.61	–54.64	–54.82	–179.45	.26	–78.48	14.58	1.60	
2.60	.38	95.14	23.33	–70.54	–49.51	124.84	.26	–91.21	8.58	.55	
2.70	.44	91.80	22.52	–92.11	–44.98	–51.16	.26	–101.78	5.12	.99	
2.80	.38	69.39	20.69	–113.66	–58.66	140.02	.26	–110.99	56.69	.18	
2.90	.41	60.48	19.63	–138.44	–41.51	89.47	.26	–122.48	4.75	.90	
3.00	.39	47.47	18.45	–159.89	–64.53	99.09	.27	–131.81	78.93	.23	
3.10	.39	12.93	16.30	174.05	–40.84	50.10	.27	–139.43	8.14	1.29	
3.20	.41	–30.24	12.87	173.66	–42.93	–71.11	.26	–150.67	17.29	–1.13	
3.30	.19	–39.26	18.41	144.44	–45.53	–76.14	.26	–161.64	10.71	1.30	
3.40	.30	–68.34	14.64	109.53	–55.94	108.38	.26	–170.49	58.18	.93	
3.50	.38	–88.10	12.73	86.65	–53.28	33.85	.24	–179.90	46.26	.73	
3.60	.47	–114.15	10.45	64.88	–60.46	–38.25	.23	169.94	90.26	.31	
3.70	.56	–132.73	7.91	48.42	–52.57	49.77	.22	158.07	57.20	.18	
3.80	.61	–155.40	6.56	25.44	–57.46	–46.56	.21	151.81	83.45	1.15	
3.90	.73	–178.24	3.90	7.06	–43.62	35.47	.19	142.53	21.63	.40	
4.00	.71	171.41	1.95	–7.20	–50.11	127.20	.19	133.72	67.02		