



UTO/UTC 2302 Series Thin-Film Cascadable Amplifier 1700 to 2300 MHz

T-74-13-01

FEATURES

- Frequency Range: 1700 to 2300 MHz
- Medium Gain: 10.5 dB (Typ)
- Low VSWR
- Temperature Compensated

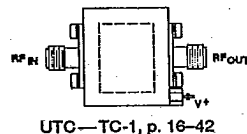
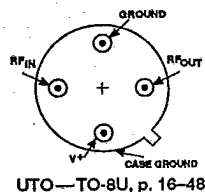
APPLICATIONS

- IF/RF Amplification
- Telemetry
- Military Communications

DESCRIPTION

The 2302 Series is a thin-film bipolar RF amplifier that incorporates resistive feedback and active bias for temperature compensation and increased immunity to bias voltage variations. Tuned inductive coupling maintains low VSWR over all conditions, while blocking capacitors couple RF through the amplifier. The 2302 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1 package.

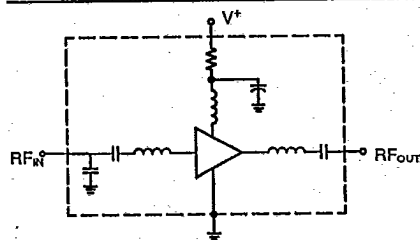
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ELECTRICAL SPECIFICATIONS (Measured in a 50-ohm system @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical T _c = 25°C	Guaranteed Specifications		Unit
			T _c = 0° to 50°C	T _c = -55° to +85°C	
BW	Frequency Range	1700-2300	1700-2300	1700-2300	MHz
GP	Small Signal Gain (Min.)	10.5	8.0	8.0	dB
—	Gain Flatness (Max.)	±0.3	±0.5	±1.0	dB
NF	Noise Figure (Max.)	5.0	6.5	7.0	dB
P _{1dB}	Power Output @ +1 dB Compression (Min.)	+8.0	+3.0	+2.0	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	+13.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+23.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+27.0	—	—	dBm
I _b	DC Current	18	—	—	mA

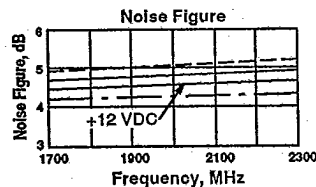
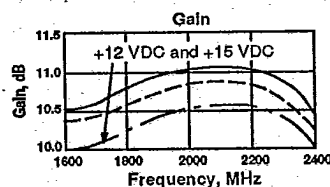
SCHEMATIC



TYPICAL PERFORMANCE OVER TEMPERATURE

(@ +15 VDC unless otherwise noted)

KEY: +25°C
+85°C
-55°C



MAXIMUM RATINGS

DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55°C to +125°C
Storage Temperature	-62°C to +150°C
"R" Series Burn-In Temperature	+125°C

THERMAL CHARACTERISTICS*

θ _{JA}	105°C/W
Active Transistor Power Dissipation	130 mW
Junction Temperature Above Case Temperature	13°C
MTBF (MIL-HDBK-217E, A _{VR} @ 90°C)	752,100 Hrs.

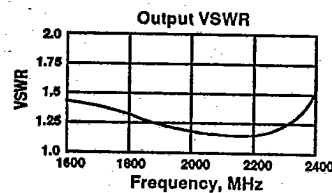
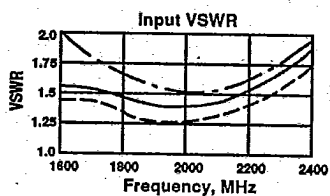
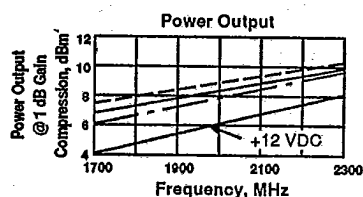
*For further information, see High Reliability section, p. 17-2.

WEIGHT: (typical) UTO—2.1 grams; UTC—21.5 grams

Avantek, Inc. • 481 Cottonwood Drive, Milpitas, CA 95035 • Contact your local representative, distributor or field sales office for further information. Listings are in the back of this Data Book.

TYPICAL PERFORMANCE OVER TEMPERATURE (continued)

T-74-13-01



AUTOMATIC NETWORK ANALYZER MEASUREMENTS (Typical production unit @ +25°C ambient)

NUMERICAL READINGS

BIAS = 15.00 VOLTS

FREQ MHz	VSWR IN	GAIN dB	PHASE DEG	PHASE DEV	GPDEL ns	VSWR OUT	ISOL dB
400.0	4.43	8.86	-156.61	—	.98	2.04	28.14
500.0	2.46	10.44	171.17	—	.80	1.85	26.08
600.0	1.91	10.94	145.35	—	.62	1.69	25.26
700.0	1.77	10.97	125.73	—	.49	1.61	24.76
800.0	1.76	10.74	109.58	—	.43	1.56	24.39
900.0	1.81	10.57	84.94	—	.39	1.54	24.04
1000.0	1.84	10.42	81.39	—	.36	1.51	23.61
1100.0	1.86	10.34	68.28	—	.36	1.50	23.22
1200.0	1.88	10.26	55.71	—	.35	1.49	22.75
1300.0	1.88	10.24	43.20	—	.35	1.48	22.27
1400.0	1.85	10.28	30.46	—	.35	1.46	21.75
1500.0	1.83	10.35	17.82	—	.35	1.45	21.31
1600.0	1.79	10.48	5.16	—	.36	1.43	20.82
1700.0	1.75	10.56	-7.87	-1.72	.37	1.40	20.39
1800.0	1.70	10.70	-21.84	-.14	.40	1.36	19.91
1900.0	1.66	10.83	-36.68	.64	.42	1.31	19.44
2000.0	1.61	11.01	-51.85	.89	.42	1.23	19.06
2100.0	1.60	11.08	-67.17	1.12	.44	1.13	18.79
2200.0	1.67	11.00	-83.76	.09	.48	1.07	18.68
2300.0	1.82	10.77	-101.62	-2.21	.50	1.19	18.78
2400.0	2.15	10.37	-119.98	—	.53	1.39	19.11
2500.0	2.63	9.70	-139.72	—	.55	1.65	19.83

LINEARIZATION RANGE: 1700 to 2300 MHz

S-PARAMETERS

BIAS = 15.00 VOLTS

FREQ MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
300.00	.861	-152.9	3.553	-121.6	-34.830	104.4	.395	-101.6
400.00	.846	172.4	9.381	-162.3	-27.922	71.3	.371	-133.9
500.00	.473	154.6	10.645	168.1	-26.023	49.1	.343	-152.7
600.00	.376	146.4	11.003	143.8	-24.958	35.8	.316	-171.6
700.00	.334	143.1	10.994	125.5	-24.390	25.2	.306	-150.1
800.00	.315	142.1	10.845	111.4	-24.007	19.9	.297	-134.1
900.00	.309	139.9	10.660	96.8	-23.482	12.3	.292	-118.1
1000.00	.308	135.0	10.532	82.9	-22.964	5.9	.282	-102.9
1100.00	.308	129.9	10.448	69.9	-22.519	-1.5	.273	-88.6
1200.00	.311	125.4	10.387	58.7	-22.030	-6.6	.261	-77.6
1300.00	.306	118.5	10.370	44.9	-21.646	-13.7	.246	-61.9
1400.00	.300	110.4	10.385	30.9	-21.169	-20.8	.228	-46.3
1500.00	.289	102.8	10.464	18.3	-20.586	-27.9	.210	-30.8
1600.00	.277	94.1	10.570	6.4	-20.267	-34.5	.191	-15.0
1700.00	.260	83.9	10.651	-5.5	-19.850	-40.9	.175	-1.8
1800.00	.237	69.0	10.722	-21.6	-19.375	-50.8	.152	-25.2
1900.00	.212	53.5	10.779	-35.5	-18.936	-59.8	.134	-46.3
2000.00	.189	36.9	10.933	-46.8	-18.575	-68.2	.120	-65.4
2100.00	.168	7.1	10.967	-63.1	-18.248	-77.0	.095	-93.3
2200.00	.179	-31.4	10.927	-80.3	-18.106	-88.6	.067	-132.0
2300.00	.224	-64.6	10.682	-96.8	-18.000	-100.7	.051	-161.5
2400.00	.297	-90.2	10.376	-113.5	-18.096	-113.4	.083	-95.2
2500.00	.390	-112.3	9.817	-131.6	-18.622	-126.6	.146	-60.3
2600.00	.490	-132.8	8.981	-151.6	-19.486	-142.1	.228	-32.3
2700.00	.604	-155.1	7.713	-175.9	-20.859	-163.0	.319	5.6
2800.00	.672	-169.4	6.382	169.4	-22.149	-173.9	.377	-10.5
2900.00	.751	171.9	4.344	145.9	-24.913	167.6	.440	-33.2
3000.00	.792	161.5	2.636	132.5	-27.657	154.4	.467	-46.3