TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Thin-Film Cascadable Amplifier 10 to 2000 MHz

Technical Data

UTO/UTC 2022 Series

Features

- **Frequency Range: 10 to 2000 MHz**
- **Medium Gain: 10.0 dB (Typ)**
- **Low VSWR**
- **Temperature Compensated**

Applications

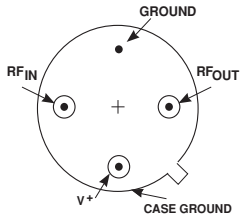
- **IF/RF Amplification**

Description

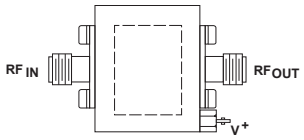
The 2022 Series is a high-power wideband, thin-film bipolar RF amplifier with resistive feedback and active bias for temperature compensation and increased immunity to bias voltage variations. Input/output blocking capacitors couple the RF through the amplifier, while a low VSWR is maintained through inductive tuning The 2022 Series amplifiers are available in either the TO-8 hermetic case or connectored TC-1A package.

Pin Configuration

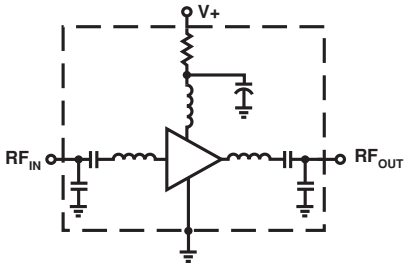
UTO—TO-8U



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 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	216 mW
Junction Temperature Above Case Temperature	23°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	814,700 Hrs.

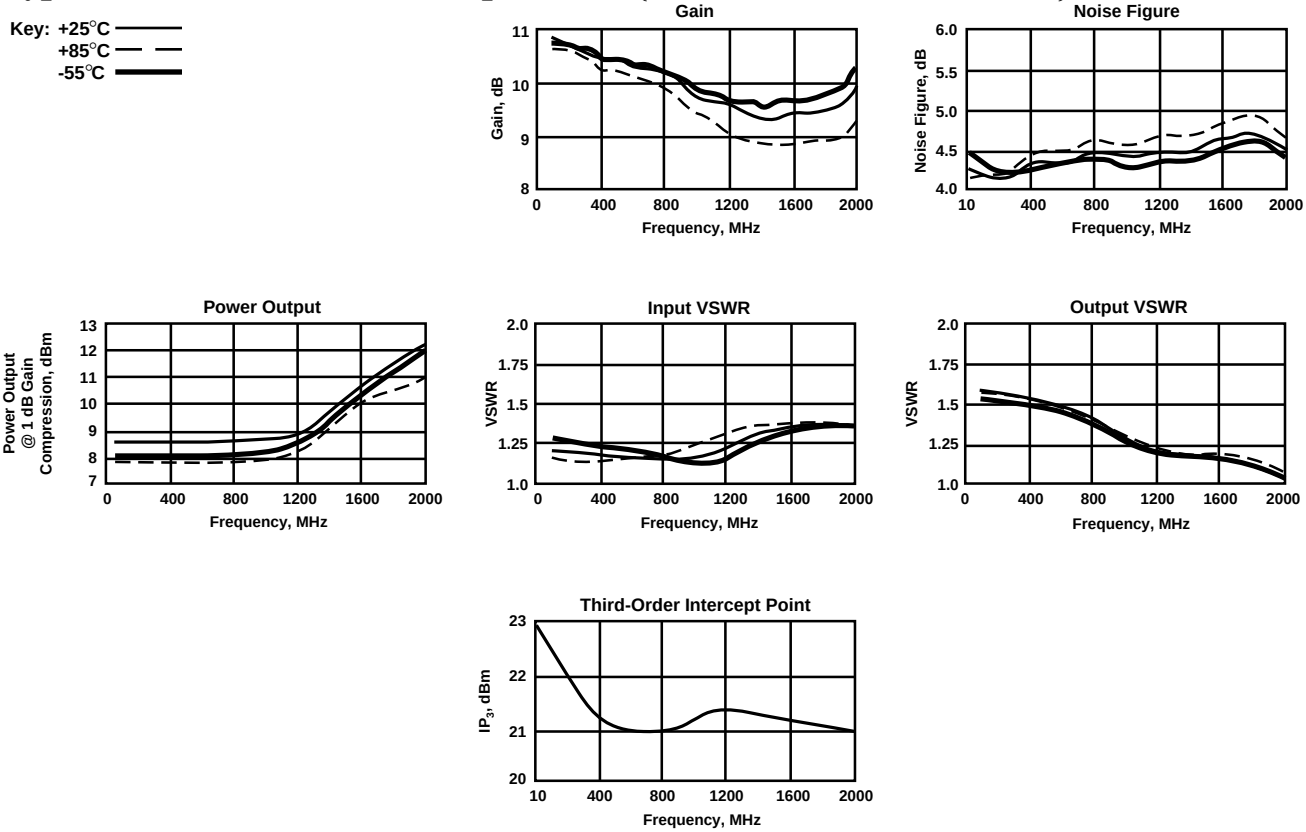
Weight: (typical) UTO—2.1 grams; UTC—21.5 grams

Electrical Specifications

(Measured in 50 Ω system @ +15 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	10-2000	10-2000	10-2000	MHz
GP	Small Signal Gain (Min.)	10.0	9.0	8.5	dB
—	Gain Flatness (Max.)	±0.5	±1.0	±1.0	dB
NF	Noise Figure (Max.)	5.0	6.0	6.0	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+8.0	+7.0	+6.5	dBm
—	Input VSWR (Max.)	<1.7:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	<1.6:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+17.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+30.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+35.0	—	—	dBm
I_D	DC Current	25	—	—	mA

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



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

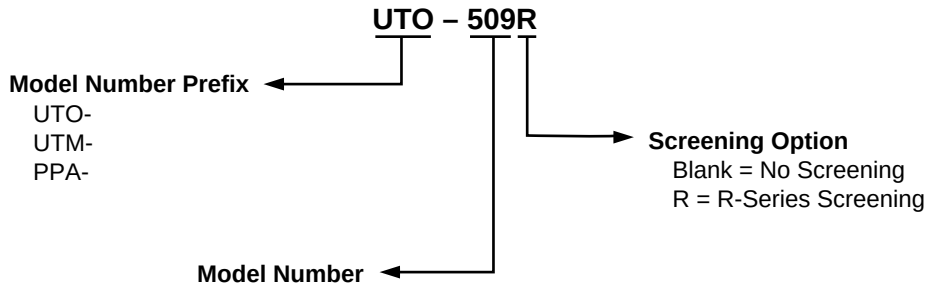
Numerical Readings **Bias = 15.00 Volts**

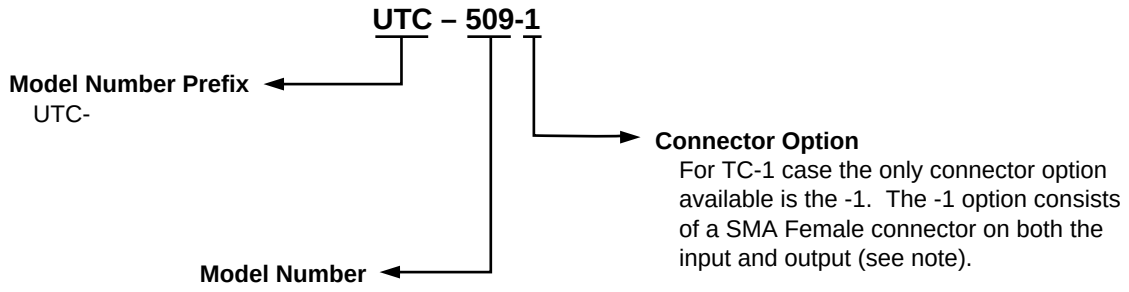
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.26	10.45	166.48	–7.64	.00	1.62	18.02
200.0	1.29	10.39	154.11	–6.19	.35	1.59	18.22
300.0	1.32	10.35	141.35	–5.12	.36	1.58	18.22
400.0	1.36	10.39	128.99	–3.66	.33	1.58	18.32
500.0	1.40	10.44	117.02	–1.80	.33	1.57	18.42
600.0	1.46	10.46	105.27	.25	.32	1.56	18.60
700.0	1.50	10.50	93.48	2.30	.31	1.55	18.69
800.0	1.56	10.57	82.37	5.01	.34	1.55	18.83
900.0	1.60	10.71	70.04	6.48	.35	1.55	19.00
1000.0	1.63	10.87	57.02	7.27	.37	1.55	19.24
1100.0	1.64	11.05	43.12	7.18	.39	1.56	19.50
1200.0	1.61	11.20	28.58	6.47	.41	1.56	19.76
1300.0	1.56	11.29	13.37	5.09	.43	1.55	19.95
1400.0	1.48	11.33	–2.31	3.23	.43	1.53	20.00
1500.0	1.40	11.26	–17.82	1.55	.43	1.48	19.84
1600.0	1.34	11.10	–33.49	–.28	.44	1.41	19.59
1700.0	1.29	10.95	–49.56	–2.52	.45	1.35	19.25
1800.0	1.31	10.89	–65.62	–4.75	.44	1.31	18.95
1900.0	1.38	10.76	–81.80	–7.11	.46	1.32	18.65
2000.0	1.55	10.46	–99.32	–10.81	.51	1.41	18.52
2100.0	1.86	10.00	–118.20	—	.54	1.57	18.44
2200.0	2.33	9.26	–138.11	—	.56	1.77	18.60

S-Parameters **Bias = 15.00 Volts**

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.00	.186	179.5	10.505	166.7	–18.576	–6.6	.268	166.3
200.00	.184	179.2	10.452	154.2	–18.519	–12.5	.261	153.2
300.00	.183	179.4	10.393	141.6	–18.585	–19.2	.254	139.8
400.00	.180	–179.5	10.405	129.1	–18.655	–25.5	.249	126.7
500.00	.185	–177.8	10.410	117.4	–18.645	–32.5	.239	115.3
600.00	.190	–175.8	10.410	105.9	–18.672	–39.2	.227	103.3
700.00	.204	–175.2	10.426	94.4	–18.801	–46.0	.212	91.3
800.00	.220	–175.7	10.456	83.7	–18.855	–52.7	.202	78.7
900.00	.239	–178.3	10.570	71.8	–18.982	–58.5	.190	65.0
1000.00	.257	178.2	10.723	59.5	–19.201	–64.8	.184	49.7
1100.00	.267	172.4	10.906	46.1	–19.411	–71.3	.183	32.4
1200.00	.266	165.7	11.096	32.3	–19.628	–76.8	.189	13.7
1300.00	.257	157.8	11.236	17.4	–19.762	–81.5	.199	–5.4
1400.00	.232	149.7	11.306	2.2	–19.845	–86.1	.209	–24.5
1500.00	.201	141.9	11.242	–13.1	–19.678	–91.0	.215	–42.0
1600.00	.165	134.8	11.088	–28.2	–19.386	–96.1	.213	–57.7
1700.00	.130	124.8	10.896	–43.7	–19.083	–101.6	.204	–69.8
1800.00	.096	109.6	10.809	–59.0	–18.775	–108.0	.184	–78.0
1900.00	.074	75.1	10.722	–73.9	–18.472	–114.9	.157	–80.1
2000.00	.085	23.5	10.576	–89.7	–18.191	–122.7	.132	–71.2
2100.00	.150	–12.3	10.340	–106.5	–17.919	–131.8	.139	–53.6
2200.00	.245	–34.2	10.002	–124.8	–17.733	–142.2	.188	–42.5
2300.00	.351	–51.3	9.410	–144.2	–17.726	–153.4	.257	–43.7
2400.00	.458	–67.1	8.497	–164.3	–17.862	–164.8	.327	–50.8
2500.00	.551	–81.4	7.273	176.0	–18.237	–176.1	.377	–59.9

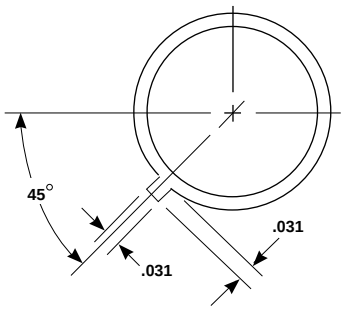
Product Options

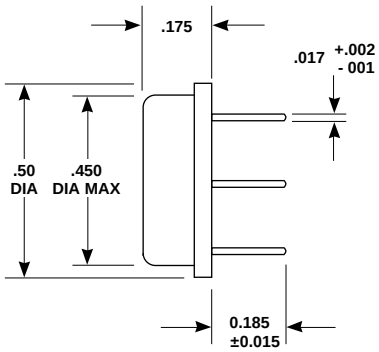


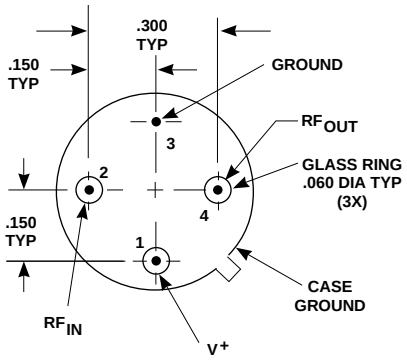


Note: R-Series screening is not available in the TC-1 case as the case is non-hermetic.

Case Drawings
TO-8U



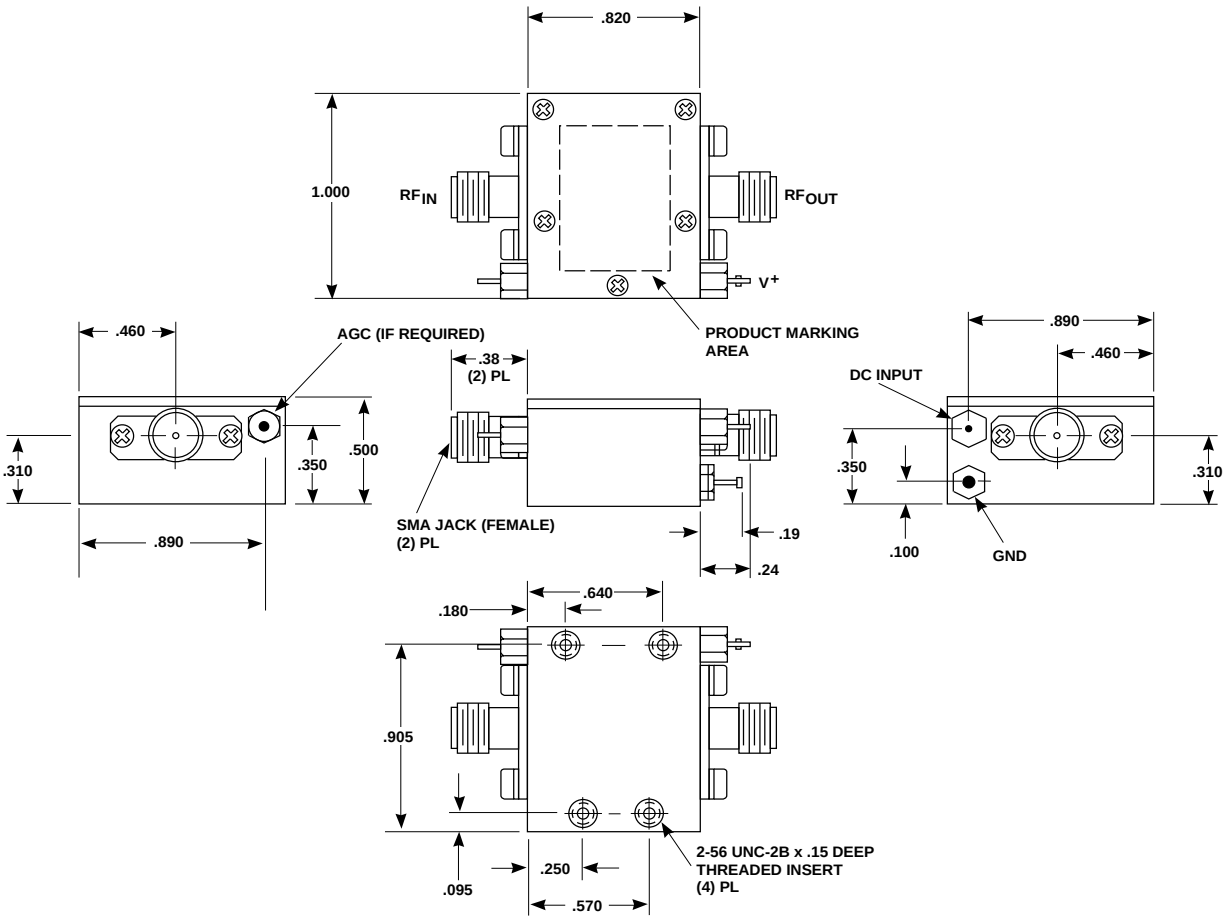




APPROXIMATE WEIGHT 2.1 GRAMS

NOTES (UNLESS OTHERWISE SPECIFIED):
1. DIMENSIONS ARE SPECIFIED IN INCHES
2. TOLERANCES: xx ± .02
   xxx ± .010

Case Drawings
TC-1



TYPICAL WEIGHT WITH CONNECTORS = 21.5 GRAMS

NOTES: 1. THE TC-1 CASE IS A NON-HERMETIC CASE.
2. THE ONLY CONNECTOR OPTION AVAILABLE FOR THE TC-1 CASE IS THE –1, SMA FEMALE CONNECTORS AT BOTH INPUT AND OUTPUT PORTS.

NOTES (UNLESS OTHERWISE SPECIFIED):
1. DIMENSIONS ARE SPECIFIED IN INCHES
2. TOLERANCES: xx ±.02
xxx ±.010

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