Avantek Products

Thin-Film Cascadable Amplifier 10 to 1000 MHz

Technical Data

UTO/UTC 1023 Series

Features

- **Frequency Range: 10 to 1000MHz**
- **High Power: +26.5 dBm (Typ)**
- **Medium Gain: 13.0 dB (Typ)**
- **Temperature Compensated**
- **Low Phase Noise**

Applications

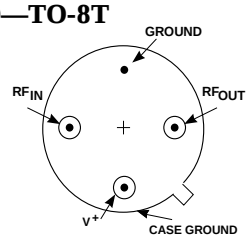
- **IF/RF Amplification**
- **Output Stage**

Description

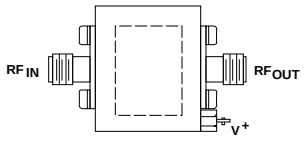
The 1023 Series is a thin-film bipolar RF amplifier for higher output power and medium-gain applications up to 1000 MHz. Resistive feedback and active bias assure temperature compensation and increased immunity to bias voltage variations. Low VSWR is maintained by inductive tuning while the RF is coupled through the amplifier by internal blocking capacitors. The 1023 Series amplifiers are available in either the TO-8 hermetic case or connectored TC-1 package.

Pin Configuration

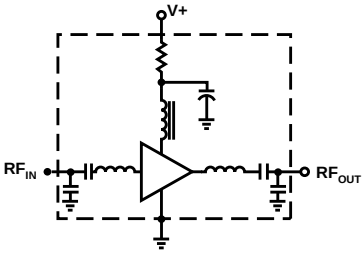
UTO—TO-8T



UTC—TC-1



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+17 dBm
Operating Case Temperature	–55 to +100°C
Storage Temperature	–62 to +150°C
"R" Series Burn-In Temperature	+100°C

Thermal Characteristics[1]

θ_{JC}	52°C/W[2]
Active Transistor Power Dissipation	924/661/661 mW[2]
Junction Temperature Above Case Temperature	48/34/34°C[2]
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	410,200 Hrs.

Notes:
1. For further information, see Reliability Screening, Pub. 5963-3240E.
2. Values refer to first, second, and third stages, respectively.

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

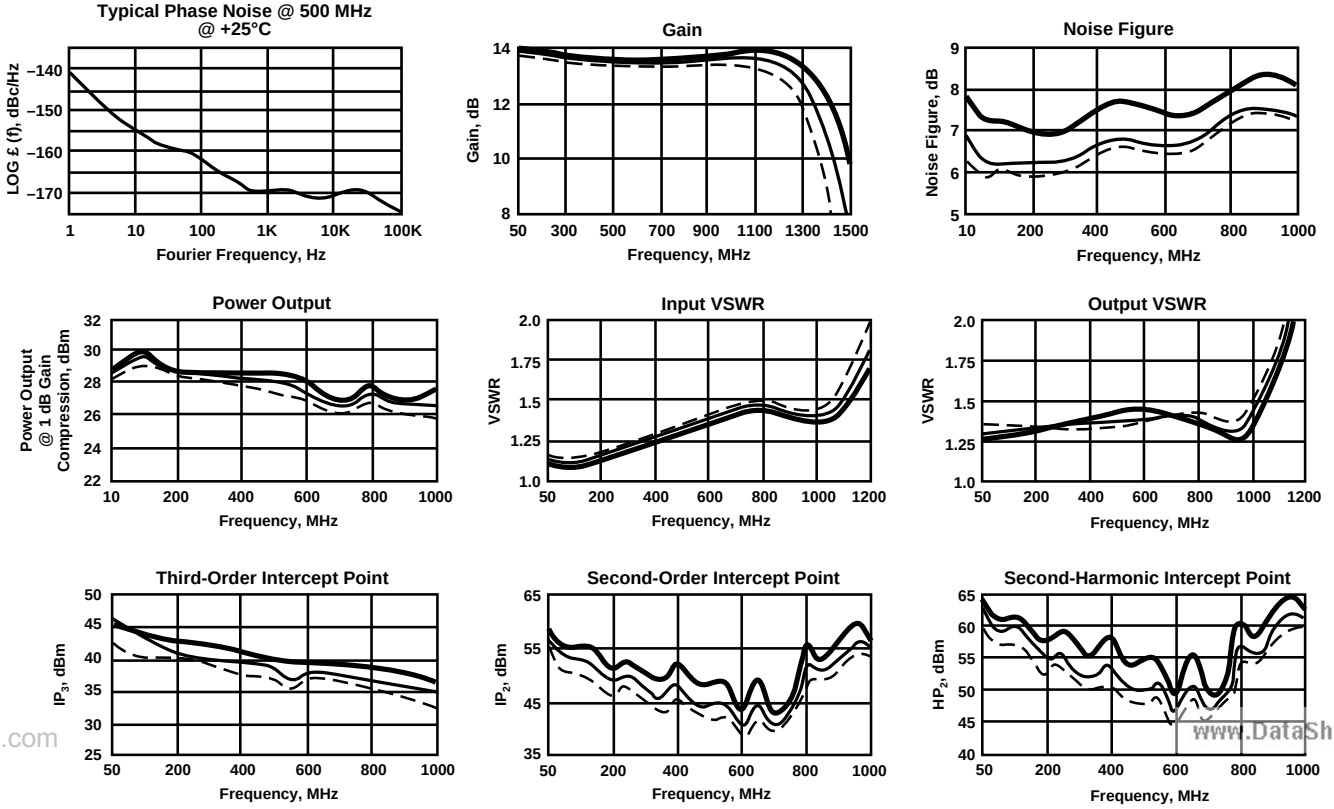
Electrical Specifications

(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical T_C = 25°C	Guaranteed Specifications T_C = 0 to 50°C	Guaranteed Specifications T_C = –55 to +85°C	Unit
BW	Frequency Range	10-1000	10-1000	10-1000	MHz
GP	Small Signal Gain (Min.)	13.0	12.0	12.0	dB
—	Gain Flatness (Max.)	±0.2	±1.0	±1.0	dB
NF	Noise Figure (Max.)				
	30-500 MHz (Max.)	7.0	7.5	8.0	dB
	10-1000 MHz (Max.)	8.0	8.5	9.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)				
	10-500 MHz	+28.0	+26.0	+25.5	dBm
	500-1000 MHz	+26.5	+24.5	+24.0	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	+36.0	+32.0	+30.0	dBm
IP_2	Two Tone 2nd Order Intercept Point	+42.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+48.0	—	—	dBm
I_D	DC Current	205	—	—	mA
—	Phase Noise @ 500 MHz; 1 KHz Offset	–165	—	—	dBc/Hz

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

Key: +25°C ——— +85°C — — -55°C ▬▬



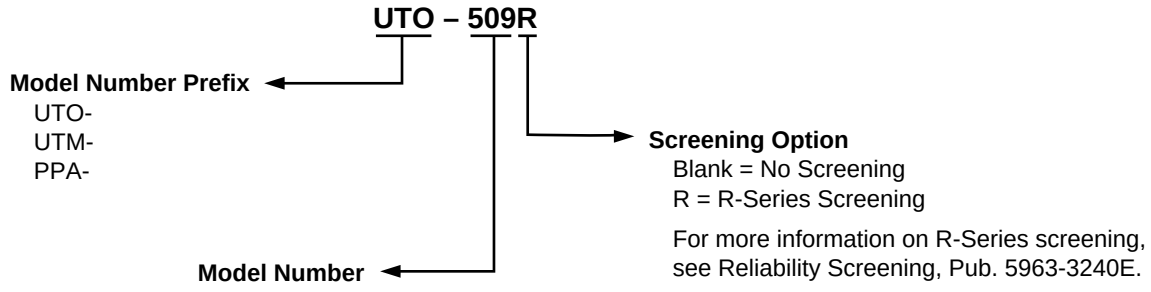
Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

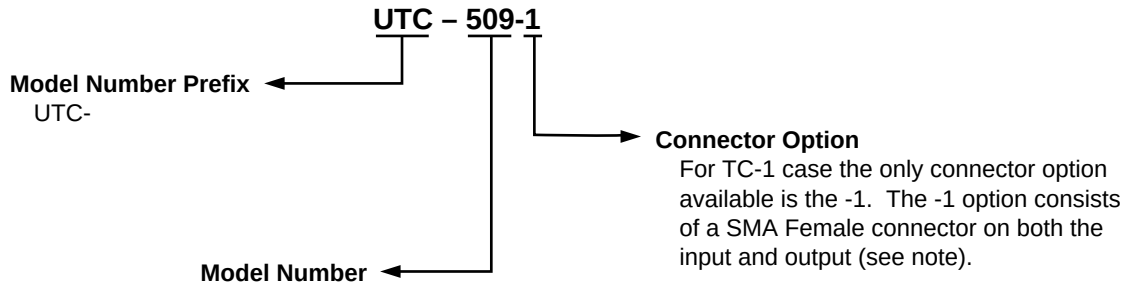
S-Parameters **Bias = 15.00 Volts**

FREQ	S_{11}		S_{21}		S_{12}		S_{22}			GPDEL	PHASE
GHz	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang	K	ns	DEG
.05	.05	–31.0	13.6	171.8	–19.9	–3.0	.13	174.08	1.25	.64	–.32
.10	.04	–21.4	13.6	160.3	–19.9	–9.6	.13	–178.73	1.25	.64	–1.24
.15	.05	–20.8	13.5	149.5	–19.9	–15.4	.13	–174.13	1.26	.59	–1.32
.20	.06	–23.4	13.5	139.0	–20.0	–20.9	.13	–170.65	1.27	.59	–1.26
.25	.07	–29.8	13.4	128.7	–20.0	–26.4	.13	–167.63	1.27	.58	–.98
.30	.08	–37.0	13.4	118.6	–20.0	–31.9	.14	–164.78	1.28	.56	–.47
.35	.09	–45.8	13.3	108.3	–20.0	–37.4	.14	–162.71	1.28	.57	–.09
.40	.10	–55.1	13.3	98.1	–20.0	–42.9	.15	–160.83	1.28	.57	.32
.45	.12	–64.3	13.2	87.9	–20.0	–48.6	.16	–159.18	1.29	.57	.70
.50	.13	–74.0	13.2	77.7	–20.1	–54.4	.16	–157.64	1.29	.57	1.15
.55	.14	–84.2	13.2	67.6	–20.1	–60.0	.16	–156.40	1.29	.56	1.63
.60	.16	–94.7	13.1	57.2	–20.0	–66.0	.17	–155.50	1.29	.57	1.91
.65	.17	–105.1	13.1	46.8	–20.0	–72.0	.17	–154.47	1.29	.58	2.10
.70	.17	–116.4	13.2	36.2	–20.0	–78.4	.16	–153.12	1.29	.59	2.11
.75	.18	–128.4	13.2	25.3	–20.0	–84.9	.16	–151.21	1.28	.60	1.88
.80	.18	–141.6	13.2	14.3	–20.0	–91.8	.15	–147.75	1.28	.62	1.42
.85	.17	–156.1	13.3	2.9	–20.0	–99.0	.14	–141.66	1.28	.64	.65
.90	.17	–173.3	13.4	–9.1	–19.3	–106.4	.13	–132.12	1.27	.66	.72
.95	.16	166.3	13.5	–21.5	–19.9	–114.5	.13	–117.40	1.26	.69	–2.50
1.00	.16	140.7	13.5	–34.6	–19.9	–123.2	.15	–102.32	1.26	.73	-4.97
1.10	.19	80.8	13.6	–63.0	–20.2	–141.9	.25	–86.40	1.24	.81	
1.20	.29	30.6	13.3	–94.9	–20.8	–162.2	.41	–89.64	1.23	.91	
1.30	.40	–6.9	12.6	–131.1	–20.0	177.7	.57	–100.99	1.21	1.04	
1.40	.48	–35.6	10.7	–171.2	–23.7	158.9	.71	–115.51	1.22	1.14	
1.50	.52	–53.7	7.0	149.7	–25.9	143.8	.80	–130.62	1.43	1.04	
1.60	.57	–66.0	2.0	120.7	–28.3	133.8	.83	–144.34	2.28	.72	
1.70	.63	–77.6	–3.1	102.8	–31.0	129.7	.84	–156.22	4.63	.43	
1.80	.68	–88.8	–7.6	92.0	–33.3	138.5	.84	–166.66	9.44	.25	
1.90	.71	–99.0	–11.5	85.2	–32.5	154.0	.82	–175.60	13.15	.14	
2.00	.74	–108.0	–14.8	82.6	–29.5	152.8	.81	177.14	13.42	.05	
2.10	.77	–116.2	–17.3	81.5	–27.4	138.6	.81	170.41	12.87	.02	
2.20	.79	–123.9	–19.1	78.3	–26.6	122.3	.82	163.51	12.44	.08	
2.30	.81	–131.2	–20.7	73.9	–26.5	107.5	.84	156.54	12.61	.14	
2.40	.82	–138.0	–22.0	69.1	–26.6	93.8	.85	149.70	13.26	.14	
2.50	.83	–144.6	–23.5	62.5	–27.0	81.9	.85	143.51	15.06	.18	

LINEARIZATION RANGE: .05 to 1.00 GHz

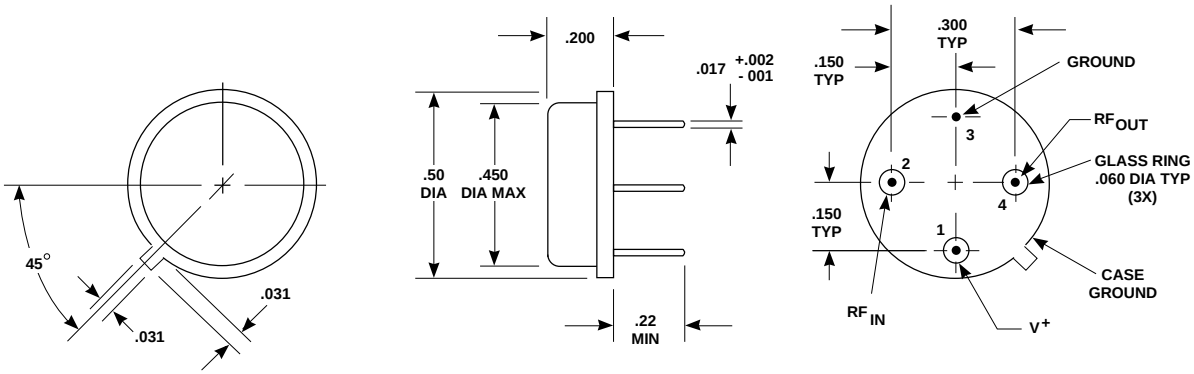
Product Options





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

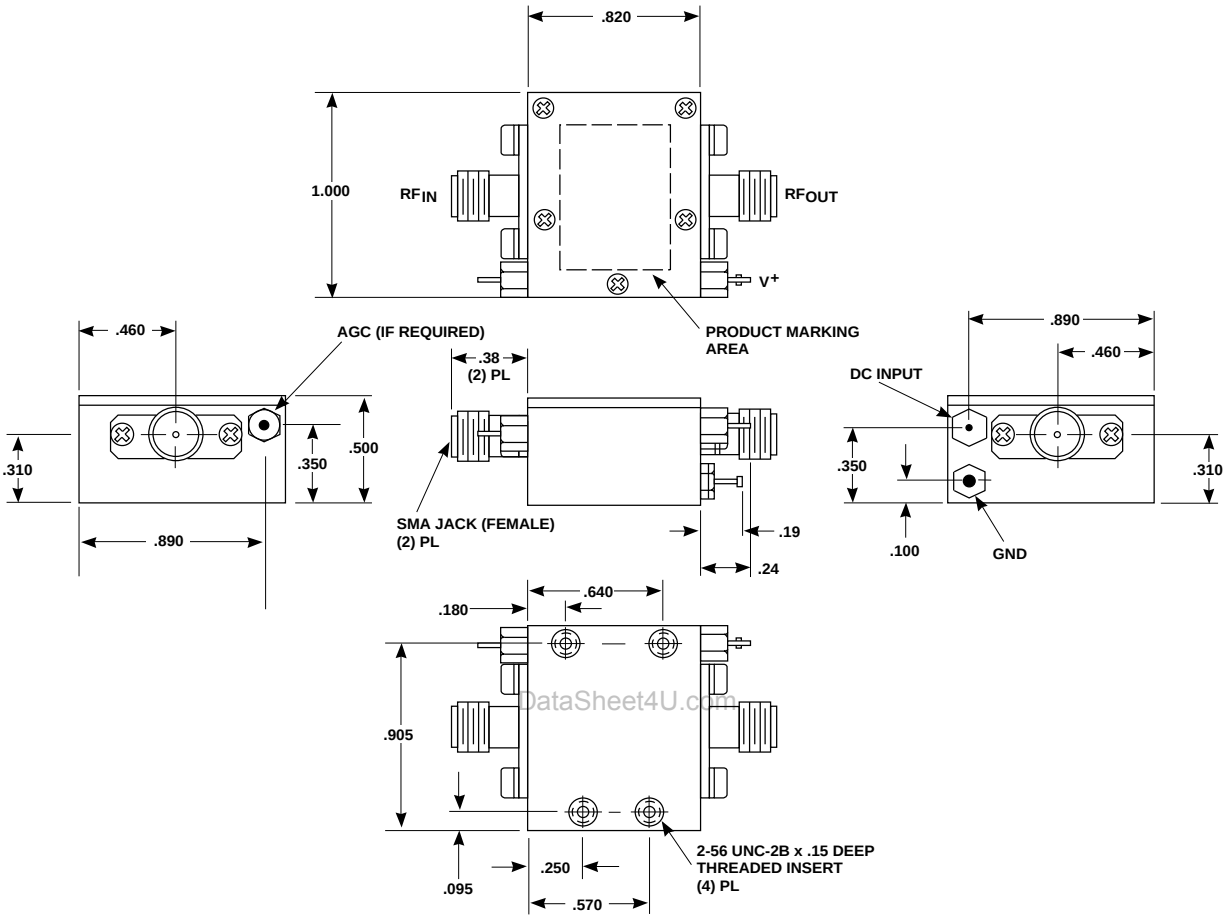
Case Drawings
TO-8T



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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