



Thin-Film Cascadable Amplifier 5 to 1000 MHz

Technical Data

UTO/UTC 1021 Series

Features

- **Frequency Range: 5 to 1000 MHz**
- **High Gain: 23.0 dB (Typ)**
- **Medium Output Power: +14.0 dBm (Typ)**
- **Temperature Compensated**
- **Surface Mount Option**

Applications

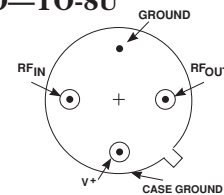
- **IF/RF Amplification**
- **Output Stage**

Description

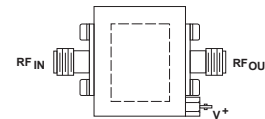
The 1021 Series is a two-stage bipolar RF amplifier built on a thin-film substrate. Active bias and resistive feedback provide for stability over temperature and bias voltage variations. Input/output blocking capacitors couple the RF through the amplifier while a low VSWR is maintained through the use of inductive tuning. The 1021 Series amplifiers are available in three packages: the TO-8 hermetic case, the connected TC-1A package or the surface mount PlanarPak PP-38.

Pin Configuration

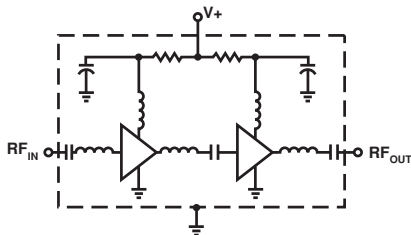
UTO—TO-8U



UTC—TC-1A



Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+13 dBm
Operating Case Temperature	-55 to +115°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+115°C

Thermal Characteristics¹

θ_{JC}	105/75°C/W ²
Active Transistor Power Dissipation	230/460 mW ²
Junction Temperature Above Case Temperature	24/34°C ²
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	575,400 Hrs.

Notes:

1. Values refer to first and second stages, respectively.

Weight: (typical) UTO—2.1 grams; UTC—21.5 grams; PPA—0.5 grams

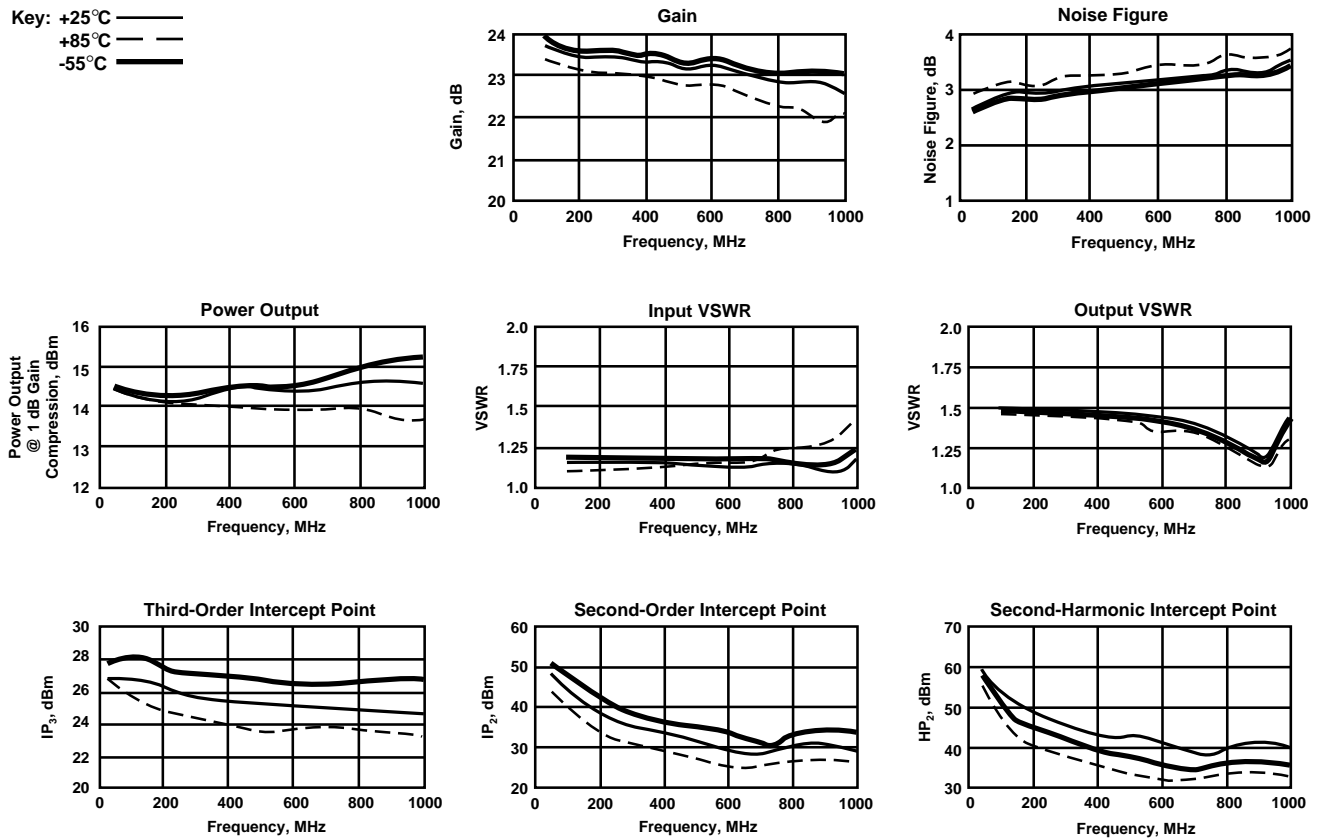
Electrical Specifications

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

Symbol	Characteristic	Typical $T_C = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_C = 0 \text{ to } 50^\circ\text{C}$	$T_C = -55 \text{ to } +85^\circ\text{C}$	
BW	Frequency Range	5-1000	5-1000	5-1000	MHz
GP	Small Signal Gain (Min.)	23.0	22.0	21.0	dB
—	Gain Flatness (Max.)	± 0.7	± 1.0	± 1.0	dB
NF	Noise Figure (Max.)	3.8	4.5	5.0	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+14.0	+12.0	+11.0	dBm
—	Input VSWR (Max.)	<1.6:1	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	+25.0	—	—	dBm
IP ₂	Two Tone 2nd Order Intercept Point	+30.0	—	—	dBm
HP ₂	One Tone 2nd Harmonic Intercept Point	+40.0	—	—	dBm
I _D	DC Current	85	—	—	mA

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)**Numerical Readings****Bias = 15.00 Volts**

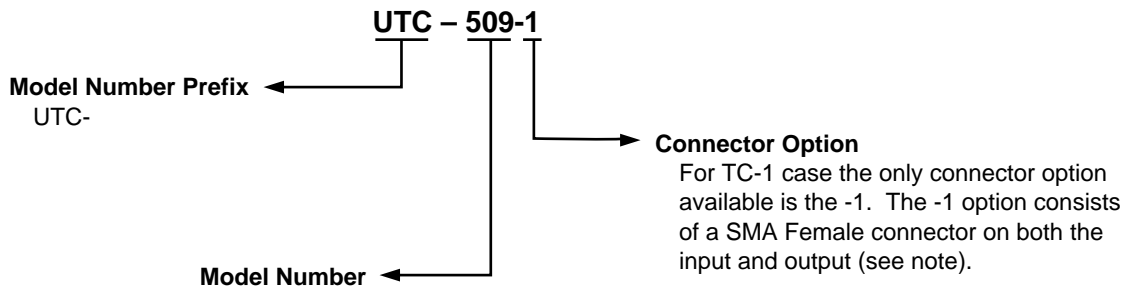
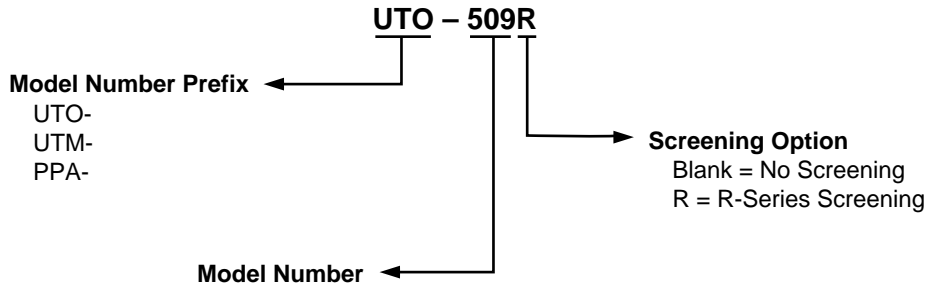
FREQUENCY MHz	VSWR IN	GAIN dB	PHASE DEGREES	PHASE DEV	GROUP DELAY ns	VSWR OUT	ISOLATION dB
100.0	1.23	23.92	-19.76	-1.86	.00	1.46	39.57
200.0	1.29	23.86	-38.37	-.30	.53	1.47	38.06
300.0	1.32	23.81	-58.28	-.05	.55	1.50	38.34
400.0	1.33	23.86	-77.78	.60	.56	1.53	38.86
500.0	1.33	24.06	-97.55	.99	.53	1.57	39.30
600.0	1.33	24.08	-117.37	1.32	.56	1.62	40.29
700.0	1.37	24.08	-137.82	1.02	.58	1.69	41.20
800.0	1.46	23.88	-158.85	.17	.59	1.75	42.65
900.0	1.60	23.79	179.93	-.87	.57	1.80	44.65
1000.0	1.75	23.77	158.44	-2.20	.60	1.80	46.55
1100.0	1.92	23.89	137.08	—	.63	1.74	47.79
1200.0	2.05	23.50	113.77	—	.67	1.57	45.26
1300.0	1.94	22.61	89.77	—	.61	1.41	44.27
1400.0	1.81	21.46	68.99	—	.55	1.32	43.97
1500.0	1.75	20.55	50.19	—	.52	1.29	45.01

LINEARIZATION RANGE: 100.0 to 1000.0 MHz

S-Parameters**Bias = 15.00 Volts**

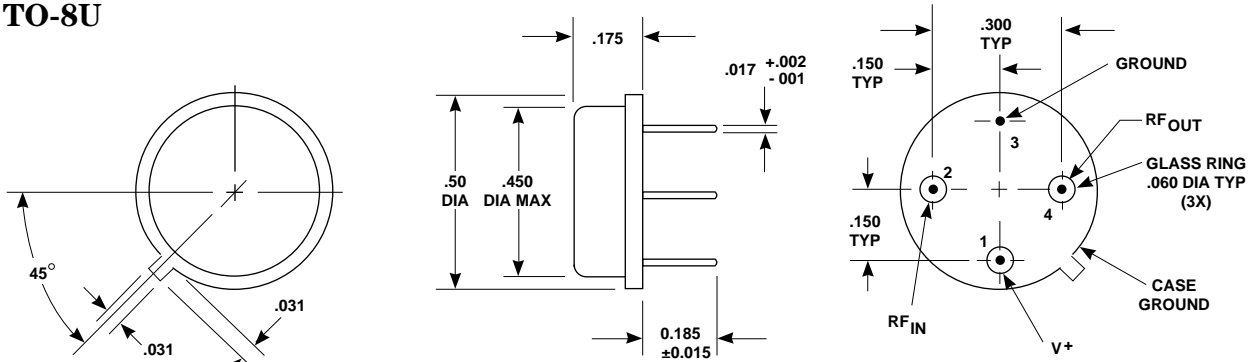
FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang
100.0	.185	146.0	23.784	-18.6	-38.957	6.3	.127	171.9
200.0	.196	121.9	23.853	-36.4	-38.320	-7.7	.130	172.8
300.0	.208	101.8	23.911	-55.6	-38.914	-13.9	.144	166.8
400.0	.217	82.3	24.117	-74.8	-38.946	-21.9	.157	156.7
500.0	.214	60.7	24.500	-94.9	-39.187	-30.0	.174	142.7
600.0	.204	33.0	24.667	-115.4	-40.060	-39.4	.194	126.6
700.0	.203	-1.5	24.741	-137.0	-41.302	-46.9	.214	110.3
800.0	.218	-37.0	24.566	159.8	-43.007	-53.4	.235	54.0
900.0	.249	-67.7	24.335	177.3	-44.784	-54.5	.249	79.7
1000.0	.277	-93.1	24.053	154.6	-47.587	-41.4	.248	65.2
1100.0	.297	-116.5	23.828	132.8	-47.857	-23.1	.227	45.2
1200.0	.299	-143.5	23.064	109.9	-44.830	-21.8	.181	31.5
1300.0	.255	-172.2	21.912	87.4	-43.135	-30.0	.137	18.9
1400.0	.204	158.6	20.568	68.2	-42.697	-40.6	.110	6.5
1500.0	.169	127.2	19.516	50.7	-42.957	-43.3	.108	-9.7

Product Options



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

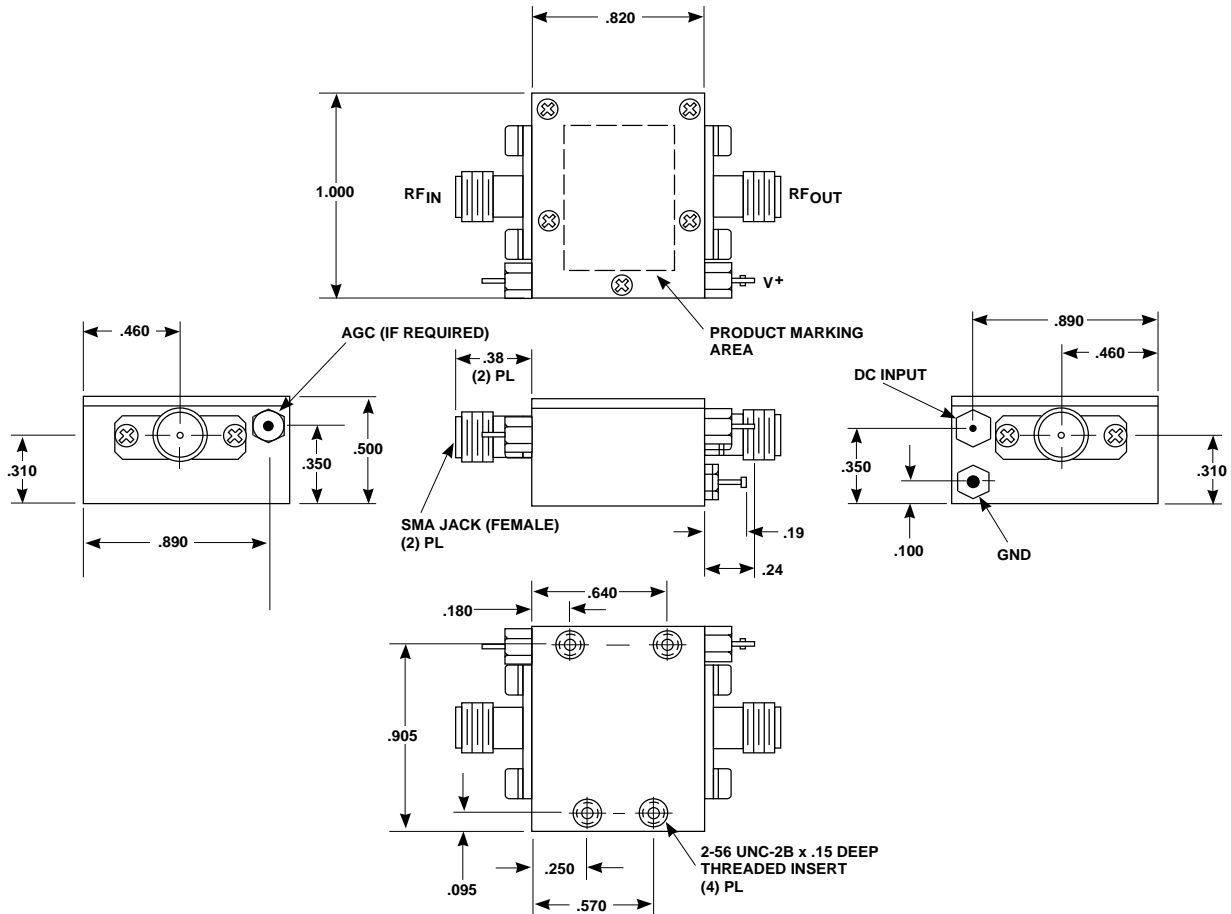
Case Drawings TO-8U



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

Contact Teledyne Microwave Solutions:
650-691-9800
650-962-6845 fax

Check for updates:
www.teledynemicrowave.com