



Thin-Film Cascadable Amplifier 10 to 2000 MHz

Technical Data

UTO/UTC 2027 Series

Features

- **Frequency Range:** 10 to 2000 MHz
- **High Gain:** +15.0 dB (Typ)
- **Medium Output Power:** +17.5 dBm (Typ)
- **Temperature Compensated**

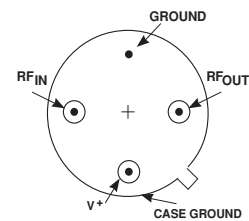
Applications

- **IF/RF Amplification**

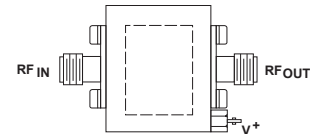
Description

The 2027 Series is a wideband, two-stage thin-film bipolar RF amplifier using 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 2027 Series amplifiers are available in either the TO-8 hermetic case or connected TC-1A package.

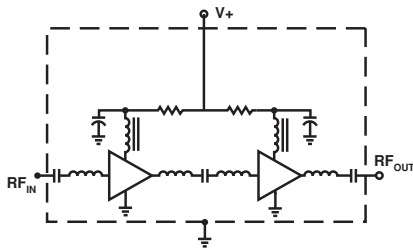
Pin Configuration UTO—TO-8T



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 Characteristics¹

θ_{JC}	75°C/W
Active Transistor Power Dissipation	300/317/317 mW
Junction Temperature Above Case Temperature	23/24/24°C
MTBF (MIL-HDBK-217E, A_{UF} @ 90°C)	383,000 Hrs.

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

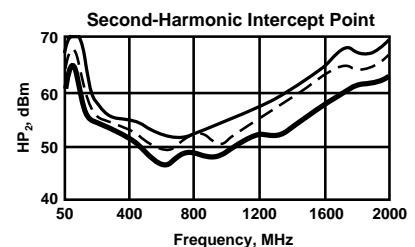
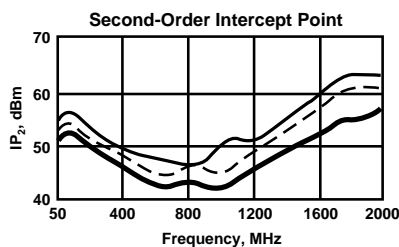
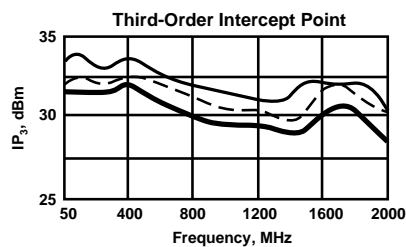
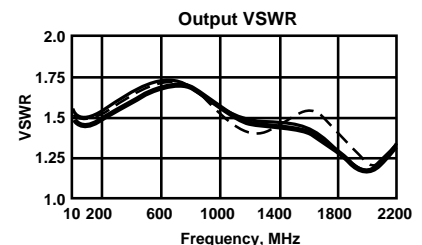
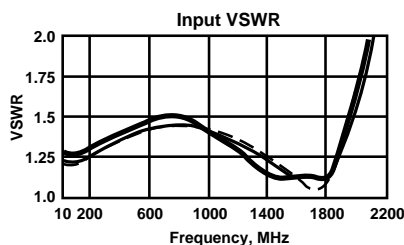
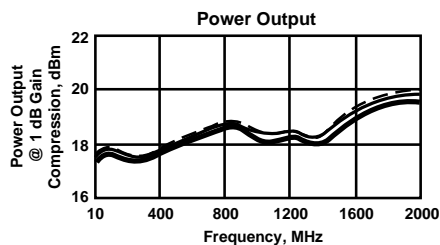
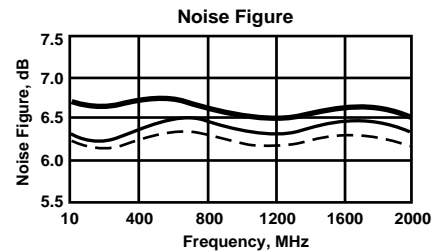
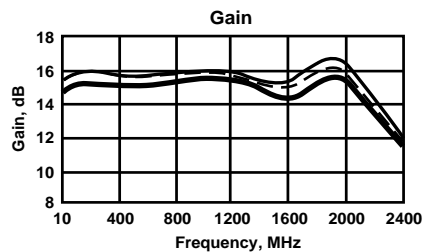
Electrical Specifications

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

Symbol	Characteristic	Typical $T_C = 25^\circ\text{C}$	Guaranteed Specifications		Unit
			$T_C = 0$ to 50°C	$T_C = -55$ to $+85^\circ\text{C}$	
BW	Frequency Range	10-2000	10-2000	10-2000	MHz
GP	Small Signal Gain (Min.)	15.0	13.5	12.5	dB
—	Gain Flatness (Max.)	± 0.5	± 1.0	± 1.5	dB
NF	Noise Figure (Max.)	6.3	7.0	7.5	dB
P_{1dB}	Power Output @ +1 dB Comp. (Min.)	+17.5	+16.0	+16.0	dBm
—	Input VSWR (Max.)	1.6:1	2.0:1	2.0:1	—
—	Output VSWR (Max.)	1.7:1	2.0:1	2.0:1	—
IP_3	Two Tone 3rd Order Intercept Point	+30.0	—	—	dBm
IP_2	Two Tone 2nd Order Intercept Point	+45.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+51.0	—	—	dBm
I_D	DC Current	108	—	—	mA

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

Key: $+25^\circ\text{C}$ —
 $+85^\circ\text{C}$ - -
 -55°C —



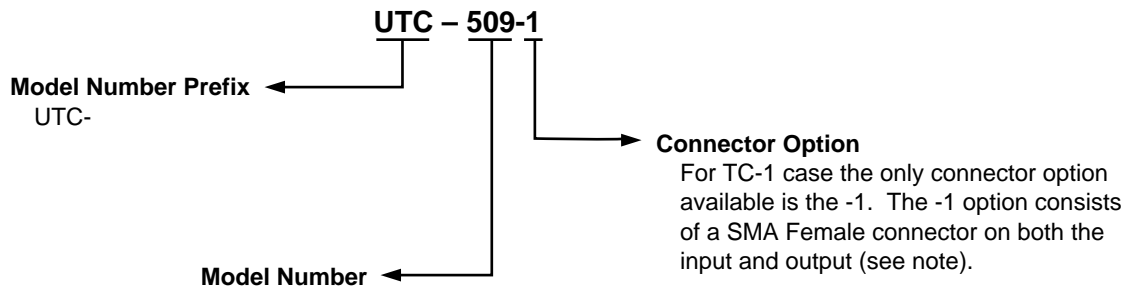
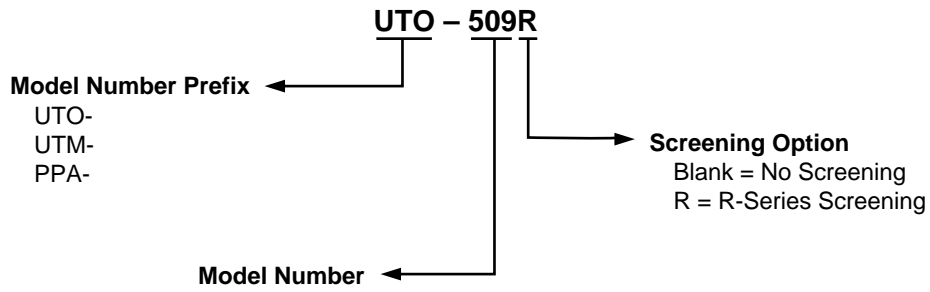
Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

S-Parameters
Bias = 15.00 Volts

FREQ GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂		K	GPDEL ns	PHASE DEG
	Mag	Ang	dB	Ang	dB	Ang	Mag	Ang			
.005	.15	-158.9	14.4	35.7	-28.1	31.6	.30	151.71	2.24	11.71	
.010	.11	-169.5	14.5	14.6	-27.9	14.4	.22	162.86	2.27	11.71	10.27
.020	.10	-173.0	14.5	4.7	-27.8	5.7	.21	170.13	2.27	2.75	2.37
.050	.10	-173.1	14.6	-5.8	-27.7	-1.7	.20	174.20	2.24	.97	-2.07
.100	.10	-169.4	14.6	-17.2	-27.7	-8.3	.20	175.55	2.24	.63	-3.45
.150	.11	-166.1	14.6	-27.5	-27.8	-13.9	.20	175.52	2.24	.57	-3.71
.200	.12	-163.9	14.7	-37.5	-27.8	-18.9	.21	174.60	2.26	.55	-3.60
.250	.12	-162.8	14.6	-47.3	-27.9	-24.1	.21	172.75	2.27	.54	-3.35
.300	.13	-163.1	14.6	-57.0	-28.0	-29.0	.22	170.32	2.28	.54	-3.00
.350	.14	-164.1	14.6	-66.6	-28.1	-33.6	.23	167.18	2.30	.54	-2.58
.400	.15	-165.6	14.6	-76.2	-28.2	-38.3	.24	163.48	2.31	.53	-2.12
.450	.16	-167.7	14.6	-85.7	-28.3	-42.5	.25	159.40	2.32	.53	-1.60
.500	.17	-170.2	14.6	-95.2	-28.3	-47.3	.25	154.80	2.33	.53	-1.04
.550	.17	-172.9	14.7	-104.9	-28.4	-51.5	.26	149.58	2.33	.54	-.65
.600	.18	-175.9	14.7	-144.5	-28.5	-56.3	.26	143.95	2.36	.53	-.21
.650	.18	-178.8	14.7	-124.2	-28.6	-60.7	.26	137.94	2.37	.54	.21
.700	.18	178.5	14.7	-133.9	-28.7	-65.3	.26	131.28	2.40	.54	.52
.750	.18	175.7	14.7	-143.6	-28.8	-69.8	.26	124.29	2.41	.54	.85
.800	.18	173.0	14.8	-153.4	-28.9	-74.1	.25	116.80	2.43	.54	1.14
.850	.18	170.5	14.8	-163.3	-29.0	-78.5	.25	108.57	2.46	.55	1.30
.900	.18	168.1	14.8	-173.2	-29.0	-83.0	.24	99.95	2.48	.55	1.43
.950	.17	165.8	14.8	176.9	-29.1	-87.1	.23	90.81	2.52	.55	1.55
1.100	.17	163.7	14.8	166.8	-29.2	-91.3	.22	80.85	2.55	.56	1.55
1.050	.17	161.7	14.8	156.8	-29.3	-95.9	.21	70.42	2.58	.56	1.59
1.100	.16	159.5	14.8	146.7	-29.5	-100.5	.21	59.44	2.64	.56	1.55
1.150	.16	157.5	14.8	136.6	-29.5	-104.1	.20	48.07	2.66	.56	1.49
1.200	.15	155.7	14.8	126.3	-28.5	-108.6	.20	36.31	2.69	.57	1.32
1.250	.14	153.8	14.8	116.1	-29.6	-112.5	.19	24.25	2.73	.57	1.18
1.300	.13	152.1	14.7	106.0	-29.8	-116.8	.19	12.17	2.79	.56	1.11
1.350	.12	151.2	14.7	95.8	-29.7	-120.6	.19	.10	2.81	.56	.97
1.400	.10	151.8	14.6	85.8	-29.8	-124.4	.19	-12.11	2.85	.56	.96
1.450	.09	154.7	14.5	75.7	-29.7	-128.7	.19	-24.36	2.85	.56	.95
1.500	.08	162.0	14.4	65.8	-29.6	-132.6	.19	-36.29	2.86	.55	1.12
1.550	.07	173.4	14.4	56.2	-29.4	-137.4	.19	-48.75	2.82	.53	1.59
1.600	.07	-175.6	14.3	46.8	-29.2	-142.5	.18	-61.11	2.78	.53	2.18
1.650	.07	-167.9	14.4	37.4	-29.1	-148.7	.17	-72.47	2.72	.52	2.90
1.700	.07	-161.7	14.6	27.7	-29.1	-155.0	.16	-83.31	2.67	.54	3.18
1.750	.07	-151.3	14.8	17.3	-28.0	-161.6	.15	-93.25	2.60	.58	2.86
1.800	.07	-132.5	15.0	6.0	-29.1	-168.5	.13	-101.16	2.57	.63	1.68
1.850	.08	-112.2	15.2	-6.1	-29.2	-175.5	.12	-106.97	2.53	.67	-.37
1.900	.12	-102.2	15.3	-18.9	-28.3	178.1	.10	-110.29	2.51	.71	-3.16
1.950	.17	-100.8	15.4	-32.3	-28.6	170.7	.09	-108.39	2.56	.75	-6.54
2.000	.22	-104.3	15.3	-46.2	-28.9	164.3	.08	-100.52	2.61	.77	-10.36
2.050	.27	-110.0	15.1	-60.3	-30.2	157.5	.08	-89.19	2.69	.79	
2.100	.32	-116.8	14.7	-74.5	-30.6	151.4	.10	-80.23	2.85	.78	
2.150	.36	-124.0	14.3	-88.4	-31.2	145.7	.12	-76.07	3.11	.77	
2.200	.38	-131.0	13.7	-101.9	-31.6	141.2	.15	-76.08	3.38	.75	
2.250	.40	-137.4	13.0	-114.7	-32.1	136.3	.17	-77.69	3.75	.71	
2.300	.41	-143.0	12.3	-127.1	-32.6	132.9	.20	-79.96	4.23	.69	
2.350	.40	-147.4	11.6	-139.0	-32.9	128.9	.23	-82.69	4.69	.66	
2.400	.40	-150.4	10.9	-150.5	-33.1	125.6	.26	-86.08	5.20	.64	
2.500	.38	-152.0	9.5	-172.9	-33.4	118.2	.31	-92.57	6.27	.62	
3.000	.62	-150.2	1.0	82.5	-34.8	61.7	.44	-110.50	12.07	.56	

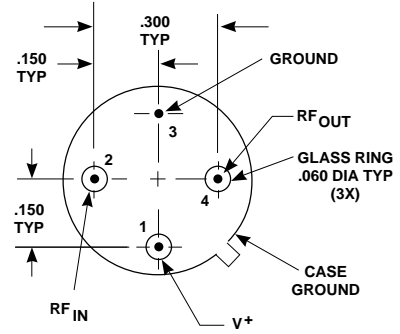
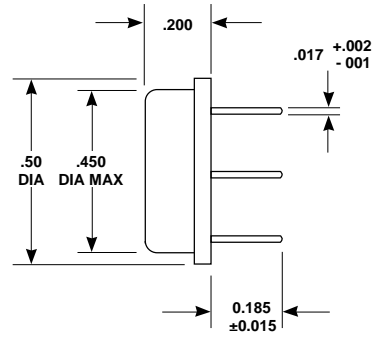
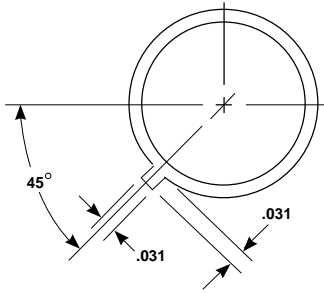
LINEARIZATION RANGE: .010 to 2.00 GHz

Product Options



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

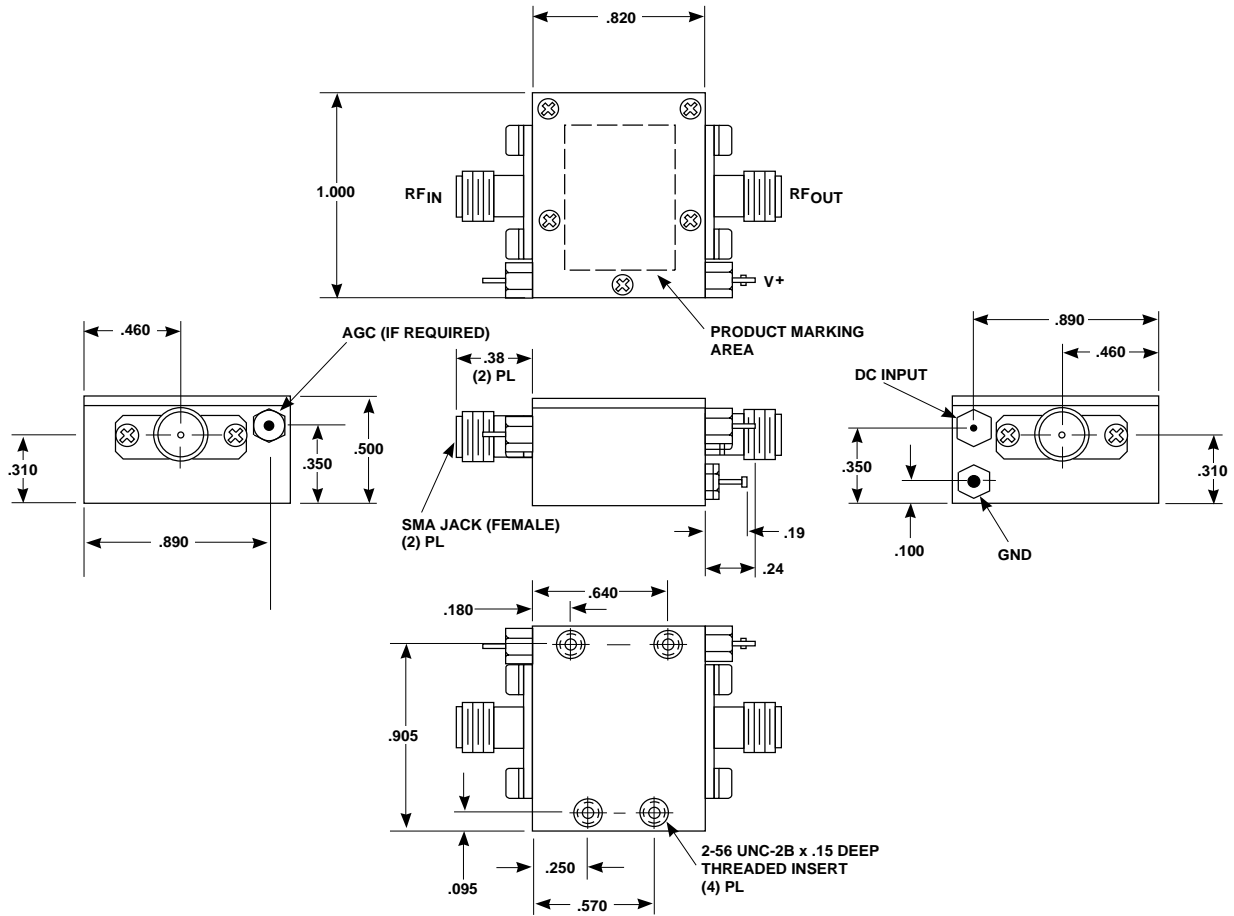
**Case Drawings
TO-8T**



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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