AVANTEK

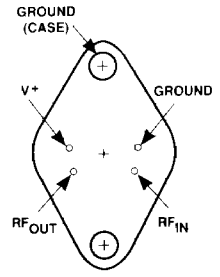
UTO-1025, UTC-1025
1 Watt Amplifier
April, 1990

FEATURES

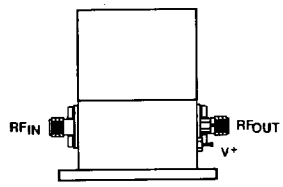
- 1 Watt Output
- Wide Bandwidth: 20-1000 MHz
- Low Noise Figure: 3dB (Typ.)
- TO-3 and UCS-1P Case Packaging

APPLICATIONS

- Bench Top
- UHF/VHF Transmitters
- Communication Circuits
- Instrumentation
- Mobile Radio



UTO—TO-3



UTC—UCS-1P

DESCRIPTION

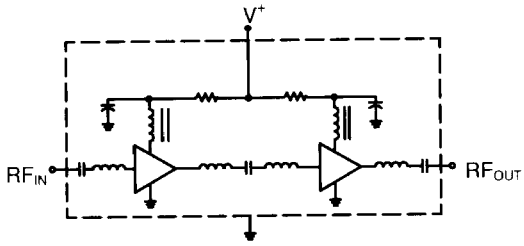
The UTO-1025 1 Watt amplifier is a low noise figure, high dynamic range amplifier designed to provide broadband high power output for a wide variety of applications. The amplifier uses two GaAs FET stages with active bias to simultaneously achieve high gain, high output power and low noise figure over the full military temperature range. Applications for this unique amplifier include bench top test sets, receiver front–end, IF gain stages and other broadband applications requiring low noise and high output power. Inputs and outputs are matched to 50 ohms for easy integration into new and existing systems. Available packaging for this unit is a hermetic TO-3 or the connectored UCS-1P case.

ELECTRICAL SPECIFICATIONS (Measured in a 50-ohm system, V_{CC} = 15V unless otherwise specified)

Symbol	Characteristic	Typical T_C = 25°C	Guaranteed Specifications		Unit
			T_C = 0° to 50°C	T_C = –55° to +85°C[1]	
BW	Frequency Range	20-1000	20-1000	20-1000	MHz
GP	Small Signal Gain (Min.)	25.0	23.0	22.0	dB
—	Gain Flatness (Max.)	±0.7	±0.7	±1.0	dB
NF	Noise Figure, 20-200 MHz (Max.)	4.0	7.0	8.0	dB
	Noise Figure, 200-1000 MHz (Max.)	3.0	4.0	4.5	dB
$P_{1\,dB}$	Power Output @ +1 dB Compression (Min.)	+30.0	+29.0	+28.5	dBm
VSWR	Input VSWR (Max.)	1.6	2:0	2:0	—
VSWR	Output VSWR (Max.)	1.7	2:0	2:2	—
IP_3	Two Tone 3rd Order Intercept Point	+40.0	+37.0	+36.0	dBm
IP_2	Two Tone 2nd Order Intercept Point	+53.0	—	—	dBm
HP_2	One Tone 2nd Harmonic Intercept Point	+60.0	—	—	dBm
I_D	DC Current	500	—	—	mA

NOTE 1: UTO version only

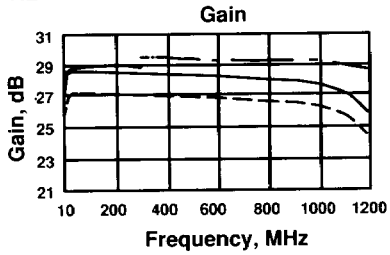
SCHEMATIC

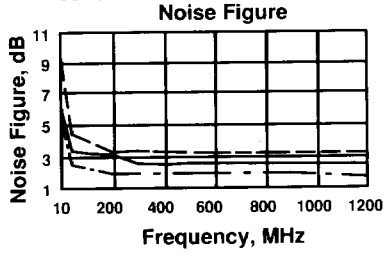


TYPICAL PERFORMANCE OVER TEMPERATURE

(@ +15 VDC unless otherwise noted)

KEY: +25°C ——— +85°C — — — –55°C —·—





MAXIMUM RATINGS

DC Voltage	16 Volts
Continuous RF Input Power	+15 dBm[2]
Operating Case Temperature Range UTO	–55°C to +85°C
Operating Case Temperature Range UTC	0°C to +50°C
Storage Temperature	–62°C to +150°C
"R" Series Burn-In Temperature	+85°C

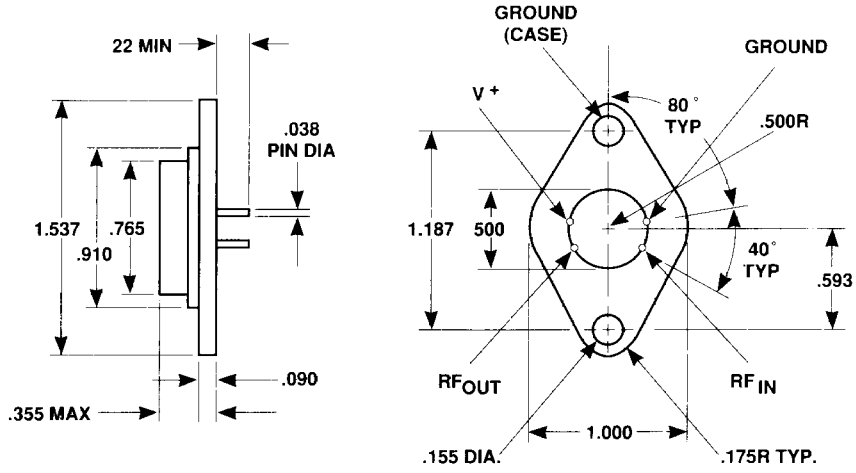
THERMAL CHARACTERISTICS

θ_{JC}	39°C/W, 19°C/W
Active Transistor Power Dissipation	1150 mW, 3420mW
Junction Temperature Above Case Temperature	45°C, 65°C

NOTE: 2. With no load on output, derate maximum input power (no damage) by 10 dBm.

WEIGHT: (typical) UTO — 14.5 grams; UTC — 281 grams

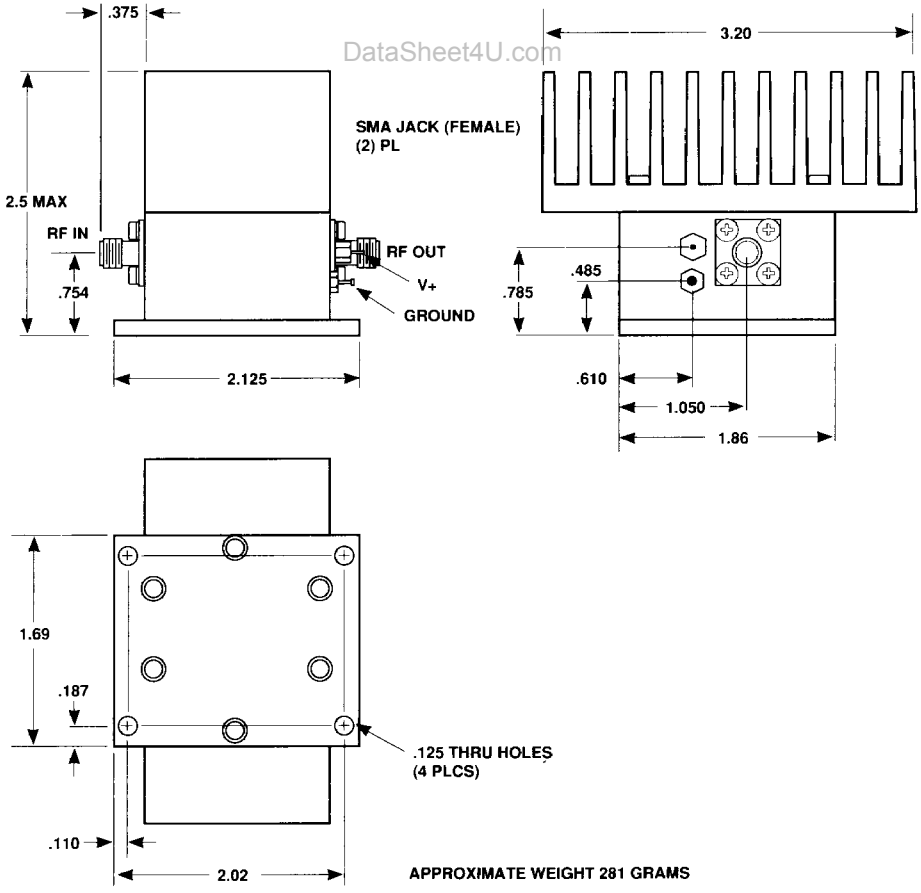
TO-3 CASE DRAWING



APPROXIMATE WEIGHT 14.5 GRAMS

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

UCS–1P CASE DRAWING

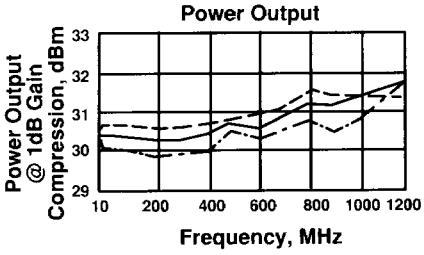


APPROXIMATE WEIGHT 281 GRAMS

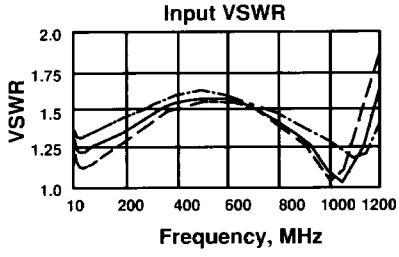
NOTES (UNLESS OTHERWISE SPECIFIED):
1. DIMENSIONS ARE SPECIFIED IN INCHES
2. TOLERANCES: xx ± .02
   xxx ± .010

TYPICAL PERFORMANCE OVER TEMPERATURE (continued)

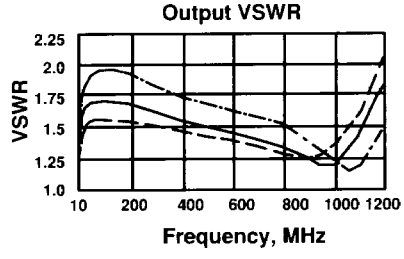
Power Output



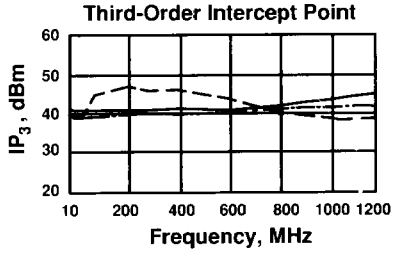
Input VSWR



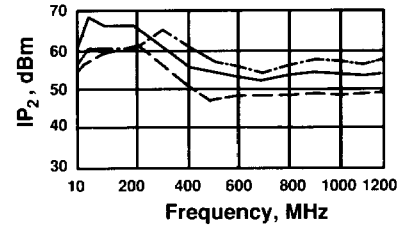
Output VSWR



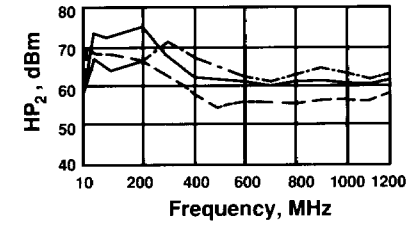
Third-Order Intercept Point



Second-Order Intercept Point



Second-Harmonic Intercept Point



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

S-PARAMETERS, MAGNITUDES AND ANGLES, 470 mA **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
.010	.13	–44.5	26.3	38.2	–39.8	–6.4	.15	–164.72	2.40	–	–
.020	.11	–22.6	27.2	17.9	–41.6	–10.7	.22	–165.59	2.58	–	–
.030	.10	–12.7	27.5	8.9	–42.0	–9.6	.24	–169.83	2.59	–	–
.040	.10	–7.1	27.6	3.1	–42.2	–9.4	.25	–172.52	2.62	–	–
.050	.10	–3.0	27.6	–1.2	–42.2	–9.4	.26	–174.42	2.61	.79	1.12
.100	.11	9.3	27.7	–16.4	–42.6	–14.3	.26	–179.92	2.67	.79	–2.01
.150	.13	15.6	27.7	–28.4	–42.9	–18.3	.26	177.05	2.75	.63	–2.20
.200	.15	18.8	27.7	–39.7	–42.8	–23.0	.25	173.85	2.70	.59	–1.68
.250	.17	19.6	27.7	–50.8	–43.0	–28.5	.25	171.14	2.75	.58	–1.06
.300	.19	18.7	27.7	–61.8	–42.9	–34.2	.24	169.26	2.70	.58	–.37
.350	.21	16.8	27.6	–72.7	–43.0	–38.7	.22	167.26	2.74	.58	.30
.400	.22	13.5	27.6	–83.5	–43.4	–46.9	.21	165.43	2.85	.59	.88
.450	.23	8.8	27.6	–94.4	–43.3	–50.2	.21	163.95	2.82	.60	1.27
.500	.23	3.9	27.5	–105.4	–43.6	–55.9	.20	162.30	2.93	.60	1.64
.550	.22	–1.8	27.5	–116.3	–43.5	–64.4	.19	160.90	2.94	.61	1.82
.600	.22	–7.7	27.5	–127.4	–43.9	–68.9	.19	159.63	3.07	.61	1.91
.650	.21	–13.5	27.4	–138.6	–43.8	–75.7	.18	158.29	3.07	.63	1.81
.700	.20	–19.8	27.4	–149.8	–44.1	–82.2	.17	157.68	3.23	.64	1.50
.750	.18	–25.9	27.3	–161.3	–44.2	–93.3	.16	158.10	3.34	.64	1.05
.800	.17	–31.8	27.3	–172.9	–44.2	–100.4	.14	159.37	3.40	.65	.46
.850	.15	–37.6	27.3	175.1	–44.5	–109.3	.13	163.20	3.56	.66	–.32
.900	.12	–42.0	27.2	162.8	–45.3	–119.0	.11	171.50	3.98	.66	–1.12
.950	.09	–44.8	27.1	150.1	–46.1	–128.6	.09	–171.43	4.42	.67	–2.01
1.000	.05	–38.7	27.0	136.9	–47.0	–140.5	.09	–144.36	4.99	.68	–3.01
1.050	.03	52.2	26.9	123.2	–47.7	–150.7	.12	–122.25	5.44	–	–
1.100	.08	89.8	26.6	108.9	–48.8	–160.5	.17	–113.05	6.23	–	–
1.150	.16	90.3	26.3	94.2	–49.6	–175.4	.24	–112.07	6.72	–	–
1.200	.24	85.8	25.8	79.1	–51.6	169.9	.30	–115.07	8.31	–	–
1.250	.32	79.6	25.3	63.9	–54.0	160.3	.36	–120.52	10.79	–	–
1.300	.39	71.9	24.5	48.4	–55.3	147.7	.42	–127.45	12.09	–	–
1.350	.46	62.8	23.7	32.7	–58.3	126.0	.47	–135.25	16.63	–	–
1.400	.54	53.2	22.7	16.7	–61.5	95.5	.51	–144.02	23.16	–	–
1.450	.61	43.5	21.4	.5	–63.9	49.1	.56	–153.53	28.99	–	–
1.500	.68	34.8	19.9	–15.5	–63.8	8.6	.61	–163.41	27.08	–	–