

Avantek Products

Thin-Film Cascadable Amplifier 10 to 1000 MHz

Technical Data

UTM-1057

Features

- **Frequency Range: 10 to 1000 MHz**
- **MODAMP Silicon Monolithic Gain Stages**
- **High Gain: 27.0 dB (Typ)**
- **Low VSWR**

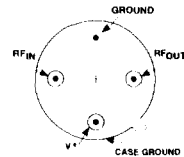
Applications

- **IF/RF Amplification**

Description

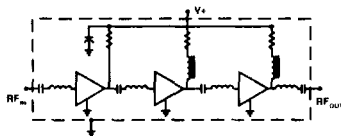
The UTM-1057 contains three monolithic microwave integrated circuits mounted on a thin-film substrate to provide an RF amplifier suitable for wideband, high-gain applications. Internal blocking capacitors couple the RF through this three-stage amplifier. The UTM-1057 is available in the TO-8 hermetic package.

Pin Configuration UTM—TO-8T



(See Section 5 for detailed case drawings.)

Schematic



Maximum Ratings

Parameter	Maximum
DC Voltage	+17 Volts
Continuous RF Input Power	+20 dBm
Operating Case Temperature	-55 to +100°C
Storage Temperature	-62 to +150°C
"R" Series Burn-In Temperature	+100°C

Thermal Characteristics¹

θ_{JC}	100/90/90°C/W ²
Active Transistor Power Dissipation	175/300/480 mW ²
Junction Temperature Above Case Temperature	18/27/43°C ²
MTBF (MIL-HDBK-217E, A _{1F} @ 90°C)	161,700 Hrs.

Notes:

1. For further information, see Reliability Screening, Section 6.
2. Values refer to 1st, 2nd, 3rd stage transistors respectively.

Weight: (typical) UTM—2.1 grams

Electrical Specifications

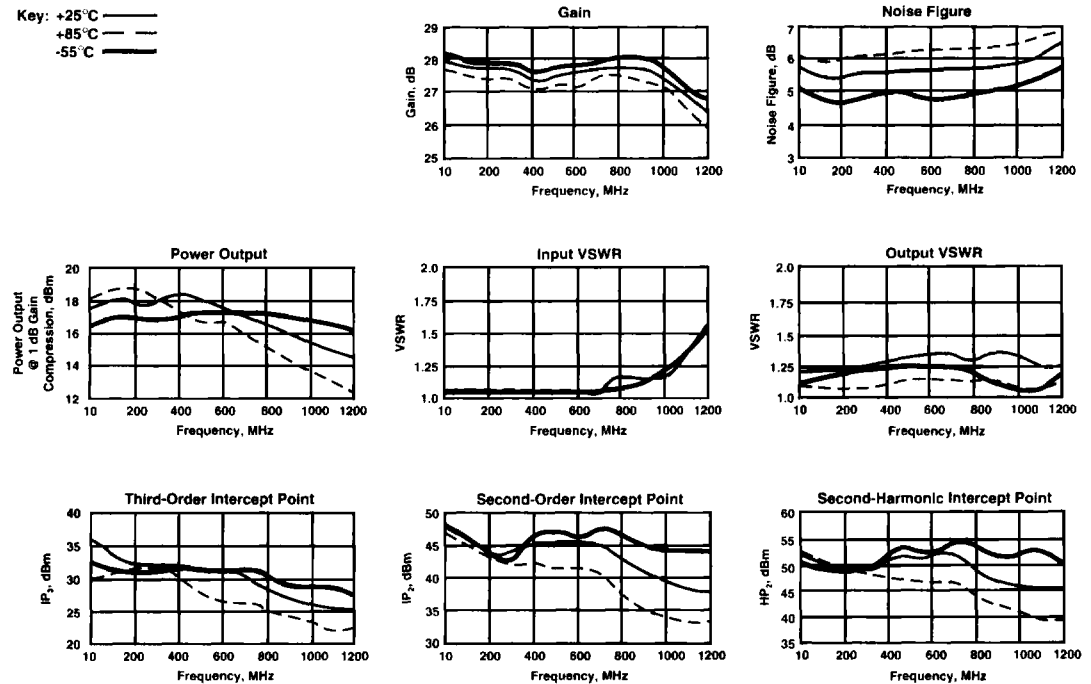
(Measured in 50 Ω system @ +15 VDC nominal unless otherwise noted)

Symbol	Characteristic	Typical T _c = 25°C	Guaranteed Specifications		Unit
			T _c = 0 to 50°C	T _c = -55 to +85°C	
BW	Frequency Range	10-1000	10-1000	10-1000	MHz
GP	Small Signal Gain (Min.)	27.0	26.0	25.0	dB
—	Gain Flatness (Max.)	±0.9	±2.0	±2.0	dB
NF	Noise Figure (Max.)	5.5	6.5	7.5	dB
P _{1dB}	Power Output @ +1 dB Comp. (Min.)	+15.5	+14.0	+12.5	dBm
—	Input VSWR (Max.)	1.4:1	1.7:1	1.7:1	—
—	Output VSWR (Max.)	1.3:1	1.7:1	1.7:1	—
IP ₃	Two Tone 3rd Order Intercept Point	+29.0	—	—	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	170	—	—	mA

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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 DEV	GROUP DELAY ns	VSWR OUT
100.0	1.05	27.60	-2.30	.00	1.14
200.0	1.05	27.49	-1.39	.66	1.16
300.0	1.06	27.27	-.62	.66	1.18
400.0	1.06	27.06	.63	.65	1.21
500.0	1.05	27.11	1.84	.65	1.24
600.0	1.07	27.48	3.48	.68	1.22
700.0	1.15	27.46	2.76	.72	1.24
800.0	1.20	27.52	.95	.74	1.25
900.0	1.26	27.55	-.81	.76	1.21
1000.0	1.34	27.28	-4.54	.80	1.11
1100.0	1.43	26.74		.80	1.07
1200.0	1.53	26.07		.79	1.27
1300.0	1.65	25.02		.74	1.62
1400.0	1.70	23.82		.76	1.82
1500.0	1.71	23.06		.80	2.54
1600.0	1.75	21.50		.77	3.34
1700.0	1.80	19.76		.73	4.29
1800.0	1.82	17.35		.67	5.03
1800.0	1.75	15.42		.60	5.34
2000.0	1.66	13.42		.00	5.57

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
100.00	.008	114.1	27.481	156.1	-48.333	19.4	.063	2.7
200.00	.019	71.2	27.369	130.1	-54.226	-30.7	.076	11.8
300.00	.028	62.1	27.334	108.1	-59.069	-56.6	.085	11.6
400.00	.036	60.9	27.044	83.6	-55.500	-53.7	.094	10.4
500.00	.025	61.7	27.153	60.4	-58.835	-4.4	.108	-6.7
600.00	.015	108.1	27.207	38.7	-53.476	-7.4	.106	-6.0
700.00	.077	101.7	27.355	10.7	-53.406	-59.9	.109	5.0
800.00	.082	99.9	27.463	-14.4	-52.683	-43.3	.119	-13.2
900.00	.095	99.0	27.429	-41.3	-53.902	-69.2	.104	-36.1
1000.00	.130	89.5	27.363	-69.8	-52.103	-53.8	.060	-65.7
1100.00	.165	84.9	26.608	-99.6	-52.052	-80.9	.033	161.3
1200.00	.202	74.7	26.158	-128.6	-55.613	-49.7	.121	113.0
1300.00	.241	66.5	25.094	-155.9	-62.287	-98.2	.226	88.4
1400.00	.272	54.2	23.788	176.9	-55.422	37.3	.334	60.2
1500.00	.251	40.3	22.988	150.6	-48.524	-32.6	.412	50.9
1600.00	.268	33.5	21.404	121.2	-49.941	-54.1	.551	31.9
1700.00	.263	27.5	19.688	95.8	-53.413	-108.7	.625	12.2
1800.00	.273	21.7	17.533	71.2	-54.797	-21.7	.662	-5.3
1900.00	.264	12.6	15.331	49.3	-55.126	-18.8	.687	-18.7
2000.00	.242	6.4	13.173	30.1	-52.753	-34.2	.707	-30.5