TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

AVP2050

900 TO 2000 MHz, 63 WATTS HIGH POWER GaNPak C AMPLIFIER

Typical Values	AVP2050
Broadband	**800-2100 MHz**
High Saturated Power, Psat	**63-100 Watts**
High Third Order I.P.	**+47 dBm**
Small Hermetic Package, Cougar GaNPakC	

SPECIFICATIONS*

Parameter	Typical	Guaranteed 0 to 50 °C	Guaranteed -55 to +85 °C
Frequency (Min.)	**800-2100 MHz**	**900-2000 MHz**	**900-2000 MHz**
Small Signal Gain (Min.)	14.0 dB	13.0 dB	12.0 dB
Gain Flatness (Max.)	±0.8 dB	±1.0 dB	±1.0 dB
Noise Figure (Max.)	3.2 dB	3.5 dB†	4.0 dB†
SWR (Max.) Input/Output	<1.8:1	2.0:1	2.0:1
Power Output (Min.) @ 5 dB comp.	+48.0 dBm +63.1W	+47.5 dBm +56.0 W	+47.2 dBm +52.5 W
Reverse Isolation	35.0 dB	30.0 dB	30.0 dB
DC Current (Max.) Linear Oper.	1700 mA	1800 mA	2000 mA
P_{5dB} Compress 2nd Stage: +28V	5500 mA	6000 mA	6200 mA
Switching Speed (Max.) 50% TTL to 90% Rise time or 10% Fall Time^	2 ms	4 ms	5 ms

* Measured in a 50-ohm system at +28V.
^ Faster switching speed option available upon request.
† Noise Figure 4.5 dB when Freq. ≤ 1 GHz.

INTERMODULATION PERFORMANCE

Typical @ 25 °C	AVP2050
Second Order Harmonic Intercept Point	+81 dBm
Second Order Two Tone Intercept Point	+75 dBm
Third Order Two Tone Intercept Point	+47 dBm

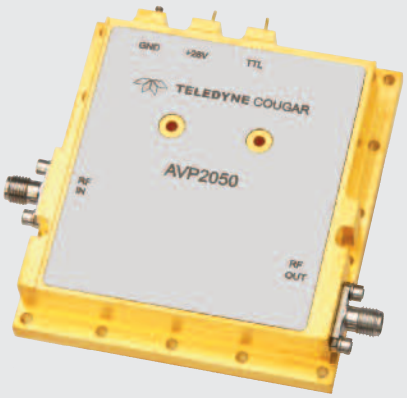
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-62 to +125 °C
Maximum Case Temperature, +28V/+32V	+90 °C/+75 °C
Maximum DC Voltage	+33 Volts
Maximum Continuous RF Input Power	+40 dBm[1,2]
Maximum Short Term Input Power (1 Minute Max.)	+42 dBm
Maximum Peak Power (3 µsec Max.)	+44 dBm
Burn-in Temperature, +28V	+85 °C
Thermal Resistance[3] (θjc)	+4.5 °C/Watt
Junction Temperature Rise Above Case (Tjc)**, +28V**	+98 °C

[1] If no load or a short on output; decrease input power by +10 dBm.
[2] Maximum gain compress is 6 dB.
[3] Thermal resistance is based on total power dissipation.

AVP2050

CougarGaNPak C



HEAT SINK WARNING:
This amplifier requires an adequate heat sink to prevent damage. Maximum case temperature must not be exceeded. The package is designed to provide adequate heat transfer to proper aluminum heat sink.

The AVP2050 amplifier provides nominal output power of 50-63 Watts. The amplifier uses control circuitry to ensure safe startup and automatic thermal shutdown and recovery. The amplifiers have an external pin for TTL on/off control. On/Off Low or High can be specified; standard is Off/Low.

Heat sinking is required to keep the case temperatures within a safe operating range. A thin layer of thermal grease or HiTherm (for example the HT-2500 series) helps provide a low resistance thermal path between the case and the mounting surface. The mounting surface should be metal with heat conduction of aluminum or better. Heat sink size depends on whether fan-driven air cooling is used, or if only convection is used.

Maximum Tj of amplifier is 200°C.

LOGIC TABLE

TTL	STATE
HIGH	ON
LOW	OFF

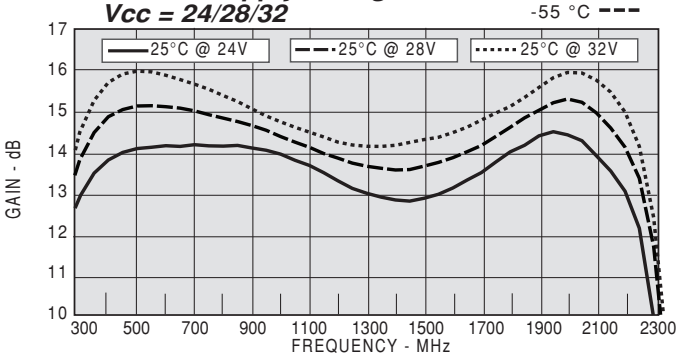
DIMENSIONS ARE IN INCHES [MILLIMETERS]

TYPICAL PERFORMANCE

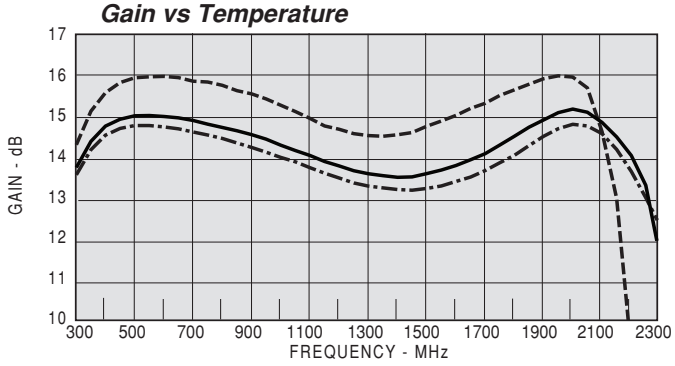
(unless otherwise noted)

KEY: +25 °C ——
+85 °C -·-·-
-55 °C - - -

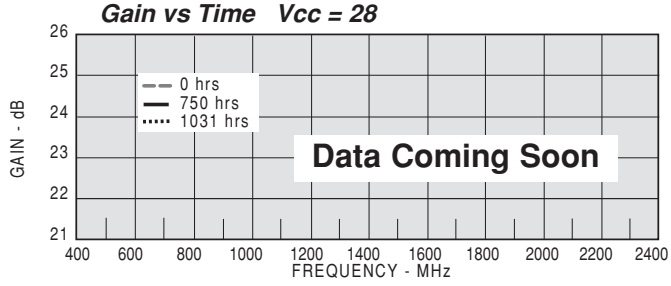
Gain vs Supply Voltage
Vcc = 24/28/32



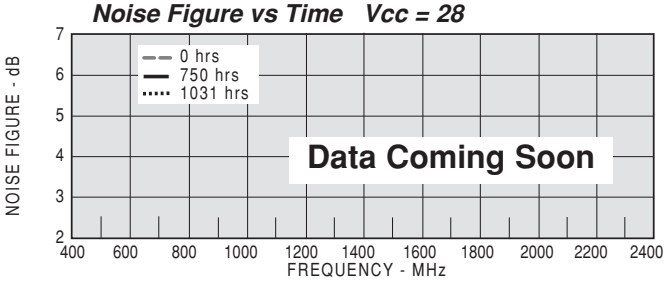
Gain vs Temperature



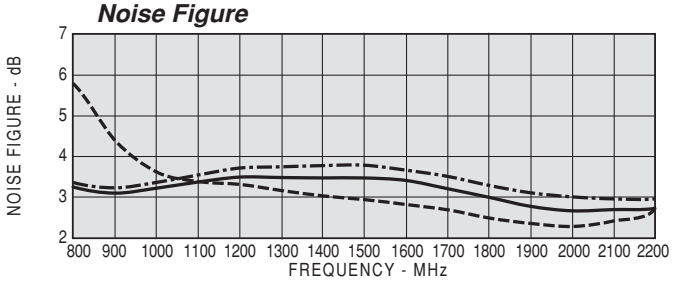
Life Test Data @ +85°C Case Temperature
Gain vs Time Vcc = 28



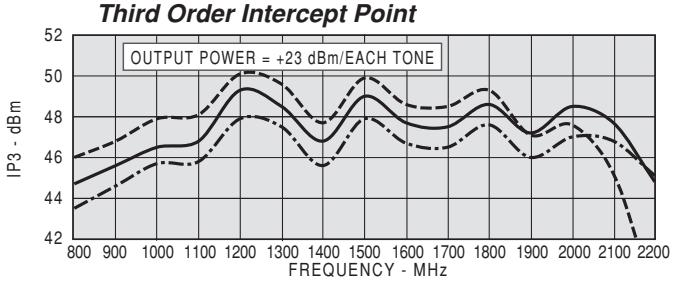
Life Test Data @ +85°C Case Temperature
Noise Figure vs Time Vcc = 28



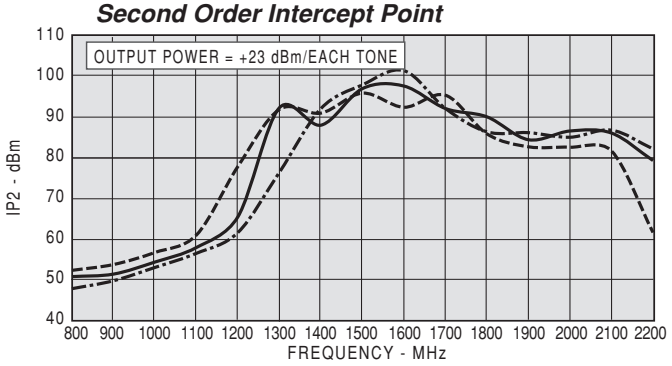
Noise Figure



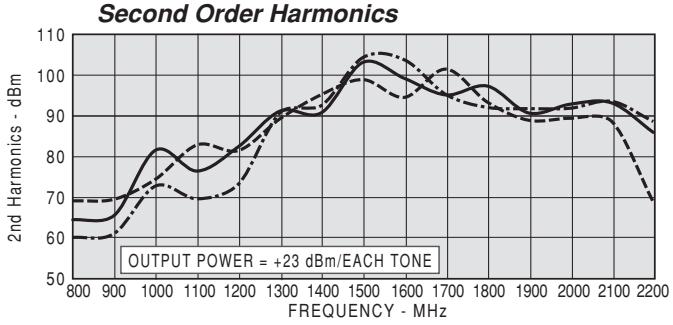
Third Order Intercept Point



Second Order Intercept Point

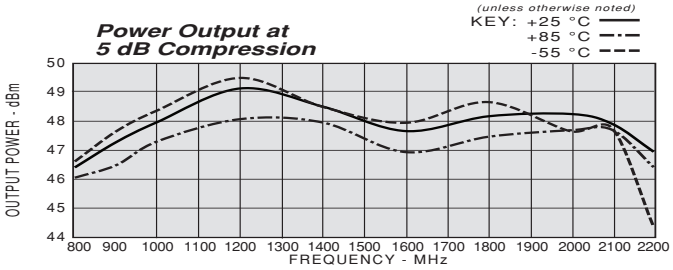


Second Order Harmonics

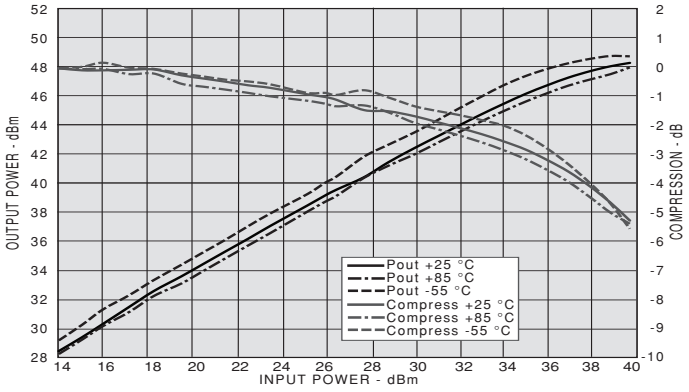


TYPICAL PERFORMANCE

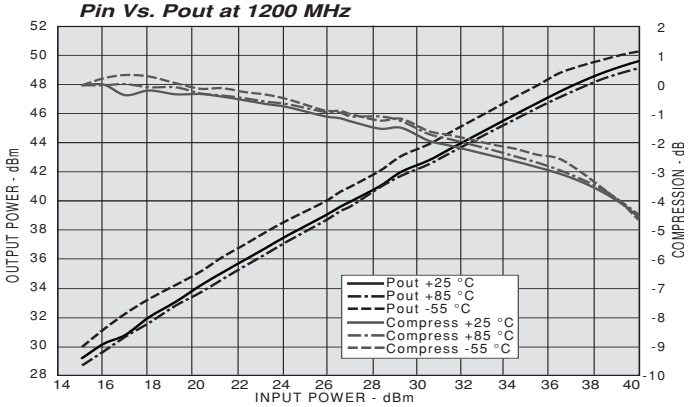
Power Output at 5 dB Compression



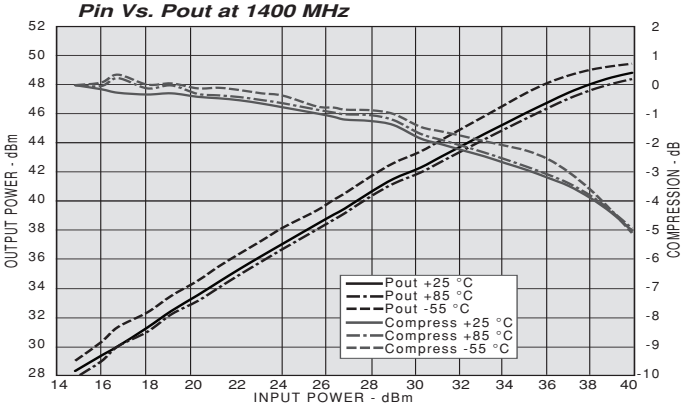
Pin Vs. Pout at 900 MHz



Pin Vs. Pout at 1200 MHz

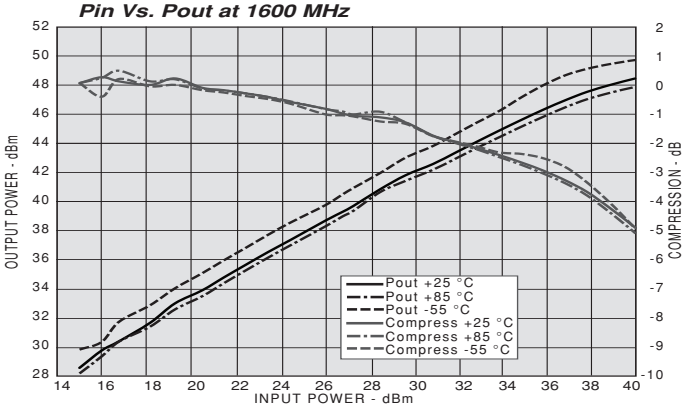


Pin Vs. Pout at 1400 MHz

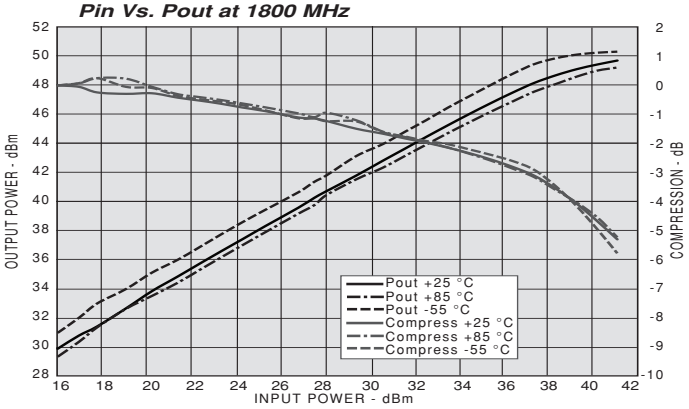


NOTE:
P_{IN} vs P_{OUT} test @ Pulse (not CW) 10% duty cycle, 10 µs Pulse Width.

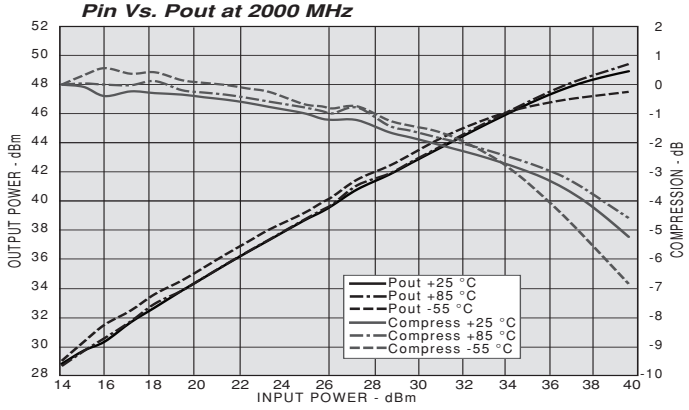
Pin Vs. Pout at 1600 MHz



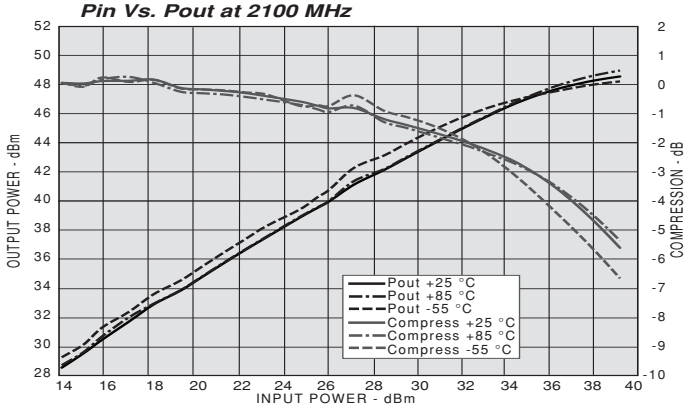
Pin Vs. Pout at 1800 MHz



Pin Vs. Pout at 2000 MHz



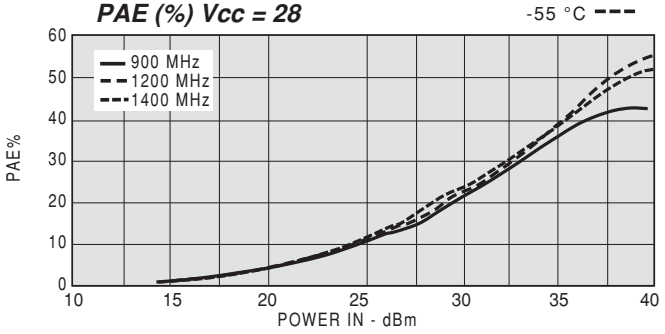
Pin Vs. Pout at 2100 MHz



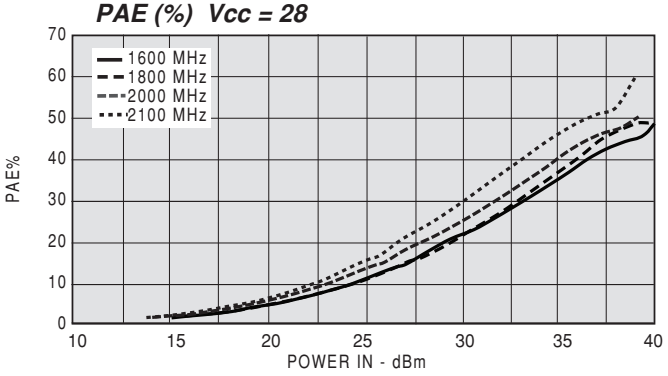
TYPICAL PERFORMANCE

(unless otherwise noted)
KEY: +25 °C
+85 °C
-55 °C

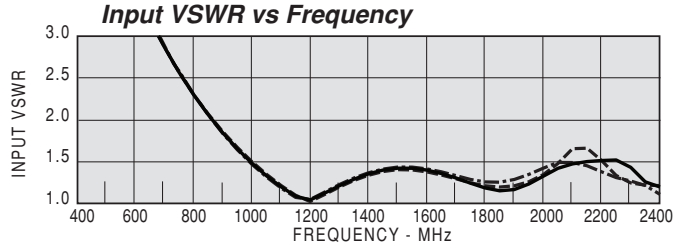
PAE (%) Vcc = 28



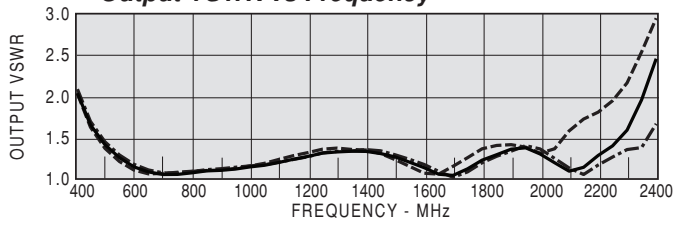
PAE (%) Vcc = 28



Input VSWR vs Frequency



Output VSWR vs Frequency



TYPICAL AUTOMATIC TEST DATA

LINEAR S-PARAMETERS
Model: AVP2050 Vcc=+12V / +28V Temp = +25 °C

FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.10	0.72	-126.78	2.66	-55.34	0.0035	159.76	0.35	-145.81
0.20	0.71	-179.36	3.67	-164.85	0.0047	54.20	0.77	112.08
0.30	0.69	145.04	4.92	132.59	0.0068	6.16	0.58	53.44
0.40	0.67	115.01	5.55	75.41	0.0084	-38.46	0.34	9.12
0.50	0.63	87.42	5.72	24.18	0.0095	-80.02	0.17	-23.27
0.60	0.56	61.35	5.70	-23.06	0.0102	-119.58	0.07	-38.62
0.70	0.49	36.52	5.64	-67.96	0.0108	-158.91	0.02	-1.02
0.80	0.40	12.57	5.53	-111.77	0.0112	161.66	0.03	49.47
0.90	0.30	-10.81	5.41	-154.70	0.0115	121.04	0.05	58.14
1.00	0.19	-33.62	5.25	162.71	0.0117	80.11	0.07	59.42
1.10	0.09	-53.52	5.10	120.59	0.0119	38.77	0.09	52.88
1.20	0.02	44.06	4.95	78.96	0.0123	-2.03	0.12	40.76
1.30	0.09	60.95	4.83	37.64	0.0131	-42.55	0.14	21.19
1.40	0.15	39.90	4.78	-4.11	0.0139	-82.97	0.14	-4.23
1.50	0.17	17.65	4.84	-46.66	0.0154	-124.15	0.12	-32.41
1.60	0.17	-3.11	4.95	-90.68	0.0171	-165.89	0.06	-62.46
1.70	0.13	-19.28	5.12	-136.83	0.0194	150.05	0.02	76.46
1.80	0.08	-20.66	5.39	173.95	0.0219	102.96	0.10	38.85
1.90	0.07	14.97	5.65	120.66	0.0246	51.80	0.15	-5.28
2.00	0.14	20.91	5.83	61.26	0.0266	-5.88	0.13	-51.64
2.10	0.19	-1.57	5.61	-4.18	0.0265	-68.77	0.04	-57.99
2.20	0.20	-23.85	5.09	-77.18	0.0256	-141.72	0.12	-41.01
2.30	0.18	-57.37	3.87	-168.28	0.0197	125.06	0.23	-173.33
2.40	0.09	-53.42	1.41	95.08	0.0070	23.04	0.42	42.24

LINEAR S-PARAMETERS
Model: AVP2050 Vcc=+12V / +28V Temp = +85 °C

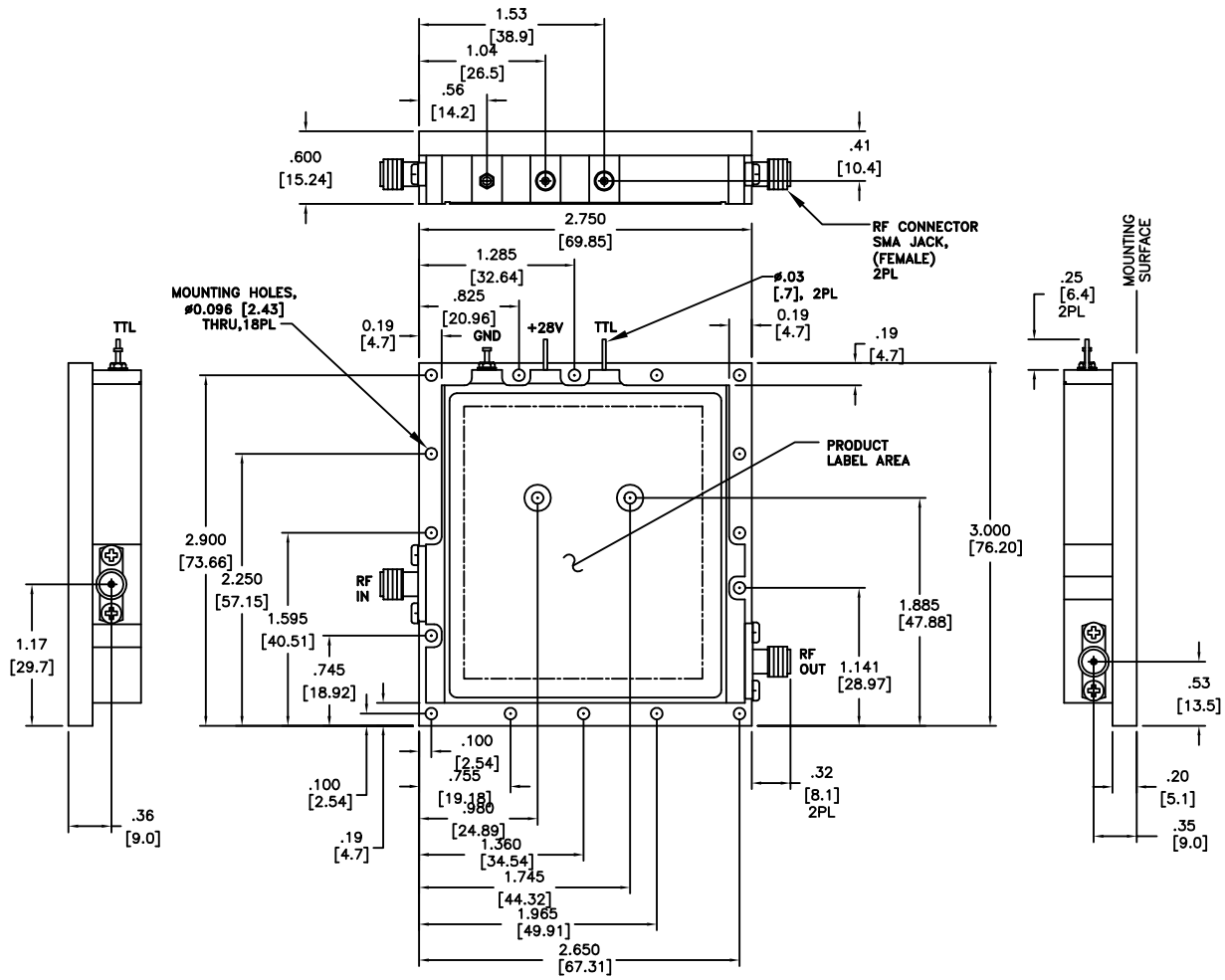
FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.10	0.73	-129.72	2.40	-60.21	0.0039	152.90	0.43	-159.87
0.20	0.72	177.99	3.55	-164.21	0.0051	55.11	0.77	112.79
0.30	0.70	142.61	4.82	132.59	0.0075	5.67	0.58	53.31
0.40	0.68	112.61	5.40	75.50	0.0093	-39.03	0.35	10.27
0.50	0.63	84.79	5.55	24.42	0.0104	-80.67	0.18	-19.45
0.60	0.57	58.33	5.53	-22.68	0.0113	-120.45	0.08	-32.22
0.70	0.49	32.94	5.45	-67.47	0.0120	-160.01	0.03	-3.96
0.80	0.40	8.16	5.35	-110.92	0.0125	160.39	0.04	42.64
0.90	0.30	-16.45	5.22	-153.68	0.0128	120.12	0.06	50.47
1.00	0.19	-41.55	5.07	164.11	0.0131	79.61	0.07	51.99
1.10	0.08	-69.63	4.92	122.30	0.0135	38.63	0.09	49.62
1.20	0.02	121.45	4.77	80.91	0.0139	-1.70	0.12	41.13
1.30	0.10	73.72	4.66	39.81	0.0147	-41.78	0.14	26.50
1.40	0.15	48.05	4.62	-1.62	0.0156	-81.96	0.15	0.81
1.50	0.18	25.13	4.63	-43.67	0.0170	-122.28	0.13	-22.79
1.60	0.17	5.60	4.73	-86.88	0.0189	-163.57	0.08	-51.63
1.70	0.14	-7.06	4.88	-131.88	0.0212	153.53	0.01	3.33
1.80	0.11	-5.28	5.10	-179.59	0.0238	107.65	0.09	44.30
1.90	0.12	7.36	5.39	129.07	0.0268	58.41	0.14	4.76
2.00	0.17	0.33	5.58	72.13	0.0293	3.09	0.15	-39.98
2.10	0.20	-23.72	5.43	9.78	0.0295	-57.05	0.06	-90.16
2.20	0.16	-46.78	4.87	-57.14	0.0282	-123.04	0.08	2.10
2.30	0.12	-55.00	4.16	-130.73	0.0253	162.30	0.15	-73.56
2.40	0.05	-59.38	2.81	136.48	0.0175	66.26	0.25	117.28

LINEAR S-PARAMETERS
Model: AVP2050 Vcc=+12V / +28V Temp = –55 °C

FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.10	0.72	-131.66	2.01	-18.47	0.0018	82.45	0.82	117.41
0.20	0.71	178.01	4.04	-163.14	0.0042	54.32	0.78	112.35
0.30	0.70	142.58	5.26	133.73	0.0058	7.62	0.59	54.91
0.40	0.67	113.18	6.11	75.89	0.0073	-37.37	0.34	8.75
0.50	0.63	85.92	6.38	23.83	0.0082	-78.84	0.16	-24.88
0.60	0.56	60.19	6.40	-24.28	0.0087	-118.47	0.05	-33.54
0.70	0.49	35.70	6.32	-70.31	0.0091	-157.80	0.03	29.00
0.80	0.40	12.04	6.24	-114.82	0.0093	161.70	0.04	44.77
0.90	0.30	-11.30	6.09	-158.84	0.0094	120.38	0.05	55.47
1.00	0.20	-34.72	5.89	157.69	0.0094	78.40	0.07	62.67
1.10	0.10	-57.43	5.67	114.78	0.0095	35.93	0.10	53.38
1.20	0.01	38.83	5.50	72.47	0.0098	-6.15	0.14	36.58
1.30	0.09	65.03	5.40	30.44	0.0105	-47.72	0.16	15.79
1.40	0.14	42.42	5.41	-12.53	0.0113	-89.34	0.15	-11.67
1.50	0.17	19.73	5.54	-57.04	0.0127	-131.72	0.10	-37.30
1.60	0.16	0.08	5.72	-104.13	0.0145	-176.14	0.03	-54.46
1.70	0.13	-12.54	5.92	-154.19	0.0166	136.73	0.07	59.09
1.80	0.09	-10.23	6.16	151.75	0.0186	85.04	0.15	23.10
1.90	0.09	10.36	6.36	92.26	0.0205	28.17	0.17	-17.84
2.00	0.15	16.78	6.39	23.44	0.0216	-38.95	0.13	-36.17
2.10	0.25	-7.98	5.46	-61.38	0.0174	-119.06	0.23	-75.87
2.20	0.20	-52.05	2.88	-162.97	0.0097	138.36	0.29	153.82
2.30	0.11	-56.25	0.67	115.38	0.0018	54.65	0.37	43.40
2.40	0.10	-44.36	0.07	80.33	0.0004	171.13	0.50	-21.48

NOTE:
S2P files are available upon request (soft copy).

OUTLINE DRAWING - COUGAR GaNPak C



THIRD ANGLE PROJECTION

INCH [MM]

.XX = ±.02 [.5]
.XXX = ±.010 [.25]