TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Rev. 5/10

AVP2524

600 TO 2600 MHz, 15 WATTS HIGH POWER GaNPak B AMPLIFIER

Typical Values	AVP2524
Broadband	400-2600 MHz
High Gain	+40 dB
High Saturated Power, Psat	17 Watts
High Third Order I.P.	+45 dBm
Small Hermetic Package, Cougar GaNPakB	

SPECIFICATIONS*

Parameter	Typical	Guaranteed 0 to 50 °C	Guaranteed -55 to +85 °C
Frequency (Min.)	400-2600 MHz	600-2600 MHz	600-2600 MHz
Small Signal Gain (Min.)	40.0 dB	38.0 dB	37.0 dB
Gain Flatness (Max.)	±2.0 dB	±2.5 dB	±3.0 dB
Noise Figure (Max.)	3.5 dB	4.0 dB	5.0 dB
SWR (Max.) Input/Output	<1.8:1	2.0:1	2.0:1
Power Output (Min.)			
@Psat, 600-2200 MHz	+43.0 dBm +20 W	+41.5 dBm +14 W	+40.5 dBm +11.2 W
@Psat, 2300-2600 MHz	+42.0 dBm +15.8 W	+40.0 dBm +10 W	+39.0 dBm +7.94W
@4 dB compression 600-2600 MHz	+41.0 dBm +12.6 W	+38.0 dBm +6.3 W	+38.0 dBm +6.3 W
Reverse Isolation	70.0 dB	65.0 dB	60.0 dB
DC Current (Max.)			
1st Stg: +12V	200 mA	215 mA	230 mA
Linear Oper. 2nd Stg: +28V	1200 mA	1500 mA	1600 mA
Psat w/+5 dBm Input 2nd Stage: +28V	2400 mA	2600 mA	2700 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 +12/+28V.
^ Faster switching speed option available upon request.

INTERMODULATION PERFORMANCE

Typical @ 25 °C	AVP2524
Second Order Harmonic Intercept Point	+76 dBm
Second Order Two Tone Intercept Point	+70 dBm
Third Order Two Tone Intercept Point	+45 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	+12 dBm[1]
Maximum Short Term Input Power (1 Minute Max.)	+14 dBm
Maximum Peak Power (3 µsec Max.)	+16 dBm
Burn-in Temperature, +28V	+85 °C
Thermal Resistance[2] (θjc)	+5.0 °C/Watt
Junction Temperature Rise Above Case (Tjc), **+28V**[3]	+60 °C

[1] If no load or a short on output; decrease input power by +10 dBm.
[2] Thermal resistance is based on total power dissipation including 28 V and 12 V supply lines.
[3] Junction temperature is measured by using thermal scan method.

AVP2524

CougarGaNPak B



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 AVP2524 amplifier provides nominal output power of 15-20 Watts. Each 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. The AVP2524 uses the preamp and driver stages to provide ~ 40 dB of overall gain.

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.

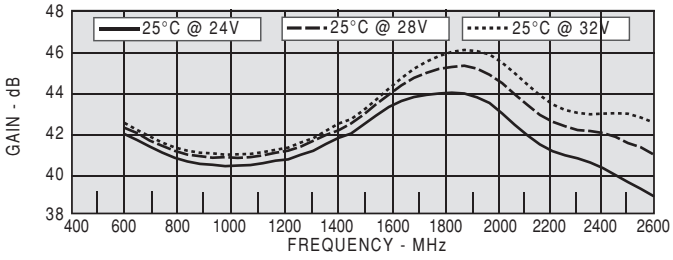
Maximum Tj of amplifier is 200°C.

DIMENSIONS ARE IN INCHES [MILLIMETERS]

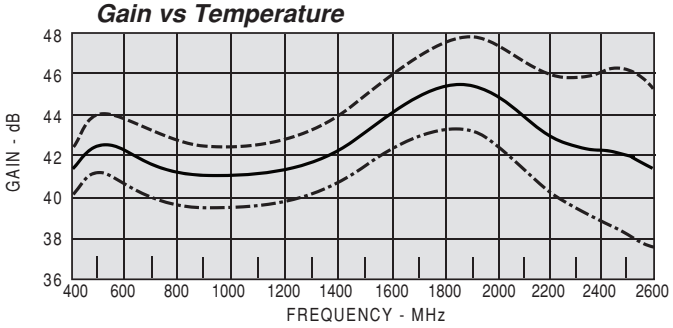
TYPICAL PERFORMANCE

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

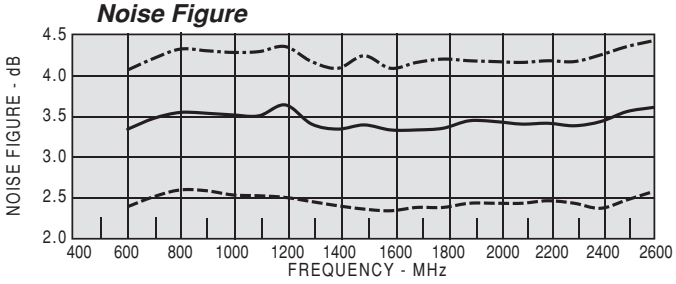
Gain vs Supply Voltage
Vcc = 24/28/32



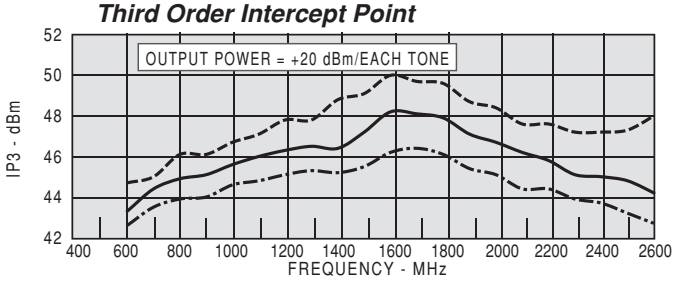
Gain vs Temperature



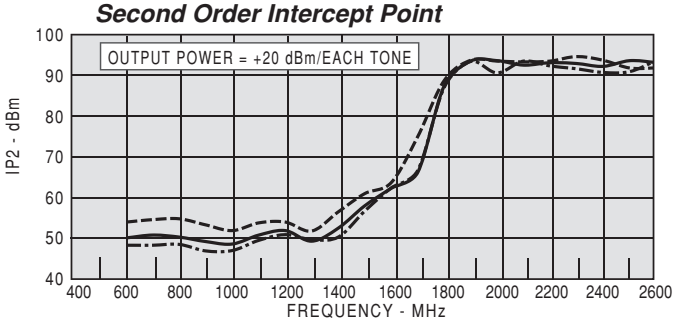
Noise Figure



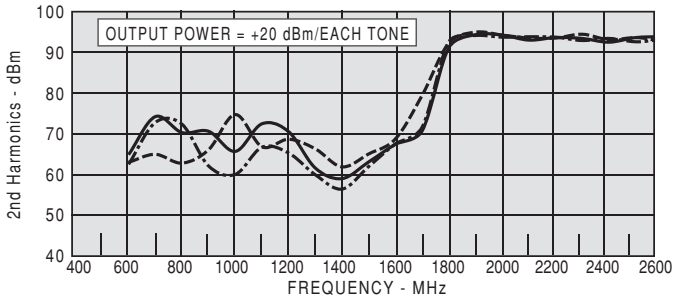
Third Order Intercept Point



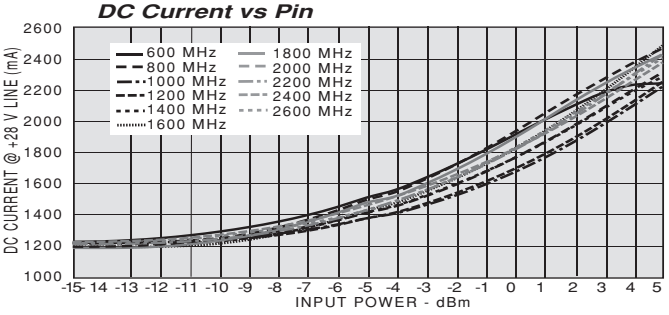
Second Order Intercept Point



Second Order Harmonics



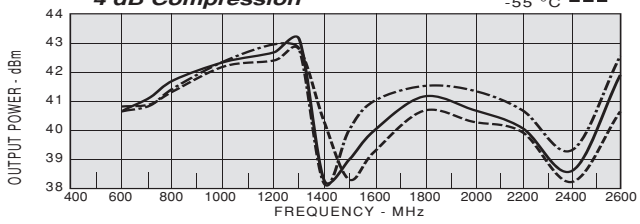
DC Current vs Pin



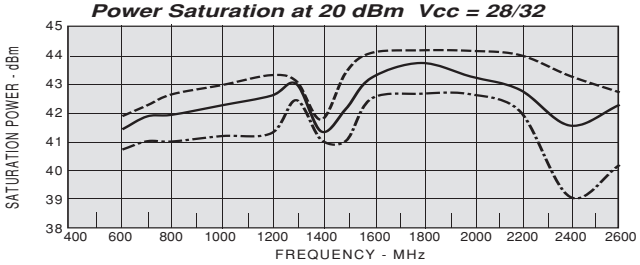
TYPICAL PERFORMANCE

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

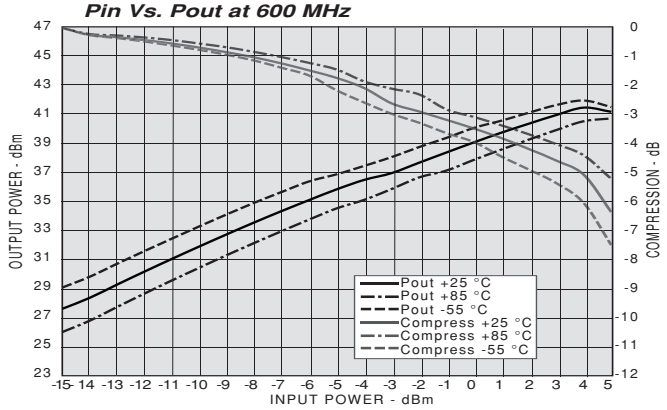
Power Output at 4 dB Compression



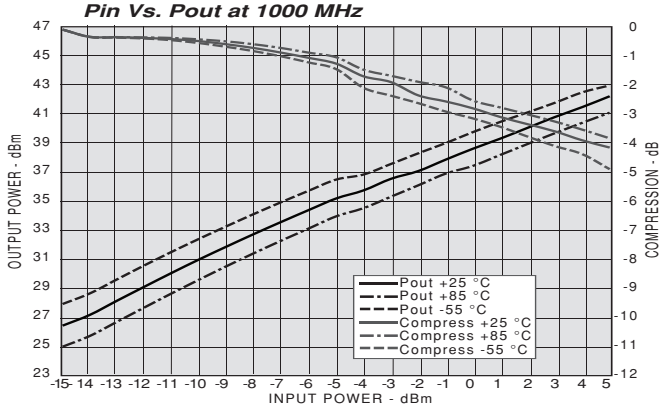
Power Saturation at 20 dBm Vcc = 28/32



Pin Vs. Pout at 600 MHz

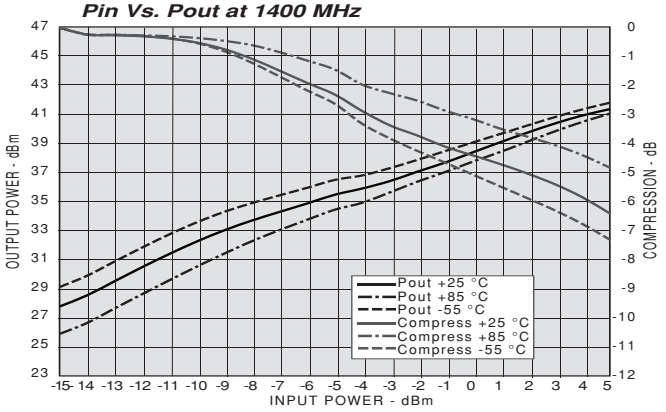


Pin Vs. Pout at 1000 MHz

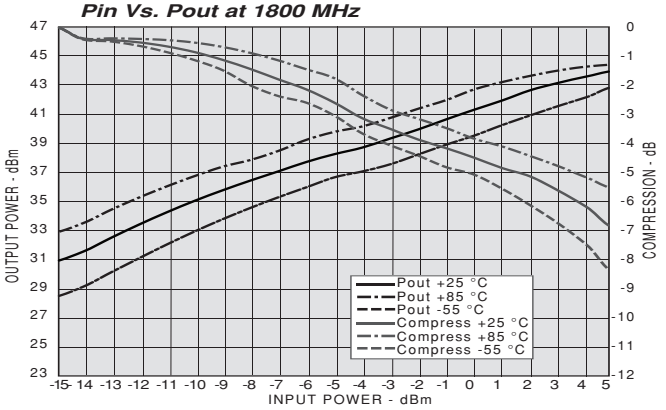


NOTE: Pin vs Pout at other frequencies available upon request.

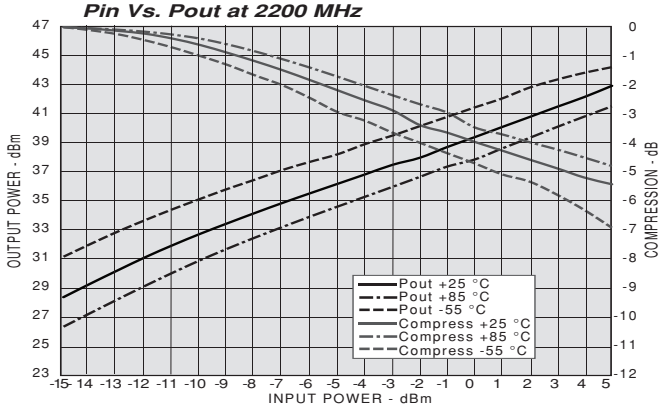
Pin Vs. Pout at 1400 MHz



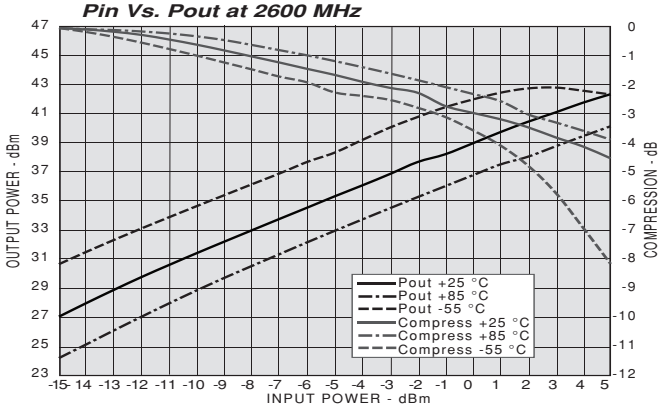
Pin Vs. Pout at 1800 MHz



Pin Vs. Pout at 2200 MHz



Pin Vs. Pout at 2600 MHz

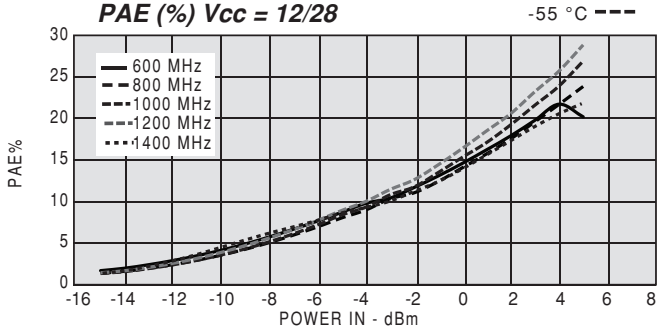


TYPICAL PERFORMANCE

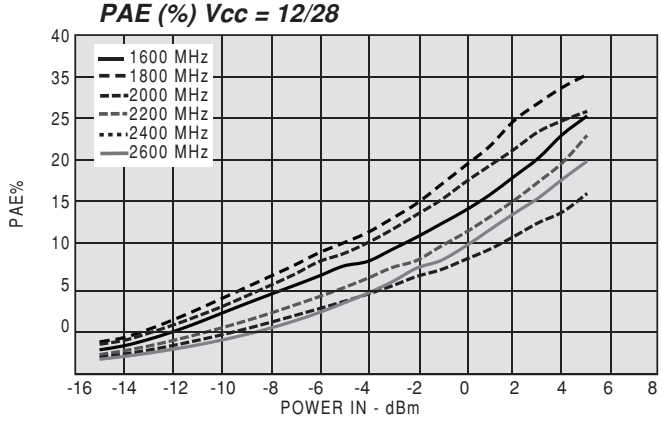
(unless otherwise noted)

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

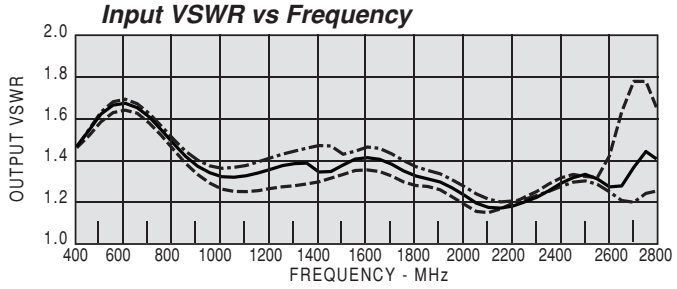
PAE (%) Vcc = 12/28



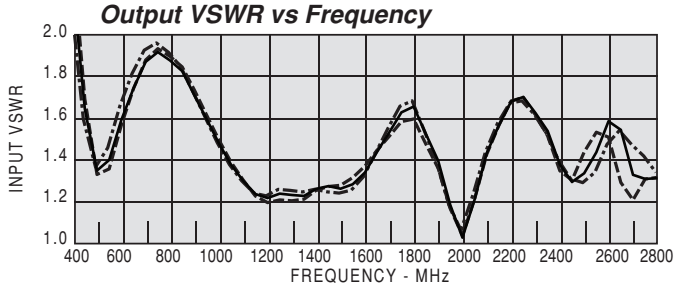
PAE (%) Vcc = 12/28



Input VSWR vs Frequency



Output VSWR vs Frequency



LINEAR S-PARAMETERS

Model: AVP2524 Vcc=+12V / +28V Temp = +25 °C

FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.4	0.19	-36.55	119.65	64.25	0.0003	-60.02	0.39	81.12
0.5	0.23	-63.56	135.45	-8.87	0.0003	-132.11	0.15	85.80
0.6	0.25	-96.76	130.35	-73.86	0.0003	-171.43	0.23	112.39
0.7	0.23	-128.39	121.69	-131.25	0.0003	128.15	0.31	91.18
0.8	0.19	-155.18	116.07	175.51	0.0002	86.16	0.31	67.15
0.9	0.16	-173.98	114.15	123.96	0.0002	51.46	0.26	45.29
1	0.14	174.36	114.03	72.78	0.0003	17.21	0.20	28.26
1.1	0.14	163.39	115.59	21.86	0.0003	-27.19	0.13	24.01
1.2	0.15	148.71	118.54	-28.79	0.0003	-69.55	0.10	33.83
1.3	0.16	130.25	125.05	-80.11	0.0003	-105.45	0.11	49.18
1.4	0.15	110.46	132.26	-133.04	0.0003	-139.93	0.12	46.40
1.5	0.16	101.66	143.99	174.41	0.0003	-173.30	0.12	48.87
1.6	0.17	80.90	160.26	117.94	0.0003	135.24	0.15	55.10
1.7	0.16	58.45	175.42	57.71	0.0004	78.22	0.21	44.11
1.8	0.14	41.47	184.18	-4.50	0.0004	42.90	0.25	12.97
1.9	0.13	23.02	187.26	-68.77	0.0004	-13.32	0.17	-30.02
2	0.11	0.01	178.48	-134.40	0.0004	-60.23	0.02	82.49
2.1	0.08	-13.73	160.63	160.82	0.0003	-119.18	0.18	62.22
2.2	0.09	-32.02	143.72	98.82	0.0004	-158.02	0.26	26.37
2.3	0.10	-72.09	135.21	37.10	0.0004	154.36	0.24	-2.21
2.4	0.13	-126.75	131.78	-28.13	0.0004	113.06	0.16	-16.69
2.5	0.14	177.94	127.76	-98.83	0.0005	48.67	0.15	7.80
2.6	0.12	141.64	120.80	-174.42	0.0005	-7.08	0.23	-8.34
2.7	0.15	129.08	106.82	98.70	0.0005	-83.11	0.14	-37.96
2.8	0.17	78.99	66.12	6.79	0.0003	-172.83	0.14	-10.951

LINEAR S-PARAMETERS

Model: AVP2524 Vcc=+12V / +28V Temp = +85 °C

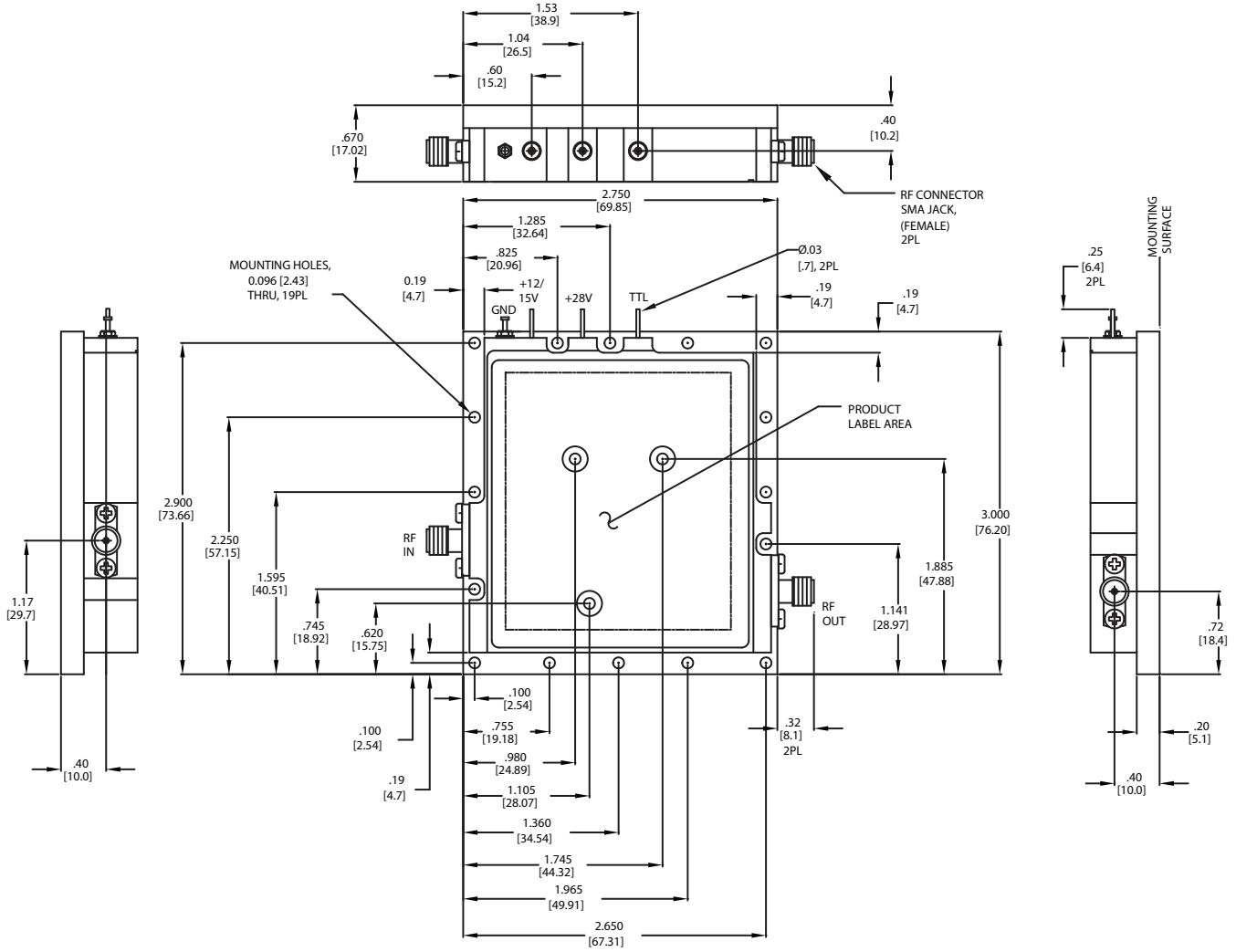
FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.4	0.19	-36.40	104.83	61.93	0.0004	-60.41	0.37	83.91
0.5	0.24	-63.64	115.95	-11.89	0.0003	-130.56	0.16	94.48
0.6	0.25	-97.22	110.14	-76.74	0.0004	-172.82	0.25	112.15
0.7	0.24	-128.57	102.37	-133.96	0.0003	138.87	0.32	90.46
0.8	0.20	-154.72	97.85	172.82	0.0003	95.61	0.32	66.17
0.9	0.17	-173.08	96.13	121.08	0.0003	44.47	0.27	43.98
1	0.15	174.88	95.82	69.67	0.0003	15.03	0.20	27.42
1.1	0.16	162.57	97.11	18.49	0.0002	-22.60	0.13	25.22
1.2	0.17	146.57	99.20	-32.42	0.0003	-67.06	0.11	36.30
1.3	0.18	128.32	104.23	-83.88	0.0003	-104.74	0.12	48.08
1.4	0.19	109.06	111.90	-136.55	0.0003	-140.43	0.12	38.81
1.5	0.18	89.14	119.63	168.71	0.0003	-176.41	0.11	50.11
1.6	0.19	73.83	131.85	112.56	0.0004	141.00	0.14	60.00
1.7	0.18	51.20	142.35	51.75	0.0005	91.91	0.22	49.01
1.8	0.16	33.80	146.61	-10.58	0.0005	44.51	0.26	16.14
1.9	0.14	15.80	146.38	-74.62	0.0004	-14.26	0.17	-25.42
2	0.12	-7.21	136.83	-139.75	0.0004	-69.77	0.03	57.62
2.1	0.10	-25.06	121.22	156.10	0.0005	-122.46	0.18	58.47
2.2	0.10	-46.82	106.51	94.64	0.0004	-148.99	0.25	25.38
2.3	0.11	-85.66	97.41	33.32	0.0003	167.47	0.24	-1.71
2.4	0.12	-137.03	90.62	-30.24	0.0003	113.29	0.17	-17.02
2.5	0.13	170.28	83.92	-96.91	0.0004	50.17	0.13	0.98
2.6	0.11	128.43	77.93	-166.10	0.0004	6.55	0.19	2.37
2.7	0.09	118.35	73.65	116.72	0.0005	-53.57	0.19	-23.35
2.8	0.11	88.36	57.05	26.06	0.0005	-141.02	0.15	-18.23

LINEAR S-PARAMETERS

Model: AVP2524 Vcc=+12V / +28V Temp = –55 °C

FREQ.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG.
0.4	0.19	-34.89	137.53	69.47	0.0003	-57.74	0.41	79.90
0.5	0.22	-61.72	160.34	-4.16	0.0002	-134.44	0.14	79.84
0.6	0.24	-95.07	156.19	-70.12	0.0003	-177.99	0.22	115.45
0.7	0.22	-127.69	146.22	-128.23	0.0002	135.95	0.31	93.12
0.8	0.18	-156.15	138.89	178.18	0.0002	94.83	0.31	67.66
0.9	0.14	-176.59	135.97	126.57	0.0002	48.41	0.27	44.06
1	0.12	172.57	135.24	75.49	0.0002	22.54	0.20	24.89
1.1	0.11	164.73	136.98	24.80	0.0002	-29.11	0.14	17.19
1.2	0.12	153.76	140.13	-25.58	0.0002	-55.47	0.09	25.35
1.3	0.12	139.89	147.56	-76.33	0.0002	-103.50	0.10	48.44
1.4	0.13	127.16	158.68	-127.82	0.0002	-153.38	0.12	45.69
1.5	0.14	111.16	175.52	178.81	0.0002	165.04	0.13	48.87
1.6	0.15	90.68	195.99	122.54	0.0003	128.06	0.16	48.39
1.7	0.14	68.88	218.01	62.65	0.0003	72.71	0.21	36.21
1.8	0.12	54.05	233.76	0.34	0.0003	27.79	0.23	8.50
1.9	0.12	35.08	243.66	-64.65	0.0003	-23.98	0.16	-31.51
2	0.09	14.43	236.86	-131.33	0.0003	-77.15	0.02	76.70
2.1	0.07	12.24	217.33	162.79	0.0003	-117.99	0.18	60.92
2.2	0.09	-5.75	198.85	99.58	0.0003	-172.95	0.26	25.45
2.3	0.11	-48.14	193.38	36.37	0.0003	137.91	0.24	-3.42
2.4	0.14	-105.11	200.26	-32.24	0.0003	93.85	0.15	-14.20
2.5	0.14	-156.70	203.58	-110.60	0.0004	29.68	0.18	8.36
2.6	0.17	-175.58	184.12	162.32	0.0004	-40.08	0.21	-27.60
2.7	0.28	135.91	127.07	67.22	0.0004	-122.87	0.10	-11.22
2.8	0.24	80.54	65.74	-18.26	0.0003	143.27	0.14	5.94

OUTLINE DRAWING - COUGAR GaNPak B



THIRD ANGLE PROJECTION

INCH [MM]

.XX = ±.02 [.5]
.XXX = ±.010 [.25]