

DESCRIPTION

AMCOM's AM060WX-BI-R is part of the BI series of GaAs pHEMTs. This part has a total gate width of 6mm. The AM060WX-BI-R is designed for high power microwave applications, operating up to 10 GHz. The BI series uses a specially designed ceramic package with bent (BI-G) or straight (BI) leads in a drop-in mounting style. The flange at the bottom of the package serves simultaneously as DC ground, RF ground, and thermal path. This part is RoHS compliant.



FEATURES

- High Frequency Operation up to 10 GHz
- High Gain & High Power, $P_{1dB}=35.5\text{dBm}$ @ 4GHz
- Surface Mountable
- Bottom ground for Effective Heat Removal

APPLICATIONS

- Wireless Local Loop Network
- Cellular Radio
- Driver Amplifier
- Repeaters
- C-Band VSAT
- Radar

RF PERFORMANCE

Load pull @ 4 GHz, ($V_{ds} = 8\text{V}$, $I_{ds} = 0.9\text{A}$)

Parameters	MIN	TYP
P_{1dB}^* (dBm)	34.5	35.5
Eff @ P_{1dB}	-	47%
P_{3dB}^* (dBm)	35.5	36.5
Eff @ P_{3dB}	-	56%
Small Signal Gain (dB)	11.5	13.5
IP3 (dBm)	-	44

* Power typically remains the same as frequency changes.

ABSOLUTE MAXIMUM RATING

Parameters	Symbol	Rating
Drain-Source Voltage (V)	V_{ds}	10
Gate-Source Voltage (V)	V_{gs}	-5
Drain Current (A)	I_{ds}	2.4
Continuous Dissipation At Room Temp. (W)	P_t	11.5
Operating Temp. ($^{\circ}\text{C}$)	T_A	-55 to +85
Max. Channel Temp. ($^{\circ}\text{C}$)	T_{ch}	+175

DC PARAMETERS

Parameters	Conditions	MIN	TYP	MAX
Saturation Current I_{dss} (A)	$V_{ds}=3\text{V}$, $V_{gs}=0\text{V}$	1.2	1.8	2.4
Pinch-off Voltage V_p (V)	$V_{ds}=3\text{V}$, $I_{ds}=2.5\% I_{dss}$	-2.2	-1.7	-1.2
Drain to Gate Breakdown Voltage BV_{gd} (V)	$I_{dg} = 6\text{mA}$	15	20	
Thermal Resistance ($^{\circ}\text{C}/\text{W}$)			13	

AMCOM Communications, Inc.

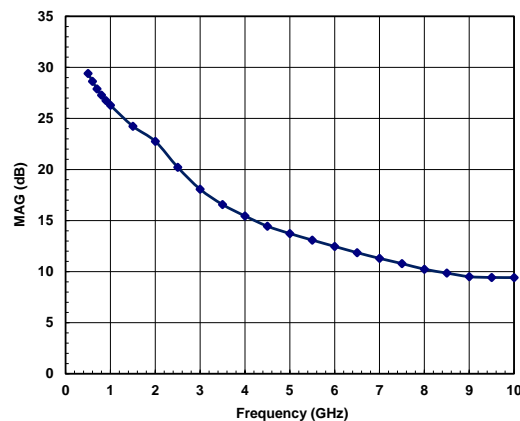
SMALL SIGNAL MEASUREMENTS

S-parameters for AM060WX-BI-R at 8 V, 0.6 A *

Freq(GHz)	MAG(S11)	ANG(S11)	MAG(S21)	ANG(S21)	MAG(S12)	ANG(S12)	MAG(S22)	ANG(S22)
0.5	0.923	-158.39	12.142	93.88	0.014	16.63	0.620	-174.78
0.6	0.926	-163.36	10.161	89.83	0.014	15.56	0.619	-176.92
0.7	0.931	-167.3	8.75	86.51	0.014	15.73	0.618	-178.66
0.8	0.929	-170.8	7.686	83.50	0.014	14.78	0.622	-179.84
0.9	0.929	-173.78	6.828	80.70	0.014	14.01	0.626	179
1	0.931	-176.18	6.150	78.16	0.014	14.29	0.625	178.13
1.5	0.931	175.23	4.113	67.16	0.015	15.65	0.629	174.22
2	0.924	169.91	3.165	57.4	0.017	16.77	0.624	171.37
2.5	0.920	164.04	2.607	47.78	0.018	17.40	0.618	168.15
3	0.915	157.79	2.254	38.04	0.021	17.36	0.614	164.12
3.5	0.910	151.47	2.017	28.25	0.023	16.59	0.607	159.95
4	0.906	144.64	1.832	18.26	0.026	14.55	0.603	154.81
4.5	0.900	137.53	1.692	8.19	0.030	11.58	0.598	149.51
5	0.896	130.47	1.577	-1.76	0.033	8.35	0.597	144.15
5.5	0.890	123.07	1.493	-11.87	0.038	3.85	0.591	138.51
6	0.882	115.3	1.433	-22.20	0.043	-1.34	0.583	132.99
6.5	0.870	107	1.399	-33.03	0.049	-6.97	0.568	126.86
7	0.855	97.46	1.396	-44.75	0.057	-14.36	0.544	119.53
7.5	0.838	86.51	1.409	-58.00	0.066	-23.37	0.509	110.13
8	0.818	73.61	1.428	-72.44	0.078	-34.22	0.471	98.10
8.5	0.805	58.62	1.442	-88.39	0.090	-47.04	0.435	81.98
9	0.797	42.12	1.429	-105.40	0.102	-61.56	0.415	62.01
9.5	0.804	24.55	1.384	-122.94	0.111	-76.77	0.420	39.36
10	0.819	6.80	1.309	-139.73	0.116	-91.19	0.447	18.82
10.5	0.838	-10.24	1.214	-156.47	0.119	-105.36	0.483	-0.76
11	0.854	-26.75	1.112	-173.11	0.121	-119.66	0.525	-20.51
11.5	0.882	-42.86	1.003	169.83	0.121	-134.94	0.572	-40.16
12	0.893	-59.07	0.878	152.7	0.118	-150	0.631	-59.42

* S2P file downloadable from the web : <http://www.amcomusa.com/products/rftrans.html>

MAXIMUM AVAILABLE GAIN (8V,600mA)

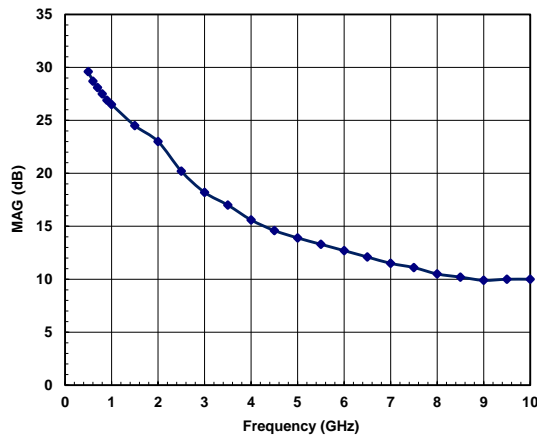


S-parameters for AM060WX-BI-R at 8 V, 0.9 A *

Freq(GHz)	MAG(S11)	ANG(S11)	MAG(S21)	ANG(S21)	MAG(S12)	ANG(S12)	MAG(S22)	ANG(S22)
0.5	0.923	-157.49	12.542	93.86	0.014	16.84	0.604	-173.86
0.6	0.926	-162.57	10.499	89.67	0.014	15.92	0.603	-175.83
0.7	0.93	-166.65	9.034	86.28	0.014	14.72	0.601	-177.7
0.8	0.928	-170.18	7.934	83.26	0.014	14.29	0.605	-178.92
0.9	0.929	-173.22	7.048	80.35	0.014	13.91	0.609	-179.96
1	0.93	-175.73	6.345	77.74	0.014	14.03	0.608	179.12
1.5	0.93	175.55	4.234	66.54	0.015	14.98	0.613	175.36
2	0.922	170.21	3.244	56.78	0.016	16.25	0.612	172.54
2.5	0.918	164.34	2.669	47	0.018	17.34	0.608	169.49
3	0.914	158.08	2.303	37.16	0.02	17.27	0.605	165.58
3.5	0.909	151.76	2.055	27.28	0.023	16.8	0.6	161.47
4	0.905	144.92	1.862	17.25	0.025	15.03	0.599	156.42
4.5	0.899	137.8	1.717	7.17	0.029	12.32	0.595	151.14
5	0.895	130.76	1.596	-2.81	0.033	9.33	0.597	145.86
5.5	0.89	123.32	1.51	-12.93	0.037	5.02	0.593	140.31
6	0.882	115.55	1.446	-23.3	0.042	0.13	0.587	134.76
6.5	0.87	107.28	1.41	-34.12	0.048	-5.93	0.572	128.73
7	0.855	97.77	1.405	-45.83	0.056	-12.83	0.55	121.4
7.5	0.839	86.78	1.417	-58.99	0.066	-21.77	0.519	112.14
8	0.819	73.89	1.438	-73.36	0.077	-32.6	0.48	100.22
8.5	0.805	58.85	1.452	-89.3	0.09	-45.31	0.447	84.35
9	0.798	42.34	1.44	-106.36	0.102	-59.72	0.426	64.79
9.5	0.806	24.89	1.398	-123.91	0.111	-75.27	0.429	42.13
10	0.82	7.01	1.32	-140.81	0.117	-89.7	0.455	21.44
10.5	0.84	-10.02	1.224	-157.52	0.121	-103.96	0.49	2.23
11	0.856	-26.7	1.121	-174.44	0.123	-118.54	0.532	-18.27
11.5	0.883	-42.76	1.012	168.44	0.122	-134.05	0.577	-38.24
12	0.895	-58.92	0.884	151.13	0.119	-149.27	0.636	-58.14

* S2P file downloadable from the web : <http://www.amcomusa.com/products/rftrans.html>

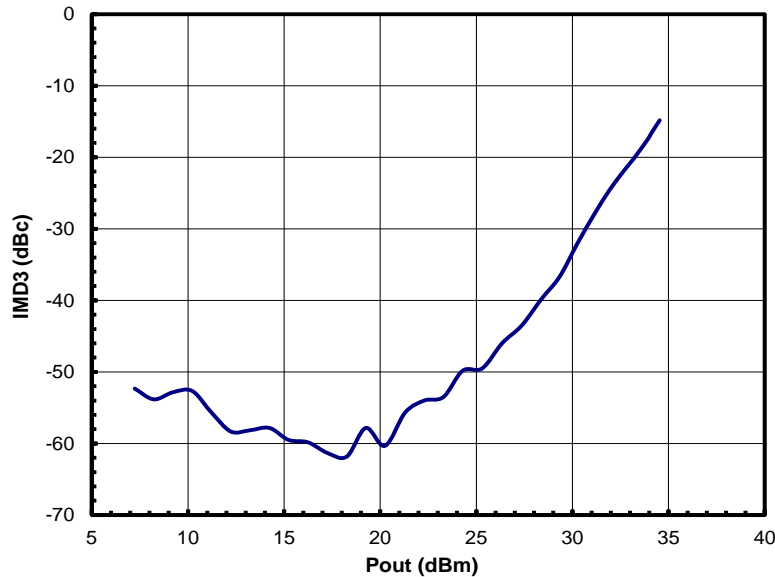
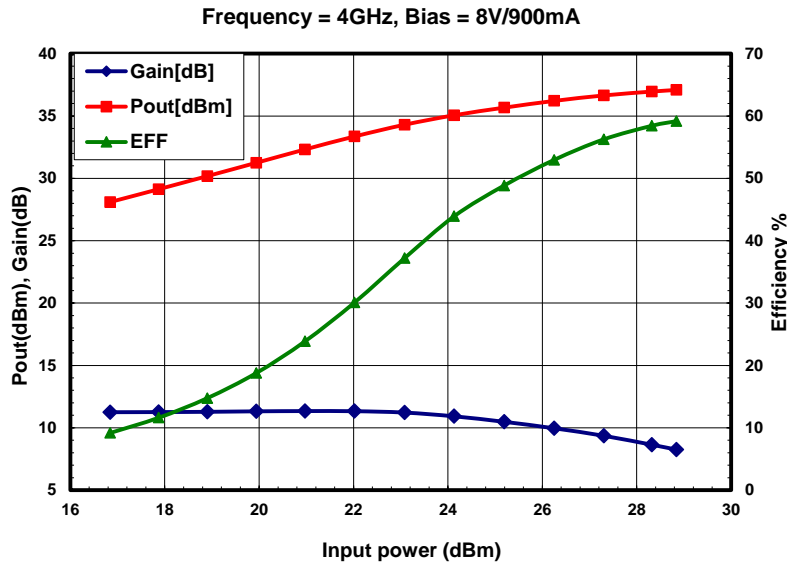
MAXIMUM AVAILABLE GAIN (8V,900mA)



POWER DATA

Optimum load test (8V,900mA)

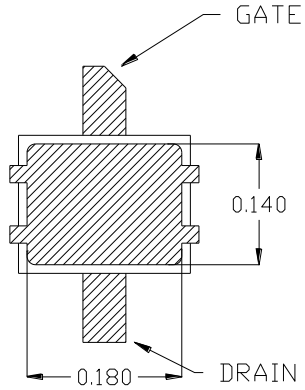
Frequency	MAG(Γ_L)	ANG(Γ_L)	Gain* (dB)	P _{1dB} (dBm)	Eff @ P _{1dB}	P _{3dB} (dBm)	Eff @ P _{3dB}
2 GHz	0.78	-171	19	36.5	52%	37.5	59%
3.5 GHz	0.74	-155	14.5	36.3	51%	37.3	59%
4 GHz	0.7	-146	13.5	35.8	47%	36.9	56%
6 GHz	0.59	-119	10.5	35.6	41%	36.4	49%
8 GHz	0.49	-79	8	35.8	43%	36.8	49%



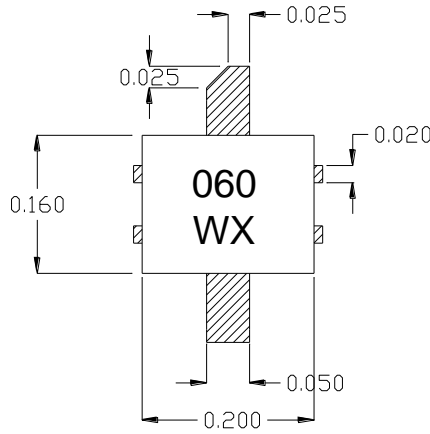
*Small signal power gain at optimum load.

PACKAGE OUTLINE

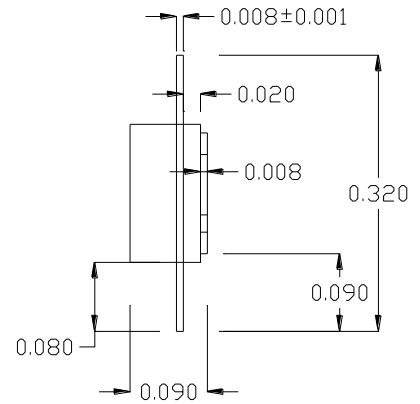
Bottom View



Top View



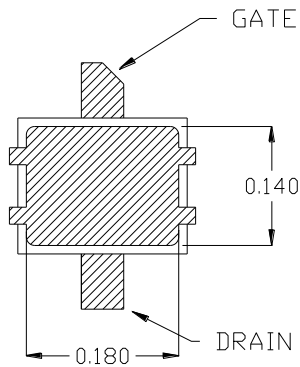
Side View



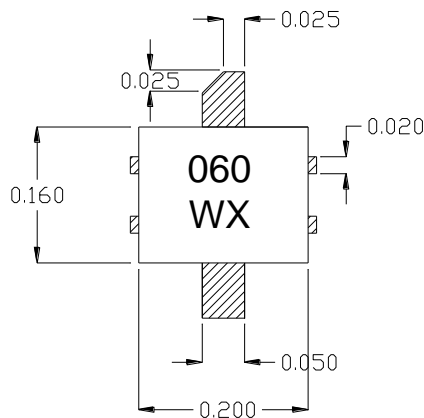
* All Dimensions are in inch

AM060WX-BI-R (Straight Leads)

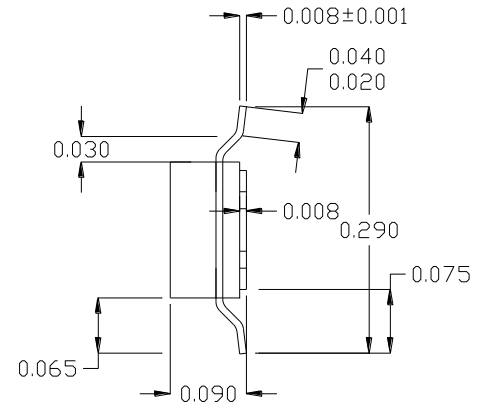
Bottom View



Top View



Side View



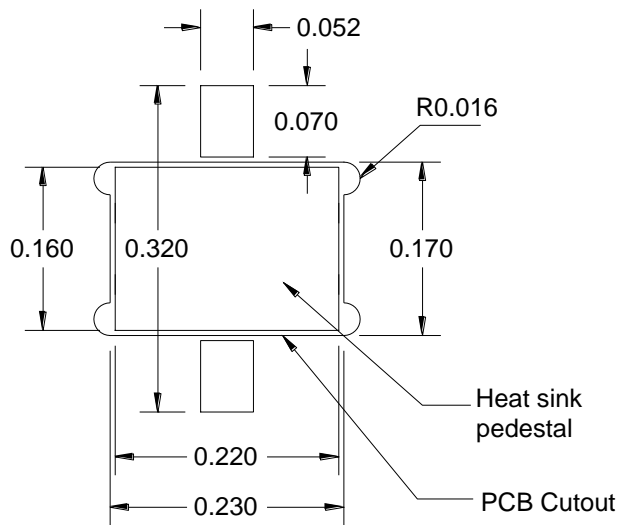
* All Dimensions are in inch

AM060WX-BI-G-R (Bent Leads)

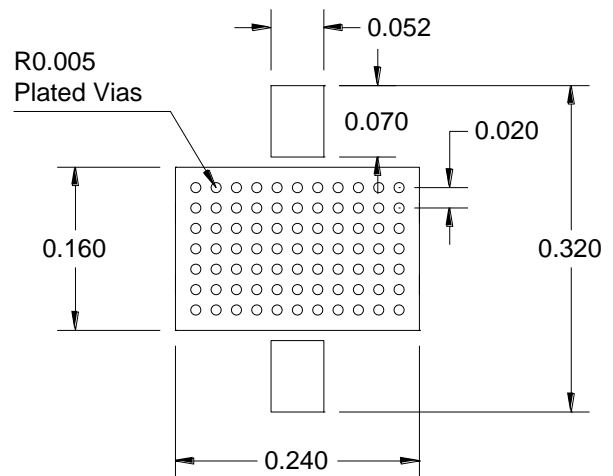
MOUNTING INSTRUCTIONS

The device may dissipate several watts of power. It is important to provide a good heat sink to dissipate the heat. There are two options of mounting the device, as shown below. The most effective way is to mount the device to a heat sink pedestal (Option 1). We strongly recommend this way for high power device. The other option, which is mounted directly on PCB, is to add sufficient number of plated through via holes to the PCB. The base of the device is soldered to the PCB (Option 2). The via hole wall should be plated by at least 1 oz thick (1.5 mil) of high thermal conductivity copper to conduct the heat from the top of PCB to the bottom of PCB. Also fill the via holes with solder to help conducting the heat.

Option 1 for Straight Leads (Recommended)



Option 2 for Bent Leads

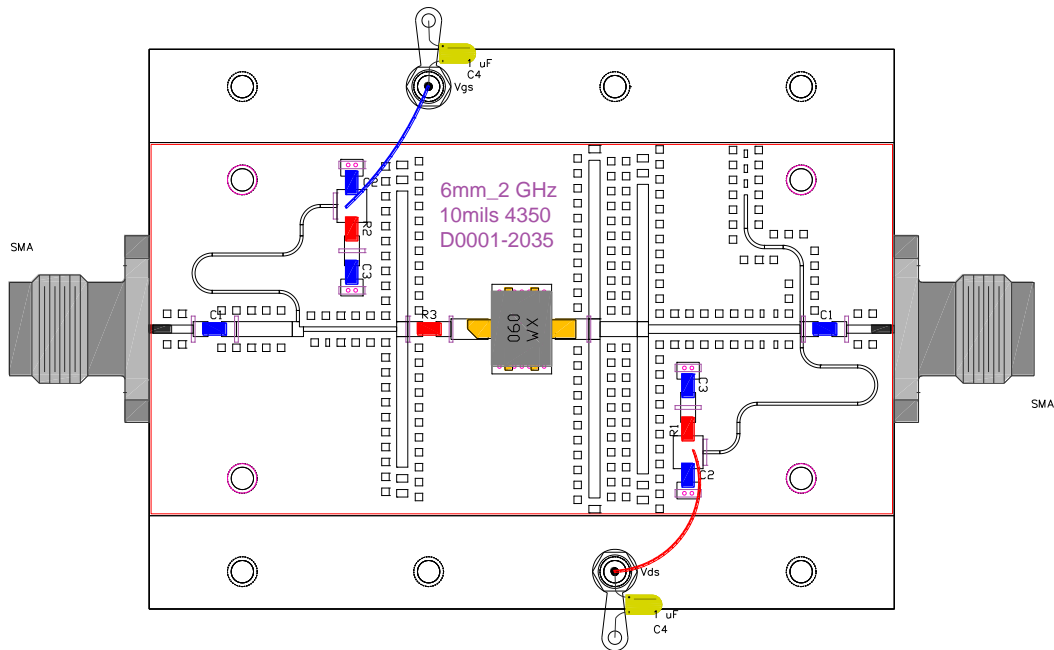
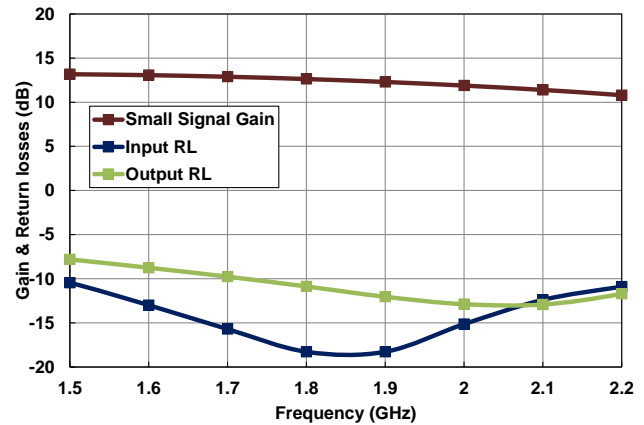
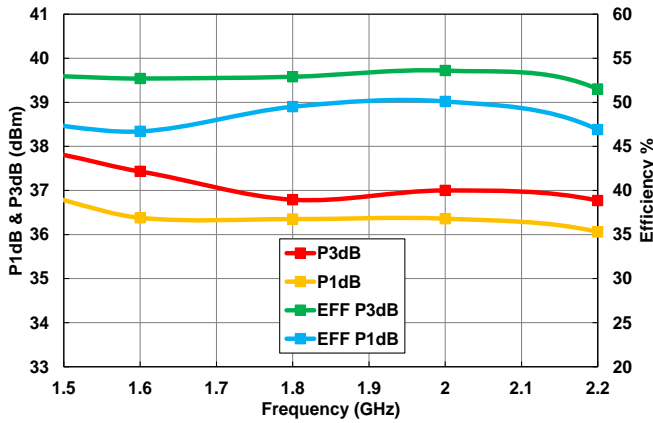


* All Dimensions are in inch

TEST CIRCUITS

A) 1.5 GHz to 2.2 GHz

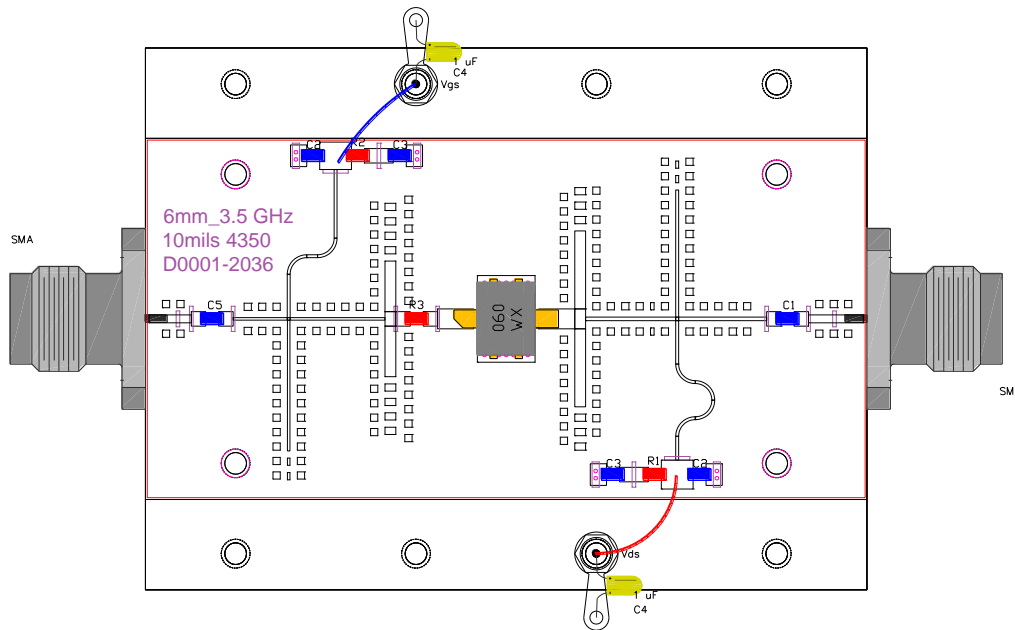
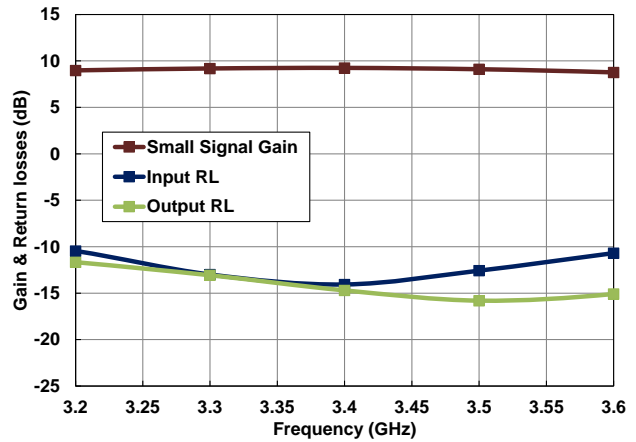
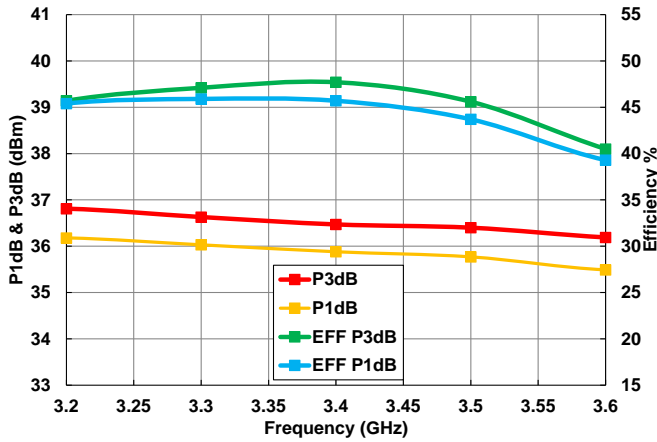
8V/900mA



- Notes:
 1- 10mils Rogers 4350 Material(LoPro)
 2- Ckt is for 6mm mask58 @ 2GHz
 3- C1=10pF, C2=20pF, C3=1000pF, C4=1uF
 R1=5.1ohms, R2=5.1ohms, R3=10ohms
 4- All Caps & Resistors are 0603 size

B) 3.2 GHz to 3.6 GHz

8V/900mA



- Notes:
- 1- 10mils Rogers 4350 Material(LoPro)
 - 2- Ckt is for 6mm mask58 @ 3.5GHz
 - 3- C1=10pF, C2=20pF, C3=1000pF, C4=1uF, C5=1.8pF
 R1=5.1ohms, R2=51ohms, R3=10ohms
 - 4- All Caps & Resistors are 0603 size