

DESCRIPTION

AMCOM's AM010WH2-BI-R is a part of the BI series of GaAs HiFETs. The HiFET is a partially matched patented device configuration for high voltage, high power and broadband applications. This part has a total device periphery of 2mm (Two 1mm FETs in series). The AM010WH2-BI-R is designed for medium power microwave applications, operating up to 12 GHz. It is also an ideal driver for larger power devices. 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 12 GHz
- High Gain & High Power, $P_{1dB}=30$ dBm @3.5GHz
- Surface Mountable
- Bottom ground for Effective Heat Removal

APPLICATIONS

- Wireless Local Loop Network
- Cellular Radio Communications
- WLAN, Repeaters & HYPERLAN
- C-Band VSAT
- Radar

RF PERFORMANCE @ 3.5 GHz, ($V_{dd} = 14V$, $I_{dq} = 0.15A$)

Parameters	MIN	TYP
P_{1dB} * (dBm)	29	30
Eff @ P_{1dB}	-	43%
P_{3dB} * (dBm)	30	31
Eff @ P_{3dB}	-	46%
Small Signal Gain (dB)	16	18
IP3 (dBm)	-	40

ABSOLUTE MAXIMUM RATING

Parameters	Symbol	Rating
Drain-Source Voltage (V)	V_{dd}	18
Gate-Source Voltage (V)	V_{gs}	-5
Drain Current (A)	I_{ds}	0.4
Continuous Dissipation At Room Temp. (W)	P_t	2.8
Operating Temp. (°C)	T_A	-55 to +85
Max. Channel Temp. (°C)	T_{ch}	+175

DC PARAMETERS

Parameters	Conditions	MIN	TYP	MAX
Saturation Current I_{dss} (A)	$V_{dd}=6V$, $V_{gs}=0V$	0.2	0.3	0.4
Pinch-off Voltage V_p (V)	$V_{dd}=6V$, $I_{ds}=2.5\% I_{dss}$	-2.2	-1.7	-1.2
Drain to Gate Breakdown Voltage BV_{gd} (V)	$I_{dg} = 1mA$	22	30	
Thermal Resistance (°C/W)			52	

*Note: There is an internal DC resistor from output to ground, therefore leakage gate current should be measured only at input lead.

Small Signal Measurements

S- Parameters for AM010WH2-BI-R @ 14V / 0.1A (S2P file downloadable from the Web)*

Freq(GHz)	MAG(S11)	ANG(S11)	MAG(S21)	ANG(S21)	MAG(S12)	ANG(S12)	MAG(S22)	ANG(S22)
0.1	0.999	-12.25	19.927	171.13	0.004	108.79	0.723	-5.04
0.2	0.985	-23.4	19.199	162.72	0.005	88.8	0.713	-9.32
0.3	0.970	-34.17	18.482	154.63	0.007	71.9	0.704	-13.37
0.4	0.956	-44.57	17.775	146.85	0.009	58.08	0.696	-17.18
0.5	0.941	-54.59	17.079	139.38	0.010	47.36	0.689	-20.75
0.6	0.926	-64.23	16.393	132.23	0.011	39.72	0.682	-24.09
0.7	0.913	-73.08	15.653	125.45	0.012	33.88	0.673	-27.40
0.8	0.900	-81.76	14.905	118.89	0.013	27.64	0.665	-30.76
0.9	0.887	-89.66	14.137	112.7	0.013	22.52	0.657	-34.04
1	0.874	-97.27	13.389	106.73	0.013	18.02	0.654	-37.22
1.5	0.829	-127.89	10.294	81.46	0.013	1.44	0.672	-52.31
2	0.803	-145.7	8.209	61.87	0.012	-5.48	0.695	-67.98
2.5	0.783	-162.06	6.798	44.65	0.010	-9.69	0.715	-80.12
3	0.760	-177.28	5.899	29.6	0.009	-6.99	0.734	-89.76
3.5	0.736	168.43	5.244	14.91	0.008	2.47	0.752	-98.53
4	0.715	153.5	4.783	0.48	0.009	19.63	0.768	-106.98
4.5	0.689	138.25	4.444	-13.89	0.011	30.38	0.786	-114.98
5	0.661	122.1	4.173	-28.94	0.016	32.42	0.808	-123.88
5.5	0.629	103.86	3.952	-44.52	0.021	28.33	0.826	-132.63
6	0.595	83.48	3.757	-60.49	0.027	21.96	0.852	-140.91
6.5	0.566	59.26	3.579	-77.33	0.035	12.33	0.878	-148.95
7	0.556	32.10	3.403	-94.34	0.043	1.26	0.901	-156.73
7.5	0.569	4.79	3.221	-111.49	0.052	-10.61	0.923	-164.51
8	0.611	-20.51	3.058	-128.39	0.061	-22.61	0.942	-172.71
8.5	0.670	-41.60	2.945	-144.78	0.072	-35.07	0.960	177.85
9	0.731	-59.37	2.884	-161.55	0.084	-49.25	0.979	165.86
9.5	0.798	-74.22	2.874	-179.02	0.098	-63.53	0.992	150.58
10	0.862	-87.99	2.887	161.92	0.112	-79.38	1.009	131.1
10.5	0.934	-100.56	2.937	140.33	0.129	-97	1.028	105.9
11	1.009	-112.92	2.971	115.33	0.146	-118.8	1.049	72.61
11.5	1.073	-126.43	2.867	84.76	0.152	-146.65	1.064	28.58
12	1.078	-140.27	2.421	50.60	0.136	-176.51	1.063	-23.06

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

Note: The device is conditional stable at high frequencies, please pay attention to amplifier design.

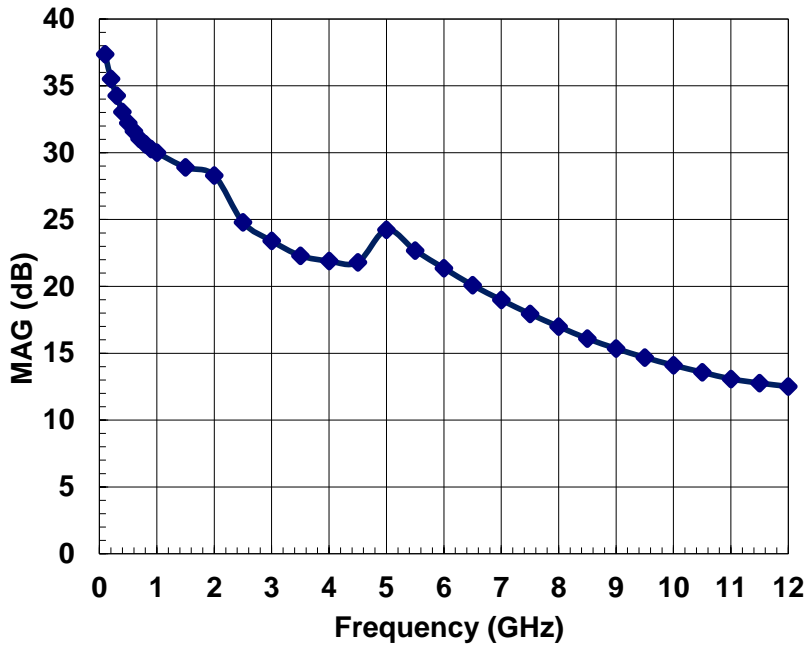
S- Parameters for AM010WH2-BI-R @ 14V / 0.15A (S2P file downloadable from the Web)*

Freq(GHz)	MAG(S11)	ANG(S11)	MAG(S21)	ANG(S21)	MAG(S12)	ANG(S12)	MAG(S22)	ANG(S22)
0.1	0.999	-12.24	19.832	171.16	0.002	96.95	0.727	-4.89
0.2	0.983	-23.35	19.119	162.78	0.004	79.46	0.719	-9.17
0.3	0.968	-34.08	18.416	154.71	0.007	65.02	0.712	-13.18
0.4	0.954	-44.41	17.721	146.95	0.009	53.6	0.705	-16.93
0.5	0.941	-54.35	17.035	139.51	0.01	45.23	0.698	-20.41
0.6	0.93	-63.9	16.358	132.38	0.011	39.89	0.691	-23.64
0.7	0.913	-72.72	15.624	125.56	0.012	33.44	0.683	-27.12
0.8	0.901	-81.36	14.875	119	0.012	27.79	0.674	-30.45
0.9	0.887	-89.21	14.11	112.84	0.013	22.87	0.668	-33.7
1	0.875	-96.83	13.373	106.83	0.013	18.28	0.665	-36.9
1.5	0.83	-127.39	10.291	81.49	0.013	1.99	0.683	-51.96
2	0.803	-145.28	8.225	61.86	0.011	-6.28	0.704	-67.68
2.5	0.783	-161.79	6.809	44.6	0.01	-9.1	0.722	-79.67
3	0.761	-176.91	5.907	29.44	0.009	-6.64	0.742	-89.35
3.5	0.737	168.75	5.251	14.73	0.008	5.53	0.76	-98.1
4	0.716	153.84	4.793	0.19	0.009	21.72	0.779	-106.55
4.5	0.69	138.62	4.449	-14.12	0.011	34.18	0.794	-114.61
5	0.663	122.4	4.177	-29.18	0.016	36.16	0.817	-123.55
5.5	0.63	104.25	3.954	-44.8	0.021	31.48	0.836	-132.28
6	0.596	83.95	3.759	-60.82	0.027	24.47	0.863	-140.55
6.5	0.567	59.74	3.579	-77.57	0.035	14.39	0.889	-148.64
7	0.554	32.67	3.402	-94.59	0.043	2.62	0.915	-156.39
7.5	0.571	5	3.221	-111.78	0.052	-8.67	0.938	-164.17
8	0.611	-20.29	3.06	-128.63	0.062	-20.73	0.961	-172.28
8.5	0.667	-41.41	2.947	-144.95	0.073	-33.19	0.982	178.31
9	0.728	-59.16	2.89	-161.52	0.085	-47.44	1.009	166.38
9.5	0.798	-73.94	2.892	-178.92	0.099	-61.52	1.033	151.24
10	0.863	-87.8	2.922	162.1	0.115	-77.27	1.065	131.9
10.5	0.933	-100.09	3.01	140.67	0.134	-94.86	1.11	106.84
11	1.014	-112.45	3.091	115.29	0.155	-117	1.167	73.79
11.5	1.085	-126.21	3.037	83.51	0.163	-146.31	1.218	29.25
12	1.089	-140.69	2.55	47.43	0.145	-178.09	1.206	-22.94

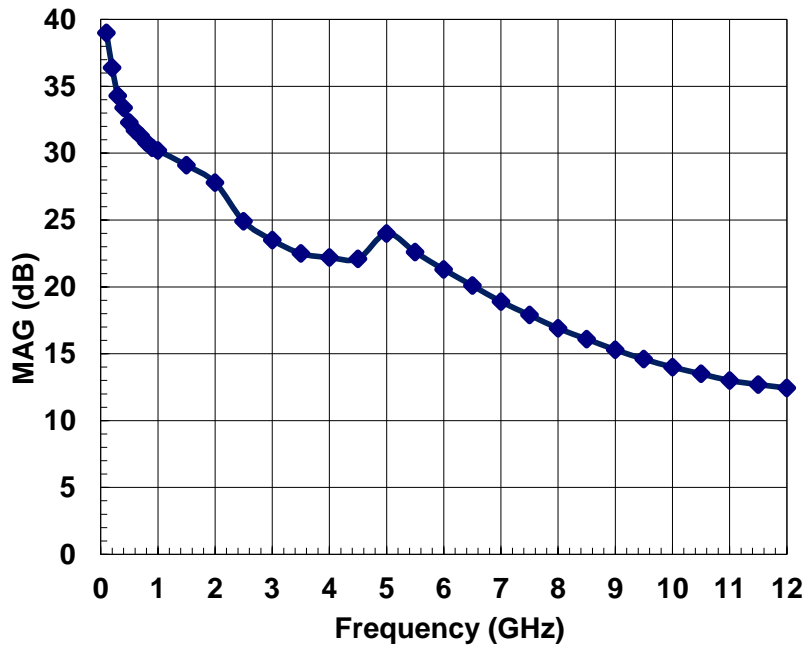
* S2P file downloadable from the web : <http://www.amcomusa.com/products/rftrans.html>

Note: The device is conditional stable at high frequencies, please pay attention to amplifier design.

MAXIMUM AVAILABLE GAIN (14V,0.1A)



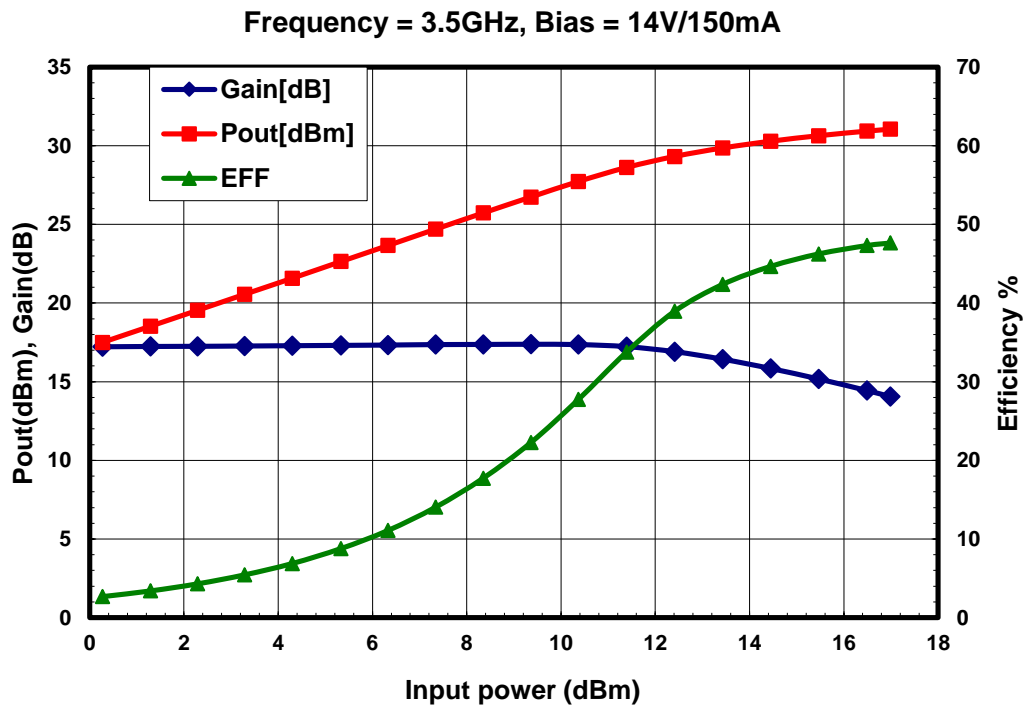
MAXIMUM AVAILABLE GAIN (14V,0.15A)



POWER MEASUREMENTS

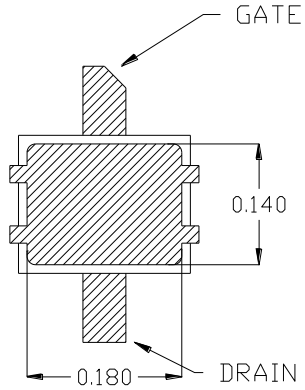
OPTIMUM LOAD TEST (14V/150mA)

Frequency	MAG(Γ_L)	ANG(Γ_L)	Gain (dB)	P _{1dB} (dBm)	Eff @ P _{1dB}	P _{3dB} (dBm)	Eff @ P _{3dB}
2 GHz	0.35	75	23	30.2	45%	31	55%
3.5 GHz	0.4	98	19	30	43%	31	46%
4 GHz	0.45	103	18	30.1	42%	31.4	49%
6 GHz	0.47	153	16	30.4	44%	31.4	49%
8 GHz	0.39	-179	12	29.9	40%	30.6	43%
10 GHz	0.15	-155	10	29.2	35%	29.6	35%

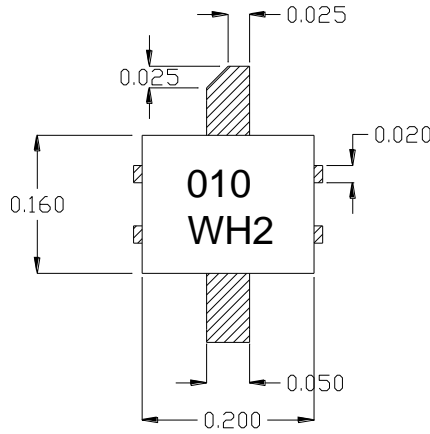


PACKAGE OUTLINE:

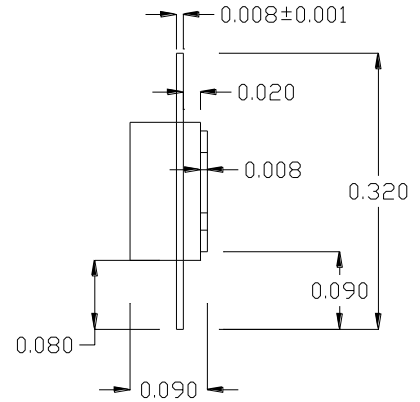
Bottom View



Top View



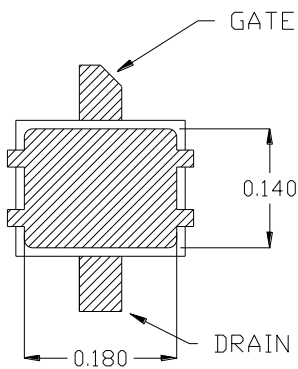
Side View



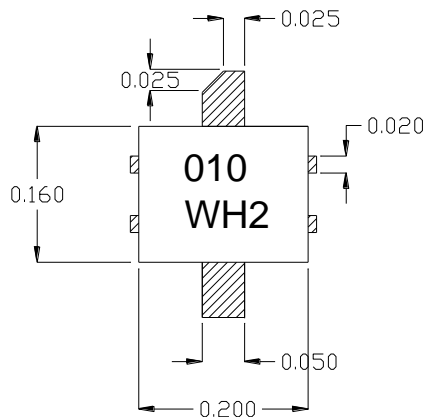
* All Dimensions are in inch

AM010WH2-BI-R (Straight leads)

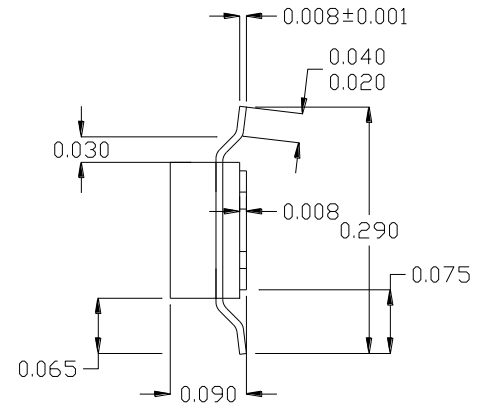
Bottom View



Top View



Side View



* All Dimensions are in inch

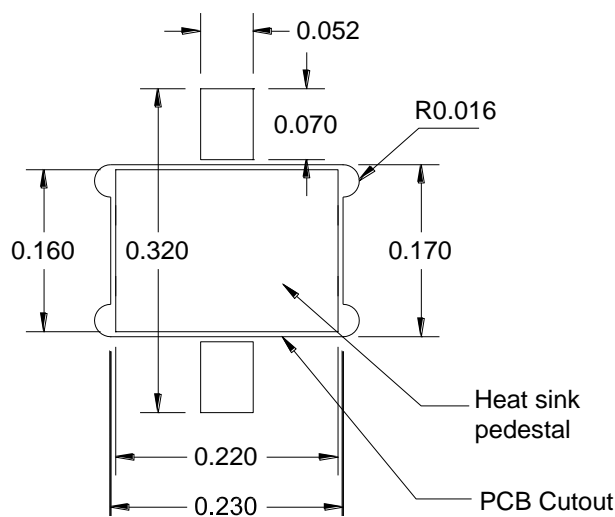
AM010WH2-BI-G-R (Bent leads)

AMCOM Communications, Inc.

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

