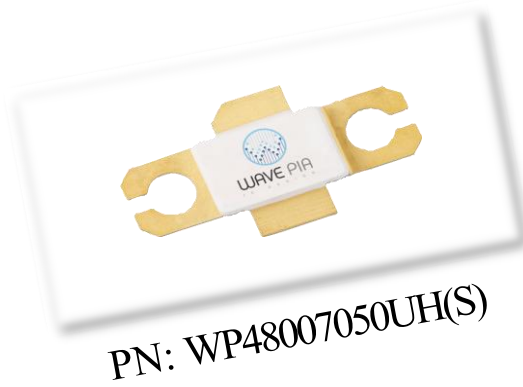




WP48007050UH(S)

50W, 48V GaN HEMT Unmatched TR



The WP48007050UH(S) is a 50W gallium nitride (GaN) High Electron Mobility Transistor (HEMT). This GaN HEMT is a wideband transistor optimized for 4.4-5.0GHz operation in a user-friendly device for high bandwidth applications. Gallium nitride (GaN) HEMT is a device optimized for 5G. GaN HEMT resistance is only 1/10 that of silicon transistors, making it capable of switching frequencies faster for greater energy efficiency.

Features

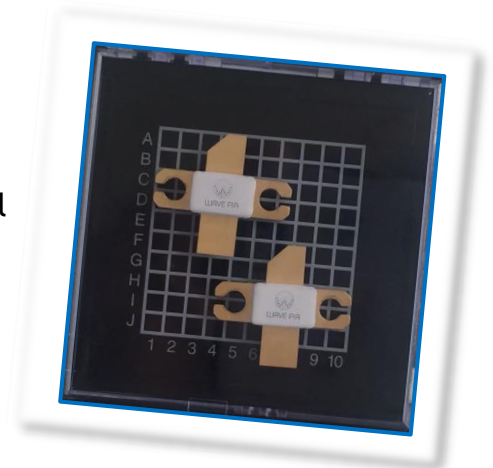
- Up to 8 GHz Operation
- 14.0 dB Typical Small Signal Gain @ 4.7 GHz
- 50 W Typical Psat @5.8GHz
- 48V Operation
- High Breakdown Voltage
- High Efficiency
- Reliability Monitoring Supporting

Applications

- U/VHF Amplifiers
- 4.4-5.0GHz applications
- Base Station Communications
- Drone, UAV
- WiMAX, LTE, WCDMA, GSM
- WPT, V2X
- Radar application

Packaging Information

- Unmatched TRs are shipped in packaged-level with each-bag or Gel-Pak® containers.
- Possible Reel-type container for SMT



Absolute Maximum Ratings (not simultaneous) at 25 °C

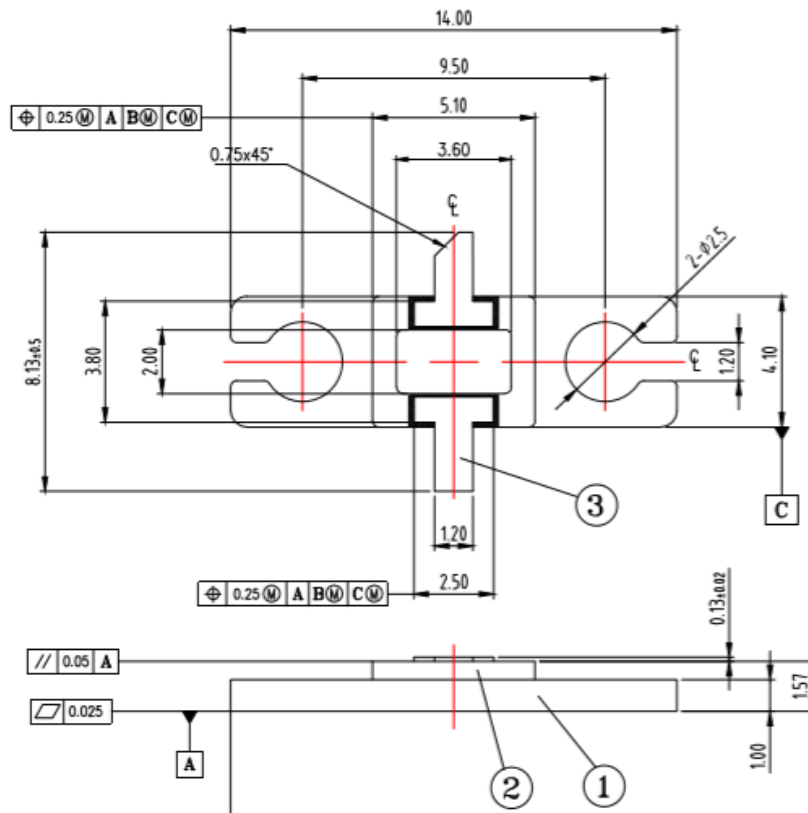
Parameter	Parameter	Typical Value	Units	Conditions
Threshold voltage @ Id=1mA/mm, Vd=10V	V _{to}	-3.4	V	25°C
Breakdown voltage @ Id=1mA/mm	V _{DG}	160	V	25°C
Drain-source current, Id @ Vd=10V, Vg=0	I _{dss}	800	mA/mm	25°C
Operating Junction Temperature	T _J	225	°C	
Storage Temperature	T _{STG}	-65, +150	°C	
Thermal Resistance, Junction to Case (packaged)	R _{θJC}		°C/W	
Thermal Resistance, Junction to Case (die only)	R _{θJC}		°C/W	
Mounting Temperature (30 seconds)	T _S	320	°C	30 seconds

Electrical Characteristics (Frequency = 4.7 GHz unless otherwise stated; TC = 25 °C)

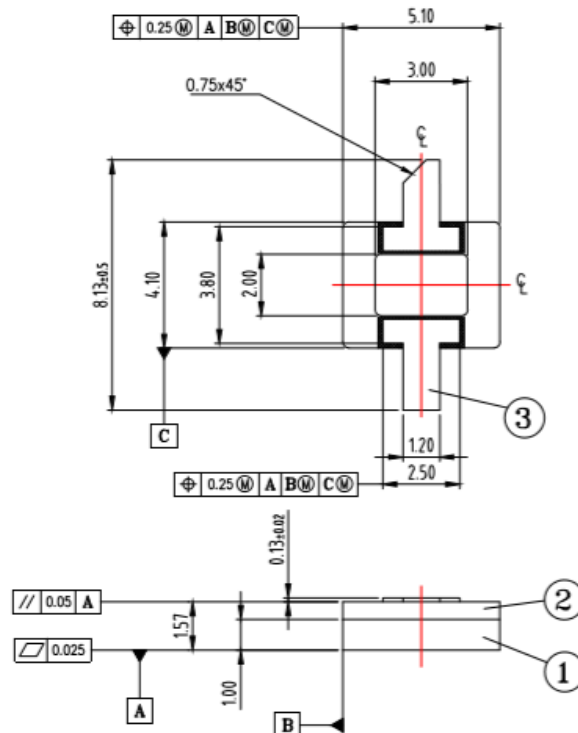
Parameter	Parameter	Typical Value	Units	Conditions
DC Characteristics				
Ohmic contact resistance	RC	0.3	Ohm-mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I _{dmax}	1000	mA/mm	25°C
Max. trans-conductance, @ Vd=10V, Vg=-4V ~ -1V (1X125µm device)	GM_PEAK	290	mS/mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I _{dmax}	1000	mA/mm	25°C
RF Characteristics				
Small Signal Gain	G _{SS}	14	dB	V _{DD} =48V, I _{DQ} =350mA
Saturated Power Output	P _{SAT}	50	W	V _{DD} =48V, I _{DQ} =350mA
Drain Efficiency	η	>60	%	V _{DD} =48V, I _{DQ} =350mA
Intermodulation Distortion	IM3	-30	dBc	V _{DD} =48V, I _{DQ} =350mA
Output Mismatch Stress	VSWR	10:1	ψ	



TR Dimensions (units in inch)



<WP48007050UH>



<WP48007050US>

Assembly Notes:

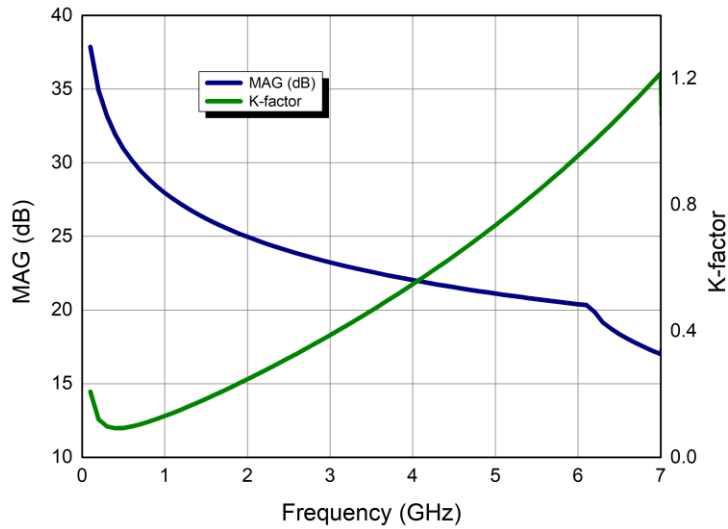
- Recommended solder is AuSn (80/20) solder. Refer to Wavepia's guide for the Eutectic Bond Procedure



Typical Performance

Simulated Maximum Available Gain (MAG) and K Factor of the WP48007050UH(S)

$$V_{DD} = 48 \text{ V}, I_{DQ} = 350 \text{ mA}$$



Intrinsic TR parameters - reference planes at centers of gate and drain pads. Wire bonds assumed.

Typical Performance

Simulated Minimum Noise Figure of the WP48007050UH(S)

$$V_{DD} = 48 \text{ V}, I_{DQ} = 350 \text{ mA}$$

Under construction



Typical TR S-Parameters

(Small Signal, $V_{DS} = 48\text{ V}$, $I_{DQ} = 350\text{ mA}$, magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
100MHz	0.85071	-104.902	59.70565	126.3813	0.009748	25.19996	0.348494	-113.907
200MHz	0.886765	-138.263	35.80607	105.518	0.011523	9.998689	0.403211	-138.489
300MHz	0.89787	-151.928	24.77986	94.79765	0.011928	1.251595	0.428249	-146.38
400MHz	0.90321	-159.273	18.73204	87.48546	0.01201	-5.02846	0.449304	-149.493
500MHz	0.906854	-163.911	14.94624	81.69771	0.011972	-10.1624	0.470765	-150.886
600MHz	0.909933	-167.166	12.35704	76.74373	0.011873	-14.6521	0.493248	-151.636
700MHz	0.912823	-169.629	10.47398	72.31772	0.011737	-18.7223	0.516498	-152.188
800MHz	0.915651	-171.602	9.042251	68.26541	0.011576	-22.4866	0.540069	-152.73
900MHz	0.918452	-173.255	7.91693	64.50084	0.011399	-26.0083	0.563527	-153.34
1000MHz	0.921223	-174.69	7.009633	60.97189	0.011211	-29.326	0.586509	-154.043
1100MHz	0.923946	-175.973	6.263384	57.64441	0.011015	-32.4652	0.608739	-154.837
1200MHz	0.926601	-177.147	5.639753	54.49434	0.010816	-35.4442	0.630021	-155.713
1300MHz	0.929168	-178.241	5.111826	51.50345	0.010617	-38.2773	0.650228	-156.656
1400MHz	0.931629	-179.275	4.660146	48.65712	0.010419	-40.9762	0.669286	-157.651
1500MHz	0.933972	-179.7347	4.270261	45.94297	0.010225	-43.5512	0.687166	-158.685
1600MHz	0.936187	-178.7776	3.931186	43.35016	0.010036	-46.0116	0.703871	-159.747
1700MHz	0.938269	-177.8453	3.634402	40.86892	0.009854	-48.3658	0.719426	-160.827
1800MHz	0.940215	-176.9313	3.373192	38.49031	0.009679	-50.6221	0.733872	-161.918
1900MHz	0.942023	-176.0305	3.142174	36.20604	0.009512	-52.7878	0.74726	-163.013
2000MHz	0.943696	-175.1387	2.936988	34.00835	0.009353	-54.8702	0.759648	-164.109
2100MHz	0.945236	-174.2524	2.754056	31.88999	0.009204	-56.8759	0.771097	-165.203
2200MHz	0.946646	-173.3687	2.590417	29.84415	0.009064	-58.8115	0.781667	-166.291
2300MHz	0.947931	-172.4848	2.443601	27.86441	0.008933	-60.6831	0.791418	-167.373
2400MHz	0.949095	-171.5985	2.311527	25.9447	0.008812	-62.4963	0.800409	-168.448
2500MHz	0.950142	-170.7075	2.192435	24.07932	0.0087	-64.2567	0.808694	-169.515
2600MHz	0.951078	-169.8098	2.084827	22.26285	0.008597	-65.9696	0.816325	-170.574
2700MHz	0.951907	-168.9035	1.987419	20.49017	0.008505	-67.6398	0.823351	-171.627
2800MHz	0.952634	-167.9866	1.899111	18.75641	0.008421	-69.2721	0.829815	-172.674
2900MHz	0.953261	-167.0571	1.818949	17.05693	0.008347	-70.871	0.835761	-173.715
3000MHz	0.953793	-166.1133	1.746109	15.3873	0.008282	-72.4408	0.841224	-174.752
3100MHz	0.954232	-165.1532	1.679875	13.74326	0.008226	-73.9857	0.846239	-175.787
3200MHz	0.954583	-164.1748	1.619623	12.12073	0.00818	-75.5097	0.850839	-176.82
3300MHz	0.954846	-163.1761	1.564808	10.51573	0.008142	-77.0166	0.85505	-177.853
3400MHz	0.955024	-162.1549	1.514952	8.924429	0.008114	-78.5103	0.8589	-178.888
3500MHz	0.955119	-161.1093	1.469638	7.343052	0.008095	-79.9945	0.86241	-179.926
3600MHz	0.955131	-160.0367	1.428498	5.767902	0.008085	-81.4727	0.865603	-179.0307
3700MHz	0.955061	-158.9348	1.391211	4.195324	0.008084	-82.9487	0.868496	-177.9805
3800MHz	0.95491	-157.8011	1.357493	2.621679	0.008093	-84.4259	0.871106	-176.9215
3900MHz	0.954676	-156.6328	1.327098	1.04333	0.008111	-85.9081	0.873448	-175.8516



Typical TR S-Parameters

(Small Signal, $V_{DS} = 48\text{ V}$, $I_{DQ} = 350\text{ mA}$, magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
4000MHz	0.95436	155.4271	1.299806	-0.54339	0.008138	-87.3987	0.875535	174.7688
4100MHz	0.953959	154.1808	1.275429	-2.14219	0.008176	-88.9016	0.877377	173.6708
4200MHz	0.953473	152.8906	1.253799	-3.75685	0.008224	-90.4204	0.878984	172.5554
4300MHz	0.952899	151.553	1.234775	-5.39126	0.008281	-91.959	0.880365	171.4202
4400MHz	0.952235	150.1642	1.21823	-7.04941	0.00835	-93.5214	0.881526	170.2624
4500MHz	0.951476	148.72	1.20406	-8.73545	0.00843	-95.1117	0.882473	169.0795
4600MHz	0.950621	147.216	1.192175	-10.4537	0.008521	-96.7341	0.883209	167.8686
4700MHz	0.949663	145.6472	1.182499	-12.2087	0.008624	-98.3933	0.883737	166.6265
4800MHz	0.948599	144.0086	1.17497	-14.0052	0.008739	-100.094	0.884058	165.3499
4900MHz	0.947423	142.2943	1.169541	-15.8482	0.008868	-101.841	0.884174	164.0353
5000MHz	0.946129	140.4982	1.166173	-17.7431	0.00901	-103.64	0.884082	162.6788
5100MHz	0.944711	138.6136	1.164839	-19.6955	0.009166	-105.496	0.88378	161.2764
5200MHz	0.943161	136.6331	1.165522	-21.7115	0.009337	-107.415	0.883263	159.8235
5300MHz	0.941472	134.5487	1.16821	-23.7975	0.009524	-109.405	0.882528	158.3152
5400MHz	0.939636	132.3519	1.172901	-25.9604	0.009727	-111.471	0.881567	156.7463
5500MHz	0.937645	130.0331	1.179598	-28.2077	0.009948	-113.621	0.880372	155.111
5600MHz	0.93549	127.5822	1.188305	-30.5473	0.010188	-115.864	0.878933	153.4029
5700MHz	0.933161	124.9879	1.199029	-32.9877	0.010446	-118.207	0.877239	151.615
5800MHz	0.930652	122.2383	1.211777	-35.538	0.010724	-120.659	0.875276	149.7397
6000MHz	0.927955	119.3204	1.226549	-38.2081	0.011023	-123.231	0.87303	147.7687
6100MHz	0.925063	116.2203	1.243336	-41.0083	0.011343	-125.933	0.870483	145.6926
6200MHz	0.921972	112.9233	1.262115	-43.9498	0.011686	-128.776	0.867617	143.5011
6300MHz	0.91868	109.4135	1.282844	-47.0443	0.012051	-131.772	0.86441	141.1831
6400MHz	0.915192	105.6749	1.305448	-50.3042	0.012438	-134.933	0.860841	138.726
6500MHz	0.911514	101.6904	1.329818	-53.7421	0.012847	-138.271	0.856886	136.1161
6600MHz	0.907663	97.44316	1.355791	-57.3715	0.013277	-141.801	0.85252	133.3382
6700MHz	0.903663	92.91661	1.383145	-61.2056	0.013727	-145.535	0.847719	130.3756
6800MHz	0.899551	88.09514	1.41158	-65.2578	0.014193	-149.486	0.842457	127.2099
6900MHz	0.895376	82.96499	1.440705	-69.5408	0.014673	-153.668	0.836715	123.8212
7000MHz	0.891204	77.51537	1.470024	-74.0666	0.015161	-158.093	0.830477	120.1876

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