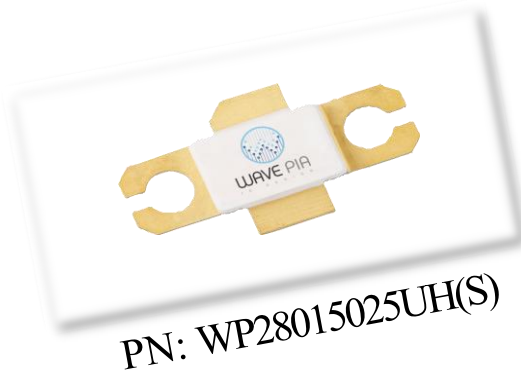




# WP28015025UH(S)

## 25W, 28V GaN HEMT unmatched TR



The WP28015025UH(S) is a 25W gallium nitride (GaN) High Electron Mobility Transistor (HEMT). This GaN HEMT is a wideband transistor optimized for C-band 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

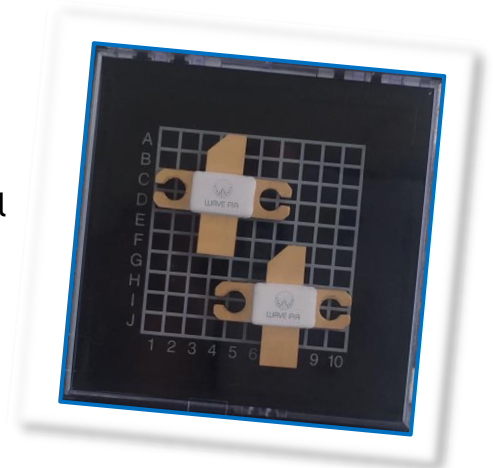
- Up to 10 GHz Operation
- 12.7 dB Typical Small Signal Gain @ 6.0 GHz
- 25 W Typical Psat @6.0GHz
- 28V Operation
- High Breakdown Voltage
- High Breakdown Voltage
- High Efficiency
- Reliability Monitoring Supporting

### Applications

- U/VHF Amplifiers
- C-band Amplifiers
- Broadband Amplifiers
- 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

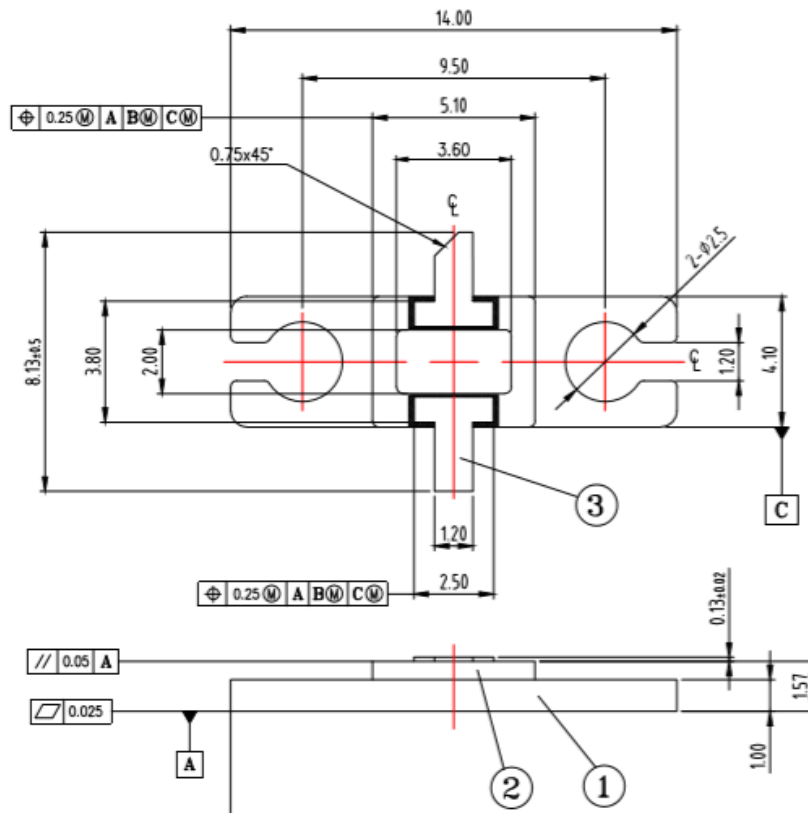
Parameter	Parameter	Typical Value	Units	Conditions
Threshold voltage @ Id=1mA/mm, Vd=10V	V <sub>to</sub>	-3.2	V	25°C
Breakdown voltage @ Id=1mA/mm	V <sub>DG</sub>	>100	V	25°C
Drain-source current, Id @ Vd=10V, Vg=0	I <sub>dss</sub>	880	mA/mm	25°C
Operating Junction Temperature	T <sub>J</sub>	225	°C	
Storage Temperature	T <sub>STG</sub>	-65, +150	°C	
Thermal Resistance, Junction to Case (packaged)	R <sub>θJC</sub>		°C/W	
Thermal Resistance, Junction to Case (die only)	R <sub>θJC</sub>		°C/W	
Mounting Temperature (30 seconds)	T <sub>S</sub>	320	°C	30 seconds

## Electrical Characteristics (Frequency = 6.0 GHz unless otherwise stated; TC = 25 °C)

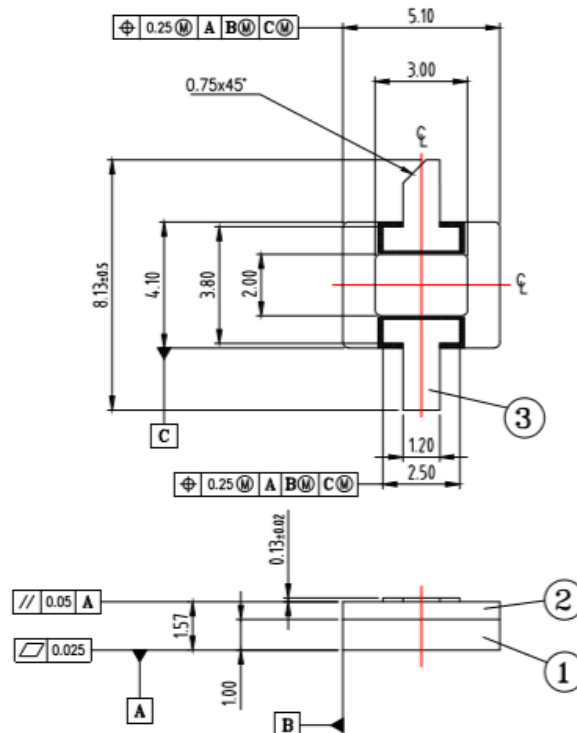
Parameter	Parameter	Typical Value	Units	Conditions
<b>DC Characteristics</b>				
Ohmic contact resistance	RC	0.4	Ohm-mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I <sub>dmax</sub>	1050	mA/mm	25°C
Max. trans-conductance, @ Vd=10V, Vg=-4V ~ -1V (1X125µm device)	GM_PEAK	340	mS/mm	25°C
Maximum Drain-source current, Id @ Vd=10V, Vg=1V (1X125µm device)	I <sub>dmax</sub>	1000	mA/mm	25°C
<b>RF Characteristics</b>				
Small Signal Gain	G <sub>SS</sub>	>10	dB	V <sub>DD</sub> =28V, I <sub>DQ</sub> =300mA
Saturated Power Output	P <sub>SAT</sub>	25	W	V <sub>DD</sub> =28V, I <sub>DQ</sub> =300mA
Drain Efficiency	η	>40	%	V <sub>DD</sub> =28V, I <sub>DQ</sub> =300mA
Intermodulation Distortion	IM3	<-30	dBc	V <sub>DD</sub> =28V, I <sub>DQ</sub> =300mA
Output Mismatch Stress	VSWR	10:1	ψ	



TR Dimensions (units in inch)



<WP28015025UH>



<WP28015025US>

Assembly Notes:

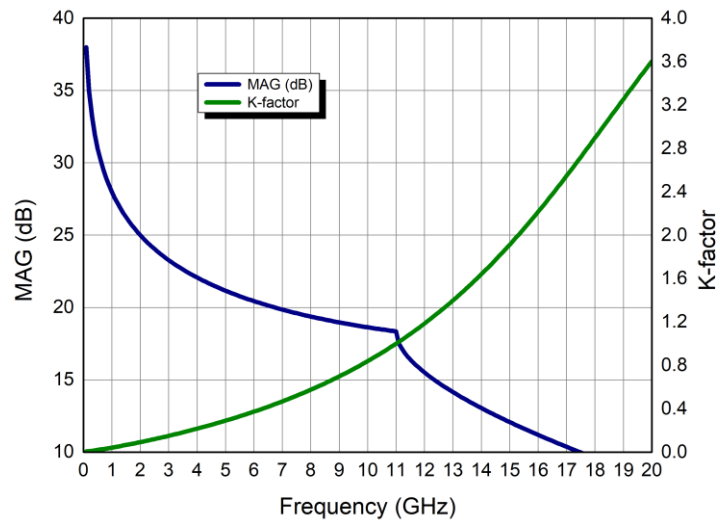
- Recommended solder is AuSn (80/20) solder. Refer to Wavepia's guide for the Eutectic Bond Procedure



## Typical Performance

Simulated Maximum Available Gain (MAG) and K Factor of the WP28015025UH(S)

$$V_{DD} = 28 \text{ V}, I_{DQ} = 300 \text{ mA}$$



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

## Typical Performance

Simulated Minimum Noise Figure of the WP28015025UH(S)

$$V_{DD} = 28 \text{ V}, I_{DQ} = 300 \text{ mA}$$

**Under construction**



## Typical TR S-Parameters

(Small Signal,  $V_{DS} = 28\text{ V}$ ,  $I_{DQ} = 300\text{ mA}$ , magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
1000MHz	0.965193	-69.2971	66.47229	142.1961	0.010565	52.2218	0.400609	-91.9289
1100MHz	0.932299	-108.972	46.80217	120.544	0.014877	30.85895	0.494573	-126.727
1200MHz	0.91706	-130.184	34.51173	108.4064	0.016454	18.95204	0.531668	-142.662
1300MHz	0.909853	-142.846	26.9743	100.5161	0.017146	11.27784	0.548465	-151.516
1400MHz	0.906043	-151.255	22.03726	94.70226	0.017507	5.674391	0.557552	-157.105
1500MHz	0.903828	-157.317	18.59634	90.02636	0.017725	1.205987	0.563293	-160.956
1600MHz	0.902447	-161.966	16.07683	86.03368	0.017874	-2.58076	0.567428	-163.787
1700MHz	0.90154	-165.708	14.15959	82.481	0.017988	-5.92842	0.570736	-165.974
1800MHz	0.900922	-168.838	12.65572	79.22744	0.018082	-8.97752	0.5736	-167.735
1900MHz	0.90049	-171.538	11.44712	76.18604	0.018168	-11.8148	0.576221	-169.203
2000MHz	0.900181	-173.928	10.45649	73.30025	0.018249	-14.4966	0.578706	-170.466
2100MHz	0.899954	-176.088	9.631246	70.53166	0.018331	-17.0614	0.58111	-171.581
2200MHz	0.899783	-178.077	8.934436	67.8532	0.018414	-19.5359	0.583463	-172.591
2300MHz	0.899647	-179.937	8.339381	65.24511	0.018503	-21.9401	0.585777	-173.524
2400MHz	0.899532	178.3019	7.826351	62.69251	0.018597	-24.2886	0.588051	-174.405
2500MHz	0.899426	176.6139	7.380459	60.18386	0.018698	-26.593	0.59028	-175.25
2600MHz	0.899318	174.9801	6.990269	57.70997	0.018807	-28.8625	0.592453	-176.071
2700MHz	0.8992	173.3848	6.646856	55.26325	0.018925	-31.1045	0.594558	-176.88
2800MHz	0.899064	171.8151	6.343164	52.83729	0.019053	-33.3256	0.596578	-177.685
2900MHz	0.898904	170.2599	6.073543	50.42652	0.019192	-35.5311	0.598498	-178.493
3000MHz	0.898714	168.7095	5.83342	48.02592	0.019343	-37.7262	0.600301	-179.31
3100MHz	0.898486	167.1555	5.61906	45.6309	0.019507	-39.9154	0.601969	179.8598
3200MHz	0.898216	165.59	5.427386	43.23712	0.019684	-42.1029	0.603485	179.0113
3300MHz	0.897897	164.0059	5.255845	40.84039	0.019877	-44.293	0.60483	178.1409
3400MHz	0.897525	162.3961	5.102304	38.43659	0.020085	-46.4898	0.605987	177.2451
3500MHz	0.897093	160.754	4.964972	36.02161	0.020311	-48.6974	0.606937	176.3204
3600MHz	0.896597	159.073	4.842335	33.59126	0.020555	-50.9198	0.607663	175.3636
3700MHz	0.896032	157.3464	4.733114	31.14125	0.020818	-53.1614	0.608147	174.3716
3800MHz	0.895393	155.5675	4.636219	28.66714	0.021102	-55.4267	0.608369	173.3411
3900MHz	0.894675	153.7291	4.550721	26.16425	0.021408	-57.7202	0.60831	172.2686
4000MHz	0.893873	151.8241	4.475827	23.62769	0.021738	-60.0469	0.607951	171.1505
4100MHz	0.892984	149.8447	4.410856	21.05225	0.022092	-62.4118	0.607271	169.9831
4200MHz	0.892002	147.7827	4.355225	18.43243	0.022474	-64.8206	0.606249	168.7621
4300MHz	0.890924	145.6292	4.308431	15.76233	0.022883	-67.2791	0.604862	167.483
4400MHz	0.889747	143.3749	4.27004	13.03565	0.023322	-69.7935	0.603086	166.1406
4500MHz	0.888468	141.0094	4.239673	10.24564	0.023792	-72.3706	0.600896	164.7293
4600MHz	0.887086	138.5219	4.216992	7.385031	0.024295	-75.0176	0.598263	163.2426
4700MHz	0.8856	135.9003	4.201696	4.446039	0.024834	-77.7424	0.595157	161.6735
4800MHz	0.884011	133.1317	4.193501	1.420284	0.025408	-80.5532	0.591545	160.0139



## Typical TR S-Parameters

(Small Signal,  $V_{DS} = 28\text{ V}$ ,  $I_{DQ} = 300\text{ mA}$ , magnitude / angle)

Frequency	Mag S11	Ang S11	Mag S21	Ang S21	Mag S12	Ang S12	Mag S22	Ang S22
4900MHz	0.865069	93.7127	4.422446	-35.9047	0.033224	-115.685	0.517636	135.6023
5000MHz	0.863559	88.17789	4.462104	-40.6098	0.034155	-120.166	0.50521	131.9334
5100MHz	0.862359	82.28245	4.499929	-45.5405	0.03508	-124.872	0.491641	127.9154
5200MHz	0.86156	76.01842	4.533836	-50.7054	0.035982	-129.81	0.476916	123.5007
5300MHz	0.861261	69.38536	4.561432	-56.1102	0.036839	-134.988	0.461062	118.6343
5400MHz	0.861556	62.39238	4.58006	-61.7564	0.037627	-140.406	0.444174	113.2533
5500MHz	0.862527	55.06019	4.58689	-67.6406	0.038318	-146.061	0.426441	107.2868
5600MHz	0.864239	47.42257	4.579058	-73.7536	0.038883	-151.943	0.40818	100.657
5700MHz	0.866722	39.527	4.553858	-80.079	0.039293	-158.037	0.389868	93.28192
5800MHz	0.869964	31.4341	4.508976	-86.5941	0.03952	-164.32	0.372177	85.08463
5900MHz	0.873908	23.21563	4.442726	-93.2692	0.039541	-170.761	0.355988	76.00906
6000MHz	0.878451	14.95107	4.35426	-100.069	0.03934	-177.326	0.342365	66.04689
6100MHz	0.883456	6.723202	4.243705	-106.954	0.03891	176.0251	0.332475	55.27234
6200MHz	0.88876	-1.38688	4.1122	-113.884	0.038252	169.3334	0.327432	43.87202
6300MHz	0.8942	-9.30443	3.961812	-120.815	0.037377	162.6407	0.328086	32.14638
6400MHz	0.899624	-16.9649	3.795359	-127.709	0.036306	155.9866	0.334828	20.46411
6500MHz	0.904909	-24.3165	3.616159	-134.53	0.035064	149.4073	0.347518	9.180934
6600MHz	0.909965	-31.3212	3.427764	-141.246	0.033683	142.9344	0.365545	-1.43542
6700MHz	0.91474	-37.9549	3.233707	-147.83	0.032193	136.5942	0.388003	-11.2377
6800MHz	0.919215	-44.2055	3.037308	-154.262	0.030627	130.4082	0.41388	-20.1866
6900MHz	0.923394	-50.072	2.841534	-160.524	0.029015	124.3933	0.442192	-28.3162
7000MHz	0.927301	-55.5616	2.648921	-166.604	0.027383	118.562	0.472058	-35.6986
7100MHz	0.930969	-60.688	2.461549	-172.492	0.025756	112.9235	0.502731	-42.419
7200MHz	0.934433	-65.4691	2.281051	-178.183	0.024151	107.4842	0.533596	-48.5609
7300MHz	0.937725	-69.9257	2.108645	-176.3274	0.022587	102.248	0.564159	-54.1994
7400MHz	0.940874	-74.0799	1.94518	171.0415	0.021075	97.21698	0.59403	-59.3992
7500MHz	0.943902	-77.9541	1.791189	165.9595	0.019626	92.39138	0.62291	-64.2143
7600MHz	0.946823	-81.5701	1.646936	161.0802	0.018244	87.77023	0.650576	-68.6896
7700MHz	0.949645	-84.949	1.512468	156.4015	0.016937	83.35129	0.676873	-72.8622
7800MHz	0.952374	-88.1104	1.387654	151.9199	0.015705	79.13127	0.701699	-76.7628
7900MHz	0.955008	-91.0725	1.27223	147.6313	0.014549	75.10597	0.725001	-80.4172
8000MHz	0.957547	-93.8521	1.165829	143.5307	0.013469	71.27043	0.746761	-83.8473
8100MHz	0.959988	-96.4642	1.06801	139.6123	0.012463	67.61901	0.766992	-87.0718
8200MHz	0.962327	-98.9226906	0.978287	135.8701	0.011529	64.14557	0.785733	-90.1069
8300MHz	0.964561	-101.240035	0.896146	132.2974	0.010664	60.84357	0.803038	-92.9672
8400MHz	0.966689	-103.427454	0.821061	128.8873	0.009864	57.70619	0.818974	-95.6654
8500MHz	0.968709	-105.495094	0.75251	125.633	0.009125	54.72644	0.833618	-98.213
8600MHz	0.970622	-107.452118	0.689982	122.5271	0.008444	51.89725	0.847051	-100.621
8700MHz	0.972428	-109.306812	0.632986	119.5628	0.007816	49.21156	0.859356	-102.898

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