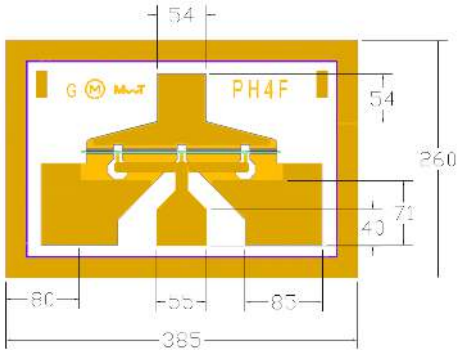
MwT-PH4F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- **23 dBm of Power at 18 GHz**
- **14 dB typical Small Signal Gain at 18 GHz**
- **45% typical PAE at 18 GHz**
- **0.25 x 180 Micron Refractory Metal/Gold Gate**
- **Excellent for High Gain, and High Power Added Efficiency**
- **Ideal for Commercial, Military, Hi-Rel Space Applications**



Chip Dimensions: 385 x 260 microns
Chip Thickness: 100 microns

Description:

The MwT-PH4F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 180 micron gate width make it ideally suited for applications requiring high-gain and medium power up to 28 GHz frequency range. The device is equally effective for either wideband (e.g. 6 to 18 GHz) or narrow-band applications. The chip is produced using reliable metal systems and passivated to insure excellent reliability.

Electrical Specifications: *at Ta= 25 °C*

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=8.0V Ids=0.7xIDSS	P1dB	18 GHz	dBm		21.5
Saturated Power Vds=8.0V Ids=0.7xIDSS	Psat	18 GHz	dBm		23.0
Output Third Order Intercept Point Vds=8.0V Ids=0.7xIDSS	OIP3	18 GHz	dBm		28.0
Small Signal Gain Vds=8.0V Ids=0.7xIDSS	SSG	18 GHz	dB		14.0
Power Added Efficiency at P1dB Vds=8.0V Ids=0.7xIDSS	PAE	18 GHz	%		45

Note: Ids should be between 40% and 80% of Idss. Currently, our data shows Ids at 70% of IDSS. Low Ids will improve efficiency, but high Ids will make Psat and IP3 better.

DC Specifications: *at Ta= 25 °C*

PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current Vds= 3.0 V Vgs= 0.0 V	IDSS	mA	40		60
Transconductance Vds= 2.5 V Vgs= 0.0 V	Gm	mS		60	
Pinch-off Voltage Vds= 3.0 V Ids= 1.0 mA	Vp	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage Igs= -0.3 mA	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage Igd= -0.3 mA	BVGDO	V		-18.0	
Chip Thermal Resistance	Rth	C/W		200 410*	

* Overall Rth depends on case mounting

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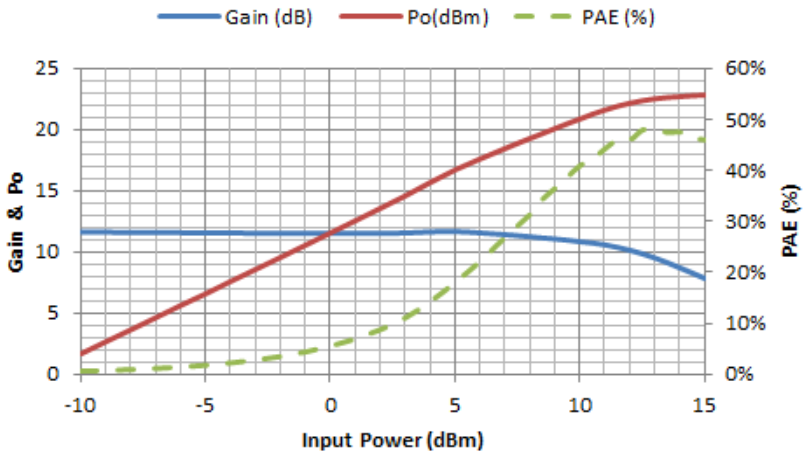
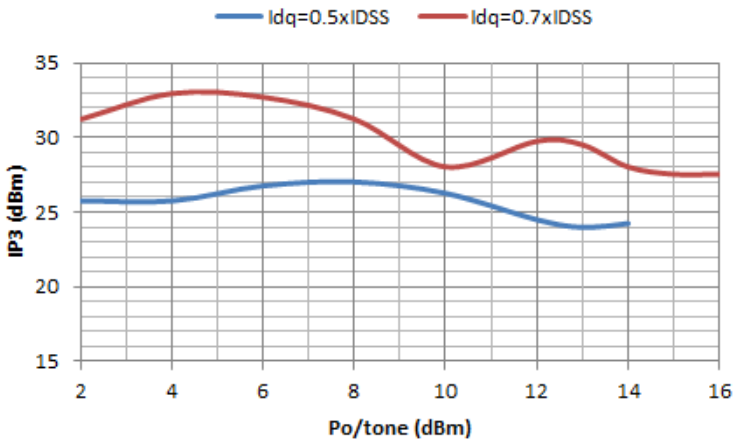
MwT-PH4F, Po, Gain & PAE vs Pin at 18GHz
Vds=8V; Idq=0.7xIDSS



MwT-PH4F, OIP3 vs Po/tone
with different Idq



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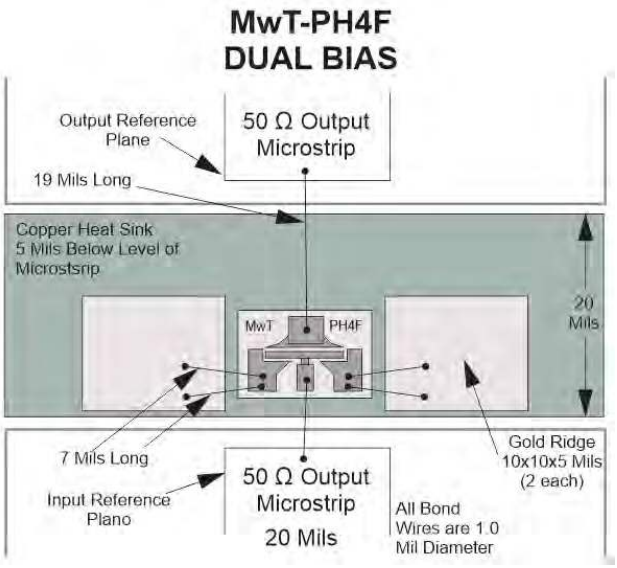

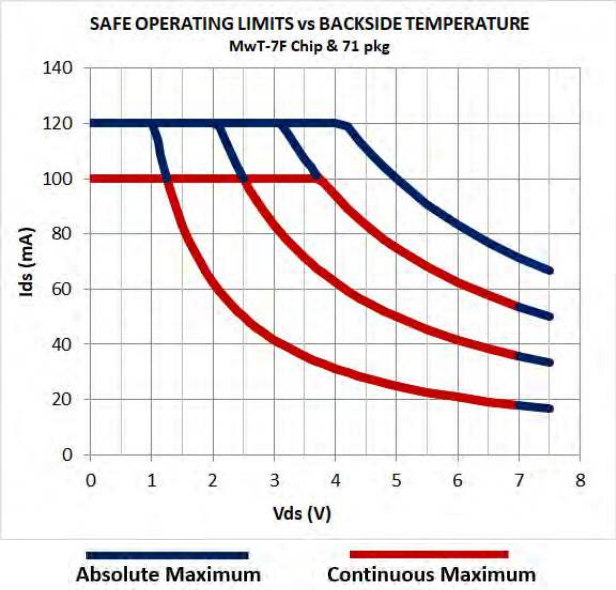

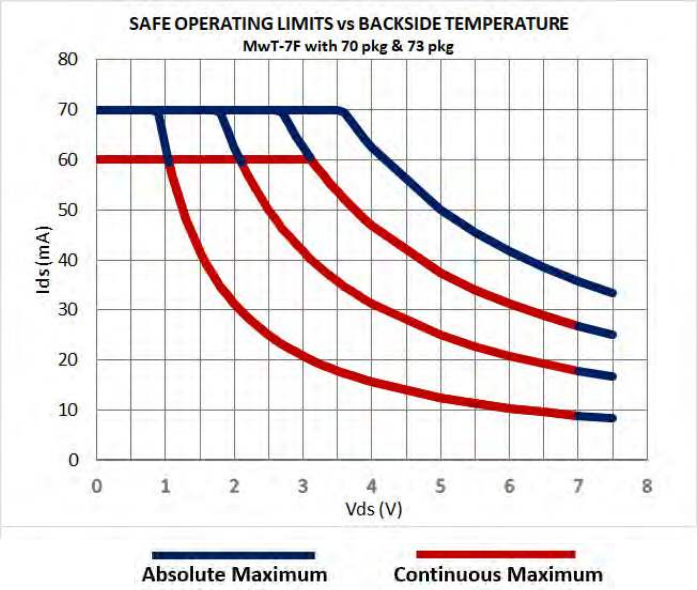

Absolute Maximum Rating

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	7.0	7.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	50	80

Notes:

1. Exceeding any one of these limits in continuous operation may reduce the mean-time- to-failure below the design goal.
2. Exceeding any one of these limits may cause permanent damage.

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S-Parameters

S-PARAMETER Vds=7V, Ids= 0.7 x Idss

Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.105	-16.176	14.790	168.090	-39.241	81.541	-1.121	-4.047	0.077	27.016
2	-0.251	-31.811	14.564	156.892	-33.706	74.217	-1.168	-7.676	0.106	24.135
3	-0.536	-46.471	14.139	146.322	-30.583	66.864	-1.381	-11.465	0.165	22.361
4	-0.801	-60.193	13.682	136.631	-28.583	60.655	-1.649	-14.224	0.215	21.132
5	-1.275	-73.123	12.983	127.307	-27.368	54.269	-1.748	-17.560	0.288	20.176
6	-1.625	-82.374	12.348	120.973	-26.535	51.215	-1.850	-17.371	0.352	19.441
7	-1.924	-93.238	11.750	113.102	-25.877	46.890	-1.991	-19.564	0.402	18.813
8	-2.280	-104.884	11.253	105.435	-25.169	42.612	-2.204	-23.461	0.438	18.211
9	-2.398	-115.055	10.775	97.416	-24.854	40.519	-2.630	-25.264	0.506	17.815
10	-2.660	-126.034	10.103	91.170	-24.512	35.805	-2.707	-27.117	0.559	17.307
11	-2.932	-134.743	9.511	85.520	-24.532	34.265	-2.894	-28.813	0.644	17.021
12	-3.003	-143.075	9.018	79.558	-24.253	31.824	-2.909	-30.479	0.660	16.636
13	-3.050	-151.488	8.575	73.891	-24.263	29.485	-2.984	-33.188	0.690	16.419
14	-3.140	-158.300	7.987	68.032	-24.363	28.358	-3.145	-35.528	0.782	16.175
15	-3.274	-165.181	7.565	64.815	-24.325	26.981	-3.153	-35.962	0.827	15.945
16	-3.062	-171.931	6.936	58.298	-24.326	27.668	-3.403	-39.855	0.864	15.631
17	-3.089	-176.891	6.505	53.335	-24.347	27.760	-3.418	-42.551	0.905	15.426
18	-2.957	177.249	6.131	48.146	-24.206	28.579	-3.497	-44.880	0.888	15.169
19	-2.988	173.079	5.681	45.137	-24.389	29.089	-3.587	-47.375	0.971	15.035
20	-3.011	167.898	5.275	40.118	-24.534	29.993	-3.621	-50.916	1.034	13.768
21	-2.980	163.739	4.930	36.235	-24.249	32.060	-3.677	-53.535	1.019	13.734
22	-2.881	160.728	4.463	32.016	-24.119	33.439	-3.646	-56.872	1.006	13.803
23	-2.792	156.554	4.119	27.412	-24.248	34.715	-3.824	-60.873	1.069	12.576
24	-2.844	153.342	3.809	23.933	-24.335	35.666	-3.695	-64.043	1.100	12.145
25	-2.696	149.953	3.413	19.645	-23.586	37.576	-3.801	-67.957	0.995	13.500
26	-2.582	148.173	2.983	15.817	-23.218	38.374	-3.715	-73.077	0.920	13.100
27	-2.659	145.300	2.562	11.874	-23.130	40.851	-3.653	-75.696	0.975	12.846
28	-2.401	143.141	2.312	8.239	-22.658	43.076	-3.756	-80.159	0.845	12.485
29	-2.478	139.982	2.008	4.402	-22.287	43.470	-3.660	-84.579	0.838	12.147
30	-2.314	136.850	1.721	0.815	-21.854	44.008	-3.582	-88.144	0.721	11.787

ORDERING INFORMATION:

When placing order or inquiring, please specify wafer number, if known. For details of Safe Handling Procedure please see supplementary information in available PDF on our website www.mwtinc.com. For package information, please see supplementary application note in PDF format by clicking located on our website.

Available Packaging:
70 Package - MwT-PH4F70
71 Package - MwT-PH4F71
73 Package - MwT-PH4F73

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