



## Features:

- 24.5 dBm of Power at 18 GHz
- 15 dB typical Small Signal Gain at 18 GHz
- 45% typical PAE at 18 GHz
- 0.25 x 250 Micron Refractory Metal/Gold Gate
- Excellent for High Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



## Description:

The MwT-PH7F is a AlGaAs/InGaAs PHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron Gate length and 250 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 $T_a = 25\text{ }^\circ\text{C}$

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	P1dB	18 GHz	dBm		23.0
Saturated Power $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	Psat	18 GHz	dBm		24.5
Output Third Order Intercept Point $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	18 GHz	dBm		29.0
Small Signal Gain $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	SSG	18 GHz	dB		15.0
Power Added Efficiency at P1dB $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	PAE	18 GHz	%		45

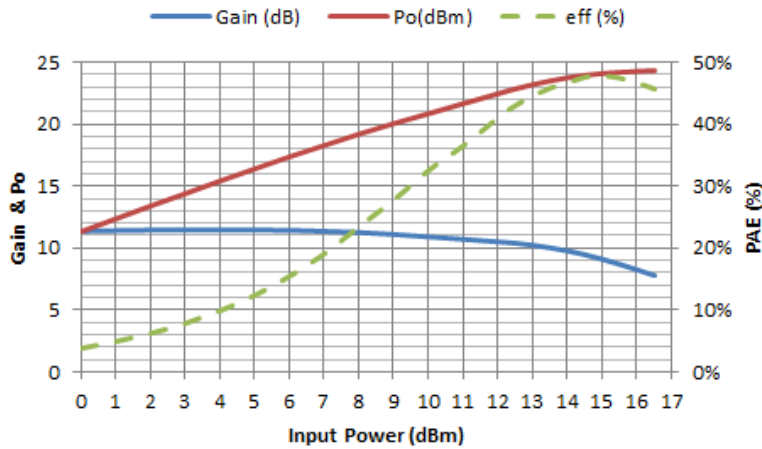
Note:  $I_{ds}$  should be between 40% and 80% of  $I_{DSS}$ . Currently, our data shows  $I_{ds}$  at 70% of  $I_{DSS}$ . Low  $I_{ds}$  will improve efficiency, but high  $I_{ds}$  will make Psat and IP3 better.

## DC Specifications: at $T_a = 25\text{ }^\circ\text{C}$

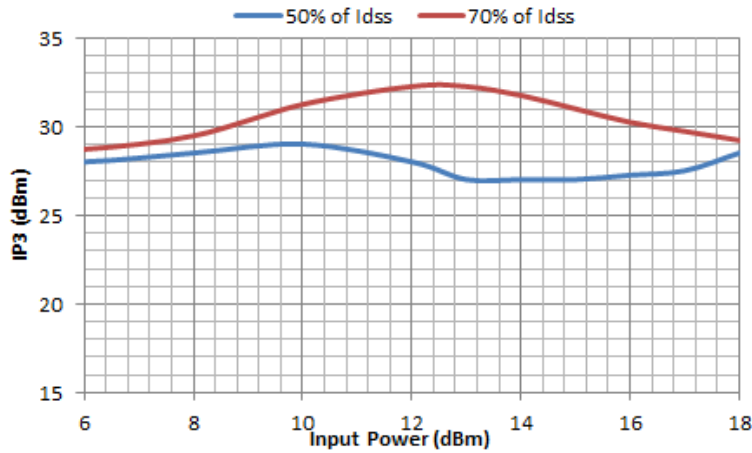
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0 V$ $V_{gs}= 0.0 V$	$I_{DSS}$	mA	60		80
Transconductance $V_{ds}= 2.5 V$ $V_{gs}= 0.0 V$	Gm	mS		90	
Pinch-off Voltage $V_{ds}= 3.0 V$ $I_{ds}= 1.0 mA$	$V_p$	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3 mA$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3 mA$	BVGDO	V		-18.0	
Chip Thermal Resistance	Rth	C/W		150 350*	

\* Overall Rth depends on case mounting

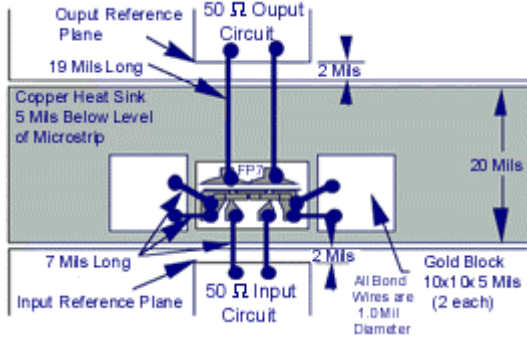
**MwT-PH7F from GCS, Typical Power at 18GHz**  
**V<sub>ds</sub>=8V; I<sub>dq</sub>=0.7×I<sub>DSS</sub>**



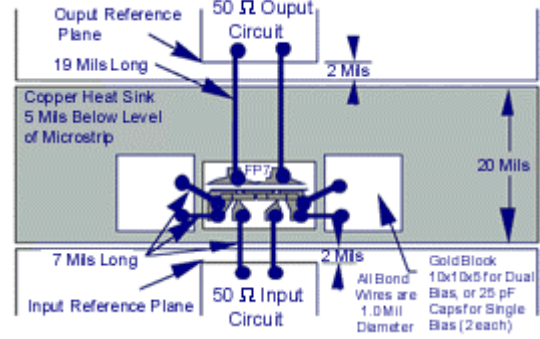
**MwT-PH7F, OIP3 vs Po/ tone**  
**with different I<sub>dq</sub> (% of I<sub>DSS</sub>)**



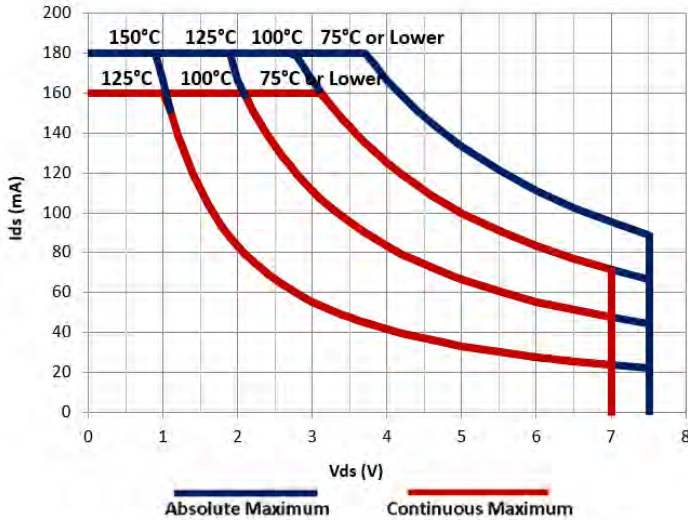
## MwT-PH7F DUAL BIAS



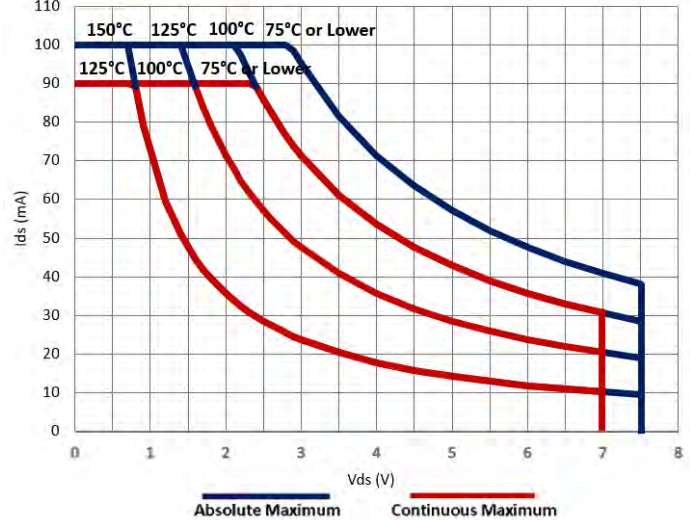
## MwT-PH7F SELF BIAS



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE  
Chip and 71 Pkg



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE  
70 and 73 Pkg



## Absolute Maximum Rating

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	6.5	7.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	80	120

### Notes:

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



## S-Parameters

S-PARAMETER Vds=8V, Ids= 0.7 x Idss										
Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.127	-22.315	17.170	164.614	-38.359	78.544	-1.486	-6.306	0.066	27.764
2	-0.340	-42.930	16.703	150.627	-32.557	67.366	-1.655	-12.009	0.114	24.630
3	-0.628	-61.534	15.960	137.974	-29.902	57.742	-1.985	-17.385	0.164	22.931
4	-0.919	-77.536	15.079	127.010	-28.426	50.326	-2.329	-21.455	0.216	21.753
5	-1.331	-91.023	14.155	117.711	-27.387	43.749	-2.569	-24.967	0.297	20.771
6	-1.588	-100.697	13.248	111.134	-26.781	40.591	-2.661	-25.792	0.351	20.015
7	-1.879	-110.878	12.409	103.834	-26.248	37.292	-2.802	-28.527	0.406	19.329
8	-1.886	-120.668	11.811	96.115	-25.956	32.294	-2.947	-33.388	0.417	18.883
9	-2.075	-130.004	10.948	89.527	-25.649	29.639	-3.341	-35.101	0.514	18.299
10	-2.099	-138.262	10.264	83.300	-25.652	25.851	-3.384	-38.703	0.547	17.958
11	-2.222	-145.187	9.527	77.544	-25.593	24.051	-3.522	-40.515	0.633	17.560
12	-2.233	-151.908	8.934	72.273	-25.466	22.490	-3.525	-44.023	0.642	17.200
13	-2.229	-157.323	8.315	67.095	-25.608	20.481	-3.627	-47.214	0.709	16.962
14	-2.272	-162.784	7.651	62.100	-25.697	20.252	-3.733	-50.239	0.786	16.674
15	-2.292	-166.358	7.208	58.170	-25.838	19.830	-3.720	-52.742	0.838	16.523
16	-2.331	-172.000	6.588	52.902	-25.991	18.308	-3.712	-56.953	0.917	16.289
17	-2.300	-175.927	6.020	48.575	-26.138	18.204	-3.665	-60.224	0.964	16.079
18	-2.125	179.674	5.544	43.935	-26.231	17.805	-3.576	-64.067	0.915	15.887
19	-2.227	177.235	5.093	40.219	-26.436	19.671	-3.571	-66.725	1.030	14.706
20	-2.257	173.458	4.561	36.044	-26.460	21.483	-3.702	-70.766	1.131	13.308
21	-2.193	172.206	4.265	31.720	-26.665	22.933	-3.525	-73.204	1.120	13.357
22	-2.162	169.060	3.716	28.317	-26.575	23.580	-3.431	-77.331	1.121	13.029
23	-2.063	166.292	3.225	23.906	-26.806	23.991	-3.470	-81.943	1.179	12.457
24	-2.079	163.714	2.945	20.160	-26.982	27.872	-3.326	-85.873	1.185	12.359
25	-2.125	161.572	2.440	16.852	-26.683	28.686	-3.235	-88.774	1.207	11.813
26	-2.074	159.356	1.924	13.822	-26.630	30.449	-3.163	-91.931	1.215	11.481
27	-2.060	157.319	1.406	10.463	-26.377	33.538	-3.047	-94.680	1.190	11.257
28	-1.912	155.285	1.111	6.408	-25.970	35.045	-2.965	-98.947	1.019	12.694
29	-1.953	153.124	0.709	3.143	-25.711	34.352	-2.803	-102.608	0.997	13.210
30	-1.879	152.092	0.372	-0.613	-25.508	36.644	-2.759	-106.288	0.941	12.940

### 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](http://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-PH8F70
- 71 Package - MwT-PH8F71
- 73 Package - MwT-PH8F73