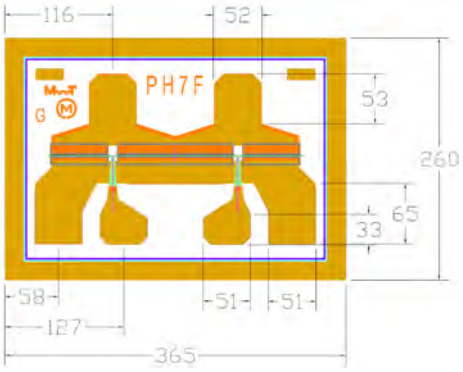
MwT-PH7F 28 GHz Medium Power AlGaAs/InGaAs pHEMT

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**



Chip Dimensions: 365 x 260 microns
Chip Thickness: 100 microns

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 Ta= 25 °C*

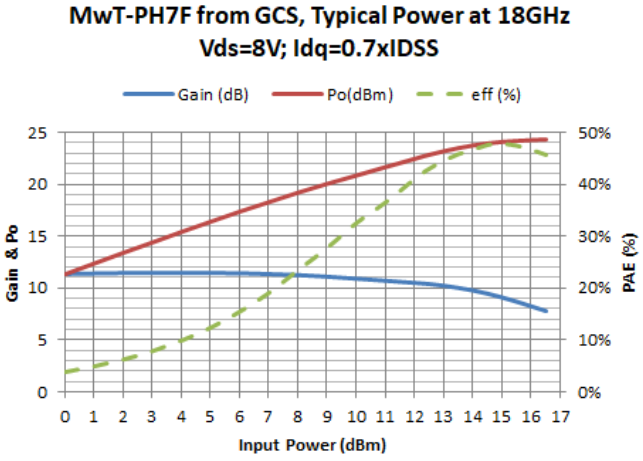
PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=8.0V Ids=0.7xIDSS	P1dB	18 GHz	dBm		23.0
Saturated Power Vds=8.0V Ids=0.7xIDSS	Psat	18 GHz	dBm		24.5
Output Third Order Intercept Point Vds=8.0V Ids=0.7xIDSS	OIP3	18 GHz	dBm		30.0
Small Signal Gain Vds=8.0V Ids=0.7xIDSS	SSG	18 GHz	dB		15.0
Power Added Efficiency at P1dB Vds=8.0V Ids=0.7xIDSS	PAE	18 GHz	%		45

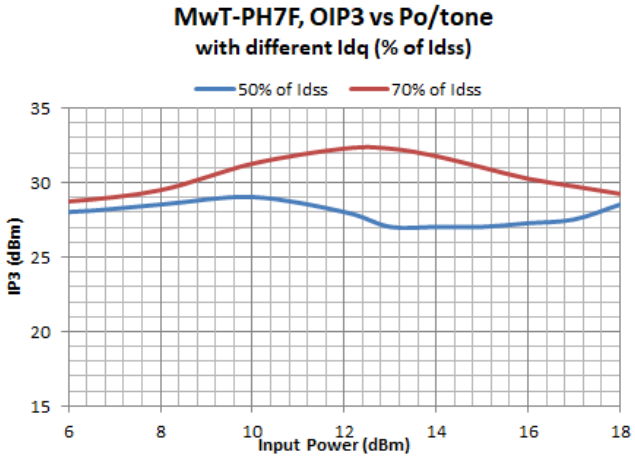
Note: Ids should be between 40% and 80% of Idss. Currently, our data shows Ids at 70% of IDSS. Low Ids will improve efficiency, but high Ids will make Psat and IP3 better.

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	60		80
Transconductance Vds= 2.5 V Vgs= 0.0 V	Gm	mS		90	
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		150 350*	

* Overall Rth depends on case mounting



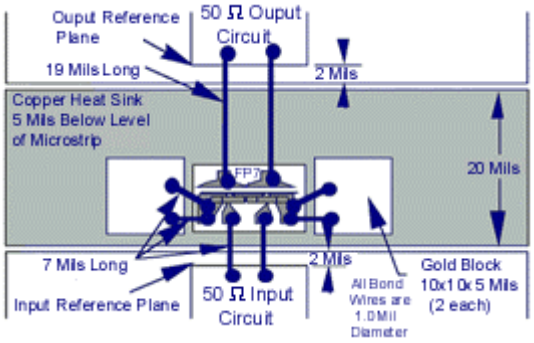


MwT-PH7F, Load Pull Data, Vdq=8V; Idq=0.7xIdss

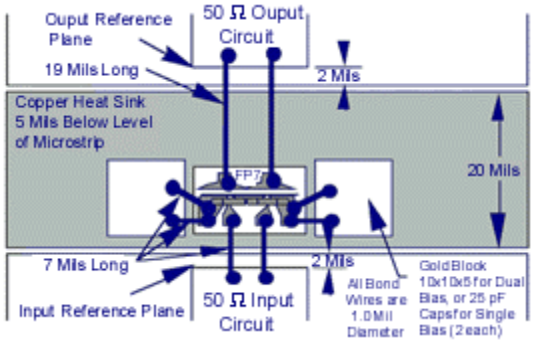
Freq (GHz)	Z_S		Z_L		P_{sat}
	Mag	phase	mag	phase	dBm
2	0.90	34.0	0.37	9.4	23.8
4	0.85	64.0	0.42	23.4	23.4
6	0.79	84.0	0.40	26.3	23.7
8	0.82	105.0	0.43	33.8	23.4
10	0.85	115.0	0.45	38.6	23.2
12	0.87	125.0	0.42	42.2	23.6
14	0.87	133.0	0.47	50.8	23.5
16	0.86	144.0	0.47	53.9	23.3
18	0.85	145.0	0.47	60.0	23.2

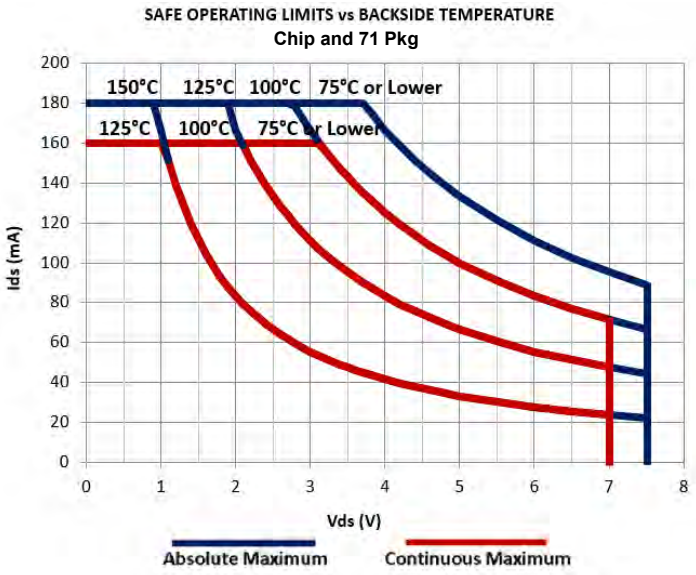
The load pull data is based on nonlinear model provided by the foundry that processes the device.

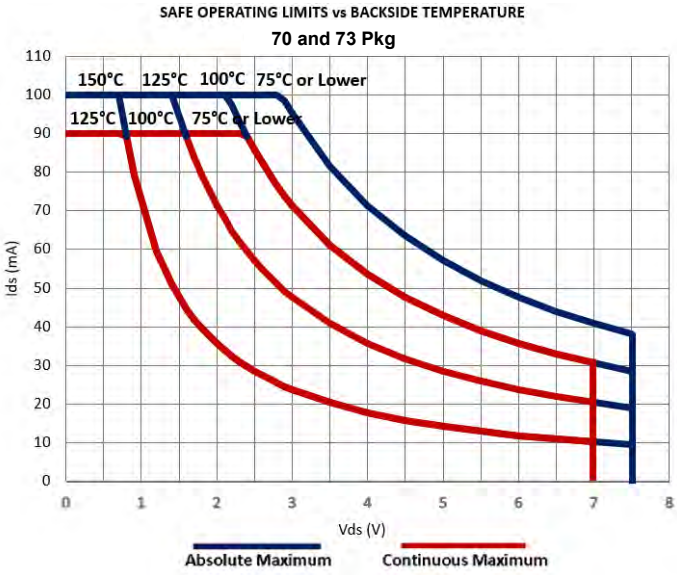
MwT-PH7F DUAL BIAS



MwT-PH7F SELF BIAS







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:

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.

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

Available Packaging:

70 Package - MwT-PH7F70
71 Package - MwT-PH7F71
73 Package - MwT-PH7F73

Contact Information

For additional information please visit www.cmlmicro.com or contact a sales office.

Europe	America	Asia
• Maldon, UK • Tel +44 (0) 1621 875500 • sales@cmlmicro.com	• Winston-Salem, NC • Tel +1 336 744 5050 • us.sales@cmlmicro.com	• Singapore • Tel +65 6288129 • sg.sales@cmlmicro.com