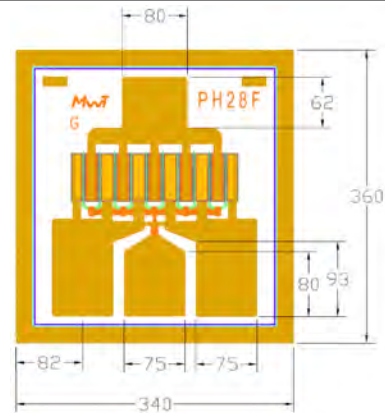


# MwT-PH28F 26 GHz Medium Power AlGaAs/InGaAs pHEMT

## Features:

- 26.5 dBm of Power at 18 GHz
- 13 dB Small Signal Gain at 18 GHz
- 45% PAE at 18 GHz
- 0.25 x 600 Micron Refractory Metal/Gold Gate
- Excellent for Medium Power, Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 340 x 360 microns  
Chip Thickness: 100 microns

## Description:

The MwT-PH28F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 600 micron gate width make it ideally suited for applications requiring high-gain and medium power up to 26 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		24.5
Saturated Power $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	Psat	18 GHz	dBm		26.5
Output Third Order Intercept Point $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	18 GHz	dBm		32.0
Small Signal Gain $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	SSG	18 GHz	dB	11.0	13.0
Power Added Efficiency at P1dB $V_{ds}=8.0V$ $I_{ds}=0.7 \times I_{DSS}$	PAE	18 GHz	%		45

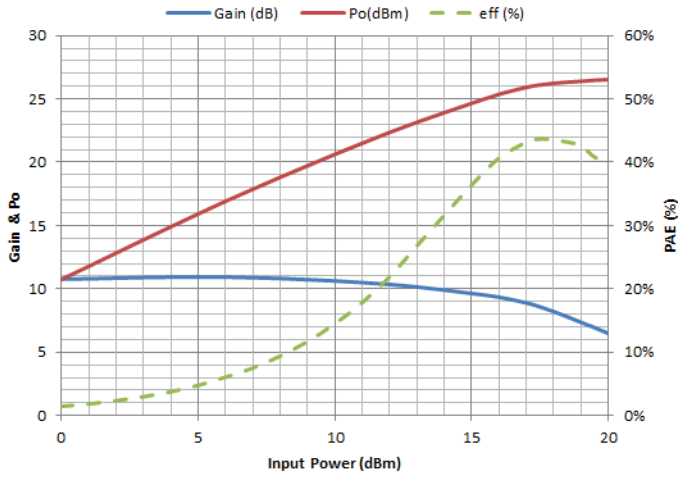
Note:  $I_{ds}$  should be between 40% and 80% of  $I_{DSS}$ . Currently, our data shows  $I_{ds}$  at 70% of  $I_{DSS}$ . Low  $I_{ds}$  will improve efficiency, but high  $I_{ds}$  will make Psat and IP3 better.

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

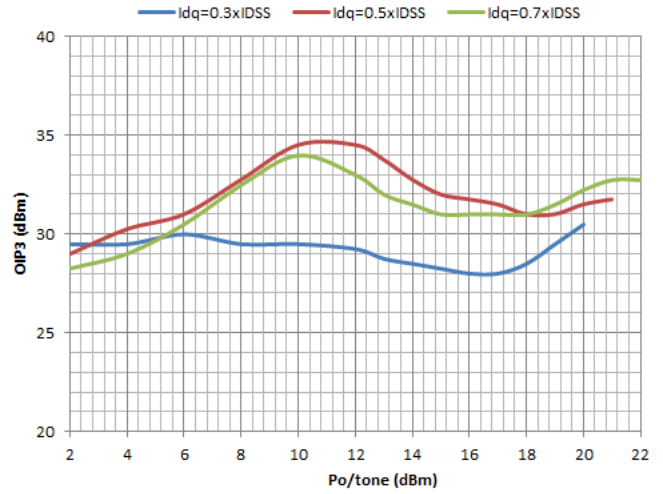
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0 V$ $V_{gs}= 0.0 V$	$I_{DSS}$	mA	140		180
Transconductance $V_{ds}= 2.5 V$ $V_{gs}= 0.0 V$	Gm	mS		210	
Pinch-off Voltage $V_{ds}= 3.0 V$ $I_{ds}= 1.0 mA$	$V_p$	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3 mA$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3 mA$	BVGDO	V		-18.0	
Chip Thermal Resistance	Chip & 71 pkg 70 & 73 pkg	Rth	C/W	65 180*	

\* Overall Rth depends on case mounting

**MwT-PH28F, Po, Gain & PAE vs Pin at 18GHz**  
Vds=8V; Idq=98mA



**MwT-PH28F, OIP3 at different Idq vs Po/tone at 18GHz**



**MwT-PH28F, Load Pull Data, Vdq=8V; Idq=0.7xIdss**

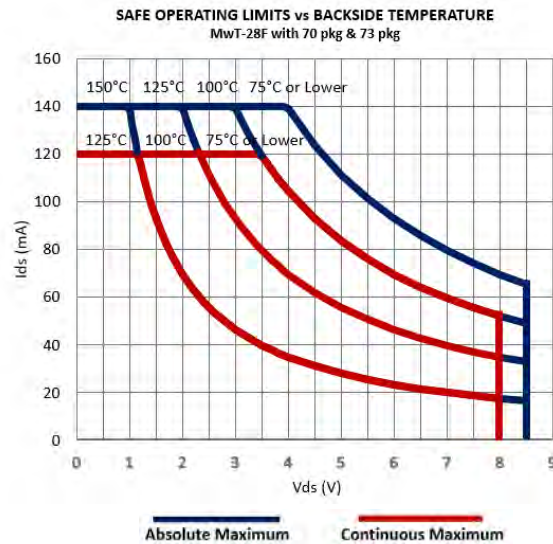
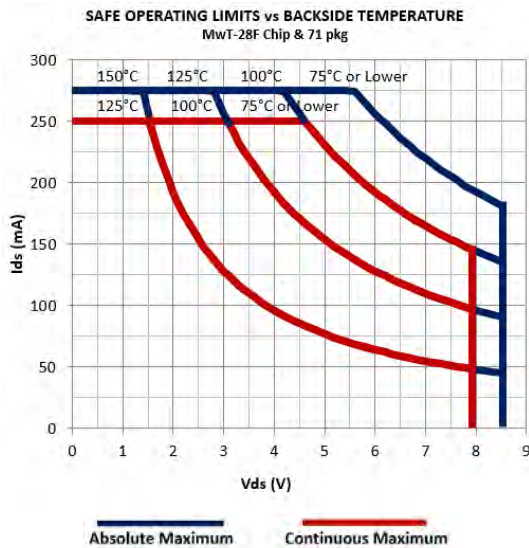
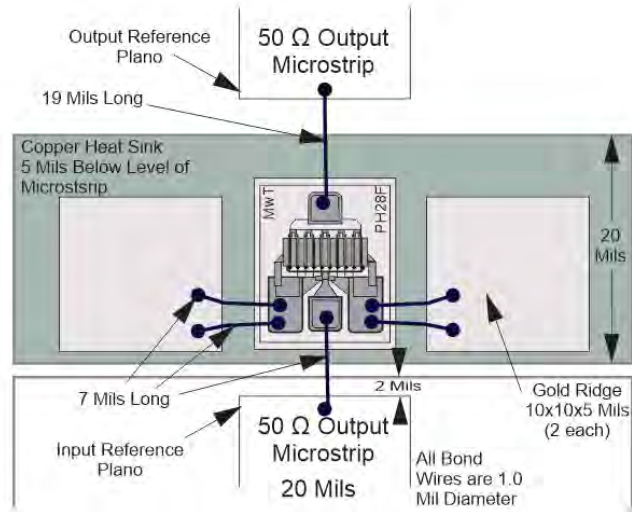
Freq (GHz)	Zs		ZL		Psat (dBm)
	Mag	phase	mag	phase	
2	0.81	74.00	0.16	95.55	27.0
4	0.88	118.00	0.19	96.09	26.9
6	0.90	140.00	0.34	89.81	27.0
8	0.92	148.00	0.35	114.30	27.0
10	0.88	159.00	0.34	110.00	27.0
12	0.92	170.00	0.41	113.70	26.7
14	0.91	170.00	0.43	120.00	26.4
16	0.87	171.00	0.45	127.80	26.5
18	0.87	175.00	0.45	130.4	26.5

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

# MwT-PH28F

26 GHz Medium Power AlGaAs/InGaAs pHEMT

## MwT-PH28F DUAL BIAS



## Absolute Maximum Rating

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	8.0	8.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	200	250

### 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	-0.450	-51.515	22.010	148.214	-33.520	63.244	-3.615	-16.389	0.136	27.765
2	-1.024	-89.239	19.950	125.819	-29.836	47.362	-4.817	-26.114	0.218	24.893
3	-1.418	-114.385	17.842	110.140	-28.378	37.558	-5.724	-31.841	0.313	23.110
4	-1.588	-131.771	16.031	98.414	-27.708	31.247	-6.324	-36.013	0.395	21.870
5	-1.788	-144.388	14.288	89.554	-27.654	28.283	-6.885	-40.072	0.535	20.971
6	-1.858	-153.655	13.035	82.249	-27.395	26.949	-7.043	-42.728	0.616	20.215
7	-1.928	-162.475	11.893	74.727	-27.241	26.751	-7.306	-46.366	0.716	19.567
8	-1.815	-168.238	10.823	68.326	-27.098	25.862	-7.342	-51.966	0.740	18.960
9	-1.875	-174.296	9.709	61.903	-27.195	27.940	-7.737	-57.413	0.899	18.452
10	-1.809	-179.740	8.890	56.077	-27.054	26.924	-7.440	-62.126	0.910	17.972
11	-1.692	-174.355	8.148	50.279	-27.033	29.872	-7.607	-67.298	0.924	17.591
12	-1.667	-170.486	7.377	44.810	-26.963	30.813	-7.532	-72.995	0.982	17.170
13	-1.688	-166.484	6.676	39.443	-26.759	32.719	-7.440	-78.775	1.045	15.418
14	-1.702	-163.288	5.873	34.762	-26.636	36.055	-7.320	-85.250	1.136	14.011
15	-1.537	-158.547	5.324	29.694	-26.385	39.146	-7.155	-90.335	1.036	14.689
16	-1.514	-156.470	4.825	24.059	-25.858	41.519	-7.049	-97.246	1.004	14.963
17	-1.550	-153.769	4.249	19.326	-25.384	42.848	-6.830	-104.371	1.028	13.800
18	-1.498	-151.117	3.639	15.499	-24.753	44.950	-6.618	-111.286	0.974	14.196
19	-1.402	-149.425	3.018	10.789	-24.188	46.869	-6.384	-116.310	0.888	13.603
20	-1.346	-144.763	2.615	5.676	-23.693	48.327	-6.153	-122.405	0.828	13.154
21	-1.258	-141.492	1.771	-1.041	-22.844	49.556	-5.656	-128.695	0.714	12.308
22	-1.274	-139.622	1.343	-5.069	-22.350	49.467	-5.386	-134.713	0.701	11.847
23	-1.140	-137.883	0.851	-8.868	-21.711	49.009	-5.248	-140.698	0.589	11.281
24	-1.180	-134.880	0.138	-13.915	-21.427	47.605	-5.106	-146.692	0.658	10.783
25	-1.178	-133.122	-0.336	-18.830	-20.542	47.550	-4.539	-153.398	0.557	10.103
26	-1.105	-131.151	-0.865	-23.013	-20.136	45.602	-4.164	-158.849	0.473	9.636
27	-1.054	-128.924	-1.340	-27.559	-19.377	45.555	-3.794	-164.556	0.388	9.019
28	-0.950	-127.808	-1.958	-30.936	-18.974	42.844	-3.581	-169.396	0.306	8.508
29	-0.949	-124.402	-2.616	-35.248	-18.545	41.863	-3.309	-174.330	0.304	7.965
30	-0.954	-122.693	-3.246	-39.254	-18.035	40.306	-3.031	-178.538	0.272	7.394

### Available Packaging:

70 Package - MwT-PH28F70  
 71 Package - MwT-PH28F71  
 73 Package - MwT-PH28F73

# MwT-PH28F

## 26 GHz Medium Power AlGaAs/InGaAs pHEMT

### Contact Information

For additional information please visit [www.cmlmicro.com](http://www.cmlmicro.com) or contact a sales office.

Europe	America	Asia
<ul style="list-style-type: none"><li>• Maldon, UK</li><li>• Tel +44 (0) 1621 875500</li><li>• <a href="mailto:sales@cmlmicro.com">sales@cmlmicro.com</a></li></ul>	<ul style="list-style-type: none"><li>• Winston-Salem, NC</li><li>• Tel +1 336 744 5050</li><li>• <a href="mailto:us.sales@cmlmicro.com">us.sales@cmlmicro.com</a></li></ul>	<ul style="list-style-type: none"><li>• Singapore</li><li>• Tel +65 6288129</li><li>• <a href="mailto:sg.sales@cmlmicro.com">sg.sales@cmlmicro.com</a></li></ul>

Although the information contained in this document is believed to be accurate, no responsibility is assumed by CML for its use. The product and product information is subject to change at any time without notice. CML has a policy of testing every product shipped using calibrated test equipment to ensure compliance with product specification.

© 2022 CML Microsystems Plc