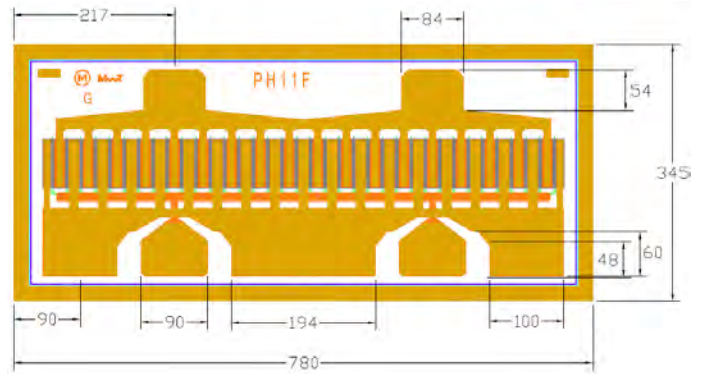


# MwT-PH11 F /MwT-PH11FV 12 GHz High Power AlGaAs/InGaAs pHEMT

## Features:

- 33 dBm of Power at 12 GHz
- 12 dB Small Signal Gain at 12 GHz
- 45% PAE at 12 GHz
- 0.25 x 2400 Micron Refractory Metal/Gold Gate
- Excellent for High Power, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications
- Available with or without via holes



Chip Dimensions: 780 x 345 microns  
Chip Thickness: 100 microns

## Description:

The MwT-PH11F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 2400 micron gate width make it ideally suited for applications requiring high power and high power added efficiency up to 12 GHz frequency range. The device is equally effective for either wideband 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 $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	P1dB	12 GHz	dBm		32.0
Saturated Power $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	Psat	12 GHz	dBm		33.0
Output Third Order Intercept Point $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	OIP3	12 GHz	dBm		40.0
Small Signal Gain $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	SSG	12 GHz	dB		12.0
Power Added Efficiency at P1dB $V_{ds}=8.0\text{V}$ $I_{ds}=0.7 \times I_{DSS}$	PAE	12 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.

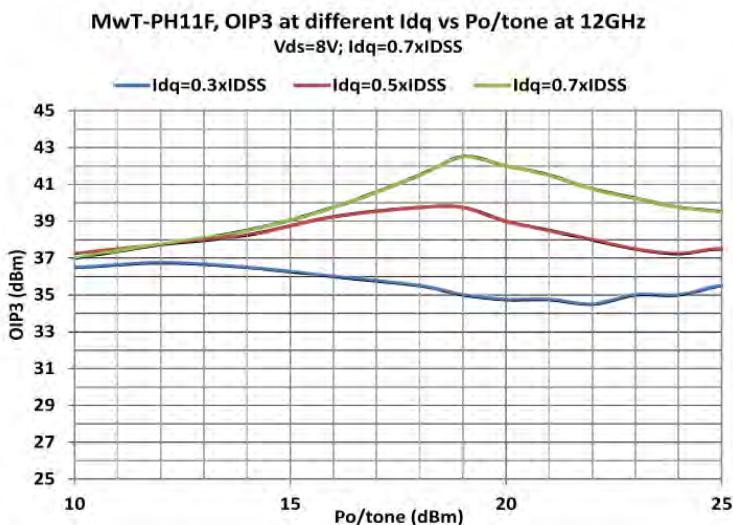
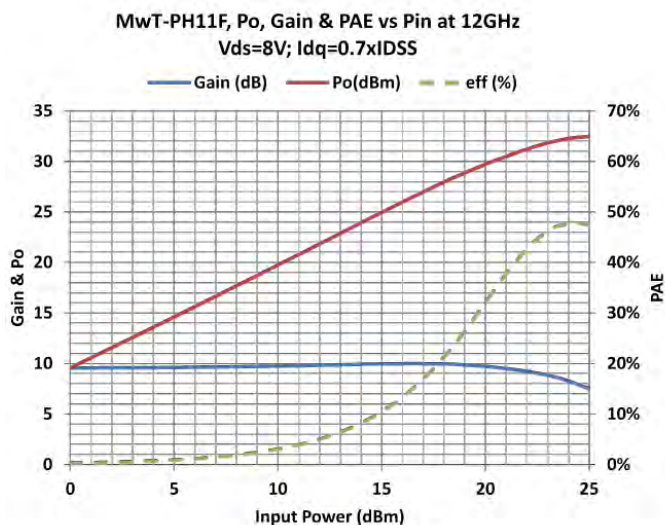
## DC Specifications: at $T_a = 25\text{ }^\circ\text{C}$

PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0\text{ V}$ $V_{gs}= 0.0\text{ V}$	$I_{DSS}$	mA	480		520
Transconductance $V_{ds}= 2.5\text{ V}$ $V_{gs}= 0.0\text{ V}$	Gm	mS		700	
Pinch-off Voltage $V_{ds}= 3.0\text{ V}$ $I_{ds}= 1.0\text{ mA}$	$V_p$	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3\text{ mA}$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3\text{ mA}$	BVGDO	V		-18.0	
Chip Thermal Resistance	Chip & 71 pkg	Rth		25	

\* Overall Rth depends on case mounting

# MwT-PH11F/MwT-PH11FV

## 12 GHz High Power AlGaAs/InGaAs pHEMT



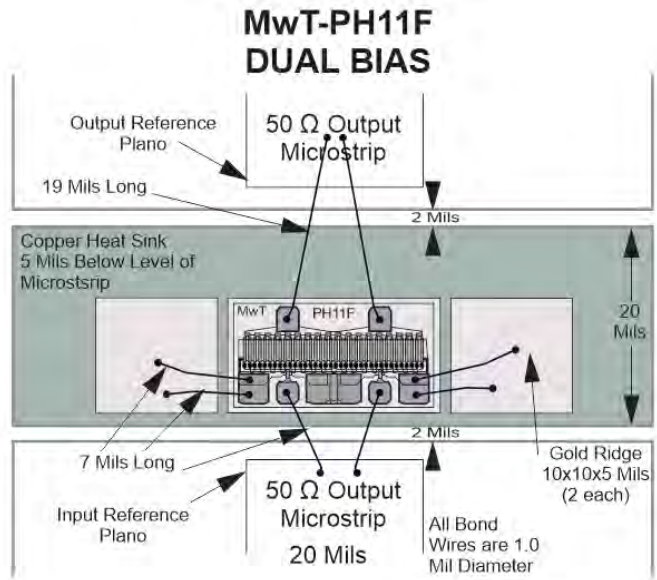
**MwT-PH11F, Load Pull data, Vds=8V, Idq=0.7xIdss**

Freq (GHz)	Z <sub>s</sub>		Z <sub>L</sub>		P <sub>sat</sub>
	Mag	phase	mag	phase	dBm
2	0.75	145.0	0.57	170.3	33.0
4	0.90	162.0	0.63	170.3	32.6
6	0.95	172.0	0.65	169.8	32.7
8	0.95	177.0	0.68	170.9	32.6
10	0.94	179.0	0.72	171.0	32.1
12	0.93	-177.0	0.72	171.0	32.3

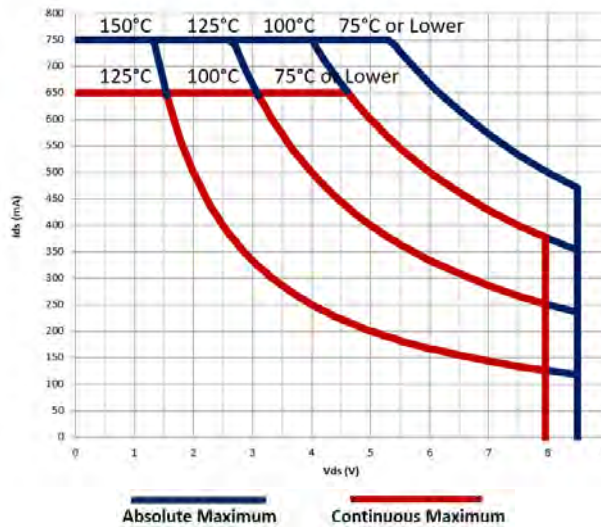
The load pull data is based on nonlinear model provided by the foundry that processes the device.

# MwT-PH11F/MwT-PH11FV

12 GHz High Power AlGaAs/InGaAs pHEMT



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE  
MwT-PH11F Chip and 71 Pkg



## 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	500	700

### 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.

# MwT-PH11F/MwT-PH11FV

12 GHz High Power AlGaAs/InGaAs pHEMT

## S-Parameters

S-PARAMETER Vds=8V, Ids= 0.7 x Idss

Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
1	-0.763	-138.853	22.454	104.657	-32.283	24.086	-10.055	-141.617	0.198	27.369
2	-0.782	-162.491	16.940	88.129	-31.888	16.281	-9.522	-155.023	0.355	24.414
3	-0.782	-172.386	13.489	78.106	-31.691	14.649	-9.063	-158.581	0.506	22.590
4	-0.765	-178.660	10.927	69.522	-31.687	15.944	-8.493	-159.528	0.649	21.307
5	-0.779	176.661	9.000	63.408	-31.705	16.914	-8.075	-160.496	0.825	20.353
6	-0.724	172.409	7.458	56.174	-31.325	20.538	-7.713	-161.777	0.874	19.392
7	-0.626	167.937	6.081	48.726	-31.182	22.865	-7.138	-164.037	0.847	18.632
8	-0.649	165.699	4.698	42.454	-31.102	25.258	-6.507	-164.374	0.975	17.900
9	-0.682	162.970	3.306	35.880	-30.956	28.978	-6.067	-167.164	1.176	14.588
10	-0.706	159.631	2.315	30.167	-30.553	31.225	-5.566	-168.217	1.251	13.415
11	-0.617	156.253	1.426	23.731	-30.040	33.719	-5.113	-171.388	1.098	13.822
12	-0.573	154.102	0.426	18.200	-29.763	36.298	-4.710	-173.542	1.065	13.533
13	-0.658	151.563	-0.521	12.655	-29.071	38.997	-4.329	-176.096	1.221	11.441
14	-0.643	149.995	-1.500	8.204	-28.735	41.598	-3.953	-178.800	1.235	10.697
15	-0.597	146.658	-2.154	3.022	-27.751	42.833	-3.642	178.934	1.053	11.393
16	-0.521	144.626	-3.083	-2.331	-27.212	44.068	-3.379	175.452	0.923	12.065
17	-0.550	142.697	-3.861	-6.552	-26.676	42.849	-3.077	172.963	0.924	11.408
18	-0.545	141.770	-4.635	-10.760	-25.991	43.314	-2.809	169.448	0.866	10.678
19	-0.556	140.063	-5.485	-14.316	-25.389	43.335	-2.692	167.217	0.886	9.952
20	-0.412	136.960	-6.123	-19.011	-24.765	43.199	-2.487	165.318	0.605	9.321
21	-0.618	135.138	-7.123	-22.456	-24.364	44.264	-2.292	162.103	0.966	8.620
22	-0.571	133.208	-7.758	-25.816	-23.792	42.959	-2.022	159.794	0.804	8.017
23	-0.489	132.372	-8.341	-28.947	-23.064	40.411	-2.015	156.412	0.652	7.362
24	-0.571	130.488	-9.202	-31.466	-23.041	39.155	-1.989	154.674	0.842	6.919
25	-0.589	128.512	-9.857	-35.045	-22.395	37.303	-1.675	150.780	0.750	6.269
26	-0.495	127.182	-10.469	-37.584	-22.030	36.296	-1.572	148.225	0.610	5.781

### Available Packaging:

71 Package - MwT-PH11F71  
71 Package - MwT-PH11FV71

# MwT-PH11F/MwT-PH11FV

12 GHz High 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