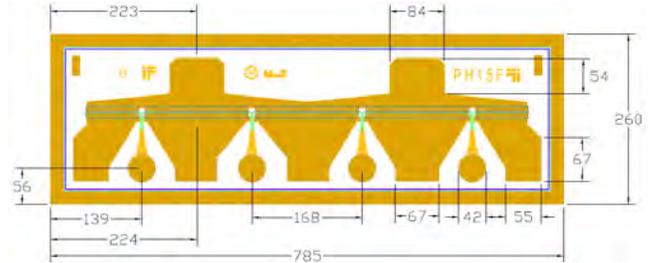


MwT-PH15F 28 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 28.5 dBm typical Output Power at 18 GHz
- 12 dB typical Small Signal Gain at 18 GHz
- 45% typical PAE at 18 GHz
- 0.25 x 630 Micron Refractory Metal/Gold Gate
- Excellent for Power, Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 785 x 260 microns
Chip Thickness: 100 microns

Description:

The MwT-PH15F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 micron gate length and 630 micron gate width make it ideally suited for applications requiring high-gain and medium power with frequency up to 28 GHz. 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 $T_a = 25^\circ C$

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression $V_{ds}=8V; I_{ds}=0.7 \times I_{DSS}$	P1dB	18 GHz	dBm		28.0
Saturated Power $V_{ds}=8V; I_{ds}=0.7 \times I_{DSS}$	Psat	18 GHz	dBm		28.5
Output Third Order Intercept Point $V_{ds}=8V; I_{ds}=0.7 \times I_{DSS}$	OIP3	18 GHz	dBm		34.0
Small Signal Gain $V_{ds}=8V; I_{ds}=0.7 \times I_{DSS}$	SSG	18 GHz	dB		12.0
Power Added Efficiency at P1dB $V_{ds}=8V; I_{ds}=0.7 \times I_{DSS}$	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 $T_a = 25^\circ C$

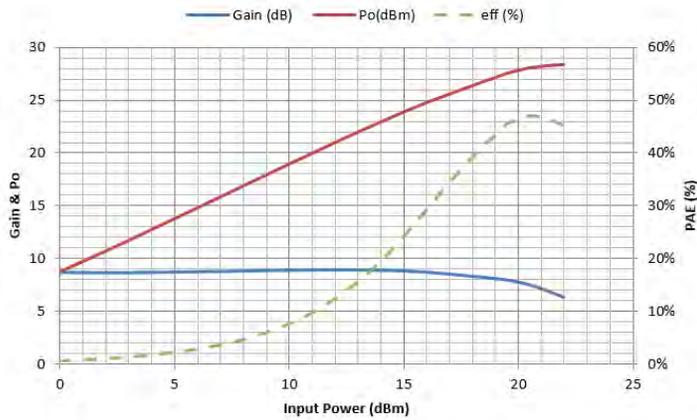
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current $V_{ds}= 3.0 V V_{gs}= 0.0 V$	I_{DSS}	mA	150		190
Transconductance $V_{ds}= 2.5 V V_{gs}= 0.0 V$	G_m	mS		200	
Pinch-off Voltage $V_{ds}= 3.0 V I_{ds}= 1.0 mA$	V_p	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage $I_{gs}= -0.3 mA$	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage $I_{gd}= -0.3 mA$	BVGDO	V		-18.0	
Chip Thermal Resistance	R_{th}	C/W		150	350*

* Overall R_{th} depends on case mounting

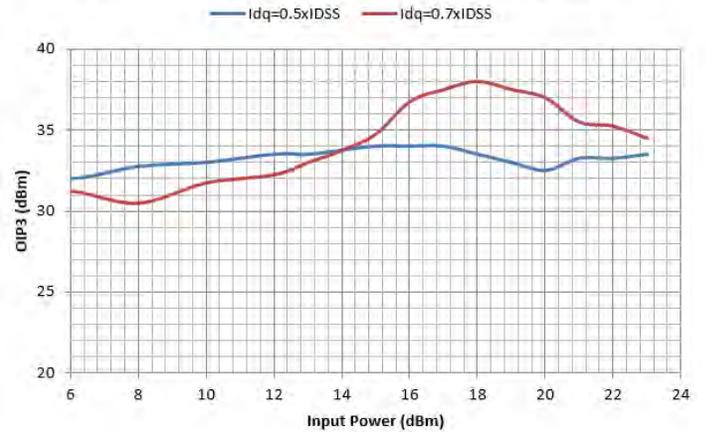
MwT-PH15F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

MwTPH15F, Gain, Po & PAE vs Pin at 18GHz
Vds=8V; Idq=0.7xIDSS



MwT-PH15F, OIP3 at different Idq vs Po/tone at 18GHz



MwT-PH15F, Load Power Data, Vds=8V, Idq=0.7xIdss

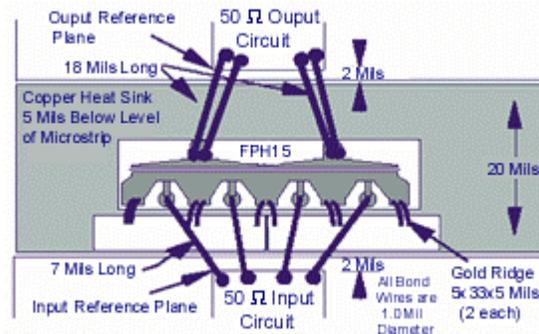
Freq (GHz)	Zs		ZL		P _{sat} (dBm)
	Mag	phase	mag	phase	
2	0.60	80.0	0.09	173.3	28.4
4	0.70	120.0	0.19	136.2	28.1
6	0.75	140.0	0.19	143.3	28.4
8	0.87	145.0	0.25	131.7	28.2
10	0.84	160.0	0.29	127.4	28.1
12	0.87	158.0	0.29	131.3	28.5

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

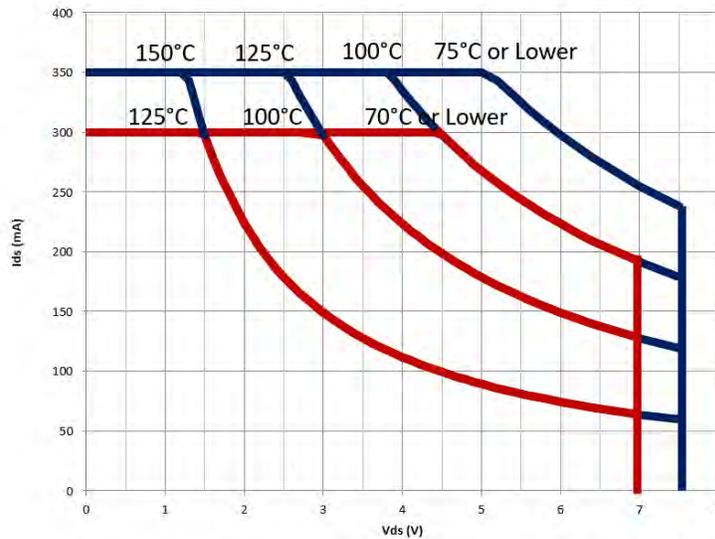
MwT-PH15F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH15F DUAL BIAS



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE
MwT-PH15F Chip and 71 Pkg



MAXIMUM RATINGS AT Ta = 25 °C

Symbol	Parameter	Units	Cont Max1	Absolute Max2
VDS	Drain to Source Volt.	V	7.5	8.0
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	200	300
Pt	Total Power Dissipation	mW	1900	2300

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-PH15F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

S-PARAMETER $V_{ds}=7V$, $I_{ds}=0.7 \times I_{dss}$

Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
1	-0.390	-59.911	22.734	144.444	-31.862	57.690	-4.544	-25.184	0.087	27.298
2	-0.762	-99.807	20.298	120.694	-28.498	37.989	-6.147	-40.126	0.135	24.398
3	-1.024	-123.262	17.856	105.447	-27.272	26.678	-7.331	-49.072	0.206	22.564
4	-1.112	-138.382	15.844	94.348	-26.856	19.448	-8.061	-55.741	0.266	21.350
5	-1.223	-148.957	14.128	85.818	-26.834	14.436	-8.270	-60.932	0.351	20.481
6	-1.247	-156.433	12.871	79.401	-26.631	11.775	-8.343	-62.561	0.408	19.751
7	-1.327	-163.022	11.651	72.422	-26.479	8.639	-8.311	-67.714	0.490	19.065
8	-1.152	-167.888	10.528	65.941	-26.710	5.733	-8.146	-74.597	0.474	18.619
9	-1.239	-173.045	9.464	59.899	-26.884	5.584	-8.250	-81.294	0.595	18.174
10	-1.172	-178.241	8.456	54.057	-27.081	2.444	-7.898	-86.878	0.629	17.769
11	-1.256	177.316	7.504	48.646	-27.125	1.842	-7.865	-91.669	0.771	17.315
12	-1.223	174.171	6.761	43.499	-27.490	1.241	-7.442	-97.159	0.828	17.126
13	-1.227	170.860	5.971	38.361	-27.797	0.097	-7.108	-102.609	0.931	16.884
14	-1.273	168.002	5.223	33.721	-27.958	1.263	-6.844	-108.607	1.060	15.095
15	-1.253	165.355	4.597	29.617	-28.433	2.102	-6.514	-113.117	1.163	14.068
16	-1.191	162.736	3.799	23.341	-28.611	3.110	-6.175	-117.598	1.206	13.464
17	-1.122	160.699	3.227	18.889	-28.530	4.625	-5.904	-122.296	1.155	13.492
18	-1.144	158.118	2.687	14.069	-28.817	5.616	-5.520	-126.821	1.258	12.698
19	-1.141	155.746	2.002	10.313	-29.172	8.971	-5.285	-131.188	1.403	11.807
20	-1.090	154.379	1.471	5.545	-29.166	11.016	-4.984	-135.947	1.361	11.730
21	-1.076	152.593	0.894	1.684	-29.076	14.604	-4.702	-140.580	1.368	11.364
22	-1.090	151.191	0.235	-2.218	-29.203	17.357	-4.432	-143.984	1.486	10.595
23	-1.046	149.091	-0.285	-6.346	-29.003	20.742	-4.188	-148.368	1.415	10.528
24	-1.107	147.083	-0.814	-10.005	-27.856	22.424	-3.971	-151.809	1.315	10.160
25	-1.031	146.378	-1.327	-14.109	-28.102	22.975	-3.721	-155.381	1.267	10.283
26	-1.033	144.630	-1.879	-17.297	-27.717	25.019	-3.535	-158.479	1.246	9.932
27	-1.069	143.710	-2.428	-20.881	-27.097	27.762	-3.260	-162.381	1.193	9.681
28	-0.933	142.159	-2.888	-24.105	-26.834	29.222	-3.088	-165.394	0.968	11.973
29	-0.955	140.332	-3.321	-27.723	-26.590	28.173	-2.924	-168.123	0.965	11.635
30	-0.952	139.172	-3.779	-31.184	-26.442	28.868	-2.763	-171.477	0.953	11.331

Available Packaging:

70 Package - MwT-PH8F70
71 Package - MwT-PH8F71
73 Package - MwT-PH8F73

MwT-PH15F

28 GHz Medium Power AlGaAs/InGaAs pHEMT

Contact Information

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

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

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