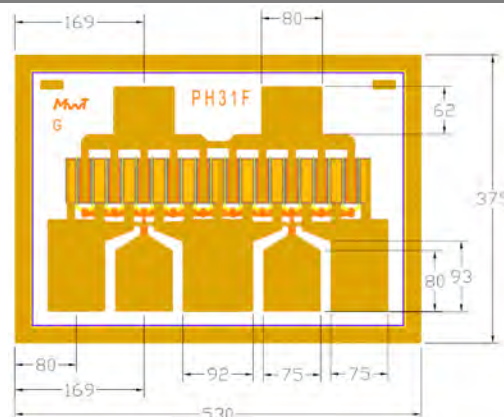


MwT-PH31F 18 GHz Medium Power AlGaAs/InGaAs pHEMT

Features:

- 30 dBm of Power at 12 GHz
- 13 dB Small Signal Gain at 12 GHz
- 44 % PAE at 12 GHz
- 0.25 x 1200 μm Refractory Metal / Gold Gate
- Excellent for Medium Power, Gain, and High Power Added Efficiency
- Ideal for Commercial, Military, Hi-Rel Space Applications



Chip Dimensions: 530 x 375 μm
Chip Thickness: 100 μm

Description:

The MwT-PH31F is a AlGaAs/InGaAs pHEMT (Pseudomorphic-High-Electron-Mobility-Transistor) device whose nominal 0.25 μm gate length and 1200 μm gate width make it ideally suited for applications requiring high-gain and medium power up to 18 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 Ta= 25 °C

PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=8.0V Ids=0.7xIDSS	P1dB	12 GHz	dBm		28.5
Saturated Power Vds=8.0V Ids=0.7xIDSS	Psat	12 GHz	dBm		30.0
Output Third Order Intercept Point Vds=8.0V Ids=0.7xIDSS	OIP3	12 GHz	dBm		37.0
Small Signal Gain Vds=8.0V Ids=0.7xIDSS	SSG	12 GHz	dB		13.0
Power Added Efficiency at P1dB Vds=8.0V Ids=0.7xIDSS	PAE	12 GHz	%		44

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

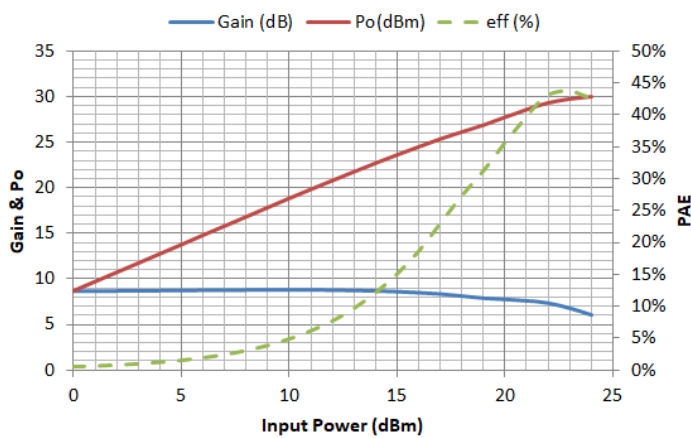
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current Vds= 2.0 V Vgs= 0.0 V	IDSS	mA	240		280
Transconductance Vds= 2.0 V Vgs= 0.0 V	Gm	mS		260	
Pinch-off Voltage Vds= 2.0 V Ids= 1.0 mA	Vp	V		-0.8	-1.0
Gate-to-Source Breakdown Voltage Igs= -0.3 mA	BVGSO	V		-17.0	
Gate-to-Drain Breakdown Voltage Igd= -0.3 mA	BVGDO	V		-18.0	
Chip Thermal Resistance	Rth	C/W		40	

* Overall Rth depends on case mounting

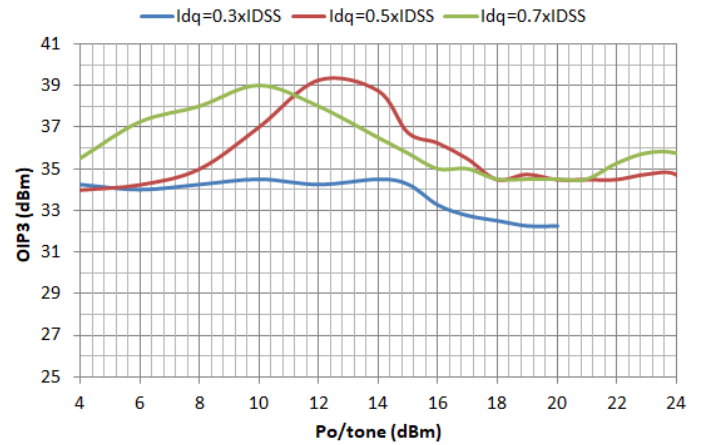
MwT-PH31F

18 GHz Medium Power AlGaAs/InGaAs pHEMT

MwT-PH31F, Po, Gain & PAE at 12GHz vs Pin
Vds=8V; Idq=0.7xIDSS



MwT-PH31F, OIP3 with different Idq vs Po/Tone at 12GHz
Vds=8V; Idq=0.7xIDSS



MwT-PH31F, Load Pull Power Data Vds=8V, Idq=0.7xIdss

Freq GHz	ZS		ZL		Psat dBm
	Mag	phase	mag	phase	
2	0.65	117.00	0.32	164.30	30.52
4	0.78	144.00	0.45	153.10	30.17
6	0.88	156.00	0.44	161.30	30.12
8	0.81	158.00	0.49	153.90	30.10
10	0.91	169.00	0.51	158.30	30.13
12	0.92	174.00	0.55	154.90	30.15

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

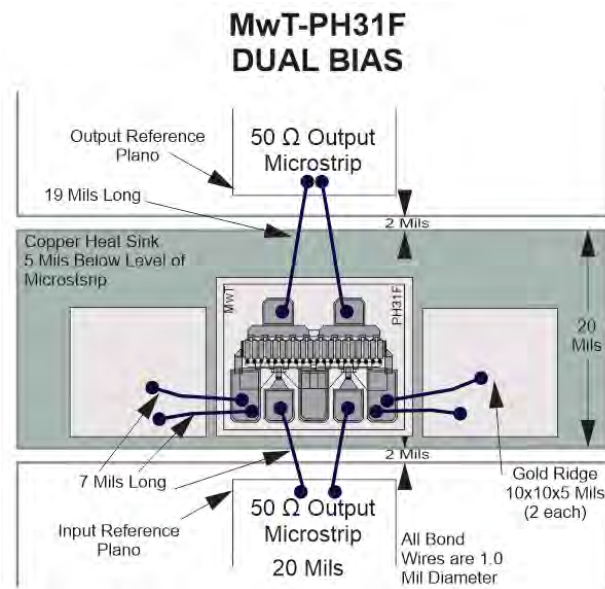
ESD Caution



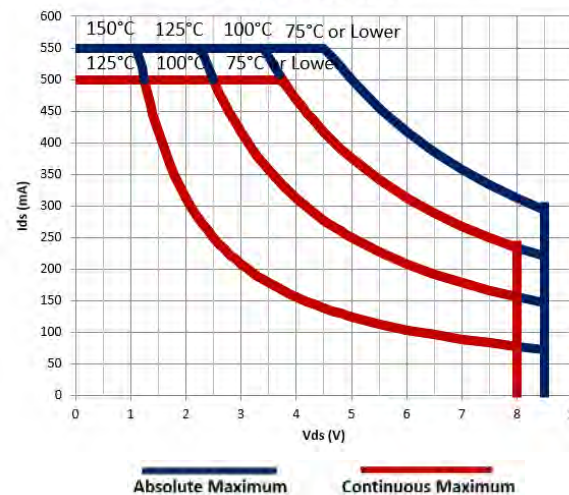
High-performance RF integrated circuits are highly sensitive to electrostatic discharge (ESD) and may contain unprotected inputs and outputs. Handling and assembly should be conducted in an ESD-controlled environment. It is recommended that ESD precautions and protocols are adopted to minimise the risk of electrostatic discharge and protect product integrity.

MwT-PH31F

18 GHz Medium Power AlGaAs/InGaAs pHEMT



SAFE OPERATING LIMITS vs BACKSIDE TEMPERATURE
MwT-PH31F 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	400	500

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-PH31F

18 GHz Medium Power AlGaAs/InGaAs pHEMT

S-Parameters

S-PARAMETER Vds=8.0V, Ids= 0.7 x Idss										
Freq.	S11		S21		S12		S22		K	GMAX
GHz	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		dB
1	-0.856	-98.858	23.713	124.210	-31.068	41.642	-9.306	-52.923	0.169	27.391
2	-1.126	-136.801	19.396	101.730	-29.580	26.348	-11.989	-73.608	0.295	24.488
3	-1.187	-154.298	16.288	88.779	-29.104	20.883	-12.849	-85.132	0.415	22.696
4	-1.214	-164.889	13.962	79.149	-28.877	18.339	-12.763	-93.478	0.533	21.420
5	-1.177	-172.272	11.967	71.631	-28.908	18.260	-12.459	-100.301	0.651	20.438
6	-1.191	-178.371	10.560	64.738	-28.809	18.831	-12.111	-104.555	0.767	19.685
7	-1.183	175.952	9.311	57.617	-28.624	20.736	-11.570	-110.970	0.855	18.968
8	-1.130	172.611	8.041	51.098	-28.513	21.777	-10.606	-116.867	0.904	18.277
9	-1.208	168.696	6.754	44.756	-28.498	24.004	-10.001	-123.659	1.124	15.483
10	-1.129	164.711	5.828	38.604	-28.378	25.482	-9.257	-127.312	1.120	15.000
11	-1.005	160.316	5.000	32.535	-28.252	29.080	-8.672	-132.778	1.060	15.127
12	-0.987	157.617	4.128	26.933	-27.850	31.077	-8.064	-137.285	1.070	14.368
13	-1.051	154.442	3.287	21.238	-27.547	33.862	-7.550	-142.388	1.206	12.677
14	-1.074	152.088	2.395	16.364	-27.121	37.341	-7.020	-147.005	1.281	11.572
15	-0.941	147.793	1.770	11.277	-26.528	40.086	-6.592	-150.663	1.099	12.233
16	-0.883	146.129	1.020	5.313	-25.745	41.127	-6.071	-156.256	0.974	13.383
17	-0.892	143.794	0.341	0.584	-25.141	41.622	-5.569	-160.728	0.951	12.741
18	-0.909	142.175	-0.308	-3.798	-24.475	41.227	-5.101	-165.805	0.918	12.084
19	-0.861	139.912	-1.092	-8.147	-23.866	42.063	-4.882	-169.054	0.869	11.387
20	-0.710	136.819	-1.615	-13.293	-23.311	42.288	-4.600	-172.327	0.663	10.848
21	-0.788	133.976	-2.529	-17.902	-22.382	41.615	-4.175	-175.873	0.698	9.926
22	-0.804	132.169	-3.096	-21.768	-22.031	41.256	-3.786	-179.774	0.686	9.468
23	-0.701	130.823	-3.691	-25.639	-21.623	38.278	-3.718	175.407	0.577	8.966
24	-0.784	128.186	-4.479	-29.154	-21.090	39.326	-3.552	171.496	0.700	8.305
25	-0.767	126.414	-5.039	-33.686	-20.375	37.433	-3.123	167.605	0.579	7.668
26	-0.686	124.598	-5.652	-37.271	-19.682	34.897	-2.871	163.404	0.449	7.015
27	-0.650	122.569	-6.125	-41.252	-19.203	32.833	-2.605	160.210	0.358	6.539
28	-0.592	121.413	-6.853	-43.261	-18.742	31.782	-2.617	156.689	0.344	5.945
29	-0.620	118.473	-7.512	-46.279	-18.198	30.189	-2.440	153.210	0.363	5.343
30	-0.654	117.126	-8.080	-48.940	-17.676	28.161	-2.275	149.717	0.363	4.798

Available Packaging:
71 Package - MwT-PH31F71

RoHS Compliance



CML Micro certifies, to the best of our knowledge, that its products comply with RoHS directive (2011/65/EU), as amended by Directive (EU) 2015/863.

REACH Compliance



CML Micro certifies, to the best of our knowledge, that its products do not contain any of the banned substances specified in the SVHC list at <https://echa.europa.eu/candidate-list-table>. CML Micro are committed to ensuring the safety of products and the compliance with regulations. Publications will be updated in the event that REACH control is compromised.

Contact Information

For further information please contact your local CML sales representative.
Contact details can be found at www.cmlmicro.com.

Important notice: The information provided in this document is believed to be accurate and reliable however, CML assumes no responsibility for any errors or omissions in this document. CML reserves the right to make changes to this document at any time without notice.

The product(s) referenced within this document are not designed, authorized, or warranted for use in life support, life-critical, surgical or nuclear applications, nor in any application where the failure of the product could create a situation where personal injury or death may occur. Customers using or selling the product for such applications do so entirely at their own risk and without any recourse to CML, financial or otherwise.

CML assumes no liability for applications assistance or the design of customers' products. Customers are solely responsible for the design, validation, and testing of customer products as well as compliance with all legal, regulatory, and safety-related requirements concerning their applications.

ALL SPECIFICATIONS AND DATA ARE PROVIDED "AS IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. PRODUCTS ARE PROVIDED UNDER THE TERMS OF CML'S CONDITIONS OF SALE.

Nothing in this document or any purchase of CML products shall be construed as granting any license, whether express or implied, under any patent, copyright, trade secret, or other intellectual property right owned or controlled by CML.