



# MwT-1F

## 12 GHz High Gain GaAs FET

### Features:

- 10 dB Gain at 12 GHz
- 26dBm Output Power at 18GHz
- Excellent for High Linear Amplifier Applications
- 0.25 Micron Refractory Metal/Gold Gate
- 630 Micron Gate Width
- Choice of Chip and Three Package Types

Chip dimensions 775 x 260 microns  
Chip Thickness 100 microns

### Description:

The MwT-1F is a GaAs HJESFET device whose nominal quarter-micron gate length and 630 micron gate width make it ideally suited to applications requiring high-gain and linearity up to 1 GHz. The straight geometry of the MwT-1F makes it equally effective for either wideband (e.g. 2 to 6 GHz) or narrow-band applications. All chips are passivated with SiN (Silicon Nitride).

### RF Specifications: • at $T_a = 25^\circ C$

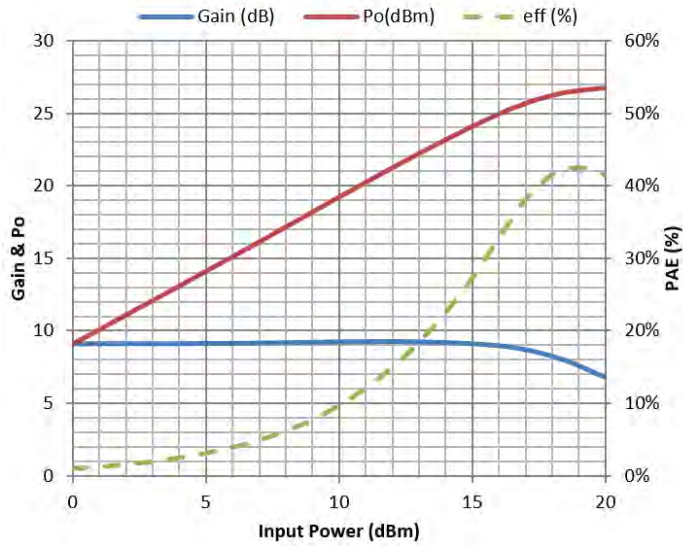
PARAMETERS & CONDITIONS	SYMBOL	FREQ	UNITS	MIN	TYP
Output Power at 1dB Compression Vds=7.0V Ids=0.6xIDSS	P1dB	12 GHz	dBm	25.0	26.0
Output Third Order Intercept Point Vds=7.0V Ids=0.6xIDSS	OIP3	12 GHz	dBm	35	37
Power Added Efficiency Vds=7.0V Ids=0.6xIDSS	PAE	12 GHz	%	35	
Small Signal Gain Vds=6.0V Ids=0.6xIDSS	SSG	12 GHz	dB	9.0	10.0
Optimum Noise Figure Vds=3.0V Ids=90mA	NFOpt	12 GHz	dB		2.0
Gain @ Opt NF Vds=3.0V Ids=90mA	GAIN	12 GHz	dB		7.0

### DC Specifications: • at $T_a = 25^\circ C$

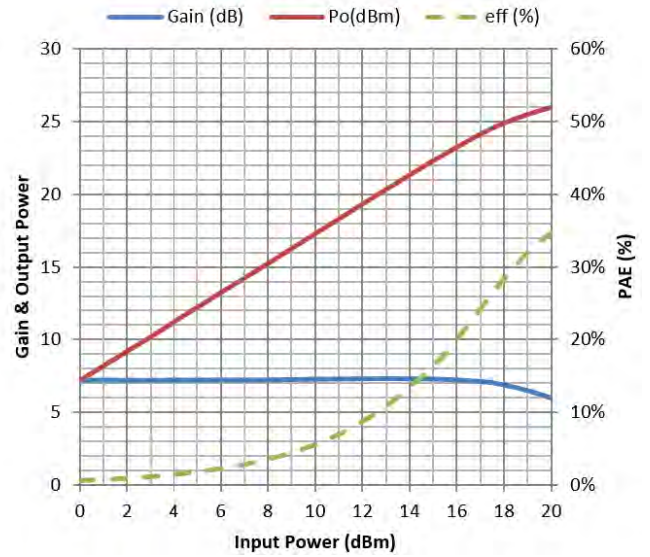
PARAMETERS & CONDITIONS	SYMBOL	UNITS	MIN	TYP	MAX
Saturated Drain Current Vds= 4.0 V Vgs= 0.0 V	IDSS	mA	180		220
Transconductance Vds= 4.0 V Vgs= 0.0 V	Gm	mS	80	100	
Pinch-off Voltage Vds= 3.0 V Ids= 4.0 mA	Vp	V		-2.0	
Gate-to-Source Breakdown Voltage Igs= -1.0 mA	BVGSO	V	-16	-17	
Gate-to-Drain Breakdown Voltage Igd= -1.0 mA	BVGDO	V	-15	-16	
Thermal Resistance <i>MwT-1F chip &amp; 71 pkg 70 pkg &amp; 73 pkg</i>	Rth	C/W			65 165*

\*Overall Rth depends on case mounting

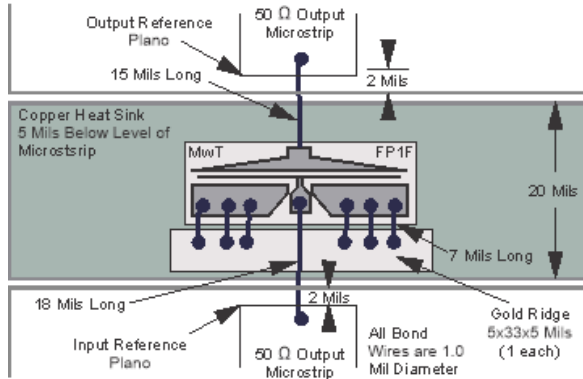
**MwT-1F, Typical Power at 12GHz**  
 $V_{ds}=7V, I_{ds}=0.6 \times I_{dss}$



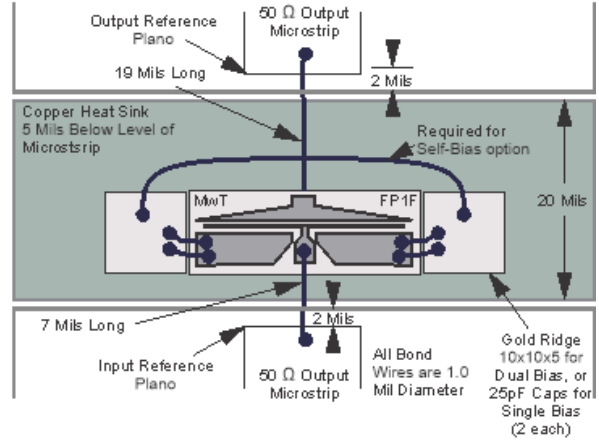
**MwT-1F, Typical Power at 18GHz**  
 $V_{ds}=7V; I_{ds}=0.6 \times I_{dss}$



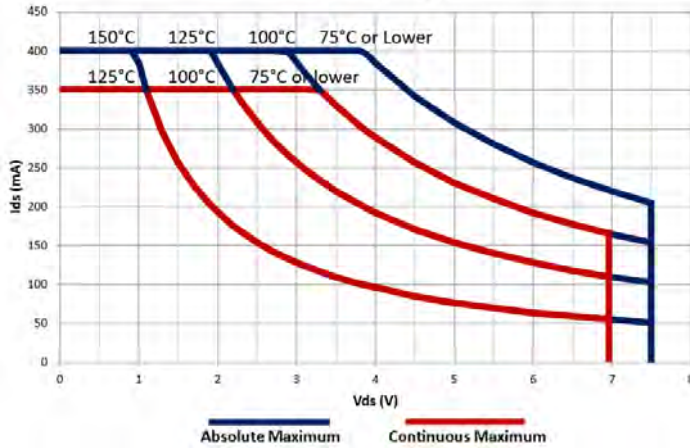
**MwT-1F  
DUAL BIAS**



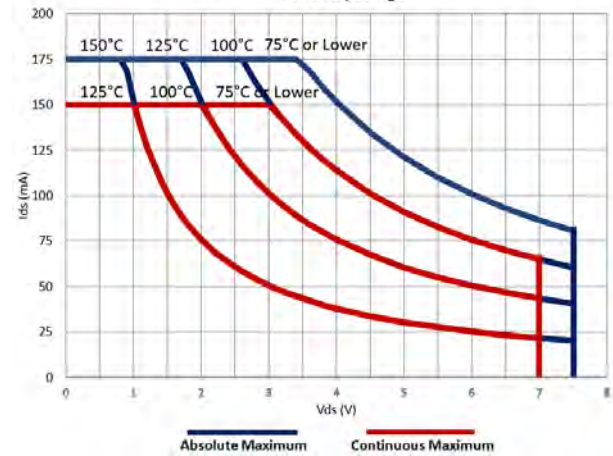
**MwT-1F  
OPTIONAL BONDING**



Safe Operating Limits vs Backside temperature  
Chip & 71 package



Safe Operating Limits vs Backside Temperature  
70 & 73 package



### S-PARAMETER V<sub>ds</sub>=6V, I<sub>ds</sub>= 0.7 x I<sub>dss</sub>

Freq. GHz	S11		S21		S12		S22		K	GMAX dB
	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)	dB	Ang (°)		
1	-0.765	-29.260	16.302	159.098	-34.610	75.507	-5.350	-12.676	0.475	25.456
2	-1.191	-55.072	15.454	140.658	-29.750	63.008	-5.818	-24.083	0.456	22.602
3	-1.668	-77.151	14.367	125.362	-27.205	53.987	-6.324	-33.072	0.517	20.786
4	-2.088	-95.058	13.143	112.629	-26.114	48.036	-6.809	-40.757	0.625	19.629
5	-2.467	-110.344	11.981	100.848	-25.314	43.546	-7.148	-48.094	0.740	18.648
6	-2.811	-121.971	10.874	92.247	-24.934	41.819	-7.493	-52.529	0.897	17.904
7	-2.845	-133.240	9.921	83.617	-24.672	40.685	-7.776	-58.558	0.973	17.296
8	-3.089	-142.838	8.995	75.663	-24.589	40.572	-7.830	-64.382	1.134	14.565
9	-3.033	-150.491	8.289	67.703	-24.245	41.184	-7.491	-73.571	1.111	14.241
10	-3.162	-158.259	7.397	61.030	-24.146	43.162	-7.675	-78.017	1.277	12.610
11	-3.038	-164.452	6.665	55.070	-23.777	45.575	-7.655	-85.600	1.276	12.063
12	-3.081	-170.917	5.992	48.845	-23.403	48.085	-7.419	-89.771	1.313	11.346
13	-2.928	-176.399	5.420	42.890	-22.891	51.213	-7.314	-96.389	1.254	11.121
14	-2.927	178.451	4.745	36.546	-22.301	53.205	-6.973	-102.799	1.235	10.602
15	-2.761	173.872	4.266	31.743	-21.655	56.242	-6.728	-109.778	1.133	10.748
16	-2.818	169.233	3.513	26.361	-20.843	57.375	-6.491	-116.046	1.134	9.951
17	-2.759	165.577	2.903	21.544	-20.051	59.400	-6.263	-122.072	1.081	9.739
18	-2.633	160.189	2.406	14.921	-19.255	59.630	-5.837	-128.257	0.964	10.830
19	-2.576	157.140	1.887	10.801	-18.534	59.326	-5.578	-134.326	0.908	10.211
20	-2.458	153.974	1.235	6.572	-17.704	60.255	-5.295	-139.888	0.841	9.469
21	-2.342	150.890	0.917	2.297	-16.915	58.203	-4.919	-145.353	0.721	8.916
22	-2.252	146.840	0.345	-2.243	-16.111	56.957	-4.568	-150.913	0.654	8.228
23	-2.052	143.492	-0.209	-6.853	-15.420	55.814	-4.256	-157.675	0.575	7.605
24	-1.925	140.757	-0.634	-11.205	-14.703	54.517	-4.004	-162.512	0.503	7.035
25	-1.920	137.444	-1.284	-13.842	-13.944	51.957	-3.527	-167.962	0.465	6.330
26	-1.847	134.467	-1.790	-17.131	-13.414	50.073	-3.272	-170.984	0.420	5.812

### MAXIMUM RATINGS AT Ta = 25 °C

Symbol	Parameter	Units	Cont Max1	Absolute Max2
V <sub>DS</sub>	Drain to Source Volt.	V	See Safe Operating Limits	
T <sub>ch</sub>	Channel Temperature	°C	+150	+175
T <sub>st</sub>	Storage Temperature	°C	-65 to +150	+175
P <sub>in</sub>	RF Input Power	mW	200	300

#### 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.

### ORDERING INFORMATION:

When placing order or inquiring, please specify wafer number, if known. For details of Safe Handling Procedure please see supplementary information in available PDF on our website [www.mwtinc.com](http://www.mwtinc.com).

### Available Packaging:

70 Package - MwT-1F70  
 71 Package - MwT-1F71  
 73 Package - MwT-1F73