

### FEATURES

- 0.6 dB Minimum Noise Figure at 12 GHz
- 10.0 dB Associated Gain at 12 GHz
- 15.0 dBm P1dB at 12 GHz
- 0.15 Micron x 300 Micron Gate

### APPLICATIONS

- Excellent Choice for Super Low Noise Applications
- Ideal for Commercial, Military, Hi-Rel Space Applications

### DESCRIPTION

The MwT-LN300 is a super low noise, quasi-enhancement-mode pHEMT whose nominal 0.15 micron gate length and 300 micron gate width makes it ideally suited for applications requiring very low noise and high associated gain up to 30 GHz. The device is equally effective for wideband (e.g. 6 to 18 GHz) and narrow-band applications. Each wafer can be screened to meet the high quality and reliability requirements for space and military applications.

### RF SPECIFICATIONS AT Ta = 25 C

SYMBOL	PARAMETERS & CONDITIONS	FREQ	UNITS	MIN	TYP	MAX
NF min	Minimum Noise Figure Vds=2.5V Ids = 25 mA (Vgs=0)	4 GHz	dB		0.2	
		12 GHz			0.6	
SSG	Associated Gain Vds=2.5V Ids = 25 mA (Vgs=0)	4 GHz	dB		13.0	
		12 GHz			10.0	
P1dB	Output Power at 1dB Compression Vds=3.0V Ids = 50 mA	12 GHz	dBm		16.0	

Note: MWT-LN300 is a quasi enhancement mode device. For best noise figure, Vgs bias voltage should be set at either 0 or slightly positive voltages to achieve the target operating current.

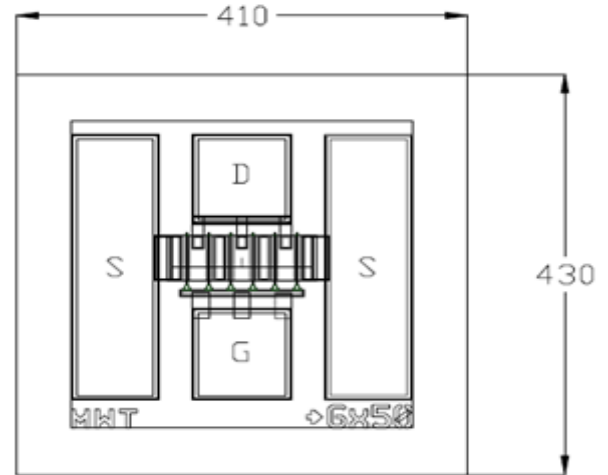
### DC SPECIFICATIONS AT Ta = 25 C

SYMBOL	PARAMETERS & CONDITIONS	FREQ	UNITS	MIN	TYP	MAX
I <sub>max</sub>	Saturated Drain Current Vds = 2.5V Vgs = 0.6V		mA		120	
G <sub>m</sub>	Transconductance Vds = 2.5V Vgs = 0.2V		mS	160	200	
V <sub>p</sub>	Pinch-off Voltage Vds = 2.0V Ids = 0.5mA		V		-0.2	
BV <sub>GSO</sub>	Gate-to-Source Breakdown Voltage I <sub>gs</sub> = -0.3mA		V	-6.0	-8.0	
BV <sub>GDO</sub>	Gate-to-Drain Breakdown Voltage I <sub>gd</sub> = -0.3mA		V	-7.5	-9.0	
R <sub>th</sub> *	Chip Thermal Resistance		°C/W		180	

\* Overall R<sub>th</sub> depends on chip mounting

### NOISE PARAMETERS $V_{ds}=2.5V, I_{ds}=25mA$

Freq (GHz)	NFmin (dB)	GA (dB)	Gamma Opt		Rn/50
			Mag	Ang	
2	0.17	16.5	0.803	-7.7	0.12
4	0.2	13.0	0.799	19.3	0.12
6	0.28	11.2	0.781	42.8	0.12
8	0.37	10.3	0.753	63.1	0.11
10	0.46	9.8	0.719	80.5	0.1
12	0.55	9.5	0.682	95.2	0.09
14	0.65	9.2	0.644	107.6	0.08
16	0.74	9.0	0.611	118.1	0.07
18	0.83	8.7	0.584	126.8	0.07
20	0.92	8.0	0.568	134.2	0.07
22	1.02	7.6	0.565	140.4	0.07
24	1.11	7.2	0.58	145.9	0.06
26	1.2	6.7	0.615	150.8	0.06



Chip Dimensions: 410 x 430 microns

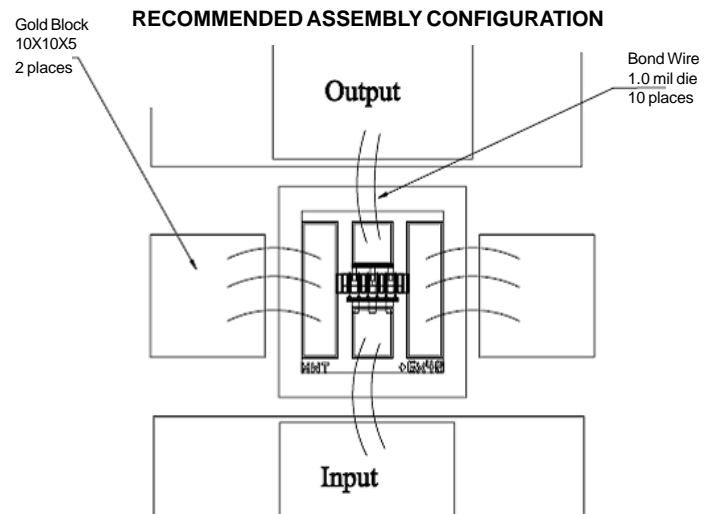
Source pad: 80 x 280

Gate and Drain pad: 90 x 90

Chip Thickness: 100 microns

### S-PARAMETERS $V=2.5V, I_{ds}=25mA$

F GHz	S11		S21		S12		S22		K	GMAX dB
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang		
1	0.93	-31.9	12.22	158.6	0.032	69.9	0.40	-31.2	0.20	25.9
2	0.90	-58.9	10.82	144.5	0.056	58.3	0.41	-61.2	0.15	22.8
3	0.87	-80.5	9.37	132.7	0.073	45.1	0.41	-83.7	0.14	21.1
4	0.86	-97.0	8.09	123.5	0.084	38.9	0.42	-99.8	0.15	19.8
5	0.84	-109.9	7.03	116.1	0.091	30.5	0.42	-112.0	0.15	18.9
6	0.84	-119.7	6.18	110.2	0.097	25.4	0.43	-120.7	0.16	18.0
7	0.83	-127.7	5.49	105.1	0.100	21.1	0.43	-127.7	0.17	17.4
8	0.83	-134.6	4.92	100.6	0.102	17.9	0.44	-133.4	0.18	16.8
9	0.83	-139.8	4.46	96.8	0.104	14.6	0.44	-137.8	0.18	16.3
10	0.83	-144.7	4.06	93.3	0.104	11.9	0.44	-141.8	0.21	15.9
11	0.82	-148.5	3.72	90.2	0.106	10.3	0.44	-144.9	0.24	15.5
12	0.81	-151.7	3.45	87.6	0.106	8.0	0.44	-147.2	0.26	15.1
13	0.82	-154.4	3.20	84.8	0.106	5.9	0.44	-149.2	0.27	14.8
14	0.81	-157.2	3.00	82.2	0.106	4.5	0.45	-151.2	0.30	14.5
15	0.82	-159.7	2.80	79.6	0.105	2.8	0.45	-153.0	0.30	14.3
16	0.82	-162.0	2.63	77.3	0.107	0.8	0.45	-154.2	0.29	13.9
17	0.82	-164.4	2.49	74.9	0.106	-0.6	0.45	-156.1	0.33	13.7
18	0.80	-166.3	2.35	72.9	0.106	-1.2	0.45	-157.0	0.40	13.5
19	0.80	-167.9	2.22	70.6	0.106	-3.5	0.45	-158.2	0.42	13.2
20	0.81	-169.2	2.11	68.3	0.107	-3.9	0.45	-159.4	0.43	12.9
21	0.81	-170.7	2.02	66.8	0.105	-5.5	0.45	-159.7	0.43	12.8
22	0.80	-172.1	1.93	64.4	0.105	-4.3	0.45	-161.2	0.51	12.6
23	0.80	-172.9	1.84	62.9	0.105	-7.8	0.45	-161.6	0.50	12.4
24	0.81	-173.6	1.77	61.1	0.103	-8.6	0.45	-162.7	0.52	12.3
25	0.79	-175.6	1.69	59.2	0.102	-8.5	0.47	-163.1	0.60	12.2
26	0.79	-176.9	1.62	57.4	0.107	-7.89	0.45	-163.5	0.61	11.8



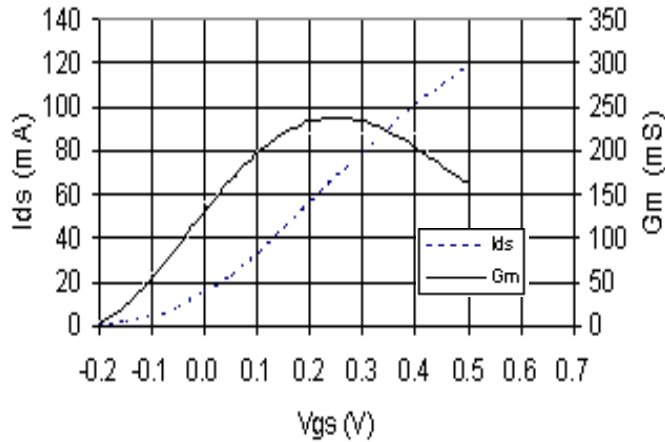
Note: The gold blocks and circuits should be placed as close to the device as possible. The bond wire should be as short as possible.

### MAXIMUM RATINGS at $T_a = 25\text{ C}$

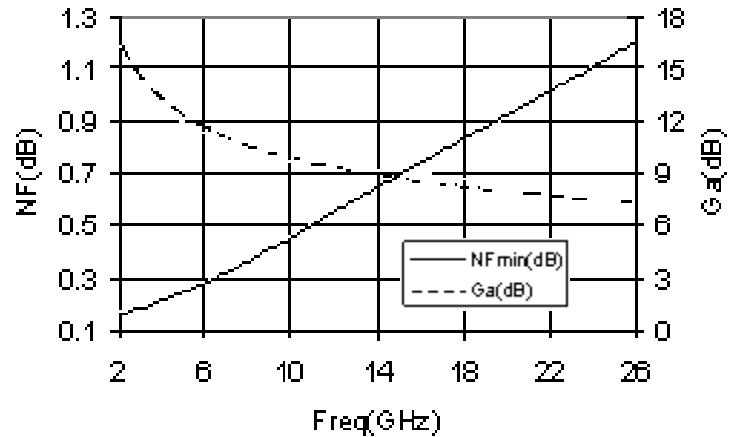
Symbol	Parameters	Units	Cont Max 1	Absolute Max 2
VDS	Drain to Source Voltage	V	4.0	4.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +160	+180
Pin	RF Input Power	mW	20	40
Pt	Total Power Dissipation	mW	300	400

Exceeding any one of these limits in continuous operation may reduce the mean-time-to-failure below the design goal and may cause permanent damage

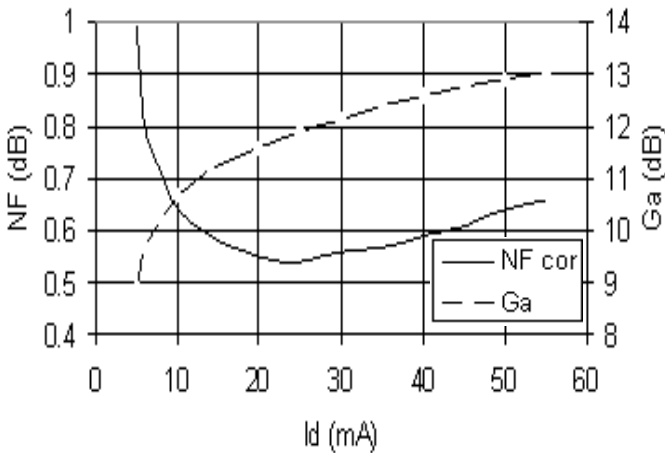
**Gm & Ids vs. Vgs**  
Vds = 2.5V



**NF & Associated Gain vs. Freq**  
Vds = 2.5V, Ids = 20mA



**NF & Ga vs. Ids**  
Freq = 12GHz, Vds = 2.5V



**DC IV Characteristics**

