MwT-LN600

26 GHz Super Low Noise pHEMT Device

FEATURES

- **0.50 dB Minimum Noise Figure at 12 GHz**
- **8.0 dB Associated Gain at 12 GHz**
- **20.0 dBm P1dB at 12 GHz**
- **0.15 Micron x 600 Micron Gate**

APPLICATIONS

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

DESCRIPTION

The MwT- LN600 is a super low noise, quasi enhancement-mode pHEMT whose nominal 0.15 micron gate length and 600 micron gate width make it ideally suited for applications requiring very low noise and high associated gain up to 20 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 quality and reliability requirements of 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 = 40 mA (Vgs=0)	4 GHz 12 GHz	dB		0.2 0.5	
SSG	Associated Gain Vds=2.5V Ids = 40 mA (Vgs=0)	4 GHz 12 GHz	dB	11.0 8.0	12.0 9.0	
P1dB	Output Power at 1dB Compression Vds=3.0V Ids = 100 mA	12 GHz	dBm		20.0	

Note: MWT-LN600 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
Imax	Maximum Current Vds = 2.5V Vgs = 0.6V		mA	150	175	250
Gm	Transconductance Vds = 2.5V Vgs = 0.2V		mS	300	400	
Vp	Pinch-off Voltage Vds = 2.0V Ids = 1.0mA		V		-0.2	
BVGSO	Gate-to-Source Breakdown Voltage Igs = -0.6mA		V	-6.0	-8.0	
BVGDO	Gate-to-Drain Breakdown Voltage Igd = -0.6mA		V	-7.5	-9.0	
Rth *	Chip Thermal Resistance		ºC/W		85	

* Overall Rth depends on chip mounting

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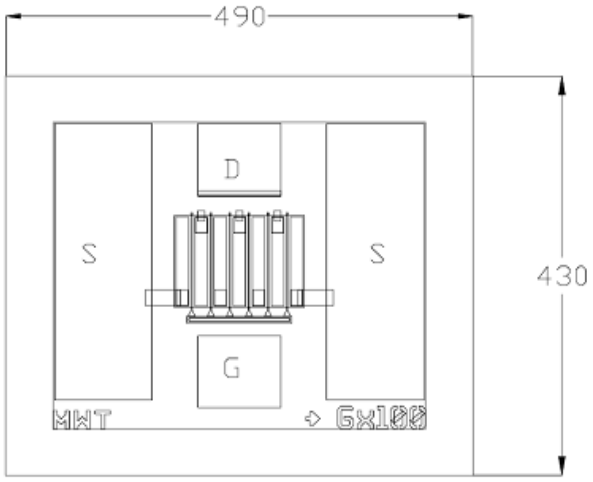
NOISE PARAMETERS Vds=2.5V, Ids=50mA

Freq (GHz)	NFmin (dB)	GA (dB)	Gamma Opt Mag	Gamma Opt Ang	Rn/50
2	0.16	14.0	0.782	3.4	0.05
4	0.2	10.8	0.739	46.2	0.07
6	0.23	9.5	0.714	80.1	0.07
8	0.3	9.0	0.706	106	0.06
10	0.38	8.5	0.71	125.3	0.04
12	0.45	8.2	0.724	138.9	0.03
14	0.53	7.7	0.745	148.1	0.03
16	0.6	7.1	0.771	154	0.02
18	0.68	6.0	0.798	157.8	0.02
20	0.75	4.8	0.823	160.6	0.02
22	0.83	3.9	0.843	163.5	0.02
24	0.9	3.8	0.856	167.8	0.02
26	0.97	3.6	0.859	174.5	0.01

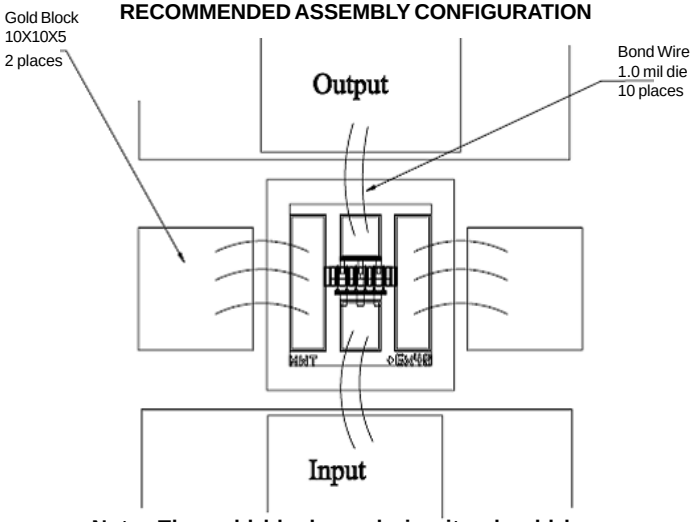


Chip Dimensions: 490 x 430 microns
Source pad: 100 x 300
Gate and Drain pad: 80 x 90
Chip Thickness: 100 microns

S-PARAMETERS Vds=2.5V, Ids=50mA

F	S11		S21		S12		S22		K	GMAX
GHz	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang		dB
1	0.86	-70.7	15.45	140.7	0.040	51.7	0.33	-113.8	0.22	25.8
2	0.86	-109.8	10.89	120.9	0.057	35.1	0.49	-139.3	0.17	22.8
3	0.86	-130.4	8.07	109.8	0.064	25.3	0.55	-152.1	0.19	21.0
4	0.86	-142.4	6.34	102.5	0.067	19.8	0.57	-159.1	0.21	19.8
5	0.86	-150.5	5.18	97.2	0.069	15.7	0.59	-163.9	0.22	18.8
6	0.86	-156.0	4.39	93.1	0.070	13.6	0.59	-167.4	0.26	18.0
7	0.86	-160.3	3.80	89.4	0.070	11.8	0.60	-170.1	0.28	17.3
8	0.86	-163.9	3.34	86.1	0.070	9.9	0.61	-172.4	0.31	16.8
9	0.87	-166.8	2.99	83.2	0.072	8.6	0.61	-174.1	0.32	16.2
10	0.86	-169.3	2.69	80.6	0.071	7.4	0.61	-176.0	0.37	15.8
11	0.86	-171.1	2.45	78.2	0.070	6.0	0.61	-177.6	0.41	15.4
12	0.85	-172.9	2.26	75.9	0.071	6.1	0.61	-178.7	0.46	15.0
13	0.86	-174.3	2.08	73.7	0.070	5.5	0.61	-179.6	0.50	14.7
14	0.85	-176.0	1.94	71.4	0.070	6.2	0.61	179.5	0.56	14.4
15	0.86	-177.2	1.81	69.2	0.070	4.4	0.61	178.3	0.57	14.1
16	0.86	-178.2	1.70	67.3	0.068	2.9	0.61	177.5	0.57	14.0
17	0.86	-179.9	1.59	64.9	0.072	3.9	0.61	176.2	0.63	13.5
18	0.85	178.8	1.51	63.2	0.069	4.7	0.61	175.4	0.75	13.4
19	0.84	177.9	1.43	61.0	0.070	4.1	0.61	174.1	0.81	13.1
20	0.85	177.4	1.35	59.2	0.068	4.3	0.61	173.0	0.89	13.0
21	0.85	176.6	1.29	57.6	0.069	6.6	0.61	173.3	0.88	12.7
22	0.83	175.5	1.22	55.7	0.067	1.6	0.61	171.4	1.07	11.0
23	0.84	175.1	1.17	53.9	0.067	4.2	0.60	171.4	1.06	11.0
24	0.84	175.6	1.13	52.3	0.066	4.9	0.61	170.7	1.11	10.3
25	0.84	173.3	1.08	50.7	0.066	6.1	0.61	170.5	1.14	9.8
26	0.83	172.8	1.04	48.8	0.068	10.0	0.60	169.6	1.35	8.3

RECOMMENDED ASSEMBLY CONFIGURATION



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 Ta = 25 C

Symbol	Parameters	Units	Cont Max 1	Absolute Max 2
VDS	Drain to Source Voltage	V	4.5	5.5
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +160	+180
Pin	RF Input Power	mW	30	50
Pt	Total Power Dissipation	mW	500	600

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

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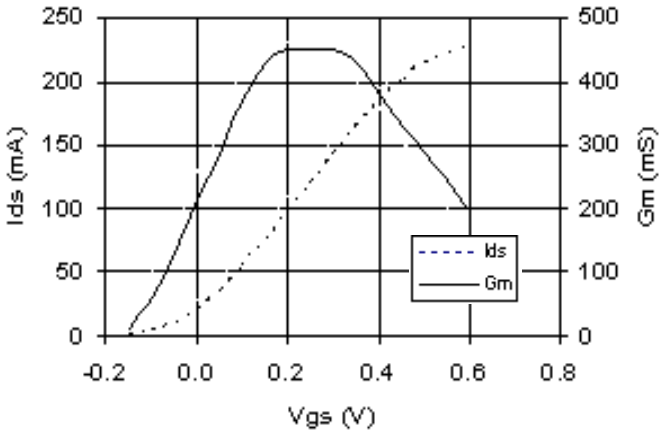
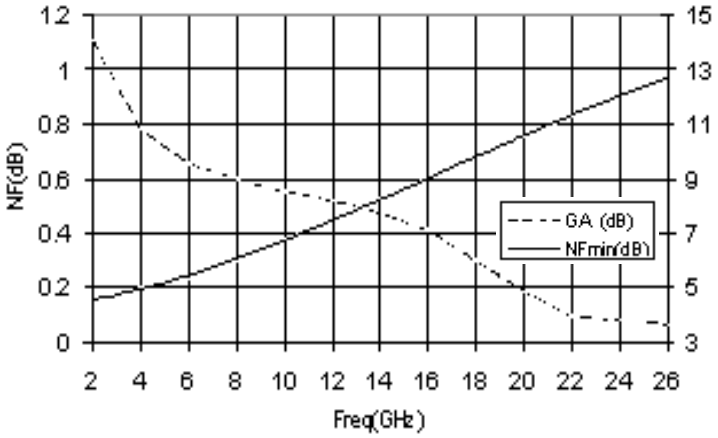
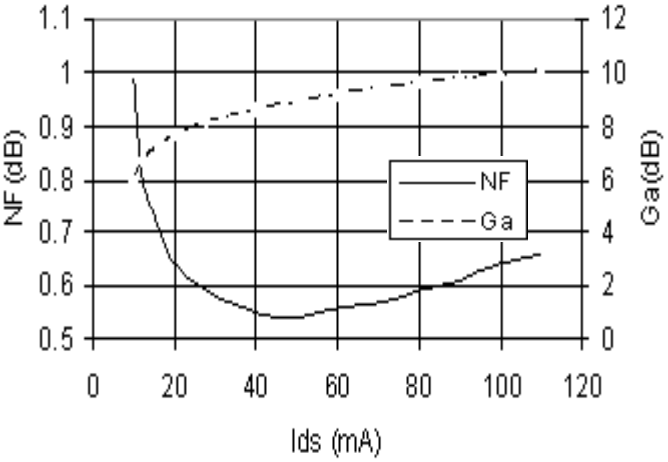
Gm & Ids vs. Vgs
Vds = 2.5V



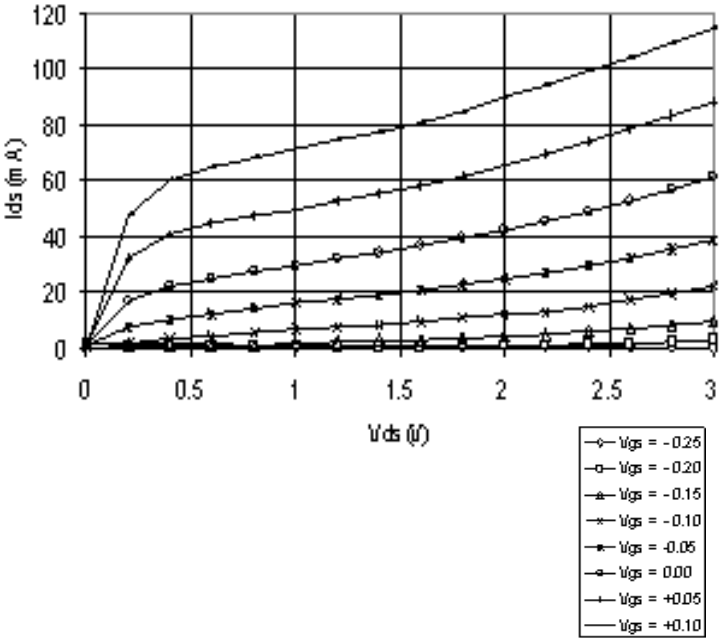
NF & Associated Gain vs. Freq
Vds = 2.5V, Ids = 50mA



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



DC IV Characteristics



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