NEC

30 W L-BAND POWER GaAs MESFET

NES1821B-30

FEATURES

- **CLASS A OR AB OPERATION**
- **HIGH OUTPUT POWER**
- **HIGH GAIN**
- **HIGH POWER ADDED EFFICIENCY**
- **PARTIALLY MATCHED**
- **HIGH RELIABILITY**

DESCRIPTION

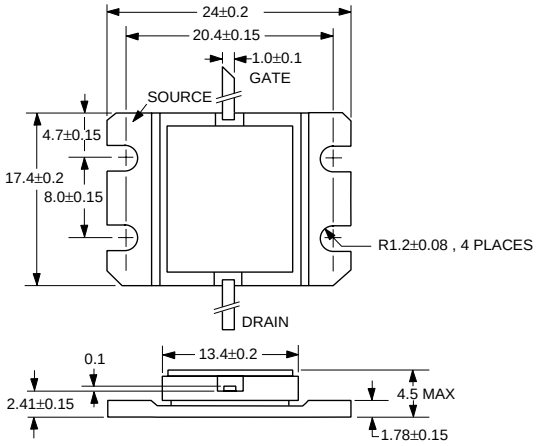
The NES1821B-30 is a power GaAs FET which provides high output power and high gain in the 1.8 - 2.1 GHz band.

Internal input matching circuits are designed to optimize performance. The device has a 0.8 µm gate length for increased linear gain.

The device incorporates a WSi (tungsten silicide) gate structure for high reliability, SiO_2 glassivation for surface stability, and a plated heat sink for reduced thermal resistance.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE T-79



ELECTRICAL CHARACTERISTICS (T_C = 25°C)

PART NUMBER PACKAGE OUTLINE			NES1821B-30 T-79			
SYMBOLS	**CHARACTERISTICS**	**UNITS**	**MIN**	**TYP**	**MAX**	**TEST CONDITIONS**
P_{OUT}	Output Power[1]	dBm	44.5	45.0		f = 1.9 GHz
G_L	Linear Gain	dB	11.5	13.0		V_{DS} = 10 V
I_D	Drain Current[2]	A		2.5		I_D = 1.0 A (RF OFF) Rg = 30 Ω[3]
I_{DSS}	Saturated Drain Current	A		18.0		V_{DS} = 2.5 V, V_{GS} = 0 V
V_P	Pinch-off Voltage	V	-4.0	-2.6		V_{DS} = 2.5 V, I_D = 80 mA
$R_{TH\ (CH-C)}$	Thermal Resistance	°C/W		1.4	1.7	Channel to Case

Notes:
1. P_{IN} = 35.5 dBm
2. P_{OUT} = 37 dBm
3. Rg is the series resistance between the gate supply and the FET gate.

ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{DS}	Drain to Source Voltage	V	15
V_{GS}	Gate to Source Voltage	V	-7
V_{GD}	Gate to Drain Voltage	V	-18
I_D	Drain Current	A	27
I_G	Gate Current	mA	180
P_T[2]	Total Power Dissipation	W	110
T_{CH}	Channel Temperature	°C	175
T_{STG}	Storage Temperature	°C	-65 to +175

Note:
1. Operation in excess of any one of these parameters may result in permanent damage.

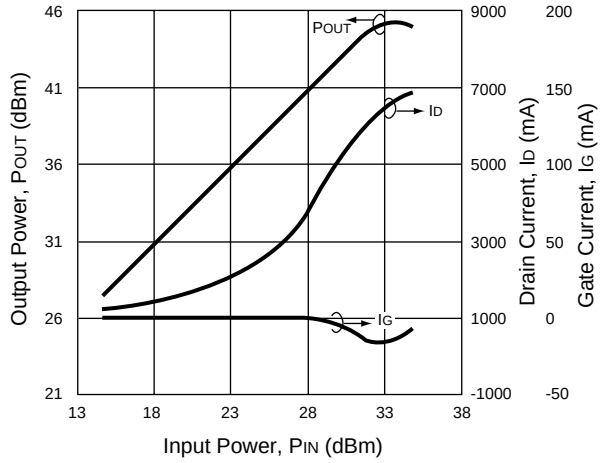
MAXIMUM OPERATING LIMITS

PART NUMBER	Rg [1] Ω	V_{DS} V	T_{CH} °C	G.C.P.[2]
NES1821B-30	30	10	125	3 dB_{COMP}

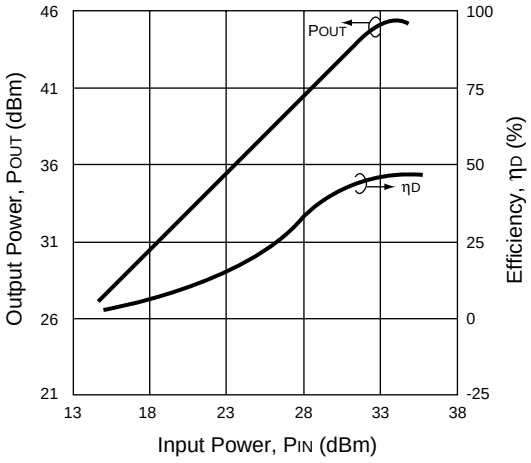
Notes:
1. Rg is the series resistance between the gate supply and the FET gate.
2. G.C.P. is the Gain Compression Point.

TYPICAL PERFORMANCE CURVES (TA = 25°C)

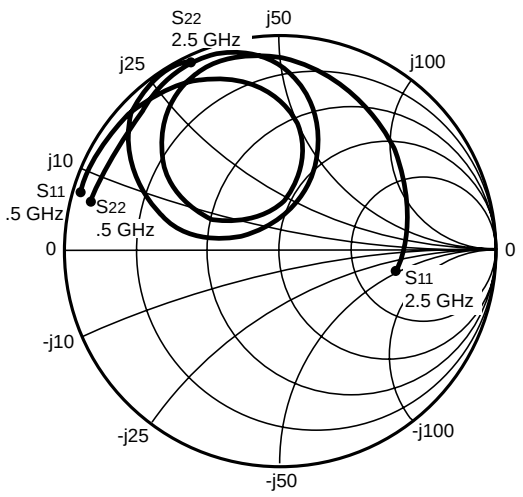
OUTPUT POWER, DRAIN CURRENT AND GATE CURRENT vs. INPUT POWER
V_{DS} = 10 V, I_{DSQ} = 1 A

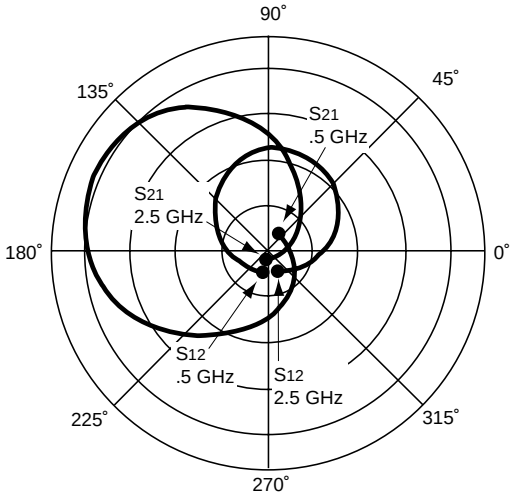


OUTPUT POWER, DRAIN CURRENT AND EFFICIENCY vs. INPUT POWER
V_{DS} = 10 V, I_{DSQ} = 1 A



TYPICAL SCATTERING PARAMETERS





V_{DS} = 10 V, I_{DS} = 1000 mA, V_{GS} = 2.33 V

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}		K	MAG[1]
(GHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		(dB)
0.500	0.968	164.2	0.530	58.3	0.005	-13.9	0.909	166.2	1.99	15.0
0.700	0.964	157.3	0.455	44.9	0.004	-22.8	0.906	162.7	2.70	12.9
0.900	0.957	149.9	0.464	29.2	0.006	-35.5	0.893	159.3	2.39	12.2
1.100	0.940	140.3	0.544	9.3	0.008	-57.7	0.872	155.0	2.28	11.7
1.300	0.905	127.7	0.713	-17.0	0.012	-86.7	0.857	150.0	2.02	11.8
1.500	0.843	112.8	1.010	-51.4	0.021	-122.4	0.863	142.4	1.49	12.7
1.700	0.737	95.5	1.581	-94.8	0.037	-169.5	0.928	128.0	0.99	16.3
1.740	0.701	91.4	1.782	-105.1	0.043	180.0	0.941	123.6	0.92	16.2
1.780	0.651	86.7	2.050	-116.1	0.052	168.1	0.949	118.3	0.87	16.0
1.820	0.573	81.4	2.434	-128.9	0.063	156.0	0.947	111.3	0.83	15.9
1.860	0.446	75.7	3.006	-145.2	0.080	139.5	0.917	101.3	0.79	15.7
1.900	0.231	84.0	3.808	-168.7	0.105	116.1	0.791	85.4	0.78	15.6
1.940	0.337	156.2	4.378	157.1	0.125	82.2	0.426	65.5	0.80	15.5
1.980	0.711	142.5	3.816	119.7	0.112	45.1	0.187	158.7	0.87	15.3
2.020	0.865	124.0	2.802	92.6	0.085	17.9	0.547	163.7	0.96	15.2
2.060	0.899	111.5	2.067	74.3	0.064	-0.5	0.764	153.4	1.04	13.9
2.100	0.900	102.6	1.580	59.9	0.050	-14.5	0.898	144.5	1.02	14.1
2.140	0.890	95.1	1.241	47.5	0.041	-26.0	0.978	137.1	0.86	14.8
2.180	0.874	88.3	0.992	36.3	0.033	-35.9	1.021	130.7	0.56	14.7
2.220	0.853	81.4	0.798	26.2	0.028	-46.0	1.029	125.3	0.25	14.6
2.260	0.828	73.9	0.648	17.6	0.023	-54.7	1.019	121.6	0.11	14.5
2.300	0.798	65.7	0.545	9.6	0.020	-61.9	1.007	118.9	0.22	14.3
2.500	0.551	-10.4	0.234	-34.9	0.008	-103.4	0.950	114.5	17.99	-1.0