

NEC

GaAs MES FET
NES1821B-30

30W L-BAND POWER GaAs FET
N-CHANNEL GaAs MES FET

DESCRIPTION

The NES1821B-30 is 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. To reduce thermal resistance, the device uses PHS (Plated Heat Sink) technology.

The device incorporates WSi (tungsten silicide) gate for high reliability and SiO_2 glassivation for surface stability.

FEATURES

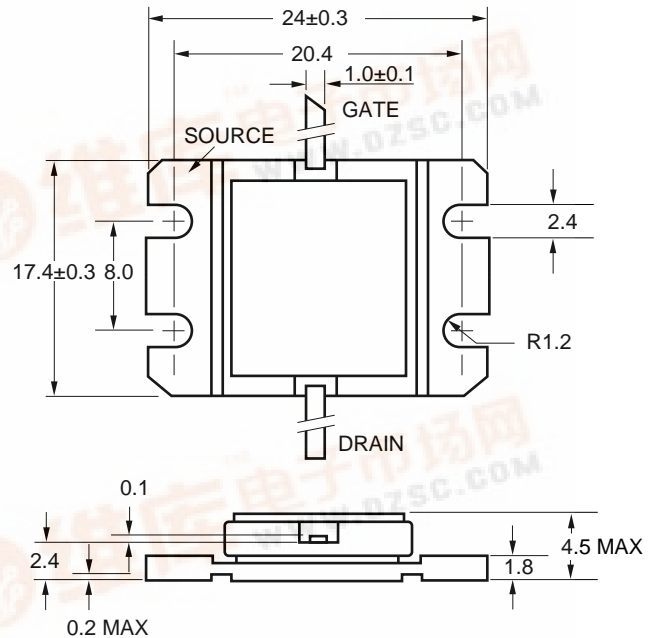
- High output power
- High gain
- High power added efficiency
- Internally matched input
- High reliability

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V _{DS}	15	V
Gate to Source Voltage	V _{GS}	-7	V
Gate to Drain Voltage	V _{GD}	-18	V
Drain Current	I _D	27	A
Gate Current	I _G	180	mA
Total Power Dissipation	P _{T(*)}	110	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-65 to +175	°C

*T_C = 25 °C

PACKAGE DIMENSIONS (UNIT: mm)



Caution Please handle this device at static-free workstation, because this is an electrostatic sensitive device.



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Saturated Drain Current	I _{DSS}	--	18.0	--	A	V _{DS} = 2.5 V, V _{GS} = 0 V
Pinch-off Voltage	V _P	-4.0	-2.6	--	V	V _{DS} = 2.5 V, I _{DS} = 80 mA
Thermal Resistance	R _{th}	--	1.4	1.7	°C/W	Channel to Case
Output Power	P _O *1	44.5	45.0	--	dBm	freq. = 1.96 GHz V _{DS} = 10 V I _{DS} = 1.0 A set R _g = 30 Ω *3
Linear Gain	GL	11.0	13.0	--	dB	
Drain Current	I _D *2	--	2.5	--	A	

*1 PIN = 35.5 dBm

*2 P_O = 37 dBm

RECOMMENDING OPERATING LIMITS

R _g *3 (Ω)	V _{DS} (V)	T _{ch} (°C)	G.C.P *4
30	to 10	to 125	to 3 dB comp

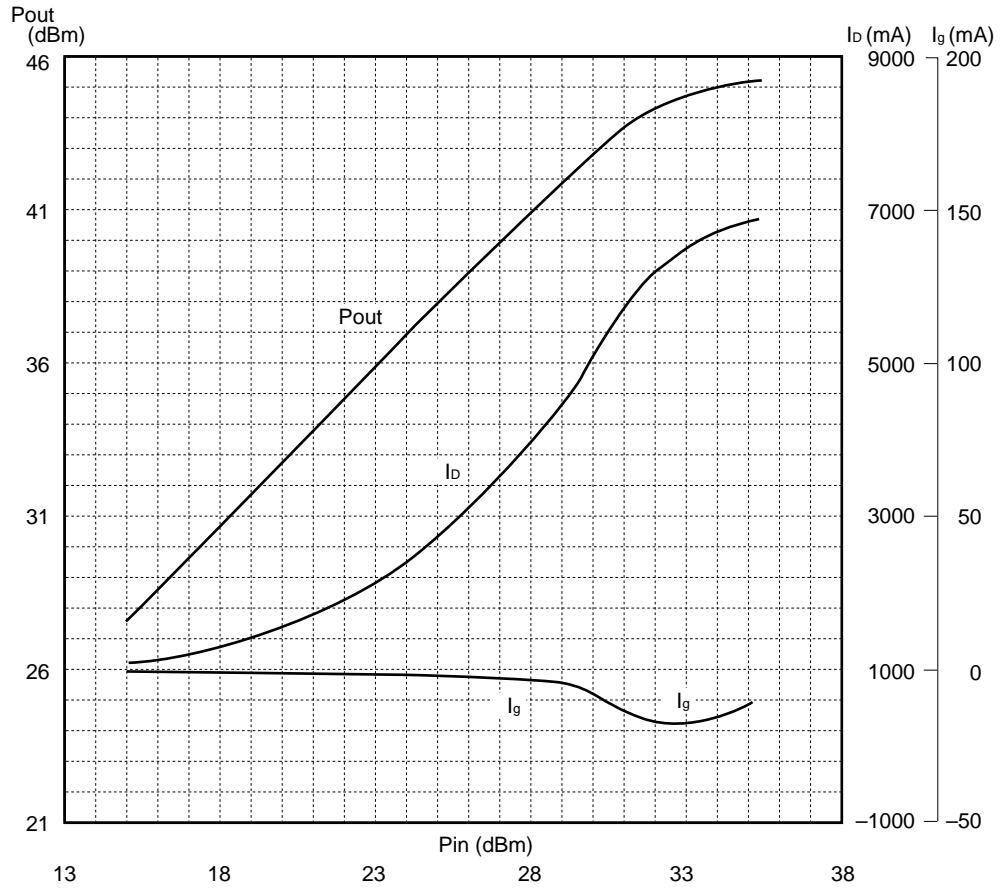
Note

*3 R_g is the series resistance between the gate supply and the FET gate.

*4 G.C.P: Gain Compression Point

TYPICAL RF PERFORMANCE

f = 1.96 GHz, Vd = 10 V, Id = 1 A set, Rg = 30 Ω



S-PARAMETER

V_{DS} = 10 V, I_{DS} = 1 A set

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
1 600.000	0.793	114.8	1.210	-18.4	0.027	-92.7	0.903	144.0
1 610.000	0.786	113.9	1.235	-20.1	0.028	-94.2	0.904	143.5
1 620.000	0.779	113.0	1.256	-21.2	0.029	-95.7	0.908	143
1 630.000	0.774	112.2	1.286	-21.8	0.030	-97.7	0.909	142.5
1 640.000	0.766	111.3	1.337	-22.3	0.032	-100.4	0.912	141.8
1 650.000	0.758	110.4	1.412	-23	0.033	-103.3	0.914	141.3
1 660.000	0.752	109.4	1.511	-24.7	0.034	-106.6	0.919	140.7
1 670.000	0.744	108.5	1.616	-27.7	0.035	-109.7	0.920	140.0
1 680.000	0.736	107.4	1.711	-32.0	0.036	-112.6	0.924	139.3
1 690.000	0.728	106.4	1.768	-36.8	0.036	-114.6	0.927	138.5
1 700.000	0.720	105.3	1.791	-41.4	0.036	-116.1	0.929	137.6
1 710.000	0.710	104.2	1.783	-45.5	0.037	-116.8	0.931	136.9
1 720.000	0.698	103.0	1.758	-48.3	0.039	-117.4	0.934	136.0
1 730.000	0.688	101.9	1.748	-49.8	0.041	-118.1	0.936	134.9
1 740.000	0.675	100.6	1.763	-50.2	0.045	-119.6	0.938	133.8
1 750.000	0.662	99.3	1.822	-49.9	0.049	-122.5	0.940	132.7
1 760.000	0.646	98.0	1.947	-50.1	0.052	-126.5	0.940	131.4
1 770.000	0.631	96.5	2.136	-51.7	0.055	-131.1	0.939	130.2
1 780.000	0.614	94.9	2.350	-55.6	0.057	-136.0	0.937	128.6
1 790.000	0.593	93.3	2.547	-61.2	0.059	-140.2	0.934	127.0
1 800.000	0.571	91.6	2.682	-67.6	0.060	-143.8	0.929	125.2
1 810.000	0.546	89.8	2.742	-73.9	0.062	-146.4	0.923	123.4
1 820.000	0.519	87.9	2.749	-79.0	0.065	-148.6	0.916	121.3
1 830.000	0.488	85.9	2.748	-83.0	0.068	-151.0	0.907	119.1
1 840.000	0.453	83.9	2.771	-86.0	0.073	-154.1	0.891	116.5
1 850.000	0.411	81.9	2.846	-88.3	0.080	-158.1	0.870	113.6
1 860.000	0.362	80.3	3.006	-90.9	0.086	-163.4	0.845	110.5
1 870.000	0.307	79.5	3.249	-94.8	0.093	-169.5	0.814	107.1
1 880.000	0.243	80.9	3.544	-100.6	0.098	-175.9	0.774	103.2
1 890.000	0.176	88.9	3.819	-108.4	0.104	177.3	0.721	99.1
1 900.000	0.124	113.0	4.028	-117.1	0.109	170.1	0.651	94.9
1 910.000	0.134	152.3	4.143	-125.9	0.113	162.4	0.569	90.6
1 920.000	0.208	172.6	4.189	-134.3	0.117	154.1	0.470	87.5
1 930.000	0.307	177.0	4.201	-142.6	0.118	145.0	0.360	86.5
1 940.000	0.410	175.3	4.179	-151.0	0.117	135.9	0.253	91.9
1 950.000	0.511	170.6	4.110	-159.7	0.115	127.2	0.174	112.1
1 960.000	0.602	164.9	3.967	-168.2	0.111	118.9	0.168	147.0
1 970.000	0.678	158.9	3.762	-176.3	0.107	111.1	0.230	168.2
1 980.000	0.739	152.9	3.531	176.3	0.101	103.6	0.312	175.3
1 990.000	0.787	147.3	3.299	169.6	0.094	96.5	0.391	176.5
2 000.000	0.822	142.2	3.081	163.3	0.088	90.5	0.462	175.3
2 010.000	0.848	137.5	2.850	157.0	0.081	85.3	0.524	173.4
2 020.000	0.865	133.2	2.607	151.2	0.076	81.0	0.576	171.2
2 030.000	0.880	129.2	2.363	146.2	0.071	77.2	0.623	168.9
2 040.000	0.887	125.7	2.129	142.6	0.068	73.5	0.661	166.6
2 050.000	0.892	122.5	1.927	140.2	0.065	69.3	0.695	164.6
2 060.000	0.895	119.4	1.772	138.9	0.062	64.3	0.724	162.6
2 070.000	0.898	116.5	1.670	138.0	0.059	58.7	0.747	160.7
2 080.000	0.897	113.8	1.613	136.6	0.054	53.5	0.768	158.7
2 090.000	0.896	111.1	1.583	134.1	0.050	49.2	0.788	157.1
2 100.000	0.894	108.7	1.546	130.3	0.045	45.9	0.804	155.5
2 110.000	0.891	106.3	1.485	125.4	0.041	44.6	0.819	154.0
2 120.000	0.887	103.9	1.386	120.2	0.038	43.6	0.831	152.7
2 130.000	0.884	101.7	1.265	116.0	0.036	43.7	0.842	151.3
2 140.000	0.879	99.5	1.141	113.2	0.035	43.5	0.851	150
2 150.000	0.875	97.2	1.031	112.1	0.035	42.4	0.860	148.7
2 160.000	0.871	95.1	0.949	112.6	0.035	39.7	0.871	147.5
2 170.000	0.865	93.0	0.897	114	0.034	35.5	0.879	146.4
2 180.000	0.861	90.9	0.880	115.0	0.033	30.5	0.885	145.4
2 190.000	0.856	88.6	0.888	114.7	0.030	26.0	0.892	144.2

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