

NEC

GaAs MES FET
NE6500496

4 W L, S-BAND POWER GaAs FET
N-CHANNEL GaAs MES FET

DESCRIPTION

The NE6500496 is power GaAs FET which provides high gain, high efficiency and high output power in L, S band.

To reduce thermal resistance, the device has a PHS (Plated Heat Sink) structure.

FEATURES

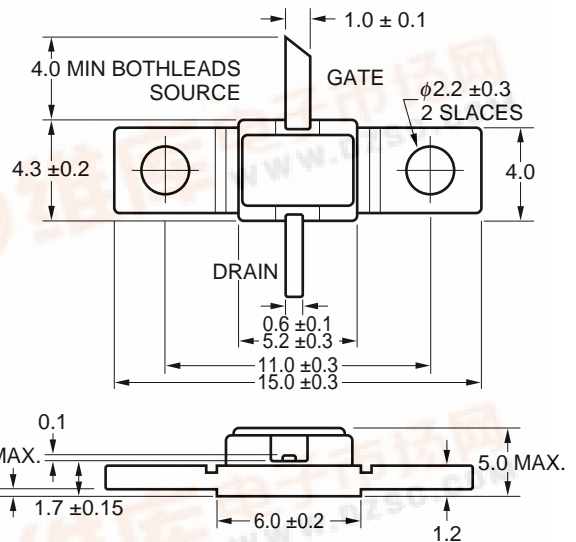
- Class A operation
- High output power: 36 dBm (typ)
- High gain: 11.5 dB (typ)
- High power added efficiency: 45 % (typ)
- Hermetically sealed ceramic package

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V _{DSX}	15	V
Gate to Drain Voltage	V _{GDX}	-18	V
Gate to Source Voltage	V _{G SX}	-12	V
Drain Current	I _D	4.5	A
Gate Current	I _G	25	mA
Total Power Dissipation	P _T (*)	25	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-65 to +175	°C
Temperature Cycling	T _∞	-40 to +120	°C

* T_C = 25 °C

PACKAGE DIMENSION (UNIT: mm)



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

MAXIMUM OPERATION RANGE

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Drain to Source Voltage	V_{DS}	–	10	10	V
Channel Temperature	T_{ch}	–	–	130	°C
Input Power	G_{comp}	–	–	3	dBcomp
Gate Resistance	R_g	–	–	200	Ω

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ °C}$)

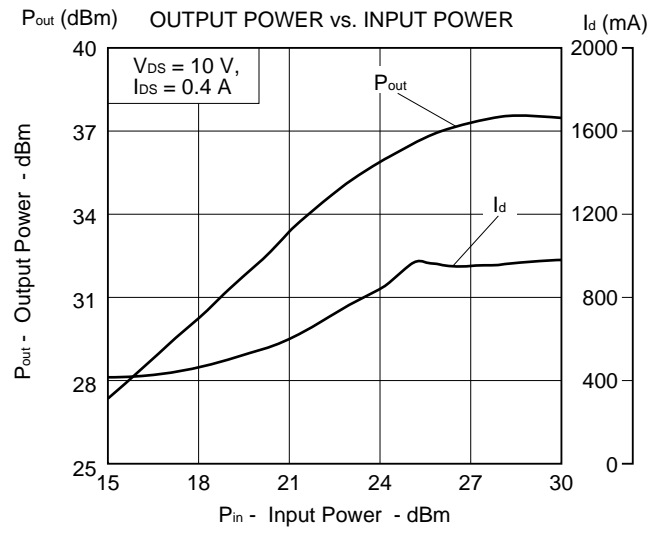
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Saturated Drain Current	I_{DSS}	1.0	2.3	3.5	A	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}$
Pinch-off Voltage	V_P	–3.5	–2.0	–0.5	V	$V_{DS} = 2.5\text{ V}, I_{DS} = 15\text{ mA}$
Transconductance	g_m	–	1300	–	mS	$V_{DS} = 2.5\text{ V}, I_{DS} = 1\text{ A}$
Thermal Resistance	R_{th}	–	6.0	6.5	°C/W	channel to case

PERFORMANCE SPECIFICATIONS ($T_A = 25\text{ °C}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Output Power	P_{out}	35.5	36.0	–	dBm	$f = 2.3\text{ GHz}, V_{DS} = 10\text{ V}$ $I_{DS} \leq 0.4\text{ A}, P_{in} = 26.0\text{ dBm}$ $R_g = 200\ \Omega$
Gate to Source Current	I_{GS}	–5	–	5	mA	
Power Added Efficiency	η_{add}	–	45	–	%	
Linear Gain	G_L	11.0	11.5	–	dB	$P_{in} \leq 20\text{ dBm (*)}$

* The other are the same as the above conditions.

TYPICAL CHARACTERISTICS (T_A = 25 °C)



S-PARAMETER

$V_{DS} = 9.0\text{ V}$, $I_{BS} = 400\text{ mA}$, $V_{GS} = -1.619\text{ V}$, $I_G = 0.0\text{ mA}$

FREQUENCY GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.100	0.978	-80.0	17.314	137.4	0.010	60.2	0.612	-172.8
0.200	0.957	-118.9	11.458	116.5	0.015	36.4	0.667	-175.2
0.300	0.951	-137.8	8.252	105.7	0.016	30.0	0.687	-177.6
0.400	0.949	-148.5	6.388	98.8	0.016	29.0	0.695	-179.7
0.500	0.947	-155.4	5.188	93.9	0.017	29.1	0.700	178.8
0.600	0.947	-160.2	4.368	90.0	0.017	27.5	0.704	177.4
0.700	0.946	-163.9	3.769	86.6	0.017	29.5	0.705	176.2
0.800	0.946	-166.8	3.319	83.6	0.018	31.0	0.707	175.1
0.900	0.946	-169.2	2.963	80.8	0.018	32.8	0.709	174.0
1.000	0.945	-171.2	2.679	78.2	0.019	33.7	0.710	173.0
1.100	0.945	-173.1	2.438	75.5	0.020	34.9	0.711	172.2
1.200	0.946	-174.5	2.251	73.4	0.020	35.7	0.711	171.2
1.300	0.945	-175.9	2.087	71.2	0.021	36.8	0.714	170.3
1.400	0.944	-177.1	1.947	69.0	0.021	38.6	0.715	169.4
1.500	0.945	-178.2	1.828	67.0	0.022	39.5	0.716	168.5
1.600	0.944	-179.4	1.720	64.7	0.023	40.5	0.715	167.5
1.700	0.943	179.6	1.627	62.6	0.024	41.8	0.716	166.2
1.800	0.944	178.6	1.547	60.5	0.024	41.8	0.721	165.4
1.900	0.943	177.7	1.468	58.7	0.025	43.8	0.718	164.5
2.000	0.944	176.8	1.404	56.4	0.026	43.8	0.719	163.2
2.100	0.944	175.9	1.345	54.6	0.027	45.8	0.722	162.0
2.200	0.945	175.2	1.296	52.7	0.028	46.4	0.728	161.1
2.300	0.945	174.3	1.245	50.8	0.030	47.4	0.725	160.4
2.400	0.945	173.5	1.201	48.6	0.031	45.8	0.726	158.7
2.500	0.944	172.7	1.163	46.8	0.031	47.2	0.734	157.4
2.600	0.944	172.0	1.131	45.2	0.034	49.1	0.742	156.8
2.700	0.945	171.2	1.087	43.7	0.035	48.7	0.737	156.1
2.800	0.947	170.4	1.054	41.6	0.036	47.5	0.738	154.5
2.900	0.947	169.6	1.028	39.6	0.037	46.7	0.745	153.3
3.000	0.946	168.7	1.008	37.7	0.039	47.2	0.757	152.3
3.500	0.947	164.9	0.901	29.5	0.046	46.8	0.766	148.8
4.000	0.950	160.5	0.840	20.9	0.056	41.3	0.771	144.2
4.500	0.941	155.3	0.810	11.9	0.059	37.4	0.776	138.0
5.000	0.933	149.6	0.795	1.5	0.069	33.4	0.792	130.8

$V_{DS} = 10.0\text{ V}$, $I_{DS} = 400\text{ mA}$, $V_{GS} = -1.662\text{ V}$, $I_G = 0.0\text{ mA}$

FREQUENCY GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.100	0.975	-80.1	17.360	137.5	0.011	55.3	0.601	-172.5
0.200	0.956	-118.9	11.506	116.5	0.015	39.8	0.657	-175.0
0.300	0.951	-137.7	8.292	105.6	0.016	30.2	0.678	-177.5
0.400	0.949	-148.4	6.420	98.7	0.016	28.9	0.687	-179.5
0.500	0.947	-155.3	5.212	93.8	0.017	26.7	0.692	178.9
0.600	0.946	-160.1	4.388	89.8	0.017	26.5	0.695	177.7
0.700	0.946	-163.8	3.786	86.4	0.018	28.9	0.697	176.4
0.800	0.945	-166.8	3.333	83.4	0.018	30.9	0.698	175.3
0.900	0.945	-169.1	2.977	80.5	0.018	32.2	0.700	174.2
1.000	0.945	-171.2	2.691	77.9	0.019	32.4	0.702	173.3
1.100	0.944	-173.1	2.448	75.2	0.020	32.7	0.703	172.4
1.200	0.945	-174.5	2.260	73.0	0.020	35.5	0.703	171.4
1.300	0.944	-175.8	2.096	70.8	0.021	36.6	0.706	170.5
1.400	0.943	-177.1	1.955	68.6	0.021	37.8	0.708	169.7
1.500	0.944	-178.2	1.834	66.5	0.022	38.5	0.708	168.9
1.600	0.943	-179.4	1.726	64.2	0.022	40.0	0.707	167.8
1.700	0.943	179.6	1.632	62.1	0.024	41.6	0.710	166.6
1.800	0.943	178.6	1.552	60.0	0.024	41.7	0.714	165.7
1.900	0.943	177.7	1.474	58.1	0.025	44.3	0.711	164.9
2.000	0.944	176.8	1.408	55.8	0.026	43.4	0.712	163.5
2.100	0.943	176.0	1.348	53.9	0.027	45.6	0.716	162.4
2.200	0.945	175.2	1.299	52.0	0.028	46.1	0.721	161.5
2.300	0.944	174.3	1.248	50.2	0.030	47.1	0.719	160.8
2.400	0.944	173.5	1.203	48.0	0.031	46.0	0.720	159.1
2.500	0.944	172.7	1.166	46.2	0.031	46.0	0.728	157.9
2.600	0.944	171.9	1.132	44.5	0.033	47.5	0.736	157.2
2.700	0.945	171.2	1.089	42.9	0.034	48.6	0.733	156.6
2.800	0.946	170.4	1.055	40.8	0.036	46.6	0.732	155.0
2.900	0.947	169.6	1.029	38.9	0.037	46.8	0.741	153.7
3.000	0.945	168.7	1.008	36.9	0.039	46.7	0.753	152.9
3.500	0.947	165.0	0.901	28.7	0.046	47.0	0.761	149.2
4.000	0.950	160.5	0.838	20.0	0.056	41.3	0.769	144.6
4.500	0.940	155.3	0.806	10.9	0.059	37.3	0.775	138.6
5.000	0.933	149.6	0.792	0.4	0.068	34.0	0.791	131.2

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