PRELIMINARY DATA SHEET

NEC

N-CHANNEL GaAs MES FET

NE6500179A

1 W L-BAND POWER GaAs MES FET

DESCRIPTION

The NE6500179A is a 1 W GaAs MES FET designed for middle power transmitter applications for mobile communication handset and base station systems. It is capable of delivering 1 W of output power (CW) with high linear gain, high efficiency and excellent distortion.

Reliability and performance uniformity are assured by NEC's stringent quality and control procedures.

FEATURES

- High output power: $P_{O\ (1\ dB)}$ = 30.0 dBm TYP.
- High linear gain: G_L = 12.0 dB TYP.
- High power added efficiency: η_{add} = 50 % TYP. @ V_{DS} = 6.0 V, I_{Dset} = 200 mA, f = 1.9 GHz

ORDERING INFORMATION

Part Number	Package	Supplying Form
NE6500179A-T1	79A	• 12 mm wide embossed taping • Qty 1 kpcs/reel

Remark To order evaluation samples, consult your NEC sales representative (Part number for sample order: NE6500179A).

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

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ABSOLUTE MAXIMUM RATINGS (T_A = +25 °C)

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

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	15	V
Gate to Source Voltage	V_{GSO}	–7	V
Drain Current	I_D	2.5	A
Gate Forward Current	I_{GF}	20	mA
Gate Reverse Current	I_{GR}	20	mA
Total Power Dissipation	P_{tot}	7	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}		–	6.0	6.0	V
Gain Compression	Gcomp		–	–	3.0	dB
Channel Temperature	T_{ch}		–	–	+125	°C

ELECTRICAL CHARACTERISTICS

(T_A = +25 °C, unless otherwise specified, using NEC standard test fixture.)

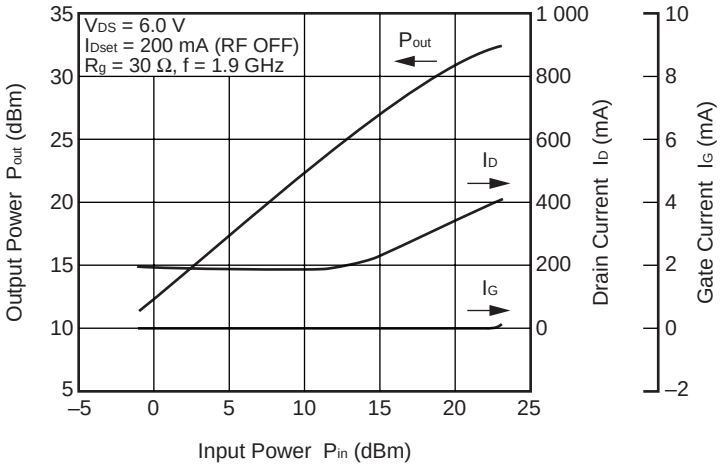
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Saturated Drain Current	I_{DSS}	V_{DS} = 2.5 V, V_{GS} = 0 V	–	1.8	–	A
Pinch-off Voltage	V_p	V_{DS} = 2.5 V, I_D = 10 mA	–3.6	–	–1.6	V
Gate to Drain Break Down Voltage	BV_{gd}	I_{gd} = 10 mA	15	–	–	V
Thermal Resistance	R_{th}	Channel to Case	–	15	–	°C/W
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	f = 1.9 GHz, V_{DS} = 6.0 V,	–	30.0	–	dBm
Drain Current	I_D	R_g = 30 Ω, I_{Dset} = 200 mA (RF OFF)	–	340	–	mA
Power Added Efficiency	η_{add}	**Note 2**	–	50	–	%
Linear Gain [Note 1]	G_L		11.0	12.0	–	dB

Notes 1. P_{in} = 0 dBm

2. DC performance is 100 % testing. RF performance is testing several samples per wafer. Wafer rejection criteria for standard devices is 1 reject for several samples.

TYPICAL CHARACTERISTICS (T_A = +25 °C)

OUTPUT POWER, DRAIN CURRENT,
GATE CURRENT vs. INPUT POWER



Remark The graph indicates nominal characteristics.

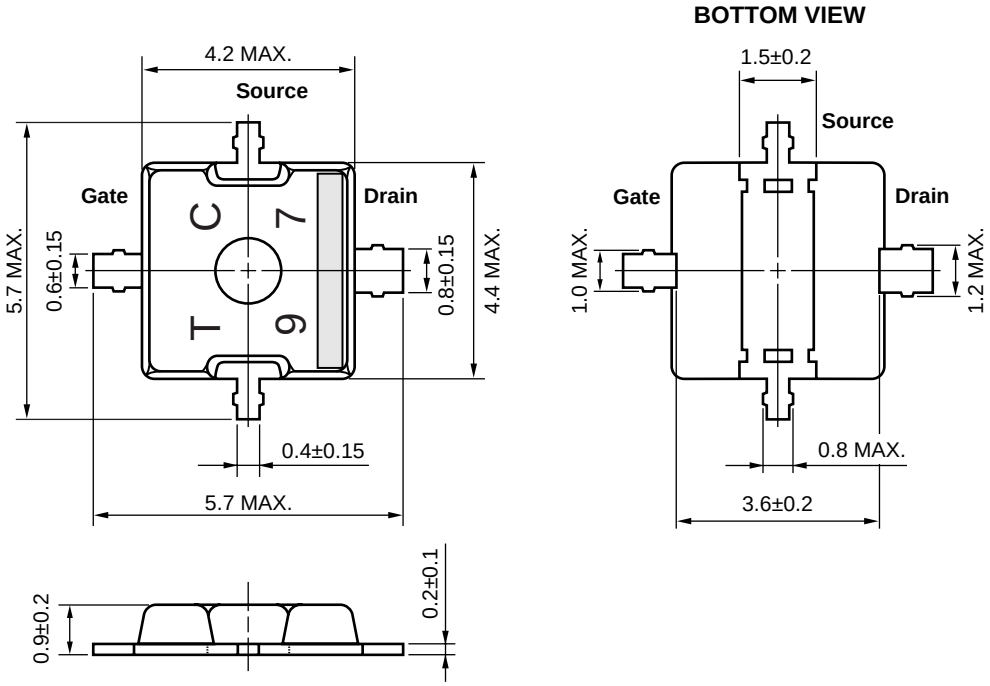
S-PARAMETERS

Test Conditions: V_{DS} = 6.0 V, I_{Dset} = 200 mA (RF OFF)

Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
500	0.895	–145.1	6.305	96.12	0.037	18.49	0.595	–172.3
600	0.890	–152.4	5.356	91.79	0.037	15.64	0.601	–175.2
700	0.886	–158.2	4.684	87.59	0.038	13.66	0.607	–177.3
800	0.884	–163.0	4.157	84.18	0.038	11.83	0.608	–179.2
900	0.881	–167.0	3.708	81.06	0.039	10.32	0.609	178.9
1000	0.879	–170.4	3.381	78.08	0.039	9.36	0.610	177.3
1100	0.879	–173.4	3.105	75.16	0.039	8.22	0.609	175.8
1200	0.879	–176.4	2.880	72.51	0.040	6.99	0.609	174.3
1300	0.877	–179.1	2.681	69.60	0.040	5.95	0.607	172.7
1400	0.876	178.3	2.518	66.85	0.041	5.24	0.607	171.1
1500	0.876	175.7	2.368	64.05	0.041	4.31	0.606	169.4
1600	0.876	173.0	2.237	61.40	0.041	3.11	0.606	167.9
1700	0.877	170.4	2.122	58.60	0.042	1.97	0.604	166.2
1800	0.875	167.7	2.021	55.76	0.042	1.23	0.603	164.6
1900	0.876	165.0	1.927	52.81	0.043	0.05	0.601	162.7
2000	0.875	162.5	1.842	49.91	0.042	–0.66	0.600	160.6
2100	0.876	159.9	1.765	47.10	0.043	–2.19	0.600	158.5
2200	0.875	157.2	1.691	44.16	0.043	–3.00	0.600	156.4
2300	0.875	154.6	1.620	41.13	0.043	–4.19	0.600	154.3
2400	0.875	151.9	1.552	38.07	0.043	–5.43	0.601	152.0
2500	0.876	149.3	1.489	35.13	0.043	–6.55	0.603	149.7
2600	0.876	146.7	1.429	32.08	0.043	–8.05	0.603	147.3
2700	0.877	144.0	1.366	29.08	0.043	–9.20	0.606	144.9
2800	0.876	141.6	1.305	26.27	0.043	–10.15	0.610	142.6
2900	0.875	139.5	1.247	23.72	0.042	–11.98	0.613	140.7
3000	0.880	137.1	1.203	20.91	0.042	–12.74	0.620	138.2

PACKAGE DIMENSIONS

79A (UNIT: mm)



RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your NEC sales representative.

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared Reflow	Package peak temperature: 235 °C or below, Time: 30 seconds or less (at 210 °C or higher), Count: 2 times or less, Exposure: limit: None [Note]	IR35-00-2
Partial Heating	Pin temperature: 260 °C or below, Time: 5 seconds or less (per pin row) Exposure: limit: None [Note]	–

Note After opening the dry pack, store it at 25 °C or less and 65 % RH or less for the allowable storage period.

Caution Do not use different soldering methods together (except for partial heating).

[MEMO]

CAUTION

The great care must be taken in dealing with the devices in this guide.
The reason is that the material of the devices is GaAs (Gallium Arsenide), which is designated as harmful substance according to the law concerned.
Keep the law concerned and so on, especially in case of removal.