PRELIMINARY DATA SHEET

NEC

N-CHANNEL GaAs MES FET

NES2427P-45

45 W S-BAND PUSH-PULL POWER GaAs MES FET

DESCRIPTION

The NES2427P-45 is a 45 W push-pull type GaAs MES FET designed for high power transmitter applications for WLL repeater and base station systems. It is capable of delivering 45 W of output power (CW) with high linear gain, high efficiency and excellent distortion under the condition of 12 V operation. Its primary band is 2.4 to 2.7 GHz. The device employs 0.9 μm Tungsten Silicide gates, via holes, plated heat sink, and silicon dioxide passivation for superior performance, thermal characteristics, and reliability.

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

FEATURES

- Push-pull type N-channel GaAs MES FET
- V_{DS} = 12.0 V operation
- High output power: P_{out} = 45 W TYP.
- High linear gain: G_L = 11 dB TYP.
- High power added efficiency: η_{add} = 41 % TYP. @ V_{DS} = 12.0 V, I_{Dset} = 4.0 A (total), f = 2.70 GHz

ORDERING INFORMATION (PLAN)

Part Number	Package	Supplying Form
NES2427P-45	T-86	ESD protective envelope

Remark To order evaluation samples, consult your NEC sales representative.

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

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ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified, 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}	19	V
Gate to Source Voltage	V_{GSO}	–7	V
Gate to Drain Voltage	V_{GDO}	–22	V
Drain Current	I_D	24	A
Gate Current	I_G	240	mA
Total Power Dissipation	P_{tot} Note	165	W
Channel Temperature	T_{ch}	175	°C
Storage Temperature	T_{stg}	–65 to +175	°C

Note T_C = +25 °C

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}		–	–	12.0	V
Gain Compression	Gcomp		–	–	3.0	dB
Channel Temperature	T_{ch}		–	–	+150	°C
Set Drain Current	I_{Dset}	V_{DS} = 12.0 V, RF OFF	–	4.0	6.0	A
Gate Resistance	R_g Note		–	–	30	Ω

Note R_g is the series resistance between the gate supply and the FET gate.

ELECTRICAL CHARACTERISTICS (T_A = +25 °C)

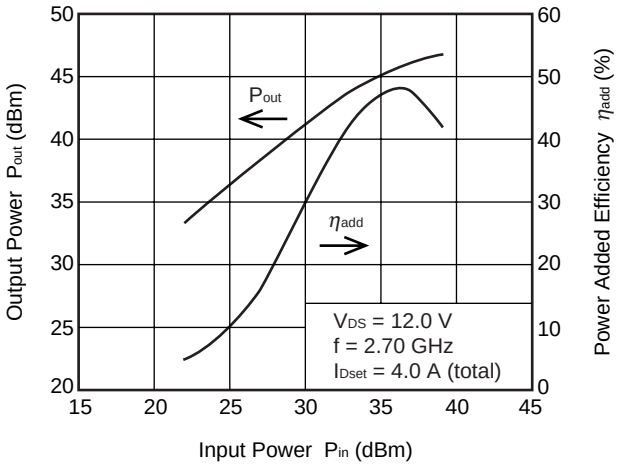
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Saturated Drain Current	I_{DSS}	V_{DS} = 2.5 V, V_{GS} = 0 V	–	24.0	–	A
Pinch-off Voltage	V_p	V_{DS} = 2.5 V, I_D = 110 mA	–4.0	–2.6	–	V
Thermal Resistance	R_{th}	Channel to Case	–	0.7	0.9	°C/W
Output Power	P_{out}	f = 2.70 GHz, V_{DS} = 12.0 V,	45.5	46.5	–	dBm
Drain Current	I_D	P_{in} = 38.5 dBm, R_g = 30 Ω,	–	8	–	A
Power Added Efficiency	η_{add}	I_{Dset} = 4.0 A Total (RF OFF) Note1	–	41	–	%
Linear Gain	G_L Note2		10	11	–	dB
3rd Order Intermodulation Distortion	IM_3	Δf = 5 MHz, P_{out} = 37 dBm (2 tones total)	–	–38	–	dBc

Notes 1. I_{Dset} = 2.0 A each drain

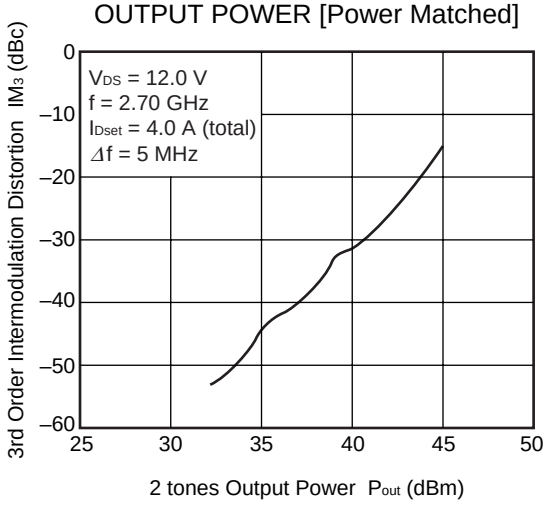
2. P_{in} = 22 dBm

TYPICAL CHARACTERISTICS (T_A = +25 °C)

OUTPUT POWER,
POWER ADDED EFFICIENCY vs.
INPUT POWER [Power Matched]



3RD ORDER INTERMODULATION
DISTORTION vs. 2 TONES
OUTPUT POWER [Power Matched]



Remark The graphs indicate nominal characteristics.

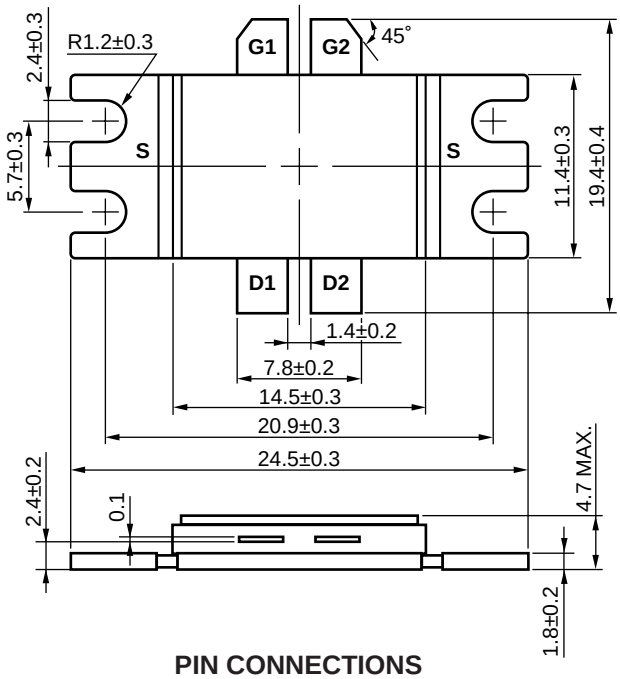
S-PARAMETERS

V_{DS} = 12.0 V, I_{Dset} = 2.0 A each drain

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
GHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
1.000	0.945	174.8	1.417	87.0	0.009	82.4	0.825	178.1
1.050	0.943	174.0	1.171	85.0	0.013	91.7	0.829	177.7
1.100	0.942	173.9	1.116	81.9	0.010	97.3	0.822	177.6
1.150	0.938	172.6	1.013	82.7	0.011	109.9	0.819	177.5
1.200	0.936	172.3	0.910	83.3	0.012	93.6	0.817	177.4
1.250	0.935	171.6	0.932	83.5	0.014	103.1	0.819	177.4
1.300	0.935	170.7	0.841	86.9	0.013	104.5	0.814	176.5
1.350	0.926	169.8	0.846	89.0	0.012	93.3	0.815	175.8
1.400	0.928	168.8	0.871	87.2	0.014	95.2	0.813	175.0
1.450	0.926	167.9	0.870	92.5	0.014	96.4	0.813	175.0
1.500	0.922	167.2	0.865	89.0	0.016	106.3	0.814	174.6
1.550	0.915	165.6	0.958	89.8	0.017	103.6	0.816	174.7
1.600	0.914	164.3	0.897	90.1	0.015	102.8	0.813	174.7
1.650	0.907	163.0	0.987	87.4	0.018	100.3	0.811	173.8
1.700	0.904	162.0	0.966	85.5	0.018	99.7	0.810	173.3
1.750	0.898	160.7	1.055	85.8	0.019	100.1	0.809	171.9
1.800	0.891	159.2	0.947	81.0	0.017	108.7	0.810	171.2
1.850	0.879	157.7	1.102	80.8	0.020	102.8	0.810	170.3
1.900	0.871	155.7	1.026	80.6	0.020	104.0	0.814	169.9
1.950	0.861	154.4	1.030	78.0	0.020	97.4	0.819	169.7
2.000	0.845	152.6	1.195	77.9	0.021	100.9	0.814	169.2
2.050	0.829	150.7	1.147	76.8	0.021	101.0	0.820	168.4
2.100	0.811	148.7	1.228	70.8	0.020	99.0	0.818	167.9
2.150	0.788	147.2	1.352	68.7	0.021	102.5	0.821	166.9
2.200	0.764	145.4	1.365	66.1	0.021	103.3	0.828	166.2
2.250	0.733	143.4	1.364	56.8	0.020	96.1	0.831	165.7
2.300	0.698	142.0	1.598	55.0	0.021	96.2	0.836	165.1
2.350	0.662	141.0	1.402	49.1	0.020	100.8	0.848	164.4
2.400	0.617	140.7	1.605	39.3	0.019	92.9	0.855	164.1
2.450	0.582	138.0	1.471	31.4	0.020	94.7	0.864	159.9
2.500	0.544	139.8	1.446	28.4	0.014	92.9	0.876	158.8
2.550	0.511	143.6	1.433	15.8	0.014	94.4	0.886	157.9
2.600	0.496	148.2	1.446	20.5	0.011	90.0	0.897	156.3
2.650	0.497	153.2	1.229	8.6	0.010	114.8	0.906	155.3
2.700	0.516	157.3	1.423	7.5	0.008	141.7	0.913	154.5
2.750	0.550	160.4	1.305	3.5	0.011	154.9	0.912	153.3
2.800	0.588	162.3	1.196	–4.7	0.014	177.6	0.914	152.4
2.850	0.628	162.6	1.346	–10.4	0.019	167.3	0.911	151.0
2.900	0.667	161.9	1.136	–13.3	0.021	169.3	0.907	150.2
2.950	0.704	161.0	1.091	–22.0	0.026	175.0	0.900	149.2
3.000	0.731	159.7	1.115	–26.8	0.027	168.2	0.897	147.8

PACKAGE DIMENSIONS

T-86 (UNIT: mm)



PIN CONNECTIONS

G1, G2 : Gate
D1, D2 : Drain
S : Source

RECOMMENDED MOUNTING CONDITIONS FOR CORRECT USE

(1) Fix to heat sink or mount surface completely with screws at the four holes of the flange.

(2) The recommended torque strength of the screws is 30 N typical using M2.3 type screws.

(3) The recommended flatness of the mount surface is less than ±10 μm (roughness of surface is $\nabla\nabla\nabla$).

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
Partial Heating	Pin temperature: 260 °C or below, Time: 5 seconds or less (per pin row)	–

For details of recommended soldering conditions, please contact your local NEC sales office.

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.

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