PRELIMINARY DATA SHEET

NEC

N-CHANNEL GaAs MES FET

NES2427P-60

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

DESCRIPTION

The NES2427P-60 is a 60 W push-pull type GaAs MES FET designed for high power transmitter applications for MMDS, WLL repeater and base station systems. It is capable of delivering 60 W of output power (CW) with high linear gain, high efficiency and excellent distortion. 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} = 10.0 V operation
- High output power: $P_{O\ (1\ dB)}$ = 60 W TYP.
- High linear gain: G_L = 12.0 dB TYP.
- High power added efficiency: η_{add} = 35 % TYP. @ V_{DS} = 10.0 V, I_{Dset} = 12.0 A (total), f = 2.50, 2.70 GHz

ORDERING INFORMATION (PLAN)

Part Number	Package	Supplying Form
NES2427P-60	T-92	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}	15	V
Gate to Source Voltage	V_{GSO}	−7	V
Gate to Drain Voltage	V_{GDO}	−18	V
Drain Current	I_D	54	A
Gate Current	I_G	360	mA
Total Power Dissipation	P_{tot} Note	200	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}		–	–	10.0	V
Gain Compression	Gcomp		–	–	3.0	dB
Channel Temperature	T_{ch}		–	–	+150	°C
Set Drain Current	I_{Dset}	V_{DS} = 10.0 V, RF OFF	–	12.0	12.0	A
Gate Resistance	R_g Note 1		–	2.5	2.5	Ω
Case Temperature	T_C Note 2		–	–	60	°C

Notes 1. R_g is the series resistance between the gate supply and the FET gate.

2. T_C MAX. = 60 °C is at the condition of I_{Dset} = 12.0 A.

T_C (°C) ≤ T_{ch} MAX. (150 °C) − V_{DS} (V) × I_{Dset} (A) × R_{th} MAX. (°C/W)

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	–	36.0	–	A
Pinch-off Voltage	V_p	V_{DS} = 2.5 V, I_D = 168 mA	−4.0	−2.1	–	V
Thermal Resistance	R_{th}	Channel to Case	–	0.65	0.75	°C/W
Gain 1 dB Compression Output Power	$P_{O(1\ dB)}$	f = 2.50, 2.70 GHz, V_{DS} = 10.0 V,	47.0	48.0	–	dBm
Drain Current	I_D	R_g = 2.5 Ω,	–	16.0	–	A
Power Added Efficiency	η_{add}	I_{Dset} = 12.0 A Total (RF OFF) Note 1	–	35	–	%
Linear Gain	G_L Note 2		10.0	12.0	–	dB
3rd Order Intermodulation Distortion	IM_3	Δf = 1 MHz, P_{out} = 39 dBm (2 tones total)	–	−48	–	dBc

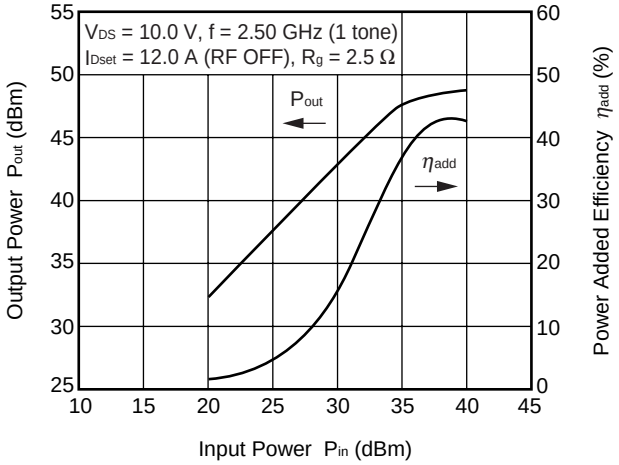
Notes 1. I_{Dset} = 6.0 A each drain

2. P_{in} = 32 dBm

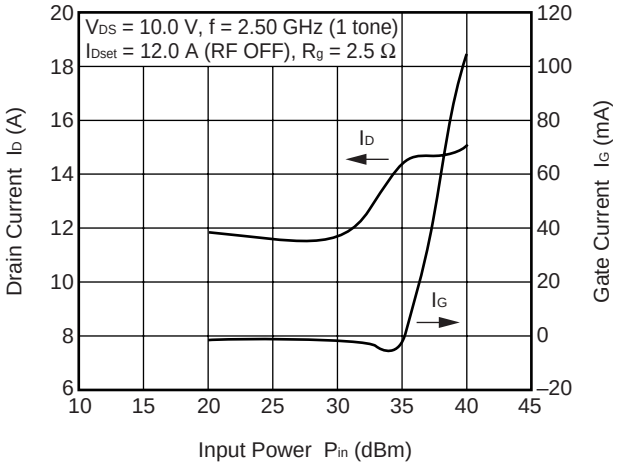
TYPICAL CHARACTERISTICS (T_A = +25 °C)

f = 2.50 GHz

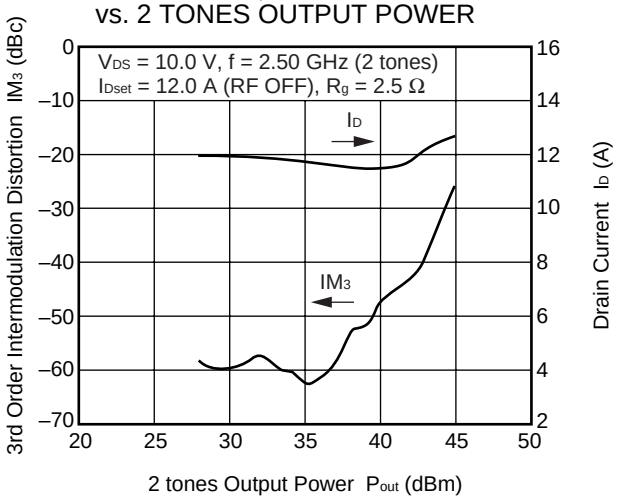
OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER



DRAIN CURRENT, GATE CURRENT vs. INPUT POWER

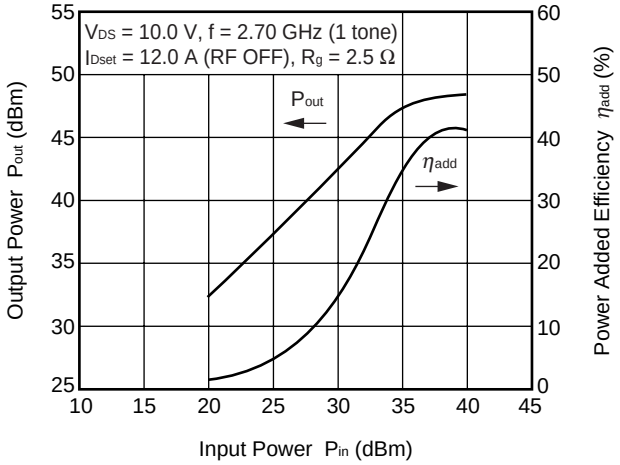


3RD ORDER INTERMODULATION DISTORTION, DRAIN CURRENT vs. 2 TONES OUTPUT POWER

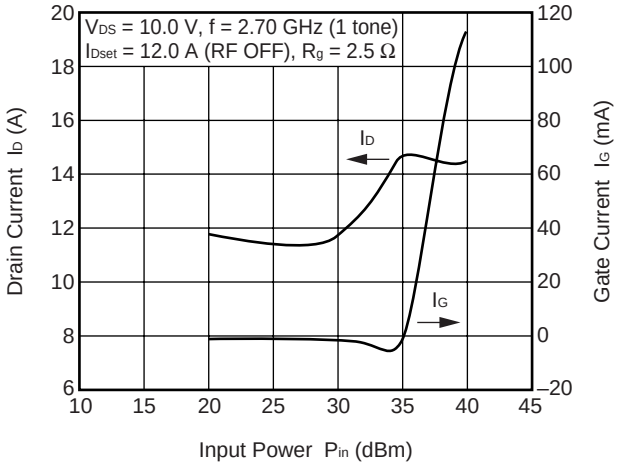


f = 2.70 GHz

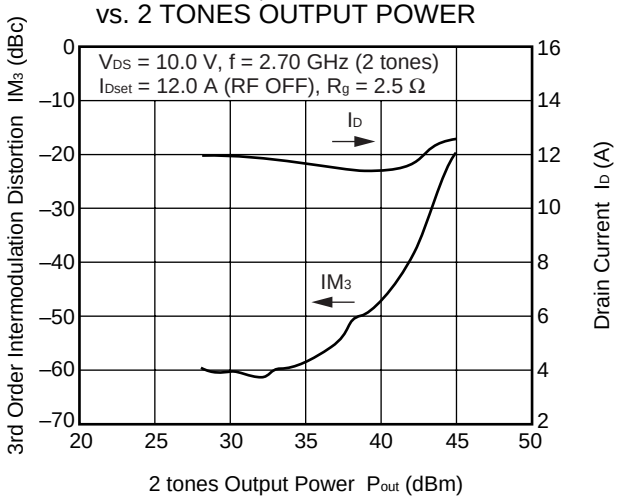
OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER



DRAIN CURRENT, GATE CURRENT vs. INPUT POWER



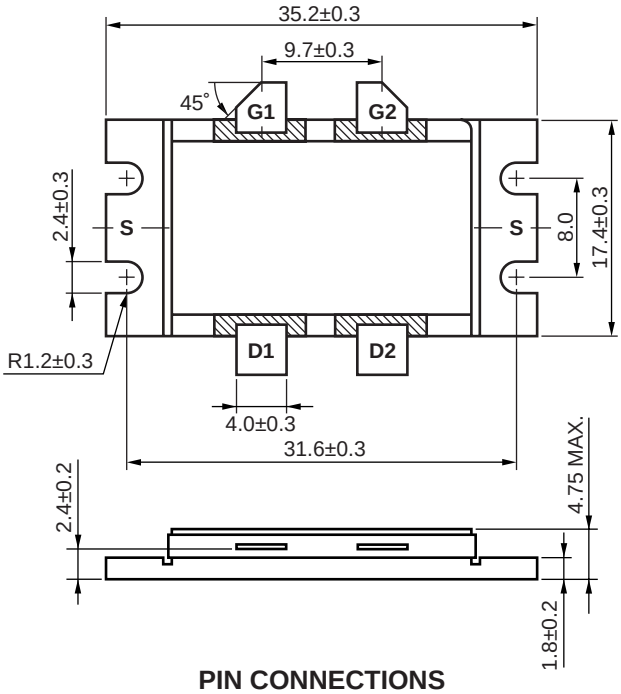
3RD ORDER INTERMODULATION DISTORTION, DRAIN CURRENT vs. 2 TONES OUTPUT POWER



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

T-92 (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.

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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.