

### 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  $\mu\text{m}$  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:  $P_{O(1\text{ dB})} = 60$  W TYP.
- High linear gain:  $G_L = 12.0$  dB TYP.
- High power added efficiency:  $\eta_{add} = 35$  % 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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.  
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

**ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified, T<sub>A</sub> = +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 <sub>DS</sub>	15	V
Gate to Source Voltage	V <sub>GSO</sub>	-7	V
Gate to Drain Voltage	V <sub>GDO</sub>	-18	V
Drain Current	I <sub>D</sub>	54	A
Gate Current	I <sub>G</sub>	360	mA
Total Power Dissipation	P <sub>tot</sub> <sup>Note</sup>	200	W
Channel Temperature	T <sub>ch</sub>	175	°C
Storage Temperature	T <sub>stg</sub>	-65 to +175	°C

**Note** T<sub>C</sub> = +25 °C

**RECOMMENDED OPERATING CONDITIONS**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V <sub>DS</sub>		-	-	10.0	V
Gain Compression	G <sub>comp</sub>		-	-	3.0	dB
Channel Temperature	T <sub>ch</sub>		-	-	+150	°C
Set Drain Current	I <sub>Dset</sub>	V <sub>DS</sub> = 10.0 V, RF OFF	-	12.0	12.0	A
Gate Resistance	R <sub>g</sub> <sup>Note 1</sup>		-	2.5	2.5	Ω
Case Temperature	T <sub>C</sub> <sup>Note 2</sup>		-	-	60	°C

**Notes 1.** R<sub>g</sub> is the series resistance between the gate supply and the FET gate.

**2.** T<sub>C</sub> MAX. = 60 °C is at the condition of I<sub>Dset</sub> = 12.0 A.

$$T_C (°C) \leq T_{ch} \text{ MAX. } (150 \text{ } °C) - V_{DS} (V) \times I_{Dset} (A) \times R_{th} \text{ MAX. } (°C/W)$$

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25 °C)**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Saturated Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 2.5 V, V <sub>GS</sub> = 0 V	-	36.0	-	A
Pinch-off Voltage	V <sub>p</sub>	V <sub>DS</sub> = 2.5 V, I <sub>D</sub> = 168 mA	-4.0	-2.1	-	V
Thermal Resistance	R <sub>th</sub>	Channel to Case	-	0.65	0.75	°C/W
Gain 1 dB Compression Output Power	P <sub>O(1 dB)</sub>	f = 2.50, 2.70 GHz, V <sub>DS</sub> = 10.0 V,	47.0	48.0	-	dBm
Drain Current	I <sub>D</sub>	R <sub>g</sub> = 2.5 Ω,	-	16.0	-	A
Power Added Efficiency	η <sub>add</sub>	I <sub>Dset</sub> = 12.0 A Total (RF OFF) <sup>Note 1</sup>	-	35	-	%
Linear Gain	G <sub>L</sub> <sup>Note 2</sup>		10.0	12.0	-	dB
3rd Order Intermodulation Distortion	IM <sub>3</sub>	Δf = 1 MHz, P <sub>out</sub> = 39 dBm (2 tones total)	-	-48	-	dBc

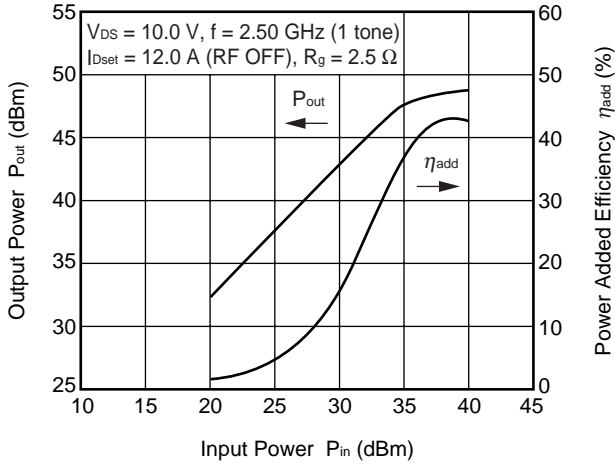
**Notes 1.** I<sub>Dset</sub> = 6.0 A each drain

**2.** P<sub>in</sub> = 32 dBm

TYPICAL CHARACTERISTICS (T<sub>A</sub> = +25 °C)

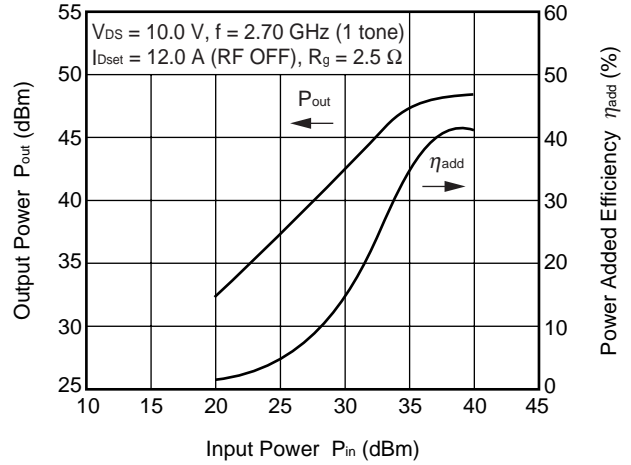
f = 2.50 GHz

OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER

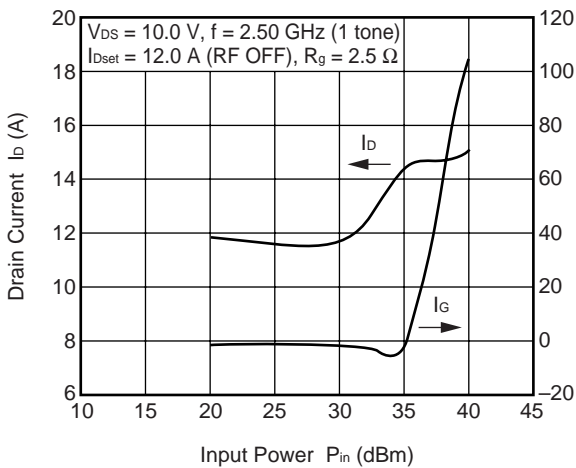


f = 2.70 GHz

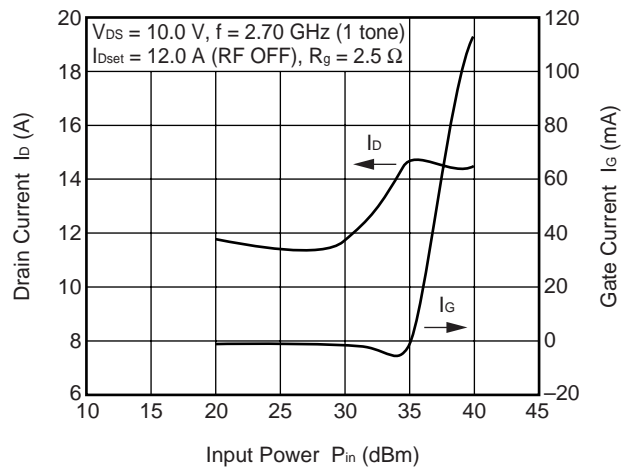
OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER



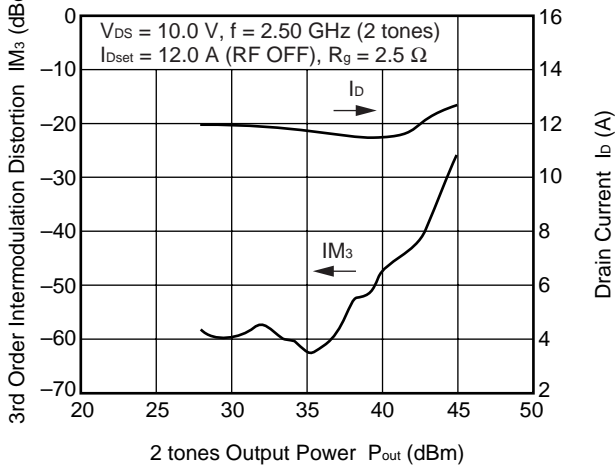
DRAIN CURRENT, GATE CURRENT vs. INPUT POWER



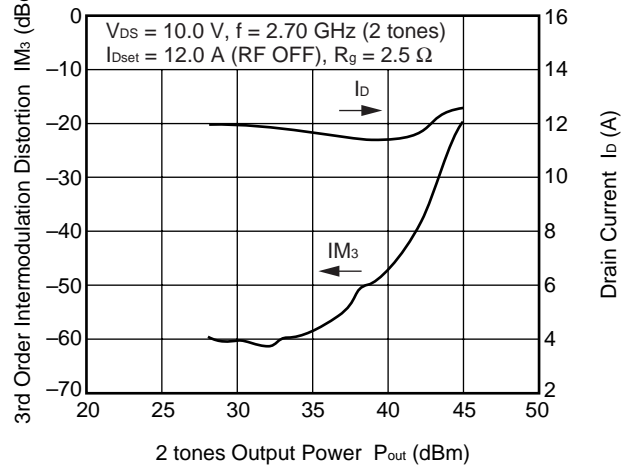
DRAIN CURRENT, GATE CURRENT vs. INPUT POWER



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



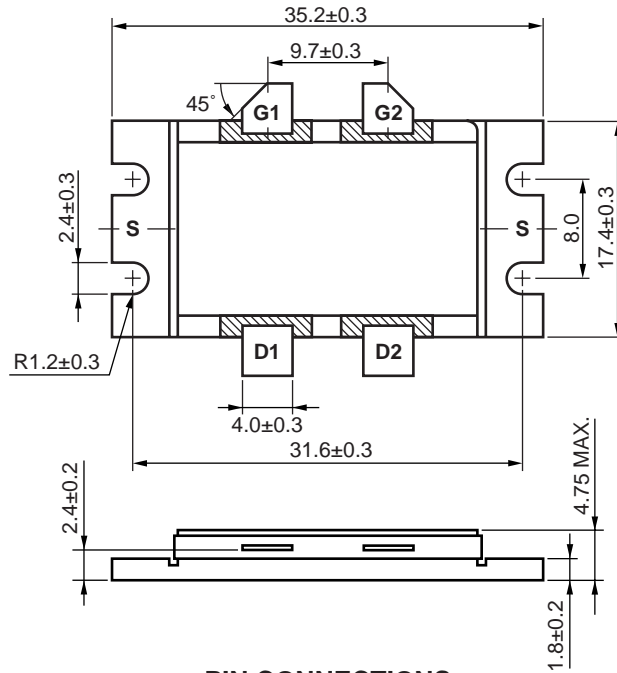
3RD ORDER INTERMODULATION DISTORTION, DRAIN CURRENT vs. 2 TONES OUTPUT POWER



**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  $\pm 10 \mu\text{m}$  (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.

[MEMO]

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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.**

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