### PRELIMINARY DATA SHEET



# 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  $\mu$ 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
- VDS = 10.0 V operation
- High output power: Po (1 dB) = 60 W TYP.
- High linear gain: G<sub>L</sub> = 12.0 dB TYP.
- High power added efficiency: η<sub>add</sub> = 35 % TYP. @ V<sub>DS</sub> = 10.0 V, I<sub>Dset</sub> = 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, TA = +25 °C)

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

Parameter	Symbol	Ratings	Unit	
Drain to Source Voltage	Vos	15	V	
Gate to Source Voltage	Vgso –7		V	
Gate to Drain Voltage	Vgdo	-18	V	
Drain Current	lο	54	Α	
Gate Current	lg	360	mA	
Total Power Dissipation	Ptot Note	200	W	
Channel Temperature	Tch	175	°C	
Storage Temperature	Tstg	-65 to +175	°C	

Note  $Tc = +25 \, ^{\circ}C$ 

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	Vos		_	_	10.0	V
Gain Compression	Gcomp		-	-	3.0	dB
Channel Temperature	Tch		_	_	+150	°C
Set Drain Current	IDset	V <sub>DS</sub> = 10.0 V, RF OFF	-	12.0	12.0	Α
Gate Resistance	Rg Note 1		_	2.5	2.5	Ω
Case Temperature	Tc Note 2		-	-	60	°C

**Notes 1.**  $R_{\text{g}}$  is the series resistance between the gate supply and the FET gate.

2. Tc MAX. = 60 °C is at the condition of IDset = 12.0 A. Tc (°C)  $\leq$  Tch MAX. (150 °C) - VDs (V)  $\times$  IDset (A)  $\times$  Rth MAX. (°C/W)

### ELECTRICAL CHARACTERISTICS (TA = +25 °C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Saturated Drain Current	Ioss	V <sub>DS</sub> = 2.5 V, V <sub>GS</sub> = 0 V	_	36.0	-	Α
Pinch-off Voltage	Vp	Vps = 2.5 V, Ip = 168 mA	-4.0	-2.1	-	V
Thermal Resistance	Rth	Channel to Case	1	0.65	0.75	°C/W
Gain 1 dB Compression Output Power	Po (1 dB)	f = 2.50, 2.70 GHz, V <sub>DS</sub> = 10.0 V,	47.0	48.0	-	dBm
Drain Current	lσ	$R_g = 2.5 \Omega$ ,	-	16.0	-	Α
Power Added Efficiency	$\eta$ add	I <sub>Dset</sub> = 12.0 A Total (RF OFF) <sup>Note 1</sup>	-	35	-	%
Linear Gain	GL Note 2		10.0	12.0	_	dB
3rd Order Intermodulation Distortion	IMз	$\Delta f$ = 1 MHz, P <sub>out</sub> = 39 dBm (2 tones total)	-	-48	-	dBc

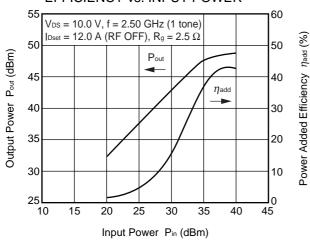
**Notes 1.** I<sub>Dset</sub> = 6.0 A each drain

**2.** Pin = 32 dBm

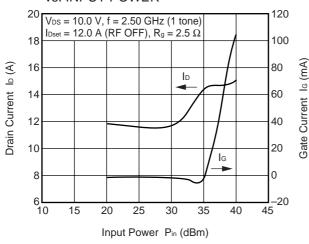
### TYPICAL CHARACTERISTICS (TA = +25 °C)



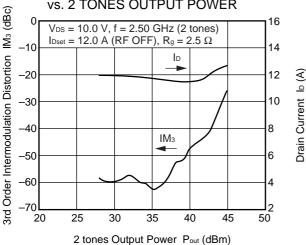
### OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER



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

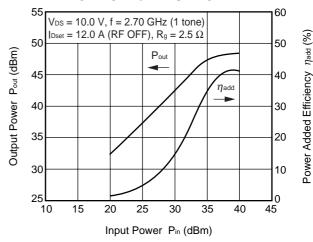


# 3RD ORDER INTERMODULATION DISTORTION, DRAIN CURRENT vs. 2 TONES OUTPUT POWER

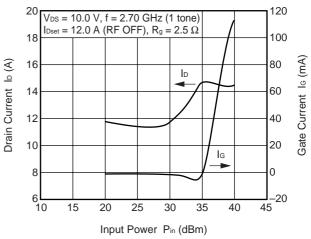


### f = 2.70 GHz

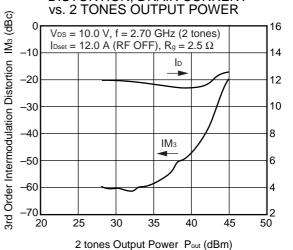
### OUTPUT POWER, POWER ADDED EFFICIENCY vs. INPUT POWER



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



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

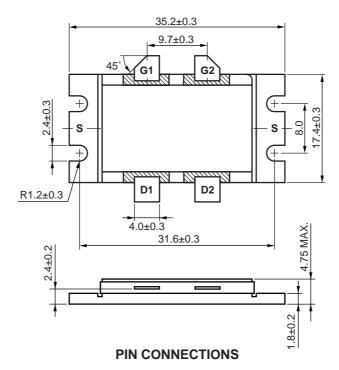


**Remark** The graphs indicate nominal characteristics.

Drain Current Ip (A)

### **PACKAGE DIMENSIONS**

T-92 (UNIT: mm)



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  $\pm 10~\mu m$  (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.

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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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  - "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
  - "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

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