

PRELIMINARY DATA SHEET

NEC

N-CHANNEL GaAs MES FET

NE650103M

10 W L, S-BAND POWER GaAs MES FET

DESCRIPTION

The NE650103M is a 10 W GaAs MES FET designed for power transmitter applications for mobile communication base station systems. It is capable of delivering 10 W of output power (CW) with high linear gain, high efficiency and excellent distortion.

Reliability and performance uniformity are assured by our stringent quality and control procedures.

FEATURES

- High output power: $P_{O(1\text{ dB})} = 40.0\text{ dBm TYP.}$
- High linear gain: $G_L = 11.0\text{ dB TYP.}$
- High power added efficiency: $\eta_{\text{add}} = 45\% \text{ TYP. @ } V_{\text{DS}} = 10.0\text{ V, } I_{\text{Dset}} = 1.5\text{ A (RF OFF), } f = 2.3\text{ GHz}$

ORDERING INFORMATION

Part Number	Package	Supplying Form
NE650103M	3M (T-91M)	ESD Protective tray.

Remark To order evaluation samples, contact your nearby sales office.
The unit sample quantity is 1 pcs.

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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 Compound Semiconductor Devices representative for availability and additional information.

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 Drain Voltage	V _{GD}	-18	V
Gate to Source Voltage	V _{GSO}	-7	V
Drain Current	I _D	5	A
Gate Current	I _G	45	mA
Total Power Dissipation	P _{tot}	33	W
Channel Temperature	T _{ch}	175	°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}		-	10.0	10.0	V
Gain Compression	G _{comp}		-	-	3.0	dB
Channel Temperature	T _{ch}		-	-	+150	°C
Gate Resistance	R _g		-	-	100	Ω

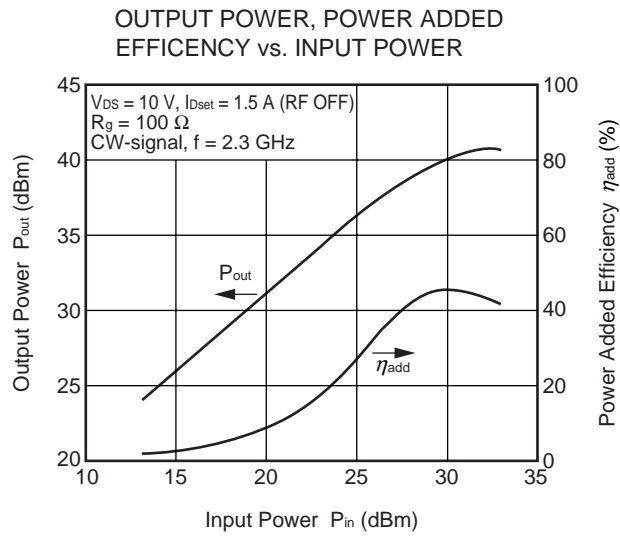
ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Saturated Drain Current	I _{DSS}	V _{DS} = 1.5 V, V _{GS} = 0 V	2.0	5.0	7.0	A
Pinch-off Voltage	V _p	V _{DS} = 2.5 V, I _D = 23 mA	-4.0	-2.5	-1.0	V
Thermal Resistance	R _{th}	Channel to Case	-	4.0	4.5	°C/W
Gain 1 dB Compression Output Power	P _{O (1 dB)}	f = 2.3 GHz, V _{DS} = 10.0 V,	39.0	40.0	-	dBm
Power Added Efficiency	η _{add}	R _g = 100 Ω, I _{Dset} ≤ 1.5 A (RF OFF)	-	45	-	%
Linear Gain ^{Note}	G _L		10.0	11.0	-	dB

Note P_{in} ≤ 23 dBm

TYPICAL CHARACTERISTICS (T_A = +25°C)



Remark The graph indicates nominal characteristics.

S-PARAMETERS

S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

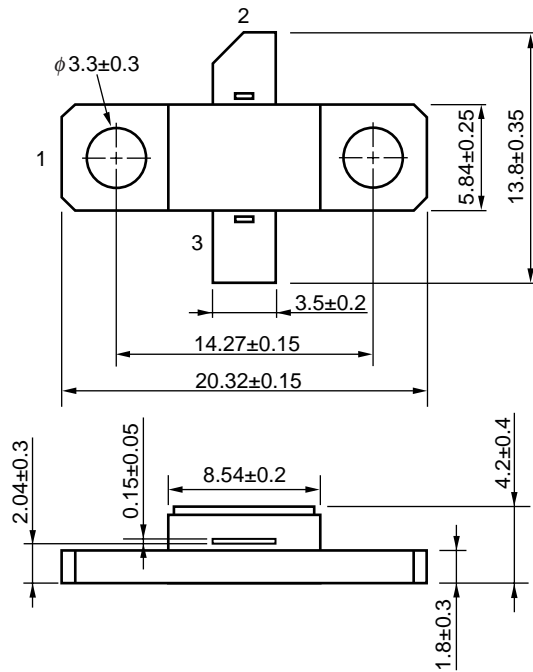
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.csd-nec.com/>

PACKAGE DIMENSIONS

3M (T-91M) (UNIT: mm)



PIN CONNECTIONS

- 1. Source
- 2. Gate
- 3. Drain

RECOMMENDED MOUNTING CONDITIONS FOR CORRECT USE

- (1) Fix to a heat sink or mount surface completely with screws at the two holes of the flange.
- (2) The recommended torque strength of the screws is 29.4 N-cm typical using M3 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 nearby sales office.

Soldering Method	Soldering Conditions	Condition Symbol
Partial Heating	Peak temperature (pin temperature) : 350°C or below Soldering time (per pin of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350-P3

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

- **The information in this document is current as of May, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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- NEC semiconductor products are classified into the following three quality grades:
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 "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
 "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.
 The quality grade of NEC semiconductor products is "Standard" unless otherwise expressly specified in NEC's data sheets or data books, etc. If customers wish to use NEC semiconductor products in applications not intended by NEC, they must contact an NEC sales representative in advance to determine NEC's willingness to support a given application.
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 (1) "NEC" as used in this statement means NEC Corporation, NEC Compound Semiconductor Devices, Ltd. and also includes its majority-owned subsidiaries.
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M8E 00.4-0110

<p>Caution</p>	<p>GaAs Products</p>	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. <ol style="list-style-type: none"> 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
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► For further information, please contact

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