

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Phase-out/Discontinued

GaAs FET

NES1823S-90

90 W L, S-BAND SINGLE-END POWER GaAs FET

DESCRIPTION

The NES1823S-90 is a 90 W single-end type GaAs FET designed for high power transmitter applications for IMT-2000 base station systems. It is capable of delivering 90 W of output power (CW) with high linear gain, high efficiency and excellent distortion under the condition of 12.0 V operation. Its primary band is 1.8 to 2.3 GHz. The device employs 0.7 μm Tungsten Silicide gates, via holes, plated heatsink, and silicon dioxide passivation for superior performance, thermal characteristics, and reliability.

FEATURES

- Single-end type GaAs FET
- $V_{DS} = 12.0$ V operation
- High output power: $P_{out} = 90$ W TYP.
- High linear gain : $G_L = 13.0$ dB TYP.
- High power added efficiency: $\eta_{add} = 50\%$ TYP. @ $V_{DS} = 12.0$ V, $I_{Dset} = 1.5$ A, $f = 2.17$ GHz
- Hollow plastic package

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NES1823S-90	T-142M	ESD protective tray

Remark To order evaluation samples, contact your nearby sales office.

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

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 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}	19	V
Gate to Source Voltage	V _{GSO}	-7	V
Gate to Drain Voltage	V _{GDO}	-26	V
Gate Current	I _G	450	mA
Total Power Dissipation	P _{tot}	125	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-65 to +150	°C
Gain Compression (CW)	G _{comp}	3.0	dB

RECOMMENDED OPERATING RANGE

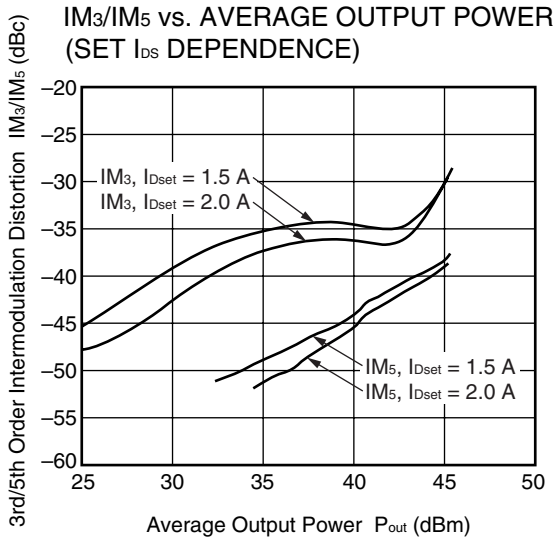
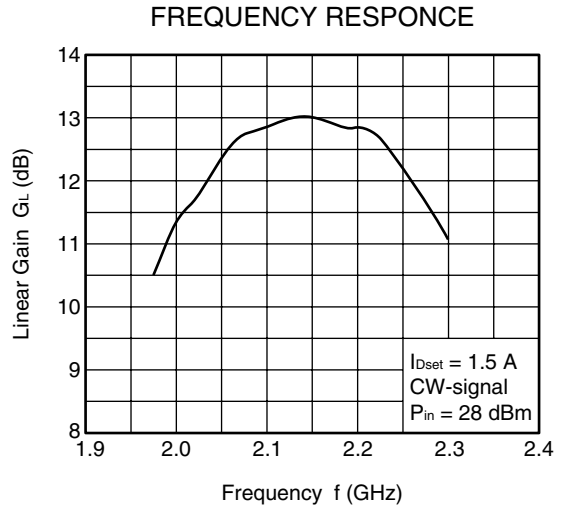
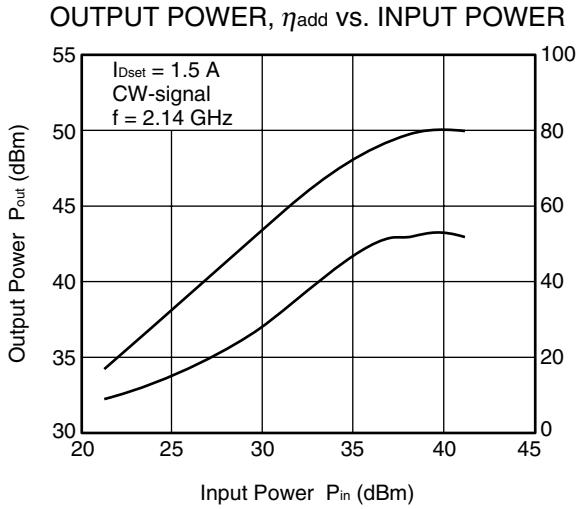
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V _{DS}		-	12.0	12.0	V
Channel Temperature	T _{ch}		-	-	+150	°C
Set Drain Current	I _{Dset}	V _{DS} = 12.0 V, RF OFF	-	1.5	3.0	A
Gate Resistance	R _g		-	1.2	2.4	Ω

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Pinch-off Voltage	V _p	V _{DS} = 2.5 V, I _D = 324 mA	-0.8	-0.5	-0.2	V
Thermal Resistance	R _{th}	Channel to Case	-	0.60	0.80	°C/W
Output Power	P _{out}	f = 2.17 GHz CW, V _{DS} = 12.0 V	48.5	49.5	-	dBm
Drain Current	I _D	P _{in} = 40.0 dBm, R _g = 1.2 Ω,	-	16	-	A
Power Added Efficiency	η _{add}	I _{Dset} = 1.5 A (RF OFF)	-	50	-	%
Linear Gain	G _L ^{Note}		12.0	13.0	-	dB

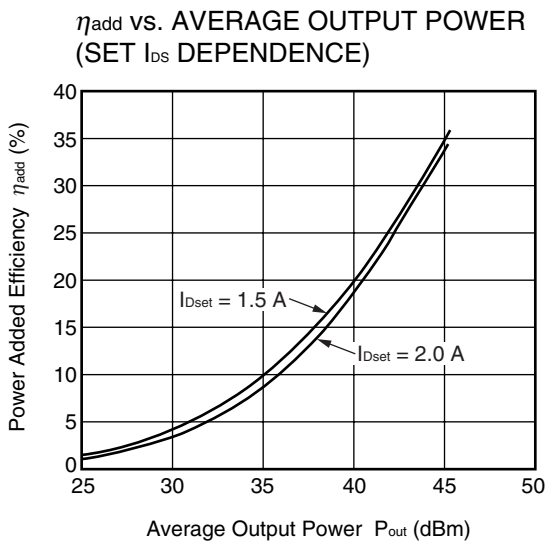
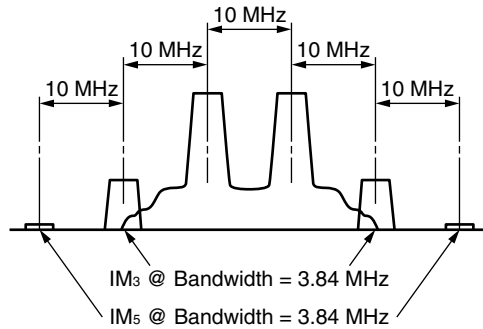
Note P_{in} = 28 dBm

TYPICAL CHARACTERISTICS (T_A = +25°C, V_{DS} = 12.0 V, R_g = 1.2 Ω)



Test Conditions

W-CDMA, 3 GPP test model 1,
64 DPCH, 2 carriers, Clipping 100%,
f₁ = 2.135 GHz, f₂ = 2.145 GHz (Δf = 10 MHz)

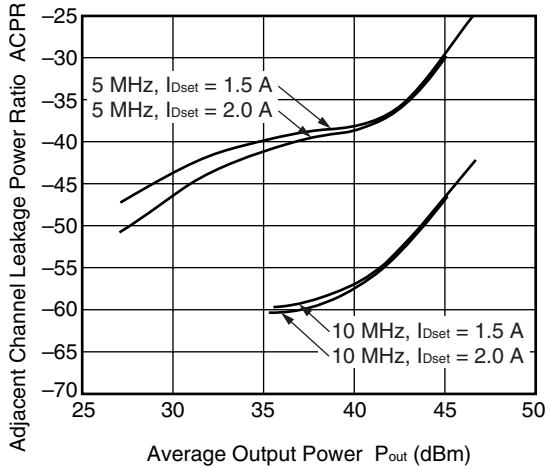


Test Conditions

W-CDMA, 3 GPP test model 1,
64 DPCH, 2 carriers, Clipping 100%,
f₁ = 2.135 GHz, f₂ = 2.145 GHz (Δf = 10 MHz)

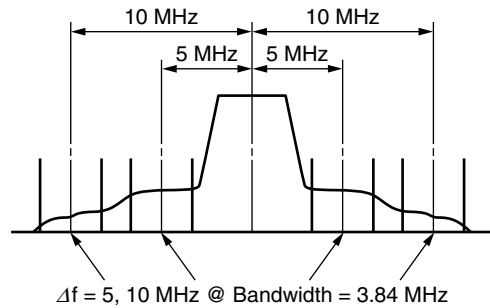
Remark The graphs indicate nominal characteristics.

ACPR vs. AVERAGE OUTPUT POWER
(SET I_{Dset} DEPENDENCE)



Test Conditions

W-CDMA, 3 GPP test model 1,
64 DPCH, 2 carriers, Clipping 100%,
 $f = 2.140$ GHz



Remark The graphs indicate 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.

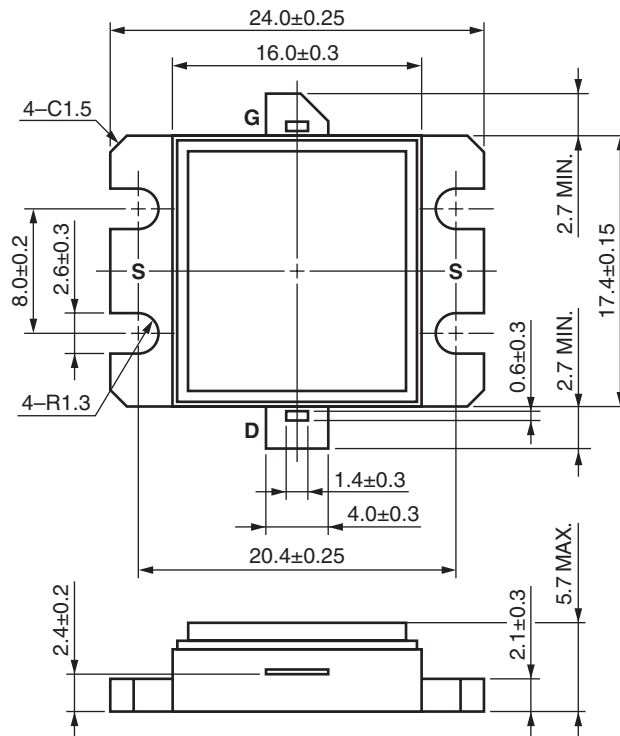
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

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

PACKAGE DIMENSIONS

T-142M (UNIT: mm)



PIN CONNECTIONS

- G : Gate
- S : Source
- D : Drain

NOTES ON CORRECT USE

- (1) Fix to a heatsink or mount surface completely with screws at the four holes of the flange.
- (2) The recommended torque strength of the screws is 29.4 N-cm 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 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

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

DEFINIITON OF THERMAL RESISTANCE

This thermal resistance (R_{th} : channel to case) guaranteed in the electrical characteristics shows the value between chip surface and the backside surface of the package.

The thermal resistance between chip surface and mount surface is 0.4 (MAX.) °C/W larger than the thermal resistance value guaranteed in the electrical characteristics, when the package is under the above-mentioned recommendation mounting condition screwed down.

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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.
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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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