

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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LDMOS FIELD EFFECT TRANSISTOR

NEM091803S-28

N-CHANNEL SILICON POWER LDMOS FET FOR 180 W UHF-BAND PUSH-PULL POWER AMPLIFIER

DESCRIPTION

The NEM091803S-28 is an N-channel enhancement-mode lateral diffused MOS FET designed for 0.8 to 1.0 GHz applications, such as, GSM/EDGE/N-CDMA cellular base station.

FEATURES

- High 1 dB compression output power : $P_{O(1\text{ dB})} = 180\text{ W TYP.}$ ($V_{DS} = 28\text{ V}$, $I_{Dset} = 1\text{ 600 mA}$, $f = 880\text{ MHz}$)
- High linear gain : $G_L = 18.5\text{ dB TYP.}$ ($V_{DS} = 28\text{ V}$, $I_{Dset} = 1\text{ 600 mA}$, $f = 880\text{ MHz}$)
- High drain efficiency : $\eta_d = 53\% \text{ TYP.}$ ($V_{DS} = 28\text{ V}$, $I_{Dset} = 1\text{ 600 mA}$, $f = 880\text{ MHz}$)
- 3rd order intermodulation distortion : $IM_3 = -37\text{ dBc TYP.}$ ($V_{DS} = 28\text{ V}$, $I_{Dset} = 1\text{ 600 mA}$, $f = 880.0, 880.1\text{ MHz}$, $P_{out} = 46\text{ dBm}$ (2 tones))
- Internal matched (Input) for ease of use
- Low cost hollow plastic packages
- 100% screening
- Integrated ESD protection
- Effective prevention against humidity
- Excellent stability against Hot Carrier Injection

APPLICATIONS

- Digital cellular base station PA : GSM/D-AMPS/PDC/N-CDMA etc.
- UHF-band TV-transmitter PA

ORDERING INFORMATION

Part Number	Package	Supplying Form
NEM091803S-28	T-101M (3S)	ESD Protective envelope

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.

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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)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V _{DS}	65	V
Gate to Source Voltage	V _{GSO}	±7	V
Drain Current	I _D	10	A
Total Device Dissipation	P _D	388	W
Channel Temperature	T _{ch}	200	°C
Storage Temperature	T _{stg}	–65 to +150	°C

RECOMMENDED OPERATING RANGE

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V _{DS}	–	28	30	V
Gate to Source Voltage	V _{GS}	1.5	1.9	2.5	V
Input Power	P _{in}	–	35	40	dBm

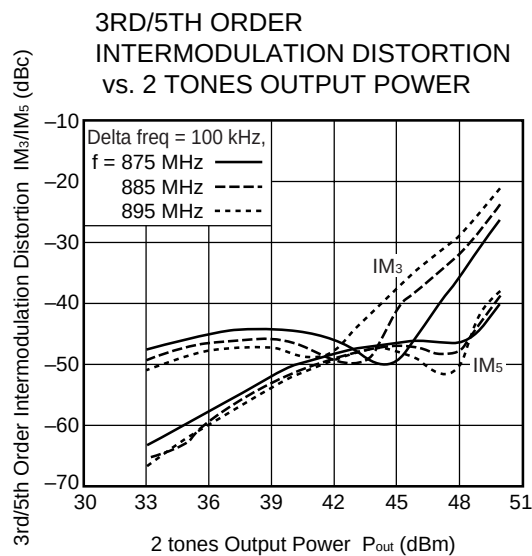
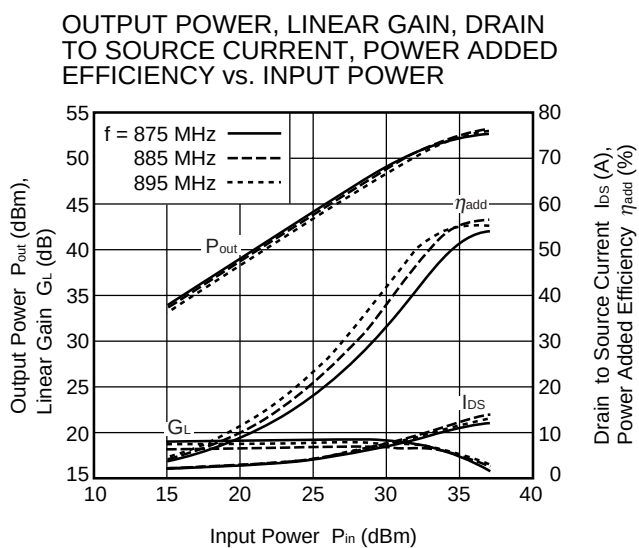
THERMAL RESISTANCE (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Channel to Case Resistance	R _{th (ch-c)}	–	0.4	0.45	°C/W

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics (Each side of device measured separately)						
Gate to Source Leak Current	I _{GSO}	V _{GSS} = 5V	–	–	1	μA
Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	I _{DSS}	V _{DSS} = 65 V	–	–	1	mA
Gate Threshold Voltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.0	1.4	2.0	V
Transconductance	g _m	V _{DS} = 28 V, I _D = 800 mA	–	4.9	–	S
Drain to Source Breakdown Voltage	BV _{DS}	I _{DSS} = 10 μA	65	75	–	V
RF Characteristics (Device measured in push-pull configuration)						
Gain 1 dB Compression Output Power	P _{O (1 dB)}	f = 880 MHz, V _{DS} = 28 V, I _{Dset} = 1 600 mA	–	52.3	–	dBm
Linear Gain	G _L	f = 880 MHz, V _{DS} = 28 V, I _{Dset} = 1 600 mA, P _{in} = 25 dBm	17	18.5	–	dB
Output Power	P _{out}	f = 880 MHz, V _{DS} = 28 V, I _{Dset} = 1 600 mA, P _{in} = 35 dBm	52	52.5	–	dBm
Drain Efficiency	η _d		48	53	–	%
Power Added Efficiency	η _{add}		–	52	–	%
3rd Order Intermodulation Distortion	IM ₃	f = 880.0, 880.1 MHz, V _{DS} = 28 V, I _{Dset} = 1 600 mA, 2 tones P _{out} = 46 dBm	–	–37	–	dBc

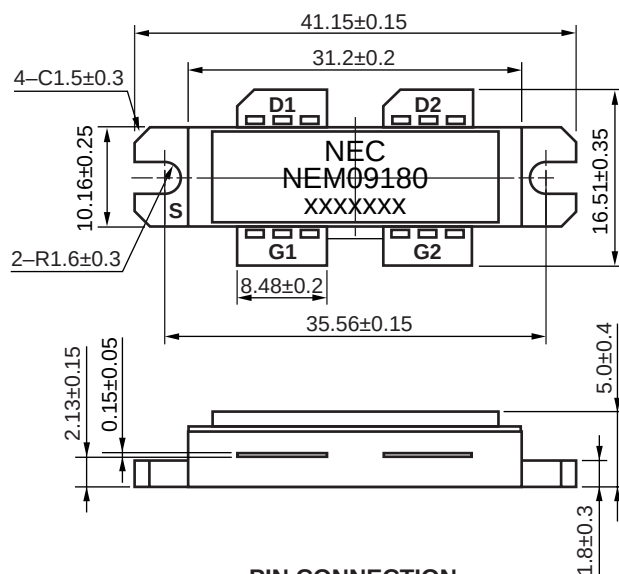
TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, $V_{DS} = 28\text{ V}$, $I_{Dset} = 1\,600\text{ mA}$, unless otherwise specified)



Remark The graphs indicate nominal characteristics.

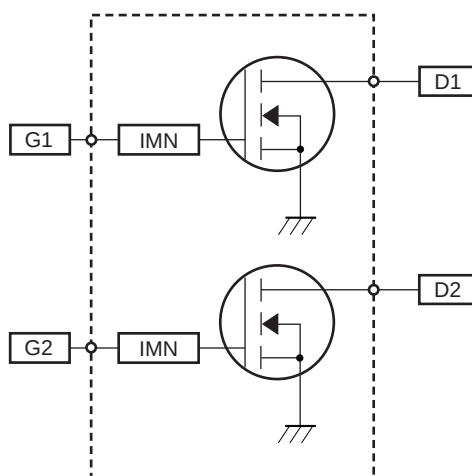
PACKAGE DIMENSIONS

T-101M (3S) (UNIT: mm)



PIN CONNECTION

S : Source
D1, D2 : Drain
G1, G2 : Gate



IMN : Internal Matching Network

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 April, 2004. 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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 "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)
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