DATA SHEET

NEC

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 : $P_{O\ (1\ dB)}$ = 180 W TYP. (V_{DS} = 28 V, I_{Dset} = 1 600 mA, f = 880 MHz)
- High linear gain : G_L = 18.5 dB TYP. (V_{DS} = 28 V, I_{Dset} = 1 600 mA, f = 880 MHz)
- High drain efficiency : η_d = 53% TYP. (V_{DS} = 28 V, I_{Dset} = 1 600 mA, f = 880 MHz)
- 3rd order intermodulation distortion : IM_3 = –37 dBc TYP. (V_{DS} = 28 V, I_{Dset} = 1 600 mA, f = 880.0, 880.1 MHz, P_{out} = 46 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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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)

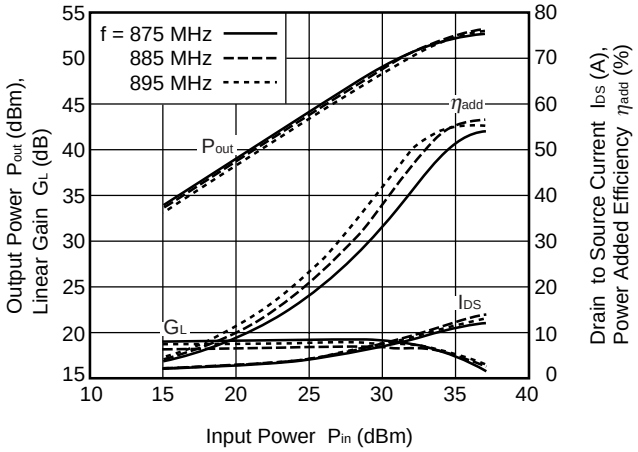
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Channel to Case Resistance	$R_{th\ (ch\text{-}c)}$	–	0.4	0.45	°C/W

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

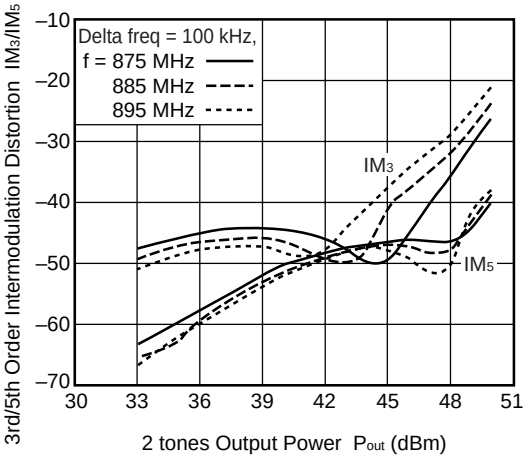
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics (Each side of device measured separately)						
Gate to Source Leak Current	I_{GSO}	V_{GSS} = 5V	–	–	1	μA
Drain to Source Leakage Current (Zero Gate Voltage Drain Current)	I_{DSS}	V_{DSS} = 65 V	–	–	1	mA
Gate Threshold Voltage	V_{th}	V_{DS} = 10 V, I_{DS} = 1 mA	1.0	1.4	2.0	V
Transconductance	g_m	V_{DS} = 28 V, I_{DS} = 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°C, V_{DS} = 28 V, I_{Dset} = 1 600 mA, unless otherwise specified)

OUTPUT POWER, LINEAR GAIN, DRAIN TO SOURCE CURRENT, POWER ADDED EFFICIENCY vs. INPUT POWER



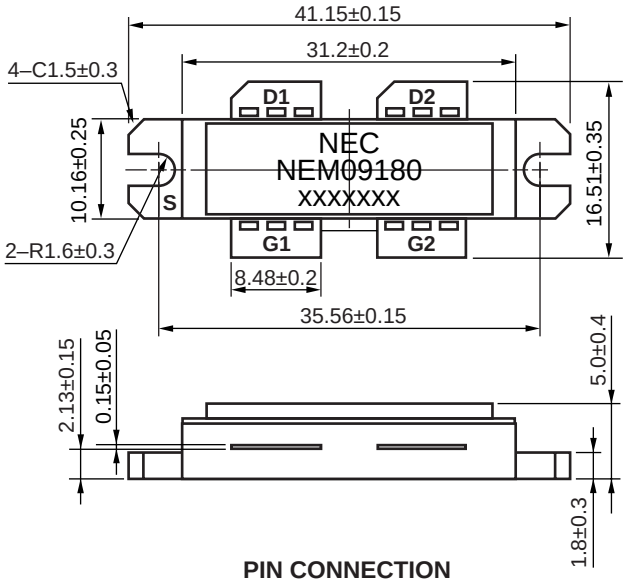
3RD/5TH ORDER INTERMODULATION DISTORTION vs. 2 TONES OUTPUT POWER



Remark The graphs indicate nominal characteristics.

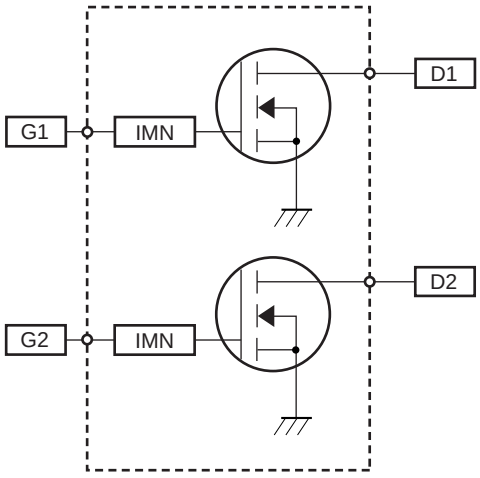
PACKAGE DIMENSIONS

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 ±10 μm (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	HS350-P3
	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).

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