DATA SHEET

NEC

LDMOS FIELD EFFECT TRANSISTOR
NEM090853P-28

N-CHANNEL SILICON POWER LDMOS FET
FOR UHF-BAND POWER AMPLIFIER

DESCRIPTION

The NEM090853P-28 is an N-channel enhancement-mode lateral MOS FET designed for 0.8 to 1.0 GHz, 90 W single-end power amplifier applications, such as, GSM/EDGE/N-CDMA cellular base station. Dies are manufactured using our NEWMOS technology (our WSi gate lateral MOS FET), and its nitride surface passivation and triple layer aluminum silicon metalization offer a high degree of reliability.

FEATURES

- High 1 dB compression output power : $P_{O\ (1\ dB)}$ = 90 W TYP. (V_{DS} = 28 V, I_{Dset} = 800 mA, f = 920 to 960 MHz CW)
- High linear gain : G_L = 19.5 dB TYP. (V_{DS} = 28 V, I_{Dset} = 800 mA, f = 920 to 960 MHz CW)
- High drain efficiency : η_d = 57% TYP. (V_{DS} = 28 V, I_{Dset} = 800 mA, f = 920 to 960 MHz CW)
- Low intermodulation distortion : IM_3 = –37 dBc TYP. (V_{DS} = 28 V, I_{Dset} = 800 mA, f = 960/960.1 MHz, P_{out} = 43 dBm (2 tones))
  : IM_3 = –45 dBc TYP. (V_{DS} = 28 V, I_{Dset} = 800 mA, f = 880/880.1 MHz, P_{out} = 40 dBm (2 tones))
- Internal matched (Input and Output) for ease of use
- Low cost hollow plastic packages
- 100% screening
- Integrated ESD protection
- Effective prevention against humidity
- Excellent stability against HCI (Hot Carrier Injection)

APPLICATION

- Digital cellular base station PA : GSM/EDGE/N-CDMA etc.

ORDERING INFORMATION

Part Number	Package	Supplying Form
NEM090853P-28	T-97M (3P)	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, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	65	V
Gate to Source Voltage	V_{GS}	7	V
Drain Current	I_D	10.0	A
Total Device Dissipation	P_{tot} Note	250	W
Thermal Resistance	R_{th}	0.7	°C/W
Channel Temperature	T_{ch}	200	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note T_C = 25 °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}	–	32	36	dBm

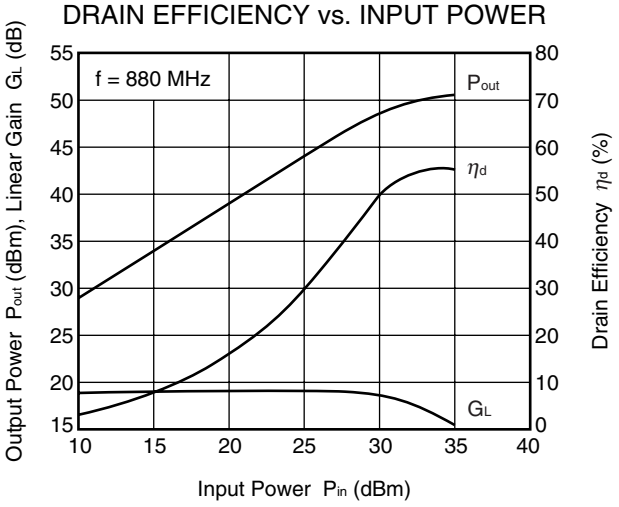
ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSS}	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} = 20 V, I_{DS} = 2 A ± 100 mA	–	4.8	–	S
Drain to Source Breakdown Voltage	BV_{DSS}	I_{DSS} = 10 μA	65	75	–	V
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	f = 920 to 960 MHz, P_{in} = 32 dBm,	–	49.5	–	dBm
Linear Gain	G_L Note	V_{DS} = 28 V, I_{Dset} = 800 mA	18.5	19.5	–	dB
Output Power	P_{out}		49.3	50	–	dBm
Drain Efficiency	η_d		50	57	–	%
Power Added Efficiency	η_{add}		–	56	–	%
3rd Order Intermodulation Distortion	IM_3	f = 960/960.1 MHz, V_{DS} = 28 V, I_{Dset} = 800 mA, 2 tones P_{out} = 43 dBm	–	–37	–	dBc
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	f = 880 MHz, P_{in} = 32 dBm,	–	49.5	–	dBm
Linear Gain	G_L Note	V_{DS} = 28 V, I_{Dset} = 800 mA	–	19.0	–	dB
Output Power	P_{out}		–	50	–	dBm
Drain Efficiency	η_d		–	57	–	%
Power Added Efficiency	η_{add}		–	56	–	%
3rd Order Intermodulation Distortion	IM_3	f = 880/880.1 MHz, V_{DS} = 28 V, I_{Dset} = 800 mA, 2 tones P_{out} = 40 dBm	–	–45	–	dBc

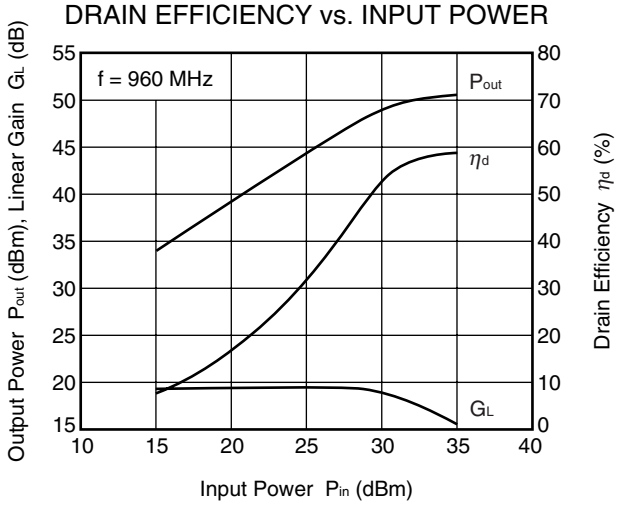
Note P_{in} = 22 dBm

TYPICAL CHARACTERISTICS (T_A = +25°C, V_{DS} = 28 V, I_{Dset} = 800 mA, unless otherwise specified)

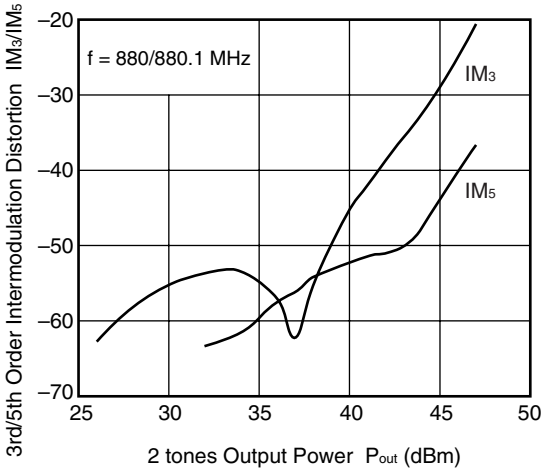
OUTPUT POWER, LINEAR GAIN, DRAIN EFFICIENCY vs. INPUT POWER



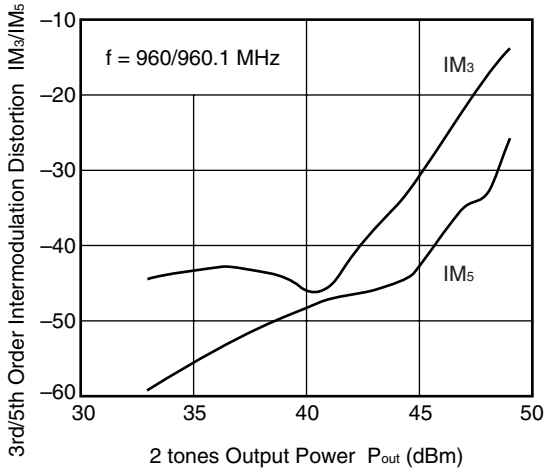
OUTPUT POWER, LINEAR GAIN, DRAIN EFFICIENCY vs. INPUT POWER



IM3/IM5 vs. 2 TONES OUTPUT POWER



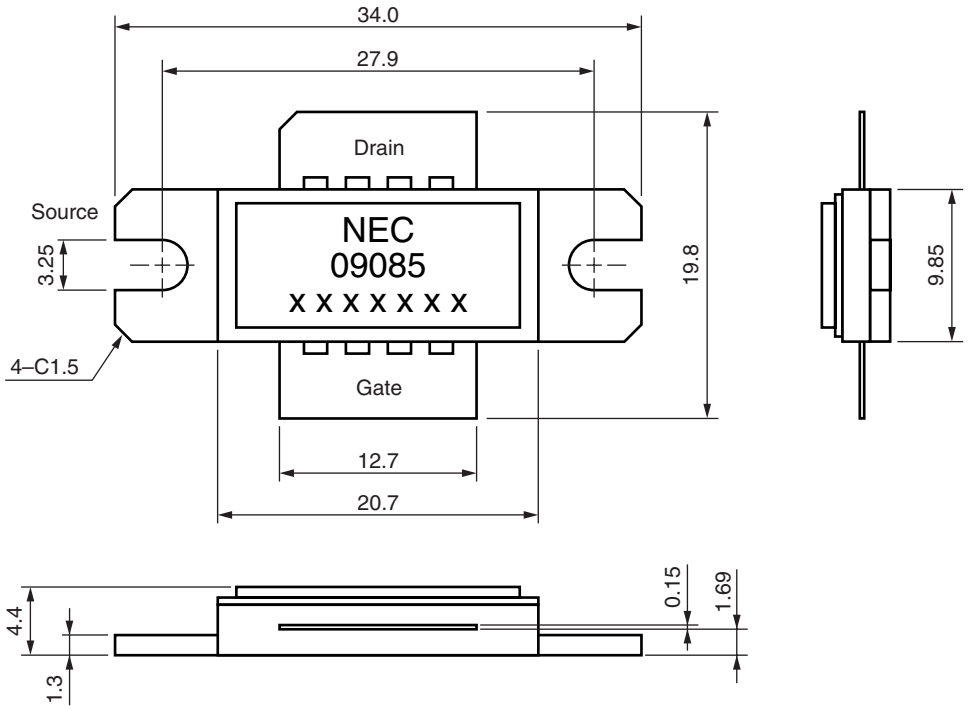
IM3/IM5 vs. 2 TONES OUTPUT POWER



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

T-97M (3P) (UNIT: mm)



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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