

HETERO JUNCTION FIELD EFFECT TRANSISTOR NE3510M04

L TO S BAND LOW NOISE AMPLIFIER N-CHANNEL HJ-FET

FEATURES

- Low noise figure and high associated gain
 $NF = 0.45 \text{ dB TYP.}, G_a = 16 \text{ dB TYP. @ } f = 4 \text{ GHz}, V_{DS} = 2 \text{ V}, I_D = 15 \text{ mA}$
 $NF = 0.35 \text{ dB TYP.}, G_a = 19 \text{ dB TYP. @ } f = 2 \text{ GHz}, V_{DS} = 2 \text{ V}, I_D = 10 \text{ mA (Reference only)}$
- Flat-lead 4-pin thin-type super minimold (M04) package

APPLICATIONS

- Satellite radio (SDARS, DMB, etc.) antenna LNA
- Low noise amplifier for microwave communication system

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Marking	Supplying Form
NE3510M04	NE3510M04-A	Flat-lead 4-pin thin-type super minimold (M04) (Pb-Free)	50 pcs (Non reel)	V81	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 1 (Source), Pin 2 (Drain) face the perforation side of the tape
NE3510M04-T2	NE3510M04-T2-A		3 kpcs/reel		

Remark To order evaluation samples, contact your nearby sales office.
 Part number for sample order: NE3510M04

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	4.0	V
Gate to Source Voltage	V_{GS}	-3.0	V
Drain Current	I_D	I_{DSS}	mA
Gate Current	I_G	140	μA
Total Power Dissipation	P_{tot}^{Note}	125	mW
Channel Temperature	T_{ch}	+150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Note Mounted on $1.08 \text{ cm}^2 \times 1.0 \text{ mm (t)}$ glass epoxy PCB

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

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RECOMMENDED OPERATING CONDITIONS (TA = +25°C)

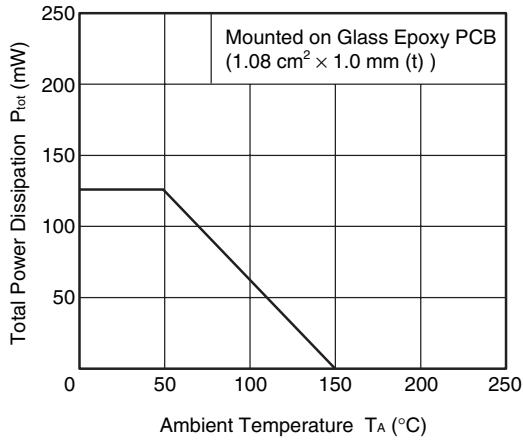
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V _{DS}	–	2	3	V
Drain Current	I _D	–	15	30	mA
Input Power	P _{in}	–	–	0	dBm

ELECTRICAL CHARACTERISTICS (TA = +25°C, unless otherwise specified)

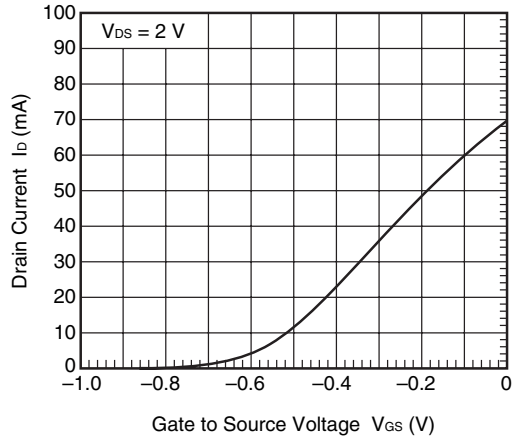
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I _{GSO}	V _{GS} = –3 V	–	0.5	10	μA
Saturated Drain Current	I _{DSS}	V _{DS} = 2 V, V _{GS} = 0 V	42	70	97	mA
Gate to Source Cutoff Voltage	V _{GS (off)}	V _{DS} = 2 V, I _D = 100 μA	–0.35	–0.7	–1.10	V
Transconductance	g _m	V _{DS} = 2 V, I _D = 15 mA	70	–	–	mS
Noise Figure	NF	V _{DS} = 2 V, I _D = 15 mA, f = 4 GHz	–	0.45	0.65	dB
Associated Gain	G _a		14.5	16	–	dB
Gain 1 dB Compression Output Power	P _{O (1 dB)}	V _{DS} = 2 V, I _D = 15 mA (Non-RF), f = 4 GHz	–	+11	–	dBm

TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

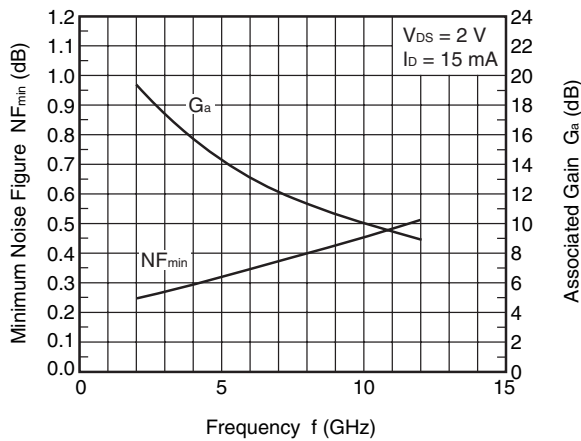
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



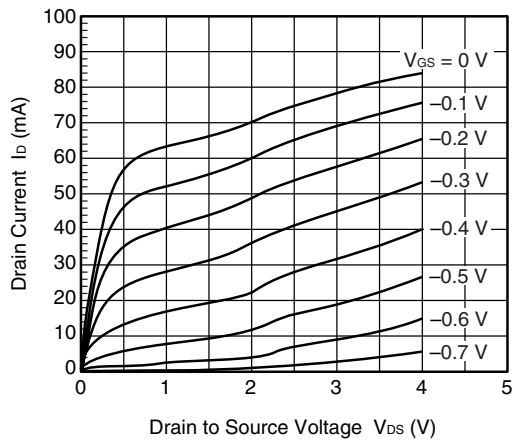
DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



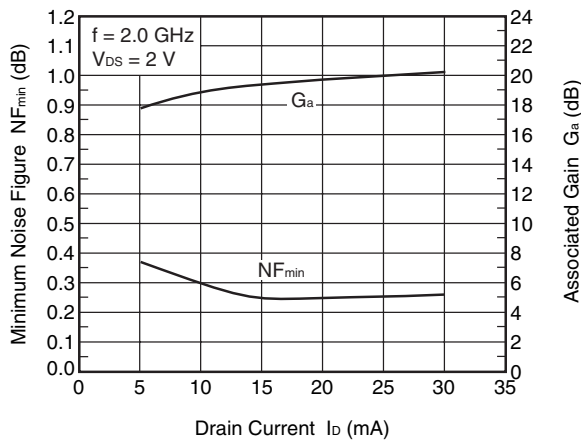
MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



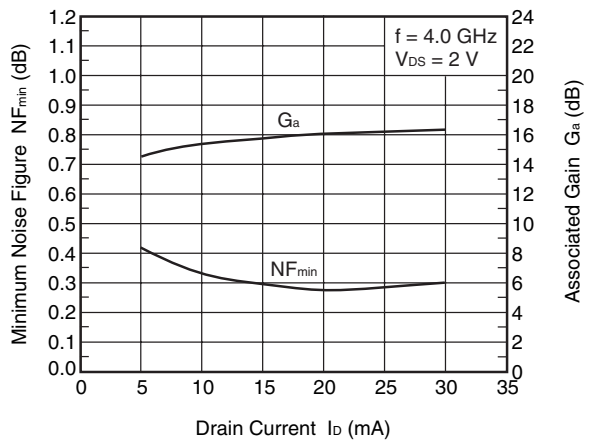
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. DRAIN CURRENT

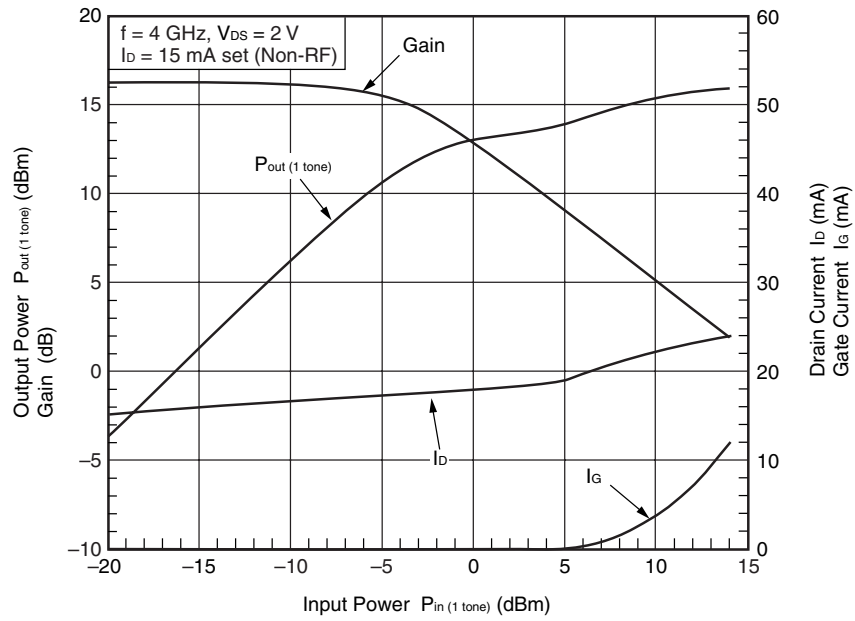


MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. DRAIN CURRENT

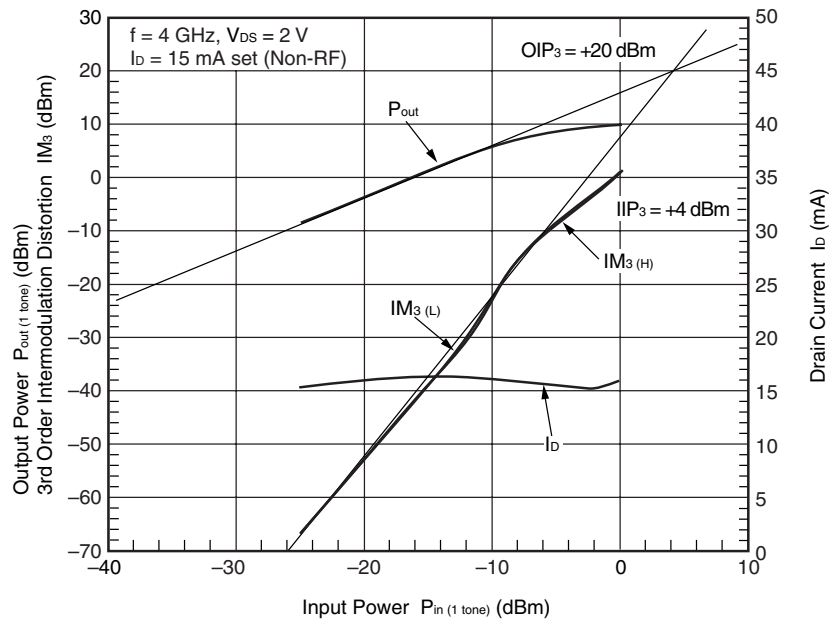


Remark The graphs indicate nominal characteristics.

OUTPUT POWER, GAIN, DRAIN CURRENT, GATE CURRENT vs. INPUT POWER



OUTPUT POWER, IM3, DRAIN CURRENT vs. INPUT POWER



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

S-parameters/Noise parameters are provided on our web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

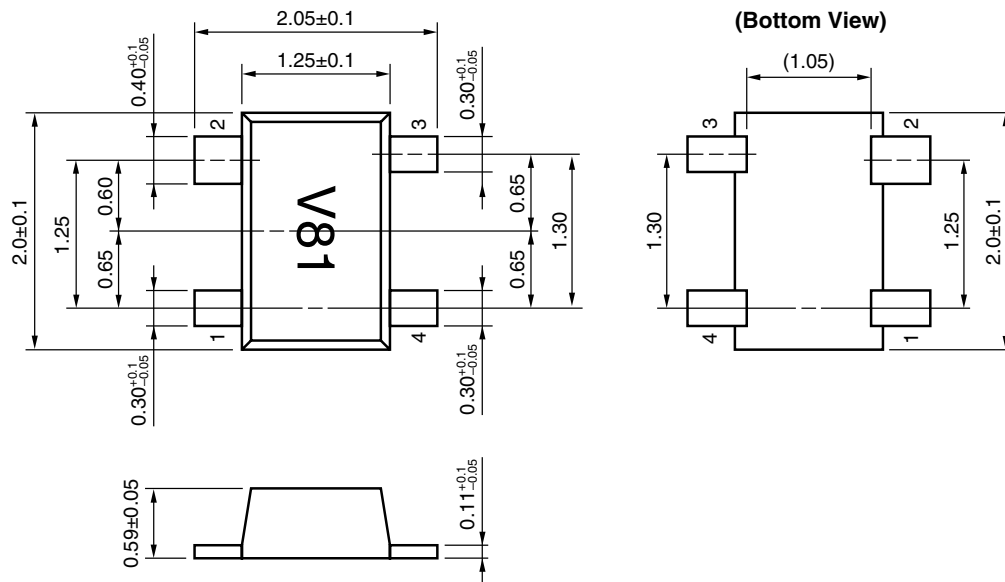
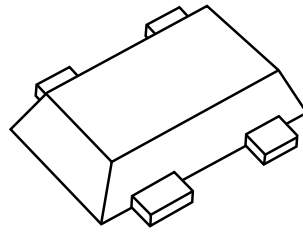
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.ncsd.necel.com/microwave/index.html>

PACKAGE DIMENSIONS

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M04) (UNIT: mm)

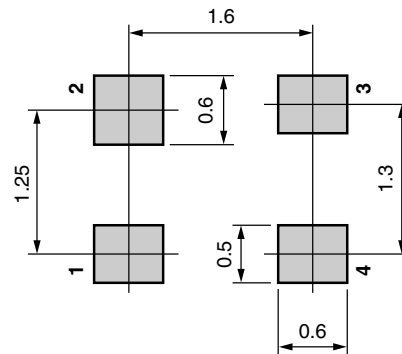


PIN CONNECTIONS

1. Source
2. Drain
3. Source
4. Gate

MOUNTING PAD DIMENSIONS (REFERENCE ONLY)

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M04) PACKAGE (UNIT: mm)



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
Infrared Reflow	Peak temperature (package surface temperature)	: 260°C or below
	Time at peak temperature	: 10 seconds or less
	Time at temperature of 220°C or higher	: 60 seconds or less
	Preheating time at 120 to 180°C	: 120±30 seconds
	Maximum number of reflow processes	: 3 times
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below
Partial Heating	Peak temperature (terminal temperature)	: 350°C or below
	Soldering time (per side 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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(Note)

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M8E 02.11-1

Caution	GaAs Products	<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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