

DATA SHEET

NEC

HETERO JUNCTION FIELD EFFECT TRANSISTOR NE3508M04

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

FEATURES

- Super low noise figure and high associated gain
NF = 0.45 dB TYP., $G_a = 14$ dB TYP. @ $f = 2$ GHz, $V_{DS} = 2$ V, $I_D = 10$ mA
- 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
NE3508M04	NE3508M04-A	Flat-lead 4-pin thin-type super minimold (M04) (Pb-Free)	50 pcs (Non reel)	V79	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 1 (Source), Pin 2 (Drain) face the perforation side of the tape
NE3508M04-T2	NE3508M04-T2-A		3 kpcs/reel		
NE3508M04-T2B	NE3508M04-T2B-A		15 kpcs/reel		

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Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: NE3508M04

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	400	μA
Total Power Dissipation	P_{tot} ^{Note}	175	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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

RECOMMENDED OPERATING CONDITIONS ($T_A = +25^\circ\text{C}$)

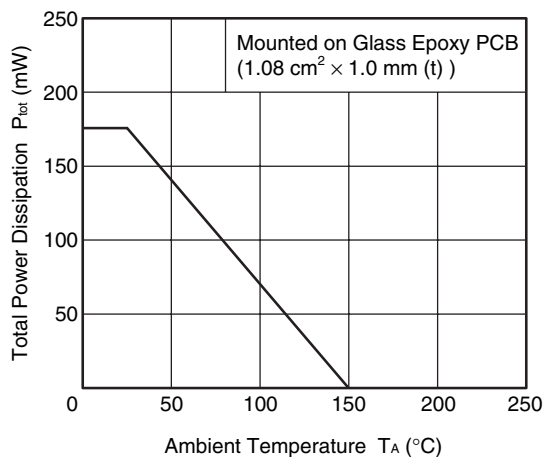
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}	–	2	3	V
Drain Current	I_D	–	10	30	mA
Input Power	P_{in}	–	–	0	dBm

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise specified)

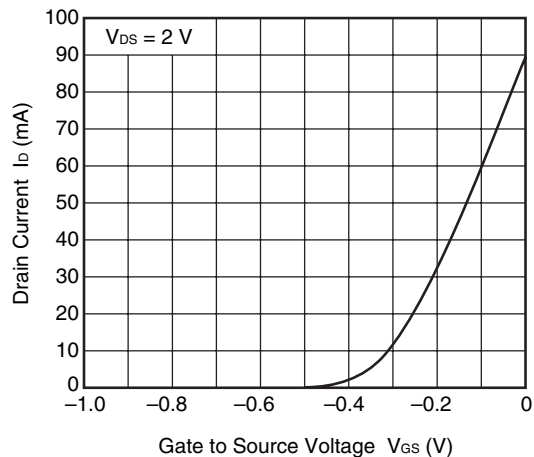
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSO}	$V_{GS} = -3\text{ V}$	–	1	20	μA
Saturated Drain Current	I_{DSS}	$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	60	90	120	mA
Gate to Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 2\text{ V}, I_D = 100\text{ }\mu\text{A}$	–0.25	–0.5	–0.75	V
Transconductance	g_m	$V_{DS} = 2\text{ V}, I_D = 10\text{ mA}$	100	–	–	mS
Noise Figure	NF	$V_{DS} = 2\text{ V}, I_D = 10\text{ mA}, f = 2\text{ GHz}$	–	0.45	0.7	dB
Associated Gain	G_a		12	14	–	dB
Gain 1 dB Compression Output Power	$P_{O(1\text{ dB})}$	$V_{DS} = 3\text{ V}, I_D = 30\text{ mA (Non-RF)},$ $f = 2\text{ GHz}$	–	18	–	dBm

TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise specified)

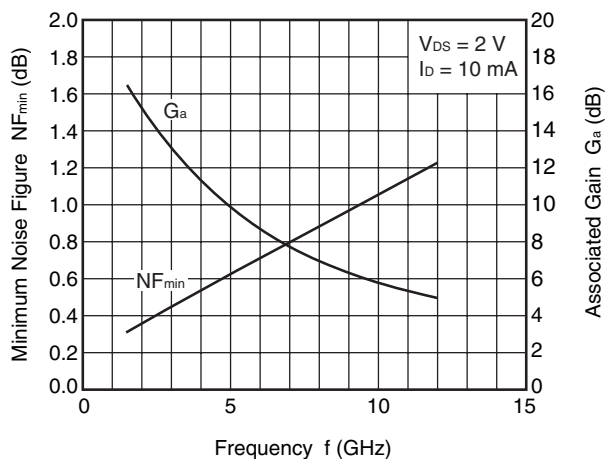
**TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE**



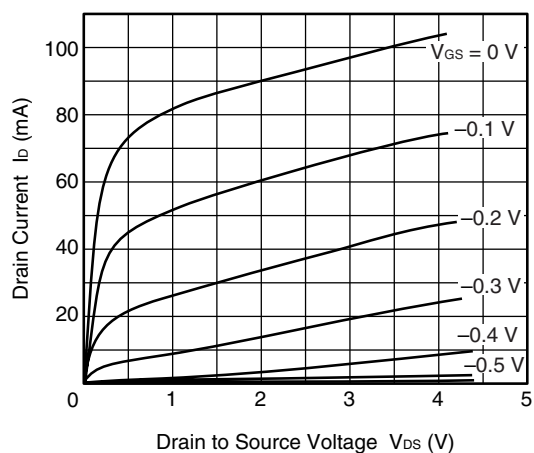
**DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE**



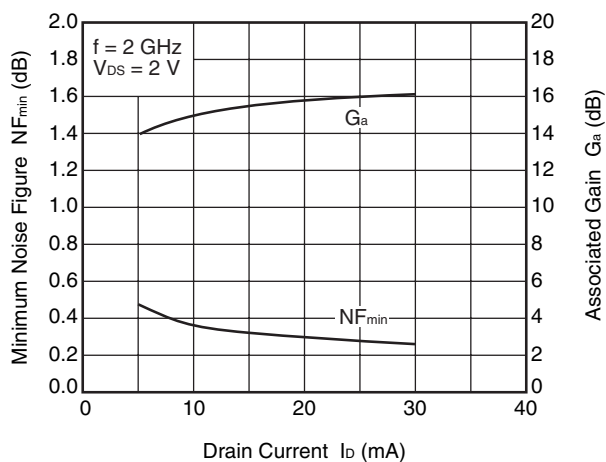
**MINIMUM NOISE FIGURE,
ASSOCIATED GAIN vs. FREQUENCY**



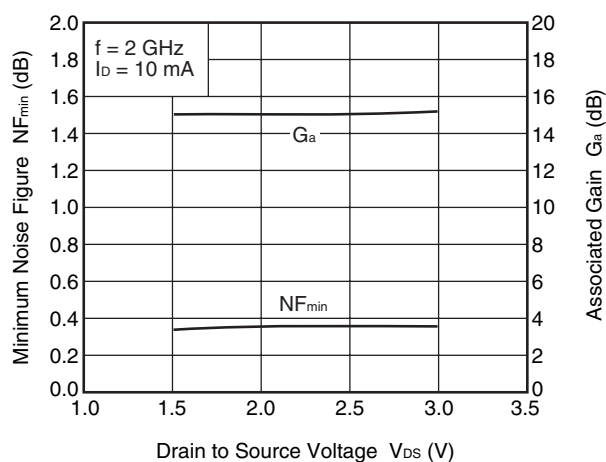
**DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE**



**MINIMUM NOISE FIGURE,
ASSOCIATED GAIN vs. DRAIN CURRENT**

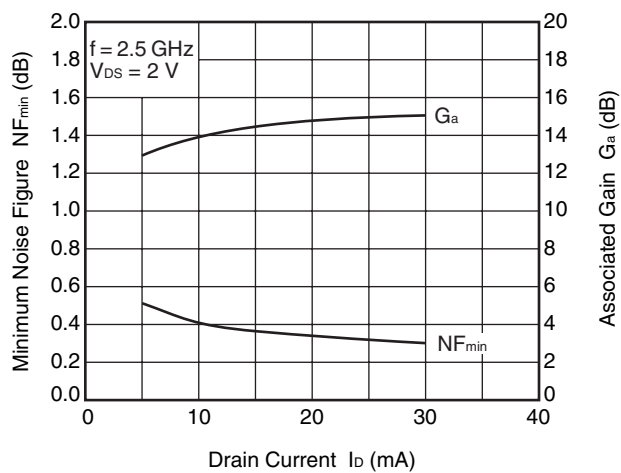


**MINIMUM NOISE FIGURE, ASSOCIATED GAIN
vs. DRAIN TO SOURCE VOLTAGE**

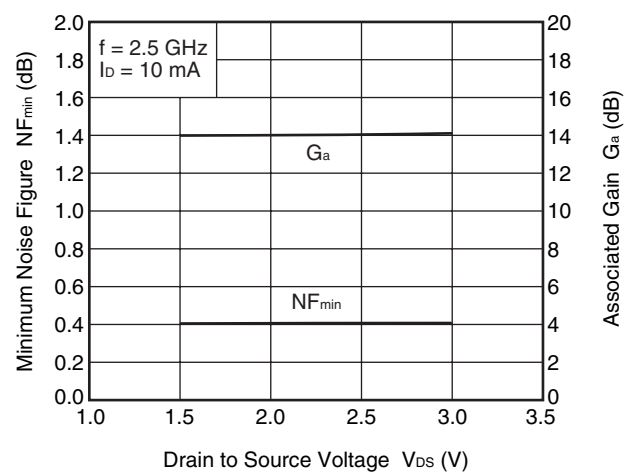


Remark The graphs indicate nominal characteristics.

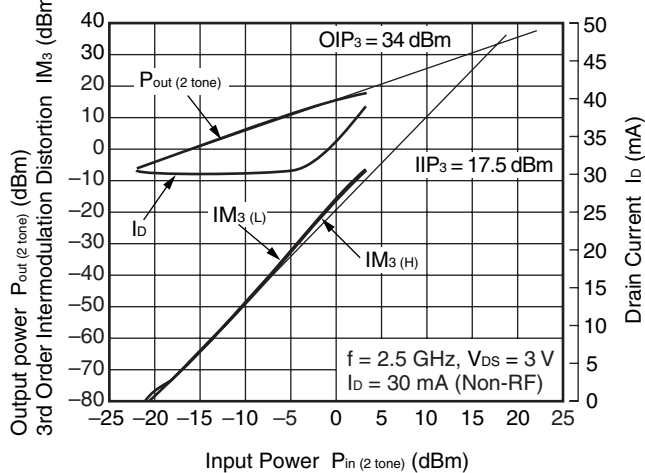
MINIMUM NOISE FIGURE,
ASSOCIATED GAIN vs. DRAIN CURRENT



MINIMUM NOISE FIGURE, ASSOCIATED GAIN
vs. DRAIN TO SOURCE VOLTAGE



OUTPUT POWER, IM_3 , DRAIN CURRENT
vs. INPUT POWER



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.

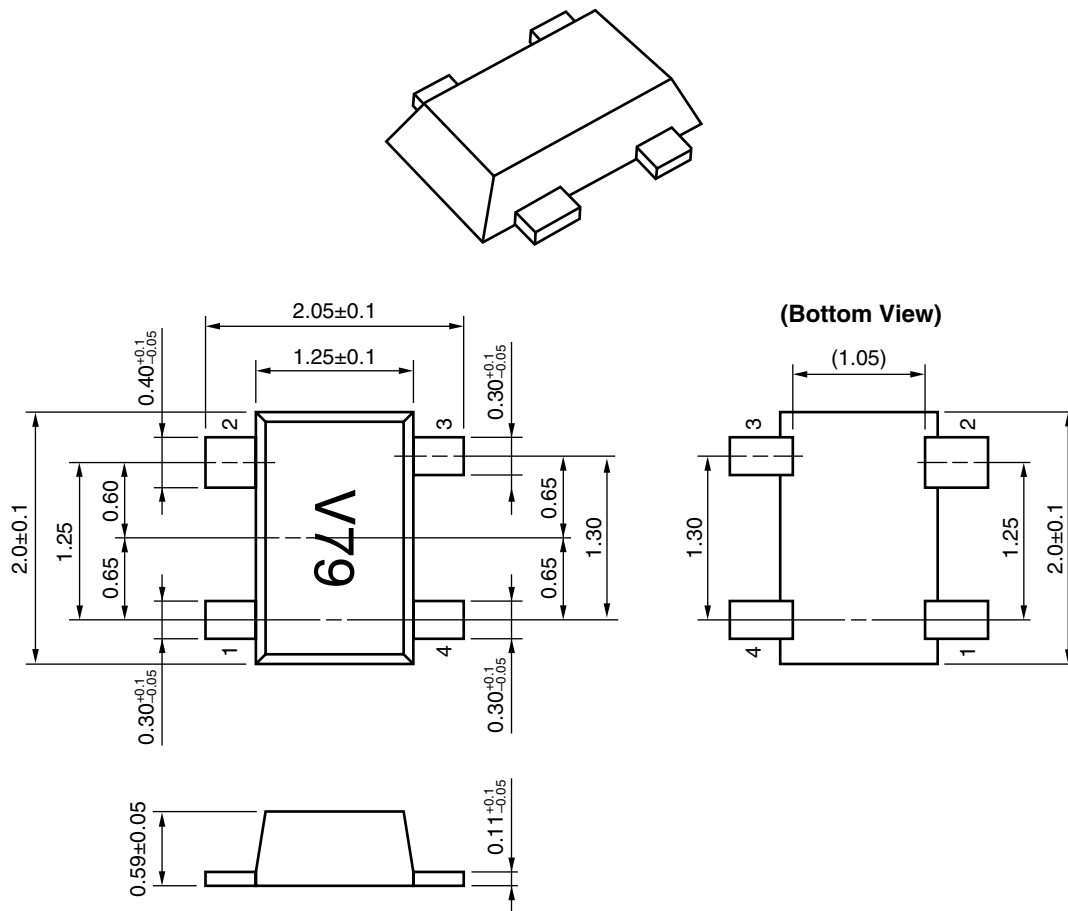
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.necel.com/microwave/en/>

PACKAGE DIMENSIONS

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

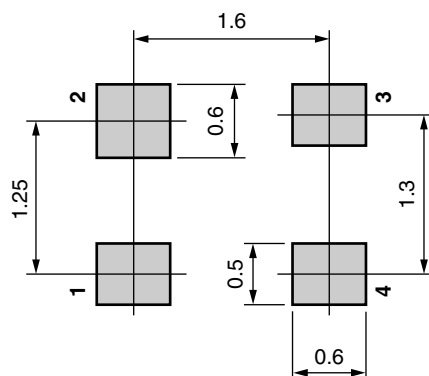


PIN CONNECTIONS

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

MOUNTING PAD DIMENSIONS (REFERENCE ONLY)

FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M04) (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).

- **The information in this document is current as of October, 2008. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
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 "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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(Note)

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M8E 02.11-1

<div>Caution</div>	<div>GaAs Products</div>	<div><p>This product uses gallium arsenide (GaAs).</p><p>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.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.</div>
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