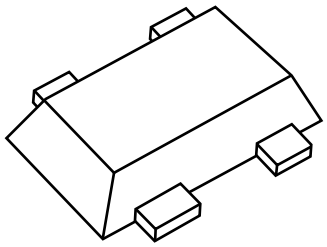
CEL

NEC's C TO Ku BAND SUPER LOW NOISE AND HIGH-GAIN AMPLIFIER N-CHANNEL HJ-FET

NE3503M04

FEATURES

- **SUPER LOW NOISE FIGURE AND HIGH ASSOCIATED GAIN:**
  NF = 0.55 dB TYP., G_a = 11.5 dB TYP. @ V_{DS} = 2 V, I_D = 10 mA, f = 12 GHz
- **FLAT-LEAD 4-PIN THIN-TYPE SUPER MINIMOLD (M04) PACKAGE:**
- **GATE WIDTH:**
  W_g = 160 μm



M04 PACKAGE

APPLICATIONS

- **DBS LNB gain-stage, Mix-stage**
- **Low noise amplifier for microwave communication system**

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKAGE	MARKING	SUPPLYING FORM
NE3503M04-A	50 pcs (Non reel)	4-Pin thin-type super minimold (Pb-Free)	V75	• 8 mm wide embossed taping • Pin 1 (Source), Pin 2 (Drain) face the perforation side of the tape
NE3503M04-T2-A	3 kpcs/reel			

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: NE3503M04-A

ABSOLUTE MAXIMUM RATINGS (T_A = +25°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	80	μA
Total Power Dissipation	P_{tot}	125	mW
Channel Temperature	T_{ch}	+125	°C
Storage Temperature	T_{stg}	−65 to +125	°C

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

RECOMMENDED OPERATING CONDITIONS (T_A = +25°C)

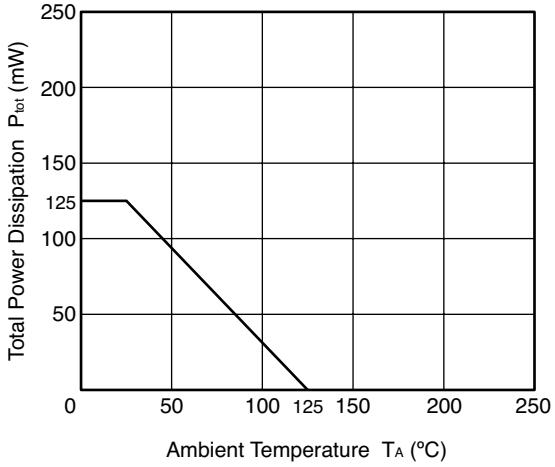
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Drain to Source Voltage	V_{DS}	–	2	3	V
Drain Current	I_D	–	10	15	mA
Input Power	P_{in}	–	–	0	dBm

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

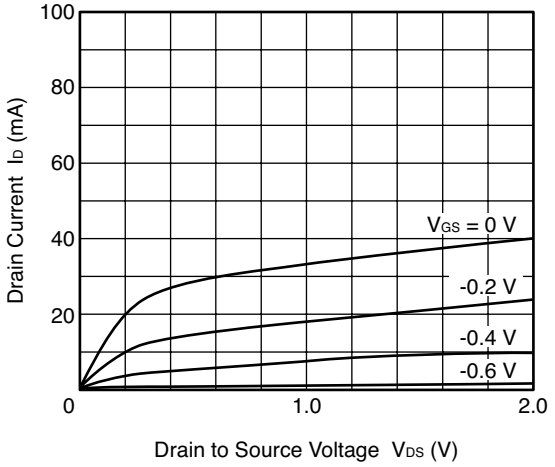
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Gate to Source Leak Current	I_{GSO}	V_{GS} = –3.0 V	–	0.5	10	μA
Saturated Drain Current	I_{DSS}	V_{DS} = 2 V, V_{GS} = 0 V	15	40	70	mA
Gate to Source Cutoff Voltage	$V_{GS (off)}$	V_{DS} = 2 V, I_D = 100 μA	–0.2	–0.7	–2.0	V
Transconductance	g_m	V_{DS} = 2 V, I_D = 10 mA	40	55	–	mS
Noise Figure	NF	V_{DS} = 2 V, I_D = 10 mA, f = 12 GHz	–	0.55	0.75	dB
Associated Gain	G_a		10.5	11.5	–	dB

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

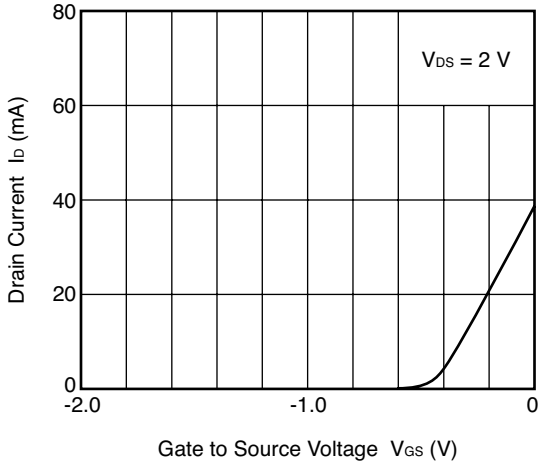
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



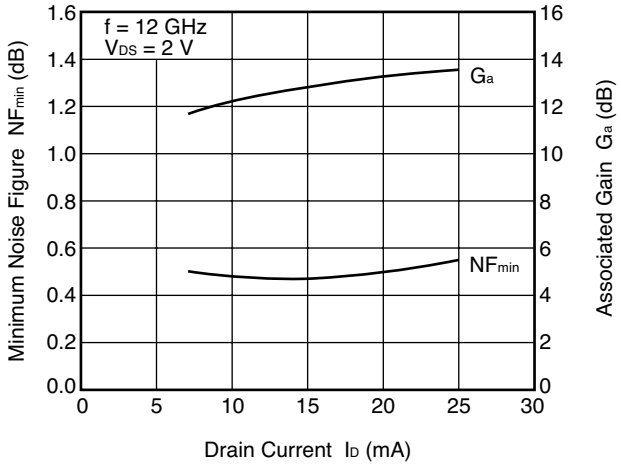
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



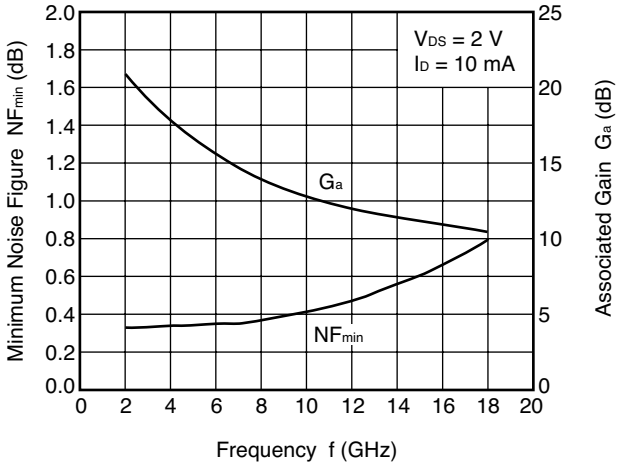
DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. DRAIN CURRENT

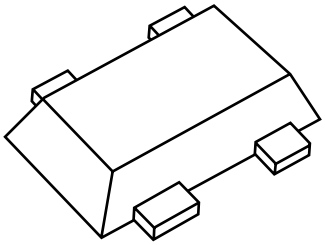


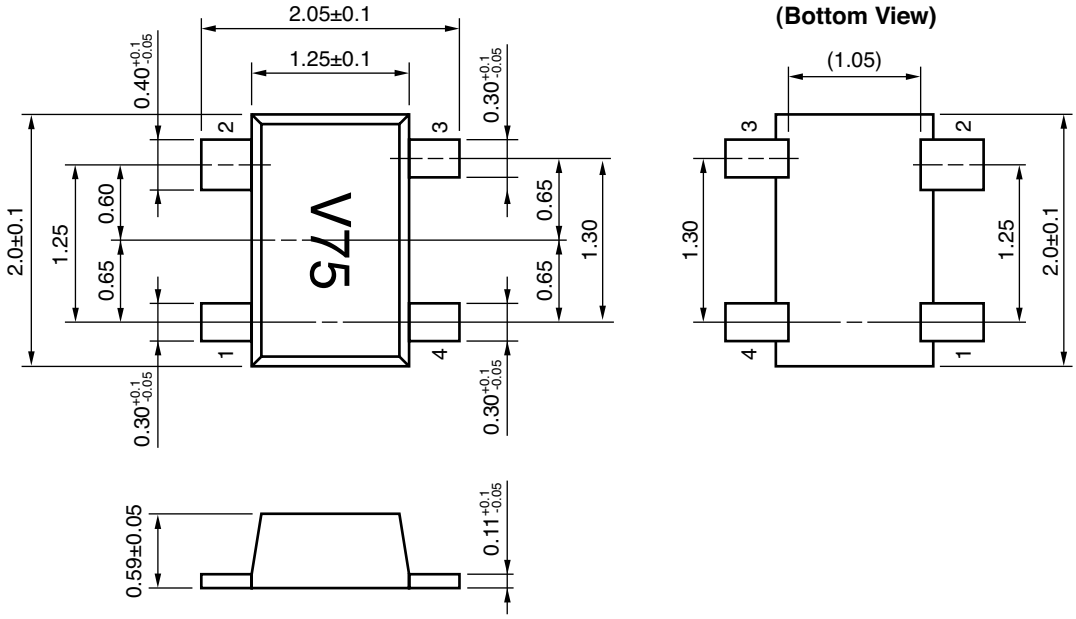
MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



PACKAGE DIMENSIONS

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





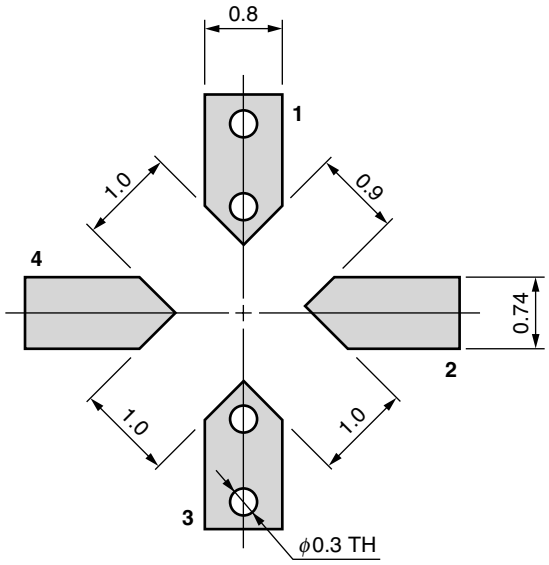
PIN CONNECTIONS

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

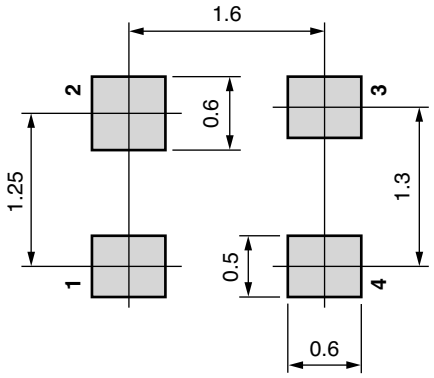
MOUNTING PAD DIMENSIONS

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

Reference 1



Reference 2



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	IR260
	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 (pin temperature)	: 350°C or below	HS350
	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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Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.