

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

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HETERO JUNCTION FIELD EFFECT TRANSISTOR
NE3512S02

**C TO Ku BAND SUPER LOW NOISE AMPLIFIER
 N-CHANNEL HJ-FET**

FEATURES

- Super low noise figure and high associated gain
 NF = 0.35 dB TYP., $G_a = 13.5$ dB TYP. @ $f = 12$ GHz
- Micro-X plastic (S02) package

APPLICATIONS

- C to Ku-band DBS LNB
- Other C to Ku-band communication systems

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Marking	Supplying Form
NE3512S02-T1C	NE3512S02-T1C-A	S02 (Pb-Free)	2 kpcs/reel	C	<ul style="list-style-type: none"> • 8 mm wide embossed taping • Pin 4 (Gate) faces the perforation side of the tape
NE3512S02-T1D	NE3512S02-T1D-A		10 kpcs/reel		

Remark To order evaluation samples, contact your nearby sales office.
 Part number for sample order: NE3512S02

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V _{DS}	4	V
Gate to Source Voltage	V _{GS}	-3	V
Drain Current	I _D	I _{DSS}	mA
Gate Current	I _G	100	μA
Total Power Dissipation	P _{tot} ^{Note}	165	mW
Channel Temperature	T _{ch}	+125	°C
Storage Temperature	T _{stg}	-65 to +125	°C

Note Mounted on 1.08 cm² × 1.0 mm (t) glass epoxy PCB

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

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 Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

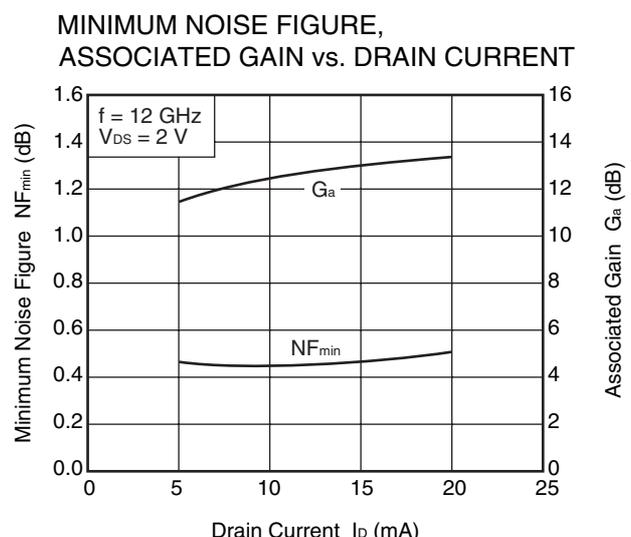
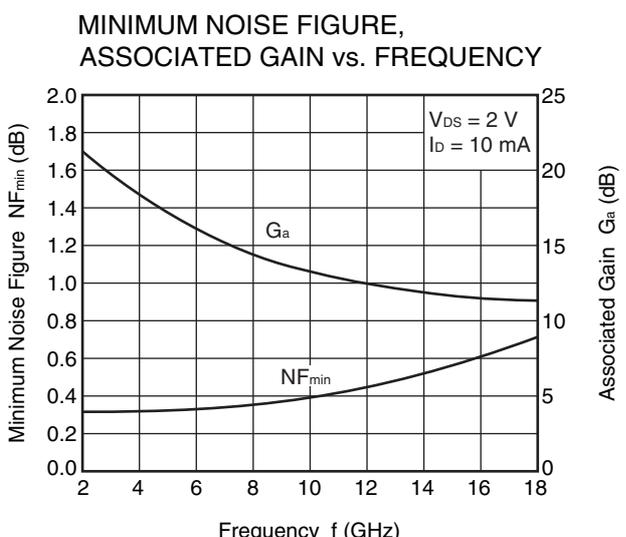
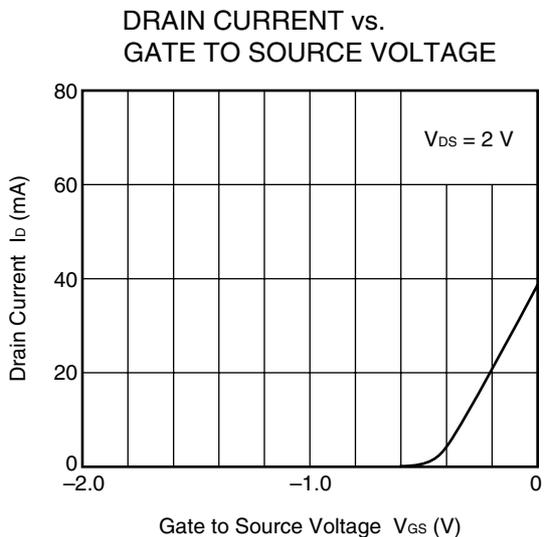
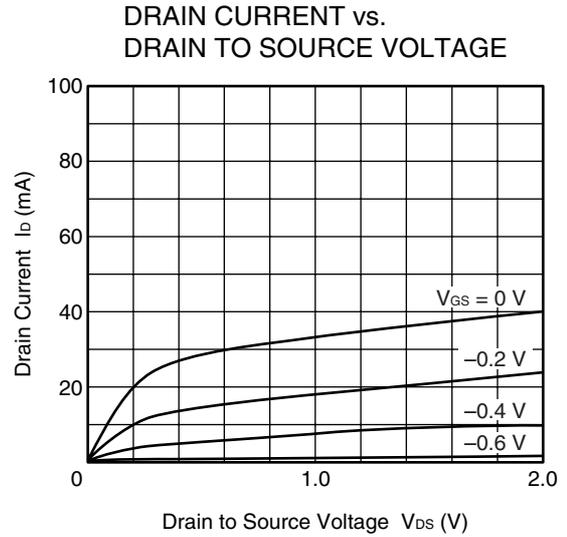
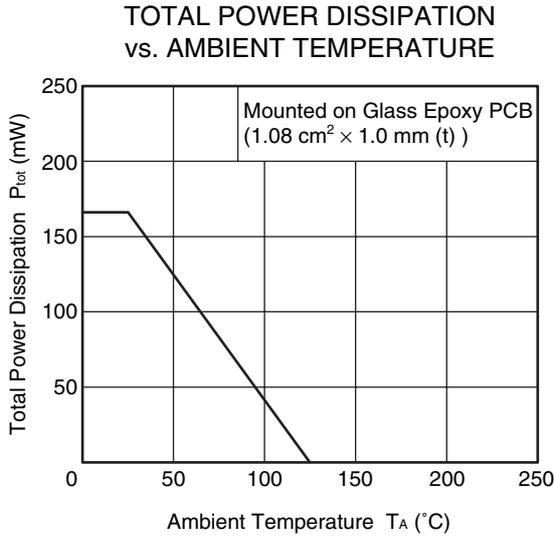
RECOMMENDED OPERATING CONDITIONS (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V _{DS}	1	2	3	V
Drain Current	I _D	5	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 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	–	0.35	0.5	dB
Associated Gain	G _a		12.5	13.5	–	dB

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



Remark The graphs indicate nominal characteristics.

S-PARAMETERS

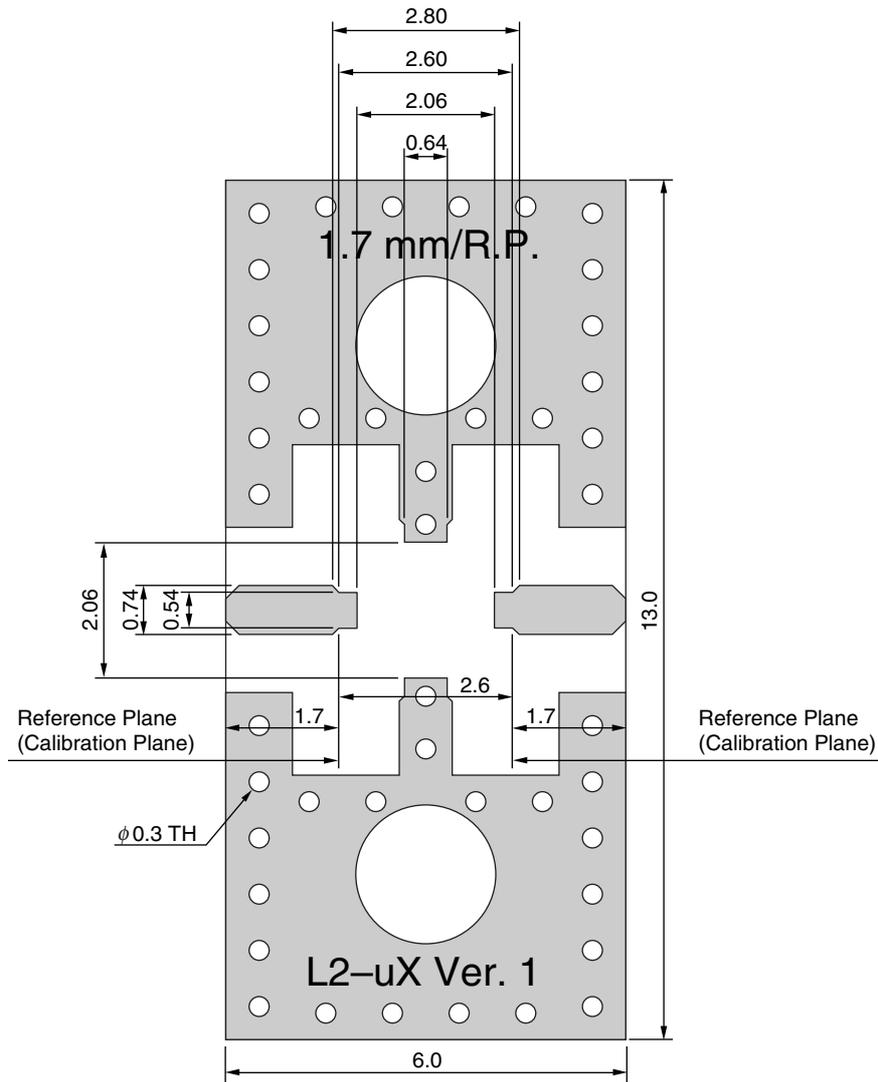
S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.ncsd.necel.com/>

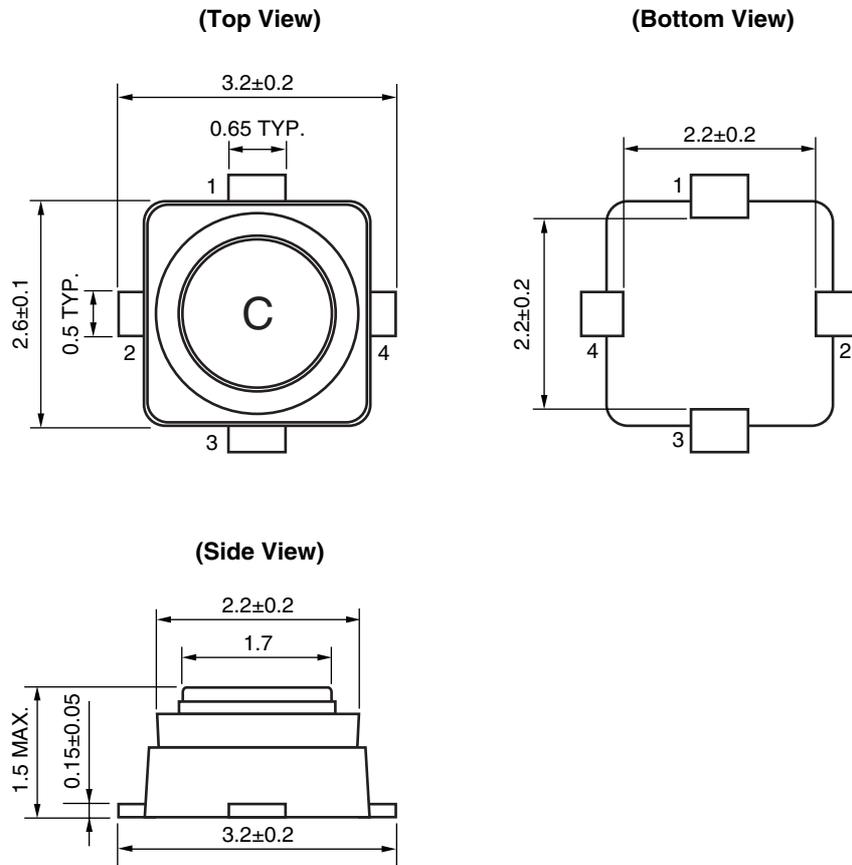
RF MEASURING LAYOUT PATTERN (REFERENCE ONLY) (UNIT: mm)



RT/duroid 5880/ROGERS
 t = 0.254 mm
 $\epsilon_r = 2.20$
 tan delta = 0.0009 @10 GHz

PACKAGE DIMENSIONS

S02 (UNIT: mm)



PIN CONNECTIONS

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

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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 "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
 "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)
 "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
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M8E 00.4-0110

<p>Caution</p>	<p>GaAs Products</p>	<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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► For further information, please contact

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