

NE3520S03

Data Sheet
R09DS0029EJ0100
Rev.1.00
Oct 18, 2011

N-Channel GaAs HJ-FET, K Band Low Noise and High-Gain

FEATURES

- **Low noise figure and high associated gain:**
 $NF = 0.65 \text{ dB TYP.}, G_k = 13.5 \text{ dB TYP. @ } f = 20 \text{ GHz}, V_{DS} = 2 \text{ V}, I_D = 10 \text{ mA}$
- **K band Micro-X plastic (S03) package**

APPLICATIONS

- **20 GHz band DBS LNB**
- **Other K band communication system**

ORDERING INFORMATION

| Part Number | Order Number | Package | Quantity | Marking | Supplying Form |
|---------------|-----------------|--------------------------|--------------|---------|---|
| NE3520S03-T1C | NE3520S03-T1C-A | S03 package (Pb-Free) | 2 kpcs/reel | J | <ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 4 (Gate) face the perforation side of the tape |
| NE3520S03-T1D | NE3520S03-T1D-A | | 10 kpcs/reel | | |

Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample order: NE3520S03-A

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified)

| 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 | 100 | μA |
| Total Power Dissipation ^{Note} | P _{tot} | 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 PWB

CAUTION

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

RECOMMENDED OPERATING RANGE ($T_A = +25^\circ\text{C}$, unless otherwise specified)

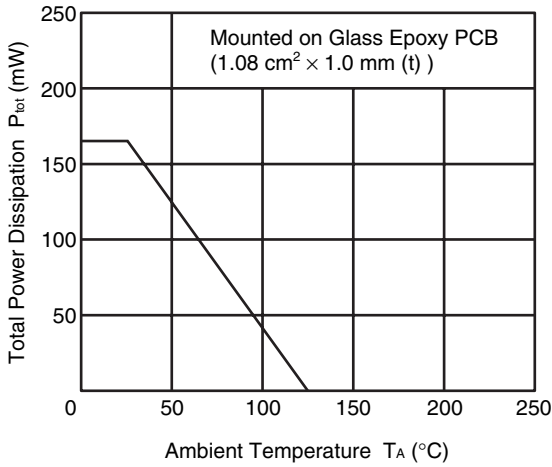
| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|-------------------------|----------|------|------|------|------|
| Drain to Source Voltage | V_{DS} | +1 | +2 | +3 | V |
| Drain Current | I_D | 5 | 10 | 15 | mA |
| Input Power | P_{in} | – | – | 0 | dBm |

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

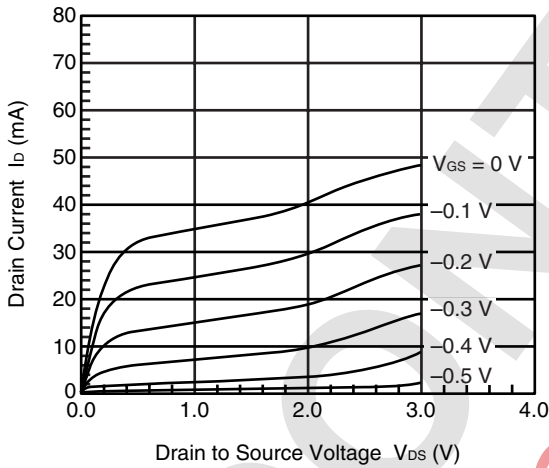
| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------------|---------------|--|------|------|------|---------------|
| Gate to Source Leak Current | I_{GSO} | $V_{GS} = -3.0\text{ V}$ | – | 0.5 | 10 | μA |
| Saturated Drain Current | I_{DSS} | $V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$ | 25 | 40 | 70 | mA |
| Gate to Source Cut-off Voltage | $V_{GS(off)}$ | $V_{DS} = 2\text{ V}, I_D = 100\ \mu\text{A}$ | -0.2 | -0.7 | -1.3 | V |
| Transconductance | gm | $V_{DS} = 2\text{ V}, I_D = 10\text{ mA}$ | 50 | 65 | – | mS |
| Noise Figure | NF | $V_{DS} = 2\text{ V}, I_D = 10\text{ mA}, f = 20\text{ GHz}$ | – | 0.65 | 0.90 | dB |
| Associated Gain | G_a | | 11.5 | 13.5 | – | dB |

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

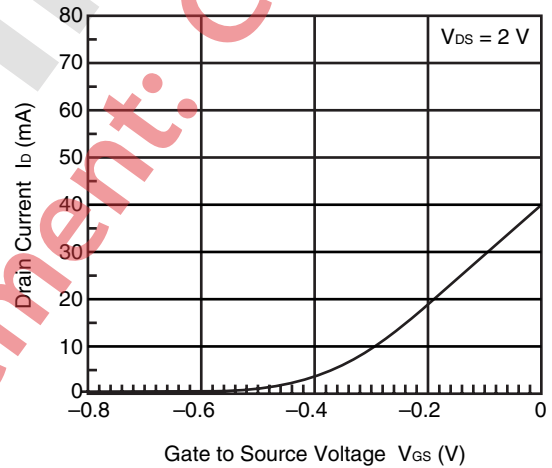
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



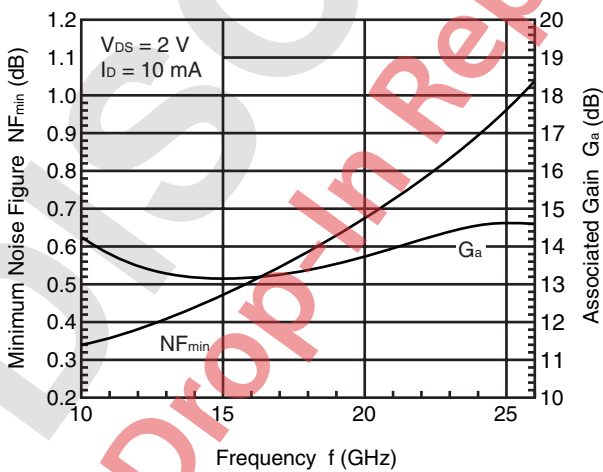
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



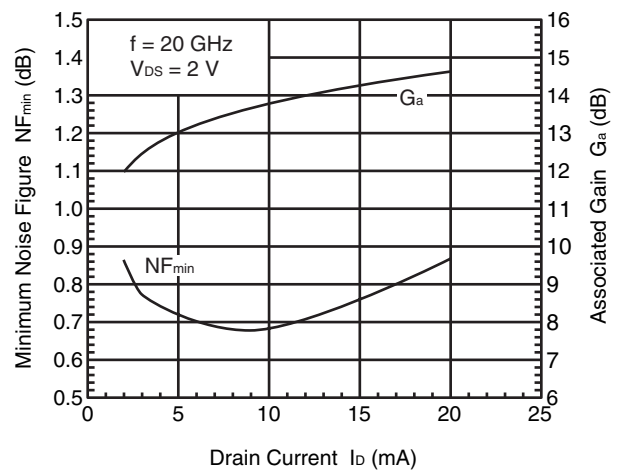
DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. DRAIN CURRENT



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.

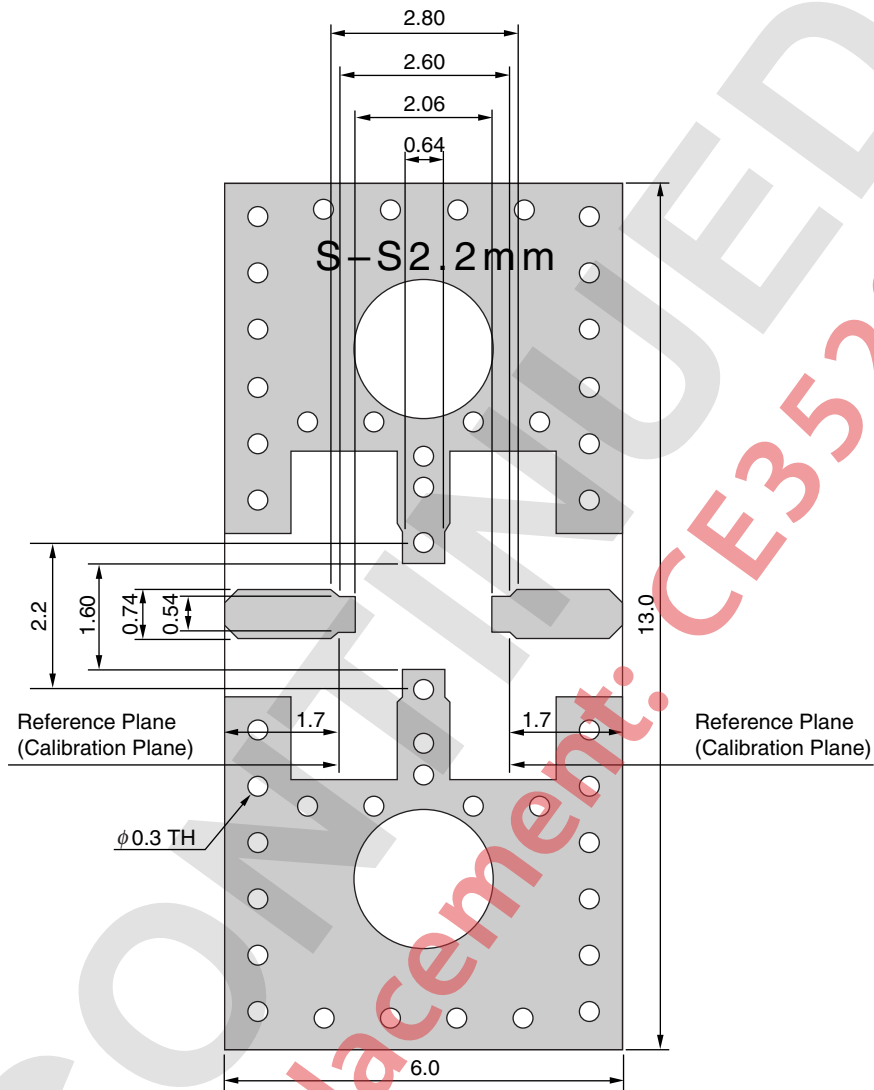
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www2.renesas.com/microwave/>

DISCONTINUED
Drop-In Replacement: CE3520K3

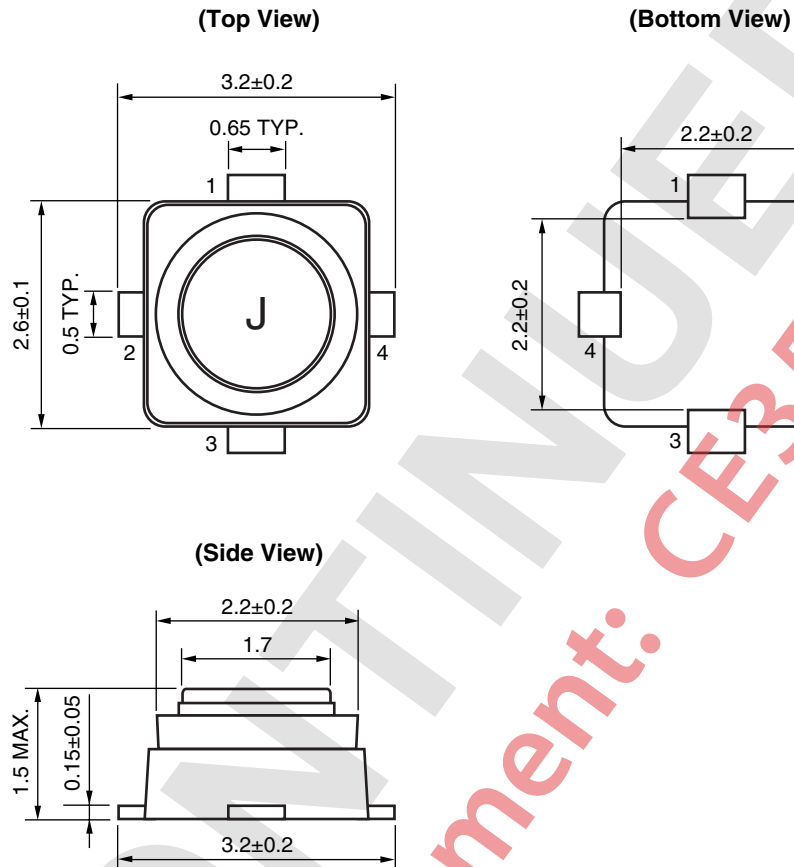
RF MEASURING LAYOUT PATTERN (REFERENCE ONLY) (UNIT: mm)



RT/duroid 5880/ROGERS
 t = 0.254 mm
 εr = 2.20
 tan delta = 0.0009 @ 10 GHz
 Au-flash plate

PACKAGE DIMENSIONS

S03 (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 | IR260 |
| 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 | HS350 |

CAUTION

Do not use different soldering methods together (except for partial heating).

| | | |
|----------------|---------------|--|
| 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. |
|----------------|---------------|--|

| | |
|-------------------------|-----------------------------|
| Revision History | NE3520S03 Data Sheet |
|-------------------------|-----------------------------|

| Rev. | Date | Description | |
|------|--------------|-------------|----------------------|
| | | Page | Summary |
| 1.00 | Oct 18, 2011 | - | First edition issued |

DISCONTINUED

Drop-In Replacement: CE3520K3

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