To our customers,

## Old Company Name in Catalogs and Other Documents

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

April 1st, 2010
Renesas Electronics Corporation

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

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RENESAS

DATA SHEET

HETERO JUNCTION FIELD EFFECT TRANSISTOR

Phase-out/Discontinued

# NE350184C

## K-BAND SUPER LOW NOISE AMPLIFIER
## N-CHANNEL HJ-FET

### FEATURES

- Super low noise figure and high associated gain
  NF = 0.7 dB TYP., $G_a$ = 13.5 dB TYP. @ f = 20 GHz
- Micro-X ceramic (84C) package

### APPLICATIONS

- 20 GHz-band DBS LNB
- Other K-band communication systems

### ORDERING INFORMATION

| Part Number | Order Number | Package | Quantity | Marking | Supplying Form |
|---|---|---|---|---|---|
| NE350184C-T1 | NE350184C-T1-A | 84C (Pb-Free) | 1 kpcs/reel | A | • 12 mm wide embossed taping<br>• Pin 4 (Gate) faces the perforation side of the tape |
| NE350184C-T1A | NE350184C-T1A-A | | 5 kpcs/reel | | |

**Remark** To order evaluation samples, contact your nearby sales office.
Part number for sample order: NE350184C

### 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 | $I_G$ | 80 | $\mu$A |
| Total Power Dissipation | $P_{tot}$ Note | 165 | mW |
| Channel Temperature | $T_{ch}$ | +150 | °C |
| Storage Temperature | $T_{stg}$ | –65 to +150 | °C |

**Note** Mounted on 1.08 $cm^2 \times$ 1.0 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 ($T_A$ = +25°C)

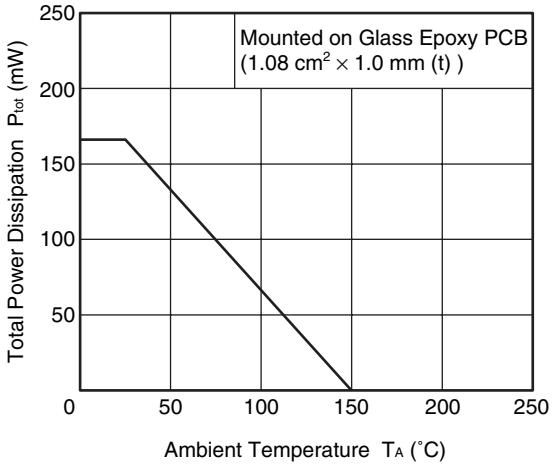
| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| Drain to Source Voltage | $V_{DS}$ | 1 | 2 | 3 | V |
| Drain Current | $I_D$ | 5 | 10 | 15 | mA |
| Input Power | $P_{in}$ | – | – | 0 | dBm |

## ELECTRICAL CHARACTERISTICS ($T_A$ = +25°C)

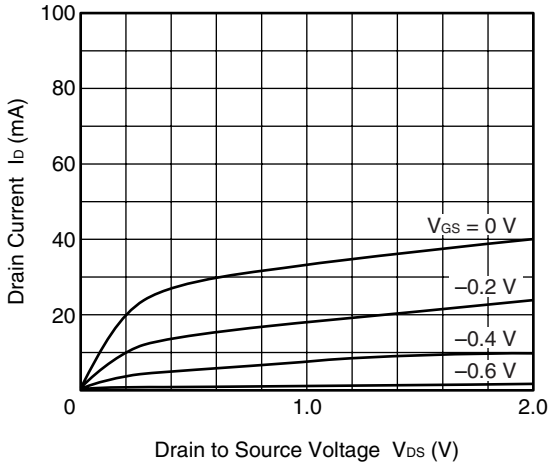
| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Gate to Source Leak Current | $I_{GSO}$ | $V_{GS}$ = –3 V | – | – | 10 | $\mu$A |
| Saturated Drain Current | $I_{DSS}$ | $V_{DS}$ = 2 V, $V_{GS}$ = 0 V | 15 | – | 70 | mA |
| Gate to Source Cutoff Voltage | $V_{GS (off)}$ | $V_{DS}$ = 2 V, $I_D$ = 100 $\mu$A | –0.2 | – | –2.0 | V |
| Transconductance | $g_m$ | $V_{DS}$ = 2 V, $I_D$ = 10 mA | 40 | – | – | mS |
| Noise Figure | NF | $V_{DS}$ = 2 V, $I_D$ = 10 mA, f = 20 GHz | – | 0.7 | 1.0 | dB |
| Associated Gain | $G_a$ | | 11 | 13.5 | – | dB |

## TYPICAL CHARACTERISTICS ($T_A$ = +25°C)

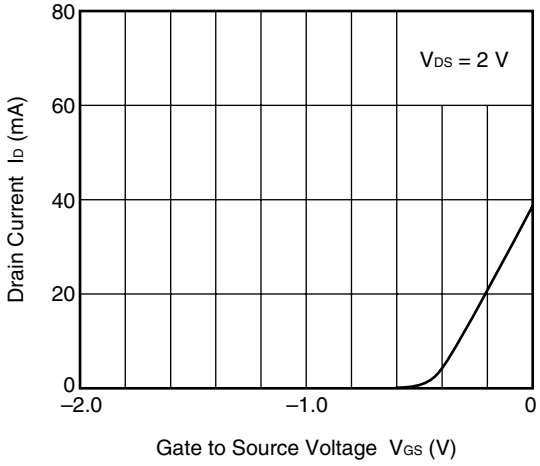
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



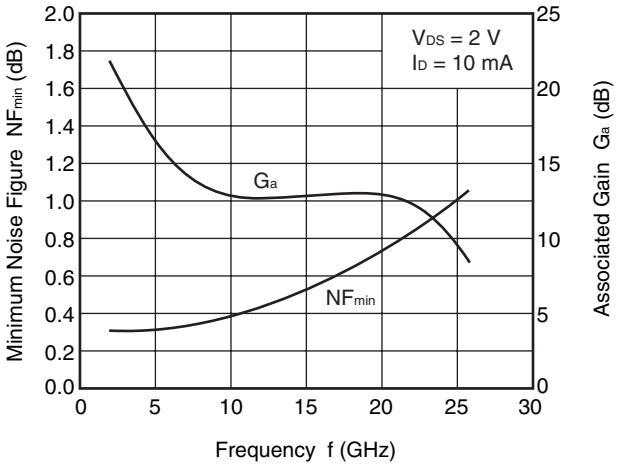

DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



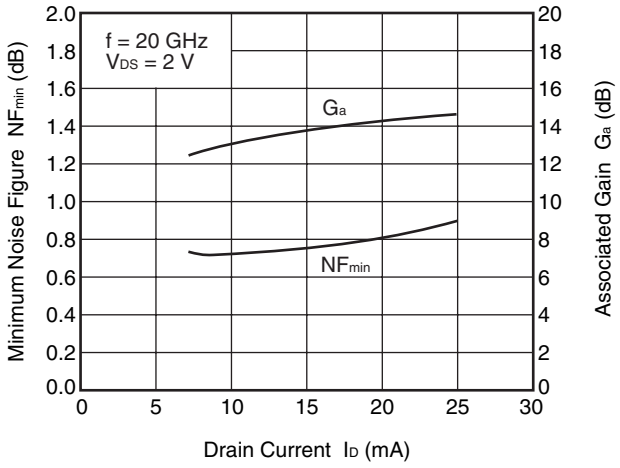

DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE




MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY




MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. DRAIN CURRENT




**Remark** The graphs indicate nominal characteristics.

**S-PARAMETERS**

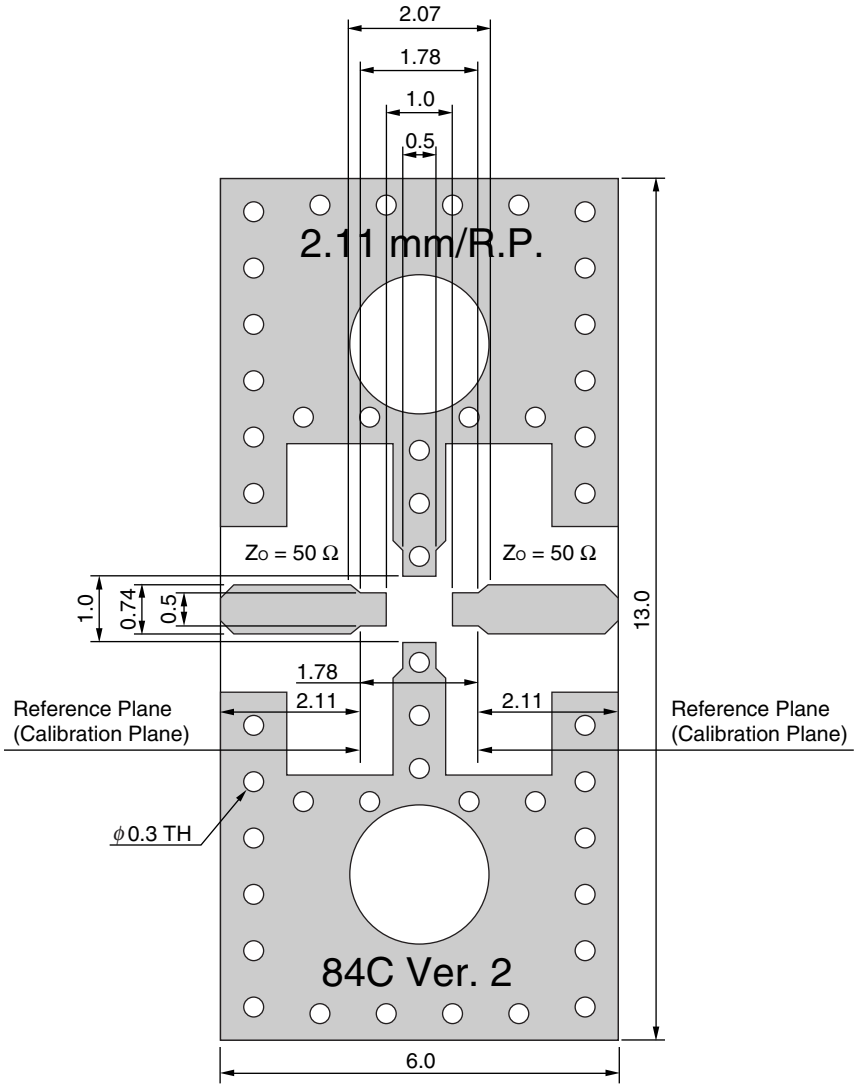
S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

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

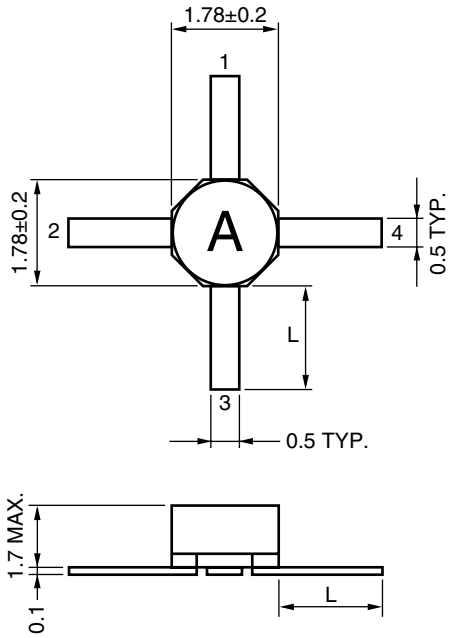
t = 0.254 mm

εr = 2.20

tan delta = 0.0009 @10 GHz

**PACKAGE DIMENSIONS**

**84C (UNIT: mm)**




L = 1.0±0.2 (All leads)

**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)<br>Time at peak temperature<br>Time at temperature of 220°C or higher<br>Preheating time at 120 to 180°C<br>Maximum number of reflow processes<br>Maximum chlorine content of rosin flux (% mass) | : 260°C or below<br>: 10 seconds or less<br>: 60 seconds or less<br>: 120±30 seconds<br>: 3 times<br>: 0.2%(Wt.) or below | IR260 |
| Partial Heating | Peak temperature (terminal temperature)<br>Soldering time (per side of device)<br>Maximum chlorine content of rosin flux (% mass) | : 350°C or below<br>: 3 seconds or less<br>: 0.2%(Wt.) or below | HS350 |

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

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M8E 00.4-0110

| | |
|---|---|
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▶**For further information, please contact**

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