

## **HETERO JUNCTION FIELD EFFECT TRANSISTOR**

# 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<sub>a</sub> = 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	Α	• 12 mm wide embossed taping
NE350184C-T1A	NE350184C-T1A-A		5 kpcs/reel		Pin 4 (Gate) faces the perforation side     of the tape

Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: NE350184C

#### ABSOLUTE MAXIMUM RATINGS (TA = +25°C)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	Vos	4	V
Gate to Source Voltage	Vgs	-3	V
Drain Current	lь	loss	mA
Gate Current	lg	80	μА
Total Power Dissipation	Ptot Note	165	mW
Channel Temperature	Tch	+150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

Note Mounted on 1.08 cm<sup>2</sup> × 1.0 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.

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## RECOMMENDED OPERATING CONDITIONS (Ta = +25°C)

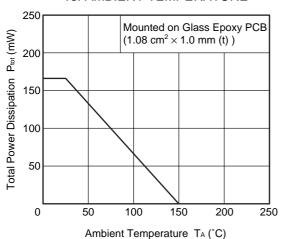
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	Vos	1	2	3	V
Drain Current	ΙD	5	10	15	mA
Input Power	Pin	Ī	1	0	dBm

### **ELECTRICAL CHARACTERISTICS (TA = +25°C)**

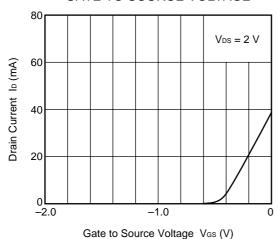
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	Igso	V <sub>G</sub> S = −3 V	-	-	10	μА
Saturated Drain Current	IDSS	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0 V	15	-	70	mA
Gate to Source Cutoff Voltage	VGS (off)	$V_{DS} = 2 \text{ V}, I_{D} = 100 \mu A$	-0.2	-	-2.0	V
Transconductance	g <sub>m</sub>	V <sub>DS</sub> = 2 V, I <sub>D</sub> = 10 mA	40	-	-	mS
Noise Figure	NF	V <sub>DS</sub> = 2 V, I <sub>D</sub> = 10 mA, f = 20 GHz	-	0.7	1.0	dB
Associated Gain	Ga		11	13.5	-	dB

#### TYPICAL CHARACTERISTICS (TA = +25°C)

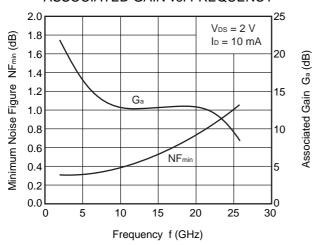
## TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



## DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE

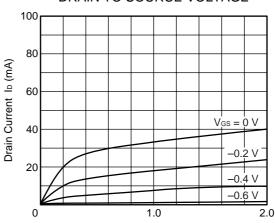


#### MINIMUM NOISE FIGURE, ASSOCIATED GAIN vs. FREQUENCY



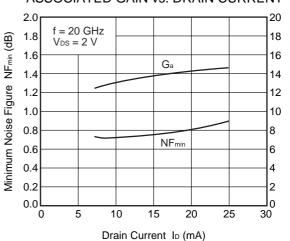
#### Remark The graphs indicate nominal characteristics.

## DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



Drain to Source Voltage VDS (V)

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



#### **S-PARAMETERS**

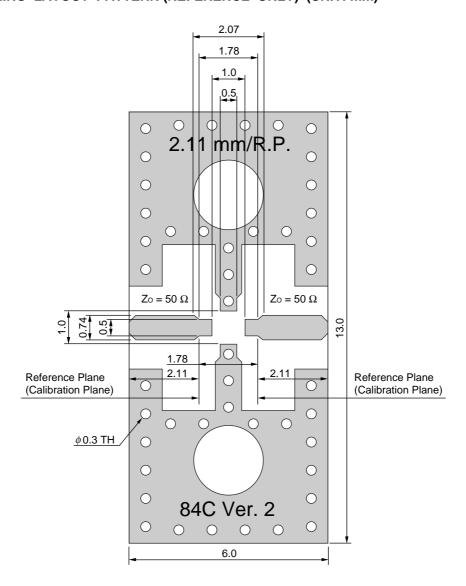
S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

Click here to download S-parameters.

 $[\mathsf{RF} \ \mathsf{and} \ \mathsf{Microwave}] \to [\mathsf{Device} \ \mathsf{Parameters}]$ 

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

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



RT/duroid 5880/ROGERS

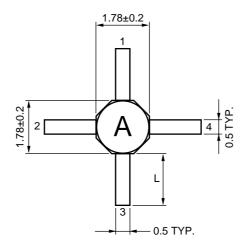
t = 0.254 mm

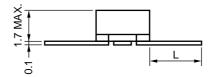
 $\epsilon r = 2.20$ 

tan delta = 0.0009 @10 GHz

### PACKAGE DIMENSIONS

84C (UNIT: mm)





 $L = 1.0\pm0.2$  (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) Time at peak temperature Time at temperature of 220°C or higher Preheating time at 120 to 180°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 60 seconds or less : 120±30 seconds : 3 times : 0.2%(Wt.) or below	IR260
Partial Heating	Peak temperature (terminal temperature) Soldering time (per side of device) Maximum chlorine content of rosin flux (% mass)	: 350°C or below : 3 seconds or less : 0.2%(Wt.) or below	HS350

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 Not Detected	-AZ (*)
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.

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