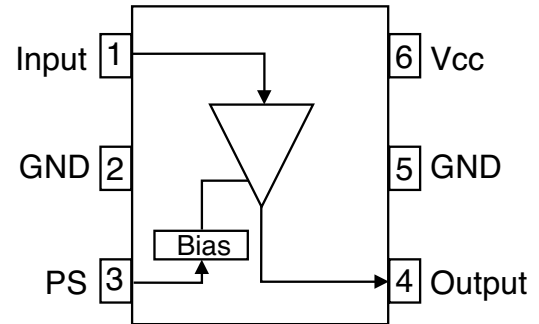


#### FEATURES

- **LOW NOISE:**  
NF = 1.3 dB TYP.
- **HIGH GAIN:**  
GP = 18.5 dB TYP.
- **LOW CURRENT CONSUMPTION:**  
I<sub>CC</sub> = 3.5 mA TYP. at V<sub>CC</sub> = 3.0 V
- **BUILT-IN POWER SAVE FUNCTION:**
- **HIGH-DENSITY SURFACE MOUNTING:**  
6-pin lead less minimold package ( 1.5 x 1.3 x 0.55 mm)

#### INTERNAL BLOCK DIAGRAM



#### APPLICATION

- Low Noise amplifier for GPS and mobile communications
- General purpose low noise amplifier

#### DESCRIPTION

NEC's UPC8211TK is a silicon germanium (SiGe) monolithic integrated circuit designed as low noise amplifier for GPS and as a general low noise amplifier for mobile communications.

The package is 6-pin lead-less minimold (1.5 x 1.3 x 0.55 mm) suitable for surface mount and optimized for very densely populated compact designs.

This IC is manufactured using NEC's 60 GHz  $f_T$ UHS2 (Ultra High Speed Process) silicon bipolar process. This process can realize excellent low noise performance and low power consumption simultaneously.

NEC's stringent quality assurance and test procedures ensure the highest reliability and performance.

#### ELECTRICAL CHARACTERISTICS,

(Unless otherwise specified, T<sub>A</sub> = +25°C, V<sub>CC</sub> = 3.0 V, f<sub>in</sub> = 1575 MHz, V<sub>PS</sub> = 3.0 V)

PART NUMBER PACKAGE OUTLINE			UPC8211TK S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I <sub>CC</sub>	Circuit Current (no input signal)	mA	-	3.5	4.5
	At power save mode (V <sub>PS</sub> < 0.8V)	μA	-	-	1
GP	Power Gain	dB	15.5	18.5	21.5
NF	Noise Figure	dB	-	1.3	1.5
IIP <sub>3</sub>	3rd Order Distortion Input Intercept Point (Gain = 18.5 dB)	dBm	-	-12	-
RLIN	Input Return Loss	dB	-	-7.5	-6
RL <sub>OUT</sub>	Output Return Loss	dB	-	-14.5	-10
ISO	Isolation	dB	-	-32.5	-
V <sub>PS ON</sub>	Rising Voltage from Power-Saving Mode	V	2.2	-	-
V <sub>PS OFF</sub>	Falling Voltage from Power-Saving Mode	V	-	-	0.8
Flat	Gain Flatness (f <sub>in</sub> ±2.5 MHz)	dB	-	-	Δ0.5
P <sub>O(1 dB)</sub>	Gain1 dB Compression Output Power	dBm	-	-4	-
P <sub>O</sub>	Output Power	dBm	-1.5	+2.0	-

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CC</sub>	Supply Voltage	V	4.0
P <sub>D</sub>	Power Dissipation	mW	232
T <sub>A</sub>	Operating Ambient Temperature	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-55 to +150
P <sub>IN</sub>	Input Power	dBm	+10

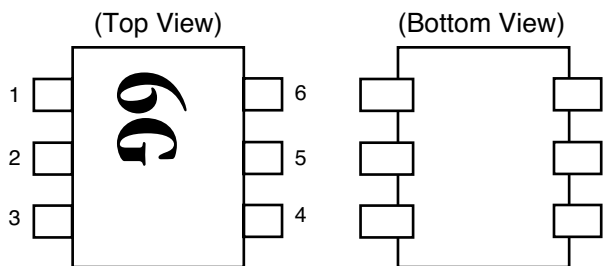
Notes:

1. Mounted on a double-sided copper-clad 50 x 50 x 1.6 mm epoxy glass PWB

## RECOMMENDED OPERATING CONDITIONS

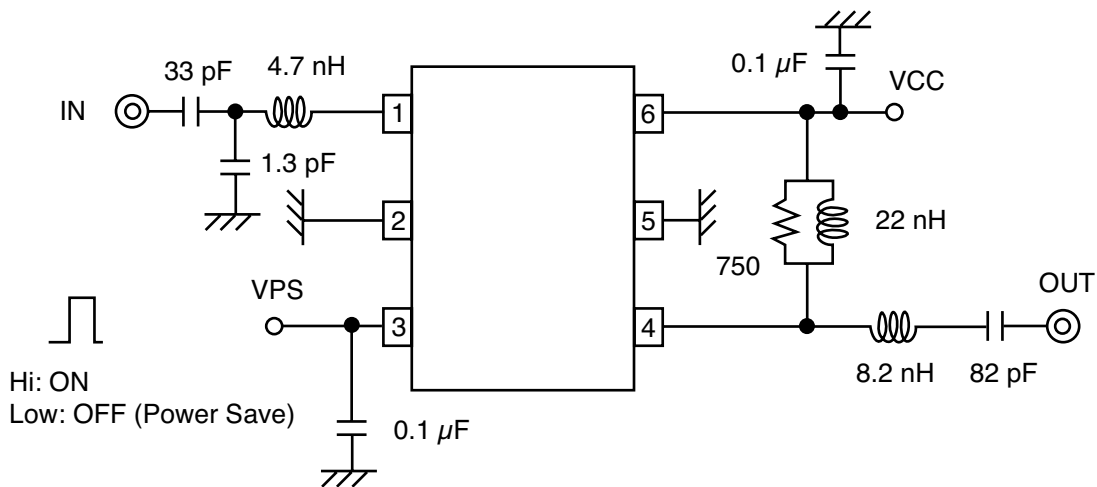
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V <sub>CC</sub>	Supply Voltage	V	2.7	3.0	3.3
T <sub>A</sub>	Operating Ambient Temperature	°C	-25	+25	+85
f <sub>in</sub>	Operating Frequency Range	MHz	-	1575	-

## PIN CONNECTIONS



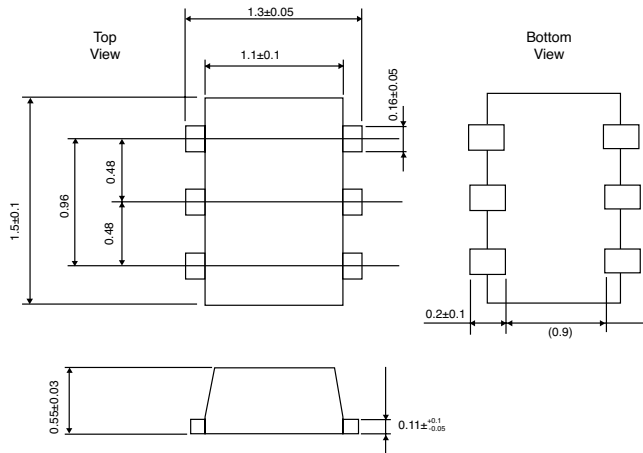
PIN NO.	PIN NAME
1	INPUT
2	GND
3	PS
4	OUTPUT
5	GND
6	V <sub>CC</sub>

## TEST CIRCUITS



## OUTLINE DIMENSIONS (Units in mm)

### PACKAGE OUTLINE S06



## ORDERING INFORMATION

PART NUMBER	QTY
UPC8211TK-E2-A	5K/Reel

### Note:

Embossed tape, 8 mm wide. Pins 4, 5, 6 are in tape pull-out direction.

### Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

**CEL** California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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DATA SUBJECT TO CHANGE WITHOUT NOTICE

01/27/2005

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	
		-A	-AZ
Lead (Pb)	< 1000 PPM	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.

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In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

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