CEL

GaAs INTEGRATED CIRCUIT

μPG2311T5F

GaAs MMIC LOW NOISE AMPLIFIER FOR GPS

DESCRIPTION

The μPG2311T5F is a GaAs MMIC LNA for Car Navigation Systems and Handy GPS. This IC consists of two stage amplifiers and has high gain performance.

FEATURES

- High gain : G_P = 37 dB TYP.
- Low noise : NF = 1.2 dB TYP.
- 12-pin plastic QFN package (3.0 × 3.0 × 0.75 mm)

APPLICATION

- Car Navigation System
- Handy GPS

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2311T5F-E2	μPG2311T5F-E2-A	12-pin plastic QFN (Pb-Free)	2311	• Embossed tape 8 mm wide • Pin 1 indicates roll-in direction of tape • Qty 3 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: μPG2311T5F

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

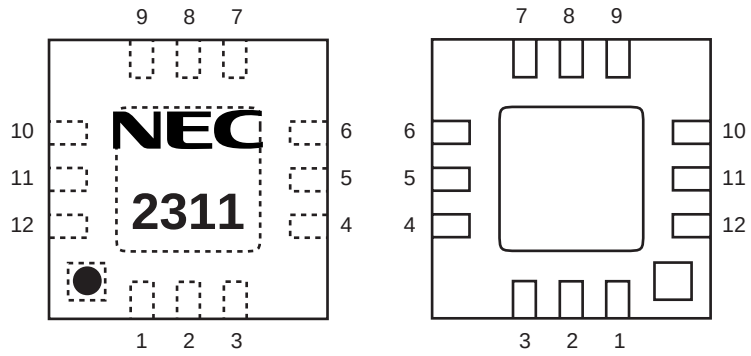
Document No. PG10571EJ03V0DS (3rd edition)
Date Published June 2006 NS CP(N)

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PIN CONNECTIONS

(Top View) **(Bottom View)**



Pin No.	Pin Name
1	OUT2
2	GND
3	$V_{CC}2$
4	$V_{CC}1$
5	GND
6	IN1
7	GND
8	OUT1
9	GND
10	IN2
11	GND
12	GND
EXPOSED PAD	GND

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

<R>

Parameter	Symbol	Ratings	Unit
Supply Voltage	$V_{CC}1$, $V_{CC}2$	+5.0	V
Input Power	P_{in}	+10	dBm
Total Power Dissipation	P_{tot}	0.25 Note	W
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C

RECOMMENDED OPERATING RANGE

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f_{opt}	–	1.575	–	GHz
Supply Voltage	$V_{CC}1$, $V_{CC}2$	+2.7	+3.0	+3.3	V

ELECTRICAL CHARACTERISTICS (T_A = +25°C, $V_{CC}1$ = $V_{CC}2$ = +3.0 V, Z_O = 50 Ω, unless otherwise specified)

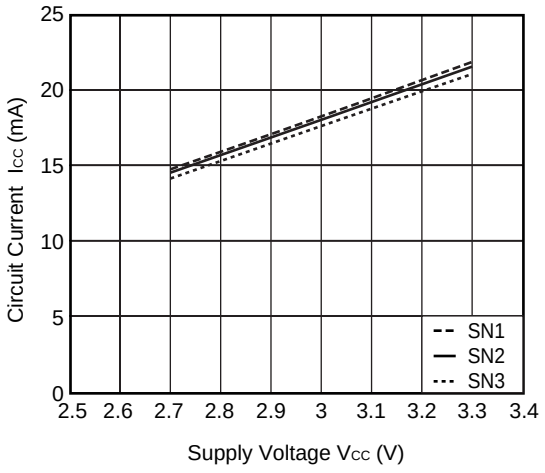
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Power Gain Note 1	G_P	f = 1.575 GHz	34	37	–	dB
Noise Figure Note 2	NF	f = 1.575 GHz	–	1.2	1.5	dB
Input Return Loss	RL_{in}	f = 1.575 GHz	–	5	–	dB
Output Return Loss	RL_{out}	f = 1.575 GHz	–	20	–	dB
1 dB Gain Compression Output Power	$P_{O\ (1\ dB)}$	f = 1.575 GHz	–	+5	–	dBm
Circuit Current Note 3	I_{CC}	f = 1.575 GHz, Non-RF	–	17	20	mA

Notes 1. Total gain of 1st stage and 2nd stage amplifiers (not include filter loss).

2. NF of 1st stage amplifier.

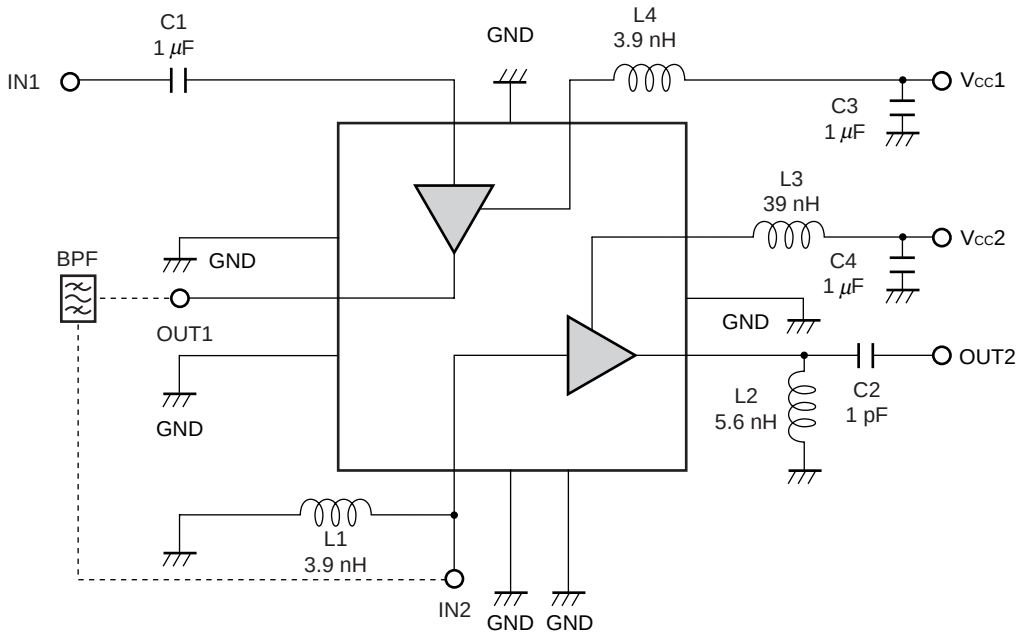
3. Please refer to following chart.

CIRCUIT CURRENT vs. SUPPLY VOLTAGE



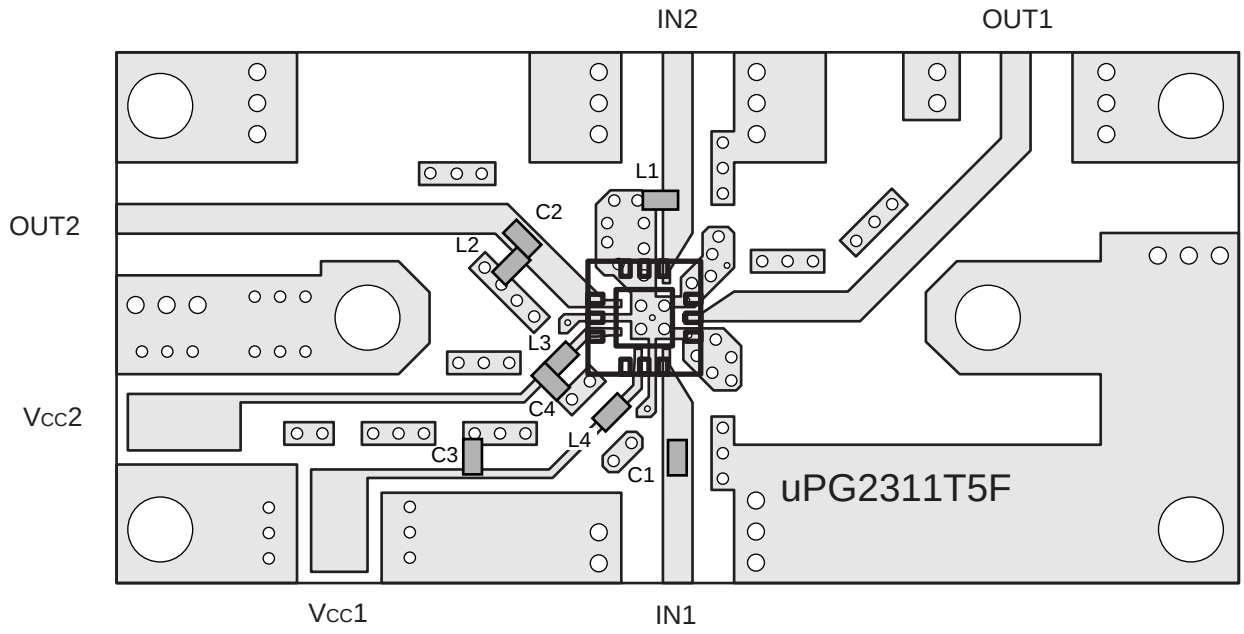
Remark The graph indicates nominal characteristics.

TEST CIRCUIT



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD

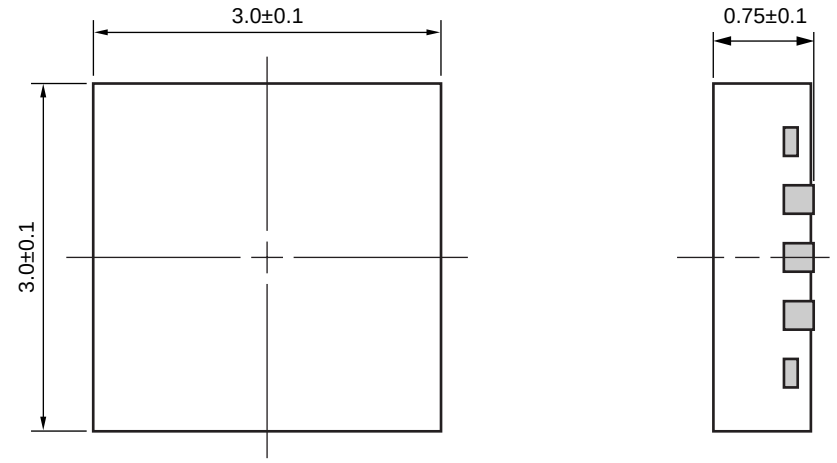


USING THE NEC EVALUATION BOARD

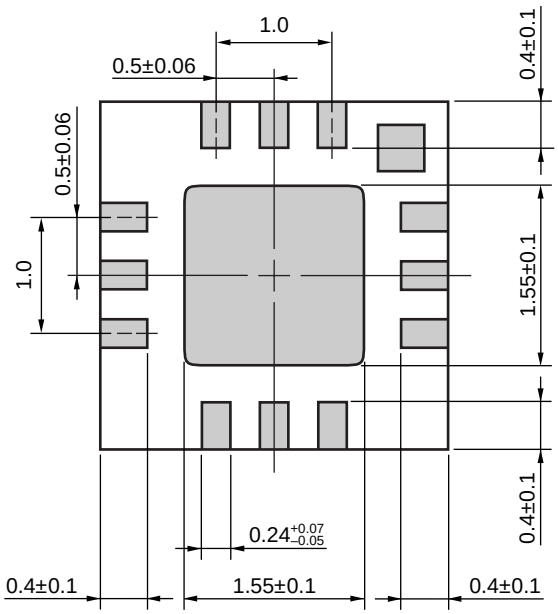
Symbol	Rating	Size	Symbol	Rating	Size
C1	1 μF	1608	L1	3.9 nH	1005
C2	1 pF	1005	L2	5.6 nH	1005
C3	1 μF	1608	L3	39 nH	1005
C4	1 μF	1608	L4	3.9 nH	1005

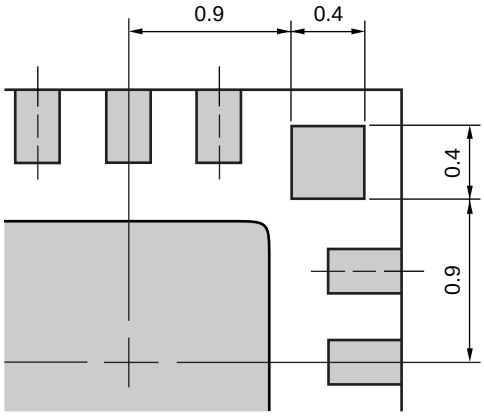
PACKAGE DIMENSIONS

12-PIN PLASTIC QFN (UNIT: mm)



(Bottom View)





Dimensions of pin No.1 indication

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
Wave Soldering	Peak temperature (molten solder temperature) Time at peak temperature Preheating temperature (package surface temperature) Maximum number of flow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 120°C or below : 1 time : 0.2%(Wt.) or below	WS260
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).

CEL California Eastern Laboratories

4590 Patrick Henry Drive
Santa Clara, CA 95054-1817
Telephone: (408) 919-2500
Facsimile: (408) 988-0279

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	-AZ
		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.