

PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

Description :

The CG3002M6 is a pHEMT GaAa Low noise amplifier for GNSS (Global Navigation Satellite Systems). This device has stand-by function to save the supply current and on chip ESD protection circuit. The device requires only two external components.

Applications :

- GNSS Applications
(GPS, Galileo, GLONASS and BeiDou etc.)

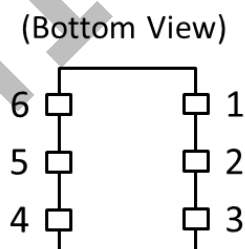
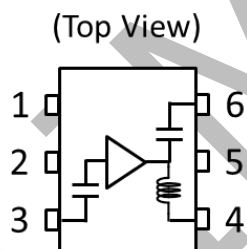
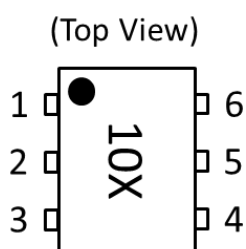
Package :

- 6-pin lead-less mini mold package
(1.5mm x 1.1mm x 0.55mm)

Features :

- High Gain : 18.0 dB TYP.
@Vdd=1.8/ 2.85V, Vctl=1.8V, f=1575MHz
- Low noise figure : 0.50 dB TYP.
@Vdd=1.8/ 2.85V, Vctl=1.8V, f=1575MHz
- Low Supply Current : 3.1/3.5 mA TYP.
@Vdd=1.8/ 2.85V, Vctl=1.8V
- High IIP3 : +1 / +3dBm TYP.
@Vdd=1.8/ 2.85V, Vctl=1.8V,
f=1575+1575.1MHz
- High out of band IIP3 : +5 / +8dBm TYP.
@Vdd=1.8/ 2.85V, Vctl=1.8V,
f=1712.7+1850MHz
- ESD protection on all pins (HBM>2kV)

Pin Configuration and Internal Block Diagram :



Pin No.	Pin Name
1	GND
2	GND
3	RFin
4	Vdd
5	Vctl
6	RFout

Ordering Information :

Part Number	Order Number	Package	Marking	Supplying Form
CG3002M6-C2	CG3002M6-C2	6-pin lead-less mini mold package	10X	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 9 Kpcs/reel

PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

Absolute Maximum Ratings :

Parameter	Symbol	Rating	Unit
Supply Voltage	Vdd	5.0	V
Control Voltage	Vctl	5.0	V
Input Power	P _{in}	+15	dBm
Operating Ambient Temperature	T _A	-40~+85	°C
Storage Temperature	T _{stg}	-55~+150	°C

Electrical Characteristics 1 (DC) :

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

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage	Vdd		1.5	2.85	3.3	V
Control Voltage (ON)	Vctl (ON)		1.5	1.8	3.3	V
Control Voltage (OFF)	Vctl (OFF)		0	0	0.3	V
Supply Current1	Idd1	Active mode; Vdd=2.85V, Vctl=1.8V	-	3.5	7.0	mA
Supply Current2	Idd2	Active mode; Vdd=1.8V, Vctl=1.8V	-	3.1	6.5	mA
Supply Current3	Idd3	Stand-by mode; Vdd=2.85V, Vctl=0V	-	-	3	uA
Supply Current4	Idd4	Stand-by mode; Vdd=1.8V, Vctl=0V	-	-	3	uA
Control Current	Ictl	Vctl=1.8V	-	1	5	uA

PRELIMINARY DATA SHEET: CG3002M6

GSNN LOW NOISE AMPLIFIER

Electrical Characteristics 2 (RF) :

($T_A=+25^{\circ}\text{C}$, $V_{dd}=2.85\text{V}$, $V_{ctl}=1.8\text{V}$, $R_F=1575\text{MHz}$, $Z_o=50\Omega$ with application circuit)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Power Gain	Gain		16.0	18.0	20.0	dB
Noise Figure	NF		---	0.5	0.8	dB
Input Return Loss	RL_{in}		10	15	---	dB
Output Return Loss	RL_{out}		10	15	---	dB
1dB Loss Compression Input Power 1	$P_{in(1dB)1}$		---	-5.0	---	dBm
Input 3rd Order Intercept Point 1	IIP3_1	$f_1=f_{RF}$, $f_2=f_1\pm 1\text{MHz}$; $P_{in}=-30\text{dBm}$	---	+3.0	---	dBm
Out of Band Input 3rd Order Intercept Point 1	IIP3_OB1	$f_1 = 1712.7\text{ MHz}$; $P_{in} = -20\text{ dBm}$ $f_2 = 1851\text{ MHz}$; $P_{in} = -20\text{ dBm}$	---	+8.0	---	dBm
		$f_1 = 1712.7\text{ MHz}$; $P_{in} = -20\text{ dBm}$ $f_2 = 1851\text{ MHz}$; $P_{in} = -65\text{ dBm}$	---	+8.0	---	dBm

Electrical Characteristics 3 (RF) :

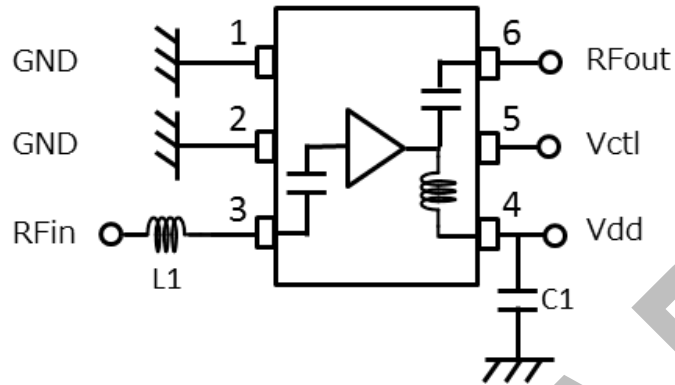
($T_A=+25^{\circ}\text{C}$, $V_{dd}=1.8\text{V}$, $V_{ctl}=1.8\text{V}$, $R_F=1575\text{MHz}$, $Z_o=50\Omega$ with application circuit)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Power Gain	Gain		16.0	18.0	20.0	dB
Noise Figure	NF		---	0.5	0.8	dB
Input Return Loss	RL_{in}		10	15	---	dB
Output Return Loss	RL_{out}		10	15	---	dB
1dB Loss Compression Input Power 2	$P_{in(1dB)1}$		---	-7.0	---	dBm
Input 3rd Order Intercept Point 2	IIP3_1	$f_1=f_{RF}$, $f_2=f_1\pm 1\text{MHz}$; $P_{in}=-30\text{dBm}$	---	+1.0	---	dBm
Out of Band Input 3rd Order Intercept Point 2	IIP3_OB1	$f_1 = 1712.7\text{ MHz}$; $P_{in} = -20\text{ dBm}$ $f_2 = 1851\text{ MHz}$; $P_{in} = -20\text{ dBm}$	---	+5.0	---	dBm
		$f_1 = 1712.7\text{ MHz}$; $P_{in} = -20\text{ dBm}$ $f_2 = 1851\text{ MHz}$; $P_{in} = -65\text{ dBm}$	---	+5.0	---	dBm

PRELIMINARY DATA SHEET: CG3002M6

GSNN LOW NOISE AMPLIFIER

Application Circuit:



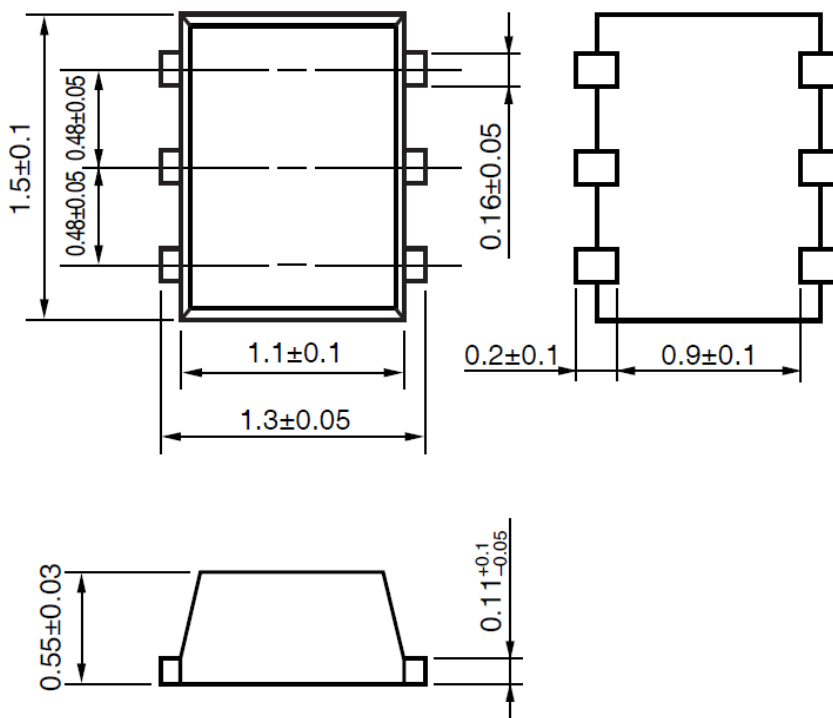
Note: L1 : 10nH, C1 : 1,000pF

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

Package Dimensions :

(Top View)

(Bottom View)

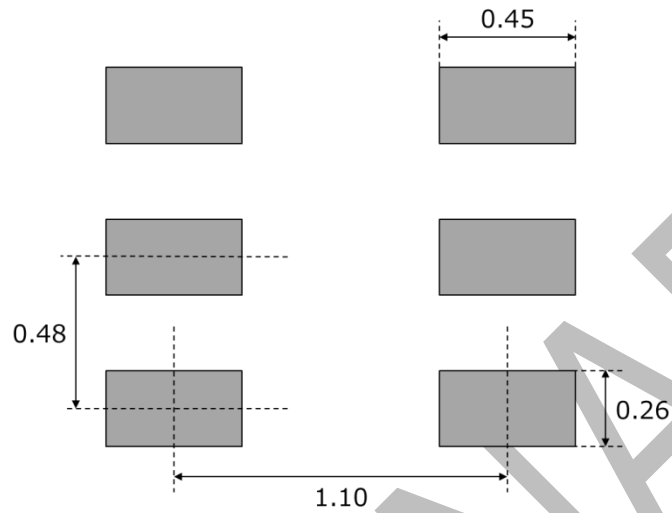


PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

PCB Layout Footprint :

6-PIN LEAD-LESS MINIMOLD (1511 PKG) (UNIT: mm)



The PCB Layout Footprint in this document is for reference only.

PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice.

- You should not alter, modify, copy, or otherwise misappropriate any CEL product, whether in whole or in part.
- CEL does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of CEL products or technical information described in this document. No license, expressed, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of CEL or others.
- Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. CEL assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
- CEL has used reasonable care in preparing the information included in this document, but CEL does not warrant that such information is error free. CEL assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
- Although CEL endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions.

Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a CEL product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures

Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.

- Please use CEL products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. CEL assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of CEL.
- Please contact CEL if you have any questions regarding the information contained in this document or CEL products, or if you have any other inquiries.



PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

[Caution in the gallium arsenide (GaAs) product handling]

This product uses gallium arsenide (GaAs) of the toxic substance appointed in laws and ordinances. GaAs vapor and powder are hazardous to human health if inhaled or ingested.

- Do not dispose in fire or break up this product.
- Do not chemically make gas or powder with this product.
- When discard this product, please obey the law of your country.
- Do not lick the product or in any way allow it to enter the mouth.

[CAUTION]

Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

CEL Headquarters • 4590 Patrick Henry Drive • Santa Clara, CA 95054 • Tel: (408) 919-2500 • www.cel.com

For a complete list of sales offices, representatives and distributors,

Please visit our website: www.cel.com/contactus

For inquiries email us at rfw@cel.com



PRELIMINARY DATA SHEET: CG3002M6

GNSS LOW NOISE AMPLIFIER

Revision History

Version	Change to current version	Page(s)
CDS-0046-01	Preliminary data sheet	N/A