

PRELIMINARY DATA SHEET: CG3002X5

GNSS LOW NOISE AMPLIFIER

Description :

The CG3002X5 is a pHEMT GaAa Low noise amplifier for GNSS (Global Navigation Satellite Systems). This device has a stand-by function to save the supply current and on chip ESD protection circuit. The part requires only two external components.

Applications :

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

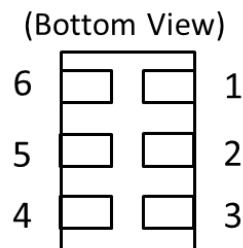
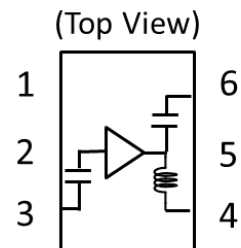
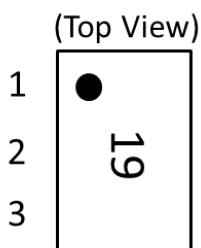
Package :

- 6-pin Small Outline No-lead package
(1.5mm x 1.0mm x 0.37mm)

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
CG3002X5	CG3002X5-C2	6-pin Small Outline No-lead package	19	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 10 Kpcs/reel

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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



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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) :

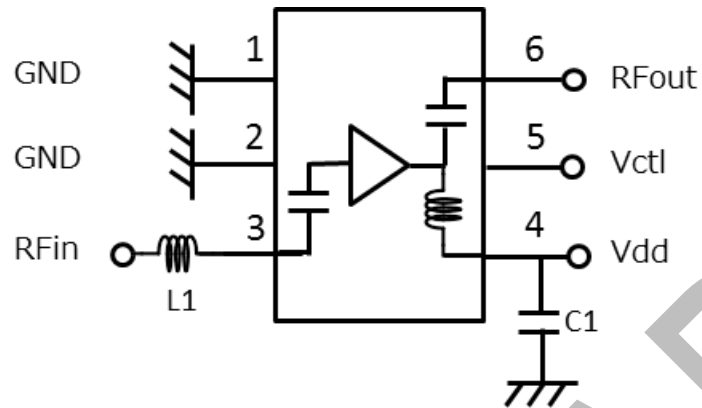
($T_A=+25^{\circ}\text{C}$, $V_{dd}=1.8\text{V}$, $V_{ctl}=1.8\text{V}$, $R_F=1575\text{MHz}$, $Z_o=50\Omega$ with application circuit)

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

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Application Circuit:



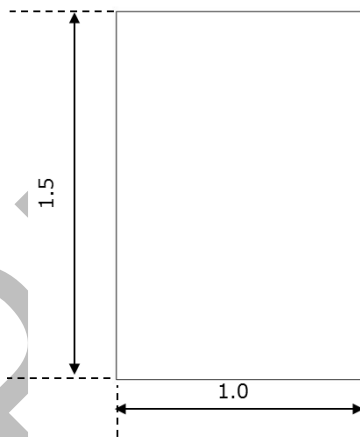
Note : L1 : 10nH, C1 : 1,000pF

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

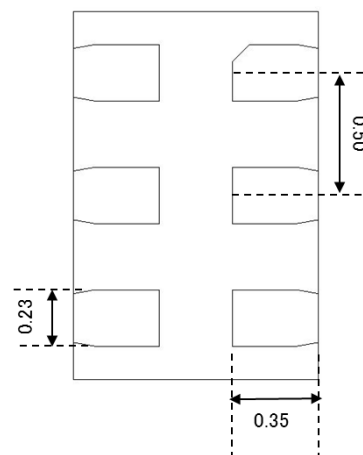
Package Dimension :

6-pin SON (Unit : mm)

(Top)



(Bottom)





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[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.

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

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Revision History

Version	Change to current version	Page(s)
CDS-0045-01	•Preliminary data sheet	N/A