DATA SHEET: CA3509M4

L TO S BAND LOW NOISE AMPLIFIER IC

Features :

- Low noise figure and high associated gain
  NF=0.4dB Typ., Ga=17.0dB Typ.
  @Vdd=3.0V, Idd=15mA, f=1.575GHz

Description :

- Low Noise and High Gain
- On chip Bias supply circuit
- On chip ESD protection diode

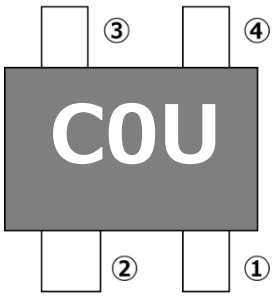
Applications :

- Low Noise Amplifier IC for Global Navigation Satellite Systems (GNSS) like GPS, GLONASS, Beidou and Galileo
- Low Noise Amplifier IC for Satellite Radio (SDARS, DMB, etc.) Antenna
- Low Noise Amplifier for Microwave Communication

Package :

- Flat-lead 4-pin thin-type super minimold package

PIN Configuration :



PIN No.	PIN Name
1	Source
2	OUT
3	Source
4	IN

Ordering Information :

Part Number	Order Number	Package	Marking	Supplying Form
CA3509M4	CA3509M4-C2B	Flat-lead 4-pin thin-type super minimold package	C0U	・Embossed 8 mm wide ・Pin 1 (Source), Pin 2 (OUT) Face the perforation side of the Tape ・Qty 5Kpcs/reel

Absolute Maximum Ratings :

Parameter	Symbol	Rating	Unit
Supply Voltage	Vdd	4.0	V
RF Input Power	P_{RFin}	+13	dBm
Operating Ambient Temperature	T_A	-45~+85	℃
Storage Temperature	Tstg	-55~+150	℃

Recommended Operating Range :

(T_A=+25℃, unless otherwise specified)

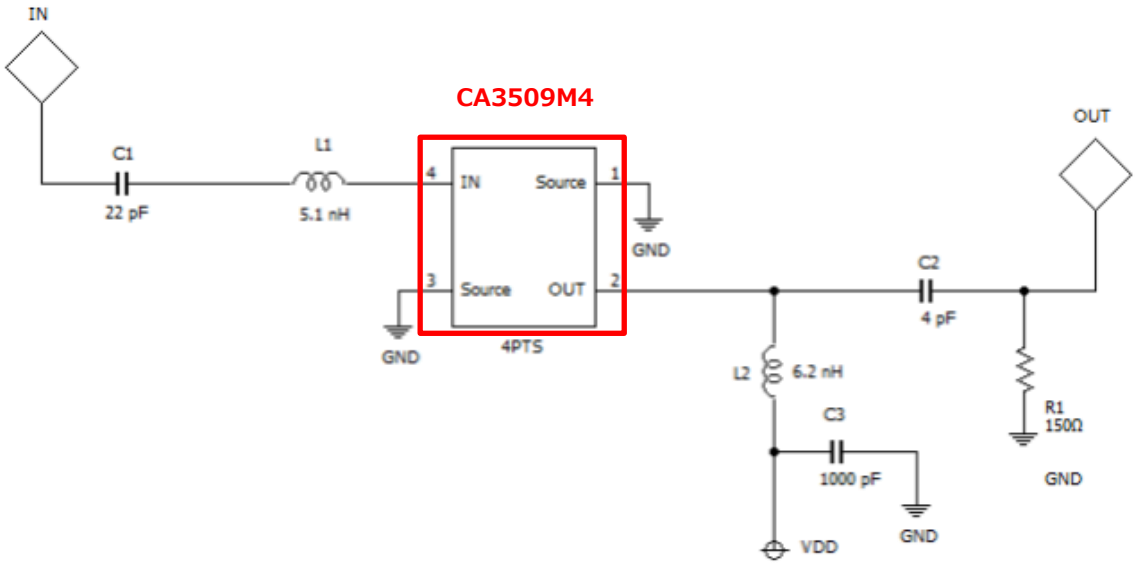
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	Vdd	2.7	3.0	3.3	V
Supply Current	Idd	11.4	15	20.6	mA

Electrical Characteristics:

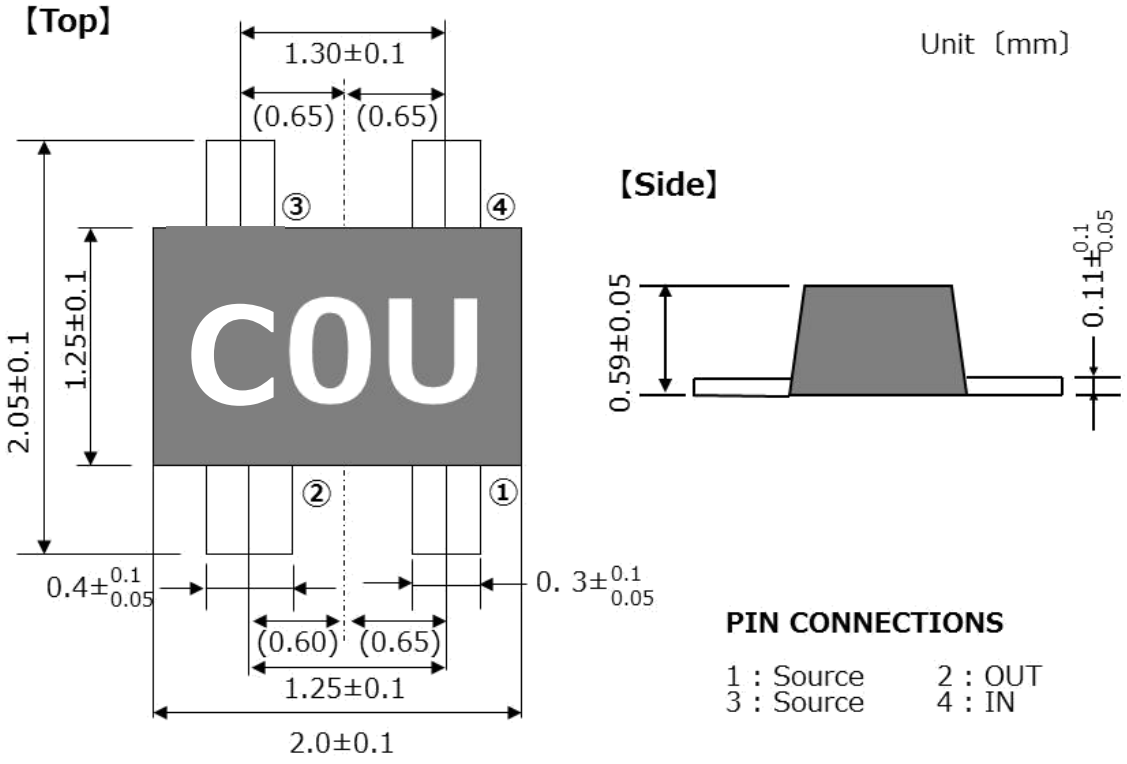
(T_A=+25℃, unless otherwise specified) *With Matching Circuit

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Power Gain	Gain	Vdd=3.0V, Idd=15mA, f=1.575GHz	15.5	17.0	-	dB
Noise Figure	NF		-	0.40	0.65	dB
Input 3rd Order Intercept Point	IIP3	Vdd=3.0V, Id=15mA, f=1.575GHz	-	+4.5	-	dBm
Output Power at 1dB Compression Point	$P_{O(1dB)}$	Vdd=3.0V, Idd=15mA (Non-RF) f=1.575GHz	-	12.0	-	dBm

Application Circuit:



Package Dimensions :



PIN CONNECTIONS

1 : Source 2 : OUT
3 : Source 4 : IN

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.

[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

Revision History

Version	Changes to current version	Page(s)
CDS-0043-01 Jan 2018	Preliminary data sheet	N/A
CDS-0043-02 March 2018	・Revised Supply Voltage ・Revised Application Circuit	1, 2, 3 3
CDS-0043-02 June 2018	Changed part number from CE3509M4 to CA3509M4	All
CDS-0043-03 Aug 2018	・Revised RF Input Power from +15 to +13 dBm ・Revised Supply Voltage from 2.85V to 3.0V ・Revised Output Power at 1dB Compression Point from 11 to 12dBm ・Changed Application Circuit	1, 2 1, 2 2 3
CDS-0043-03a Dec 2018	Changed marking information	1, 3
CDS-0043-05 March 2019	Removed “Preliminary” Updated part number and reel size Updated Electrical Characteristics tables	All 1 2
CDS-0043-06 May 2019	Revised Max Supply Current (from 20.2mA to 20.6mA)	2