

E band MMIC Low Noise Amplifier

E-LNA-7782 Previously named CO-E1320305

GaAs PHEMT MMIC Low Noise Amplifier 77-82GHz

Overview

E-LNA-7782 is a 4-stage MMIC low noise amplifier that covers frequencies from 77GHz to 82GHz band. This MMIC provides up to 25dB of stable gain, with a noise figure of 3dB from a 2V supply voltage and 25mA current. With less than ± 1 dB variation in gain across the band, this LNA provides a low noise solution for both radar and communication applications.

All bond pads and the backside of the MMIC are gold plated. The MMIC is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown is measured with the chip in a 50 Ohm environment, with 100pF decoupling capacitors on all DC connections and is contacted using RF probes.

An option with two E-LNA-7782 circuits on a single MMIC die is available as part number E-DLNA-7782 (previously named CO-E1320306).

Features

- 77 – 82GHz.
- 25dB gain.
- 3dB noise figure.
- Unconditionally stable.
- $< \pm 1$ dB gain variation.

Applications

- Millimeter-wave imaging.
- High resolution radar.
- Sensing.
- P2P communications; short haul / high capacity / low interference links.
- Medical.
- Automotive radar.

	E band Datasheet	E-LNA-7782	Issue date: 30 April 2021	DOC REV 4	Page 1 of 8
---	------------------	------------	---------------------------	-----------	-------------

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	77		82	GHz
Gain	23.3	25	25.3	dB
Gain Flatness		±1		dB
Input Return Loss		10		dB
Output Return Loss		12		dB
Noise Figure		3		dB
Voltage		2		V
Current		25		mA

Notes

The tests indicated have all been performed with 100pF de-coupling capacitors on all bias pads.

All tests are carried out at 25°C.

Absolute Maximum Ratings

Parameter	Rating
Voltage	3V
RF Input Power	-5dBm
Storage Temperature	-65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	-40°C to +85°C



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features proprietary protection circuitry, damage may occur on devices subjected to ESD. Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Measured Performance Data

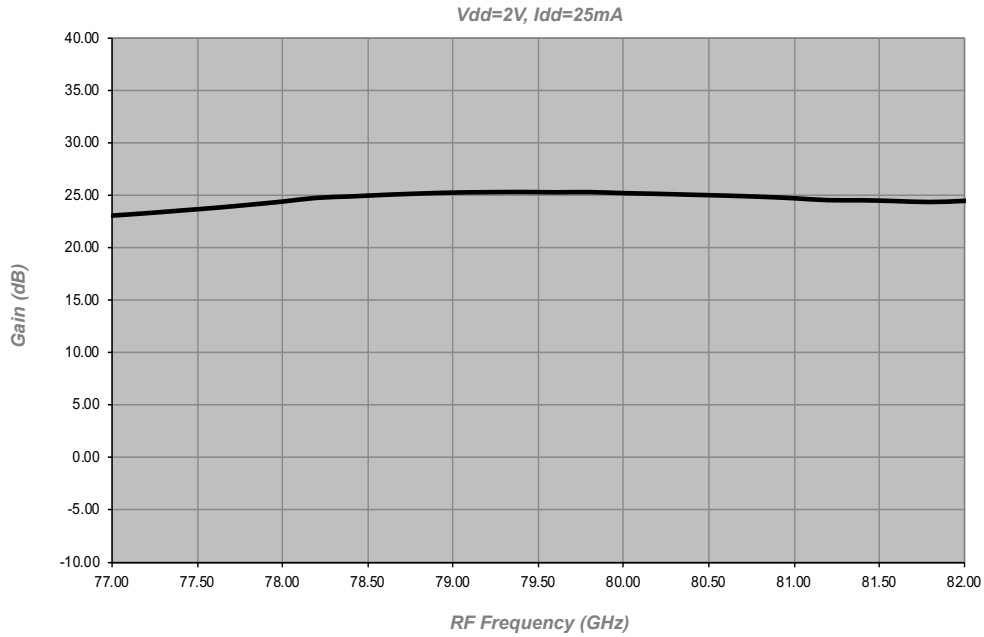


Figure 1
Gain

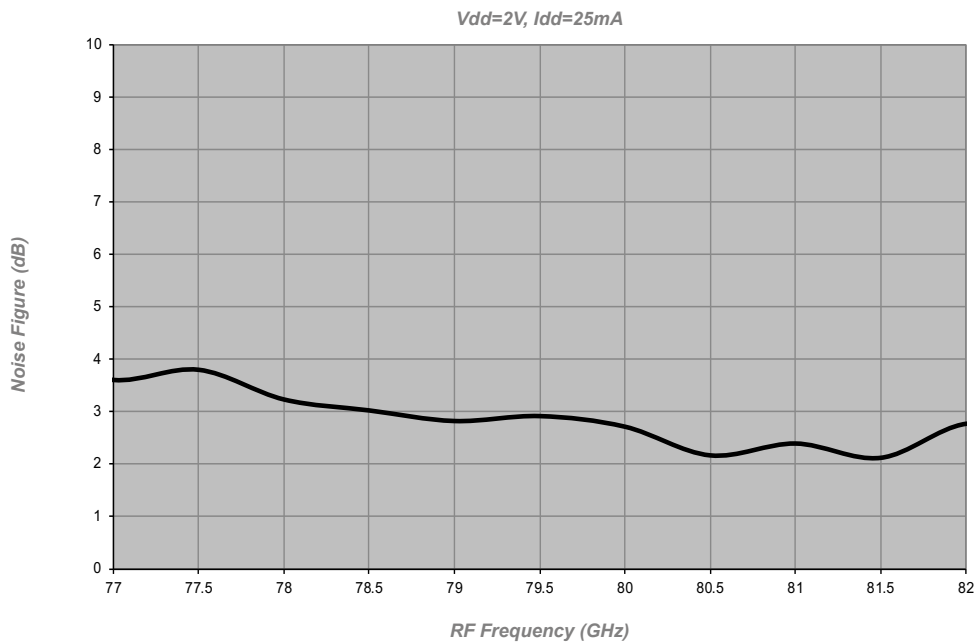


Figure 2
Noise Figure

Measured Performance Data

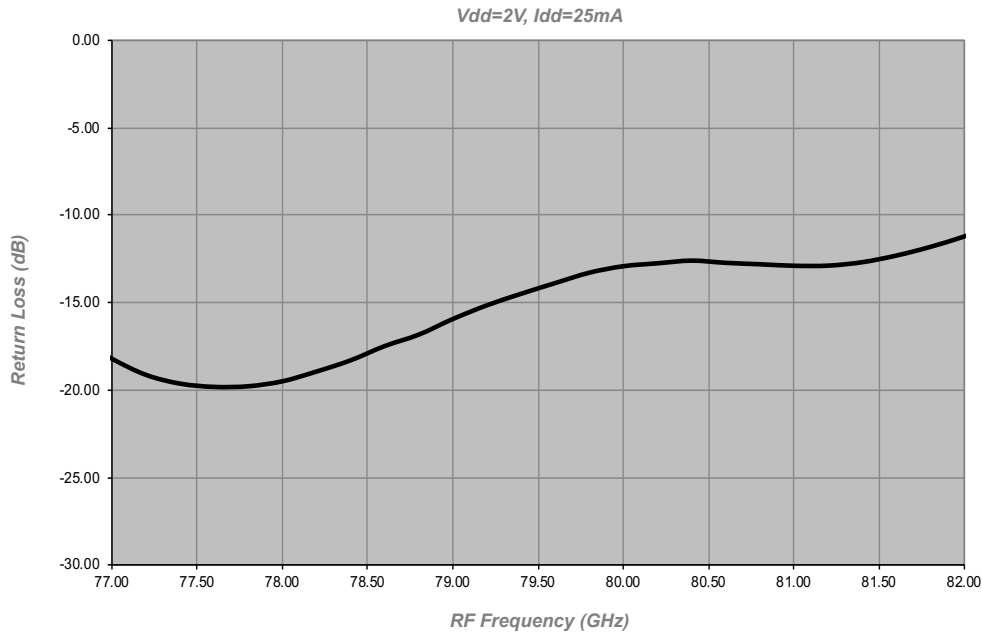


Figure 3
Input Return Loss

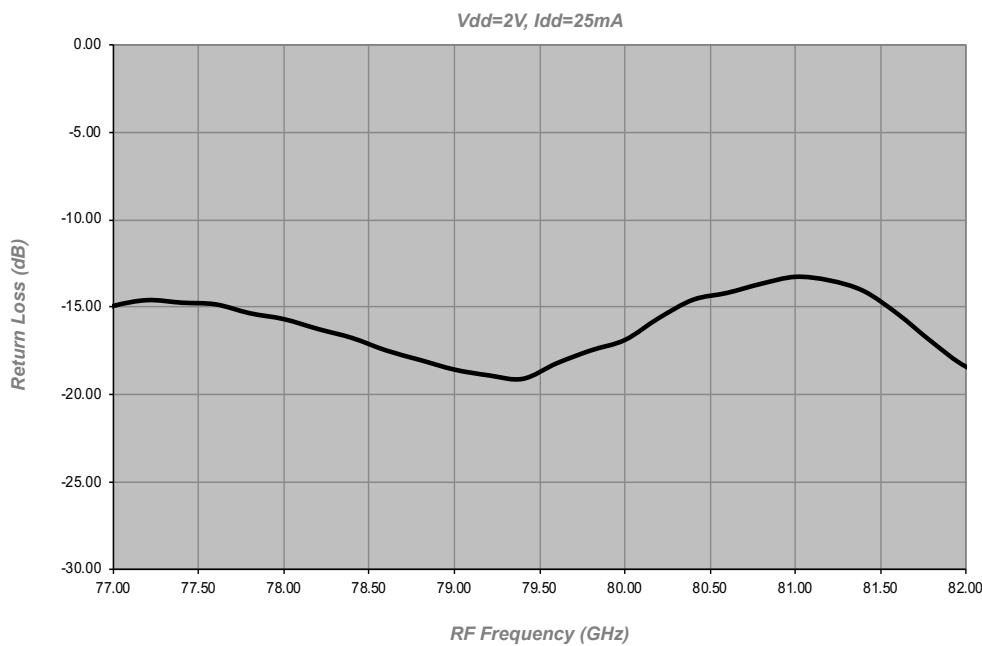
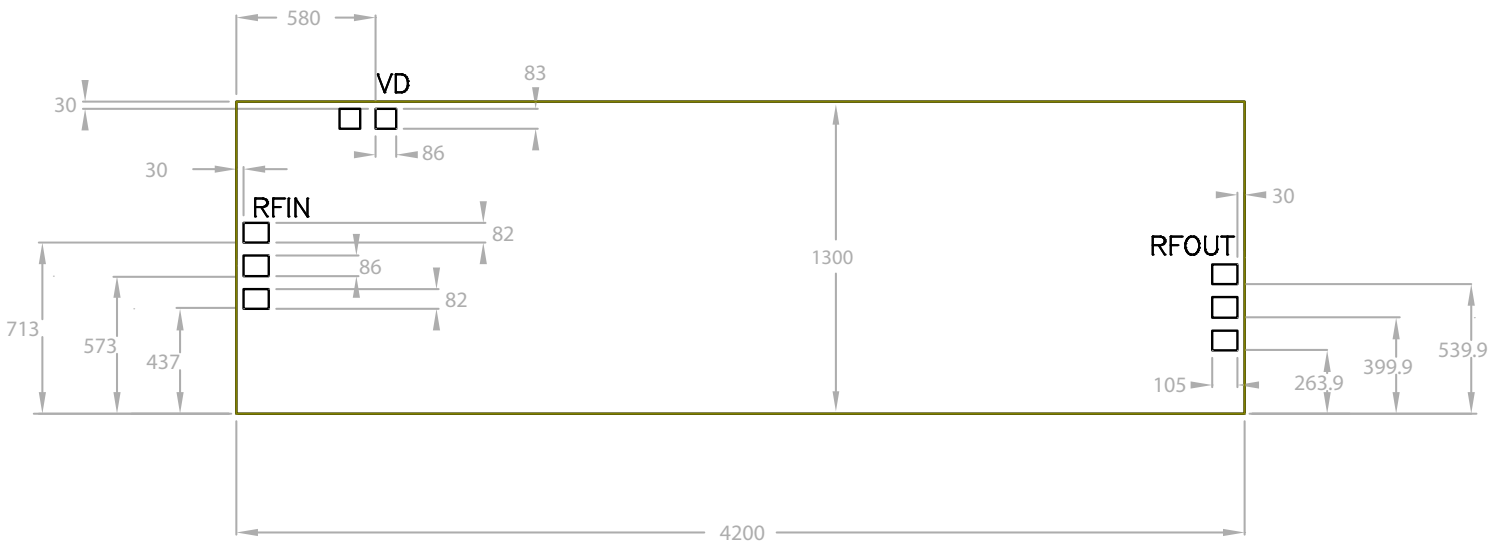


Figure 4
Output Return Loss

Outline Drawing

Die Packing Information
 All die are delivered using gel-paks unless otherwise requested.



Notes

1. All dimensions are in μm .
2. Typical DC bond pads are $86 \times 83 \mu\text{m}$.
3. RF bond pads are $86 \times 105 \mu\text{m}$.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabeled bond pads.
8. Die thickness is $70 \mu\text{m}$.

Pad Descriptions

Name	Description
RFIN	Input RF pad. This pad is ac coupled.
RFOUT	Output RF pad. This pad is ac coupled.
VD	Voltage bias pad.
BOTTOM	The die backside must be connected to RF/dc ground.

Connection Configurations



General Notes on Assembly

Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/Sn occurs at approximately 280°C so the die (plus mount and preform) is initially heated up to 180°C and then it is heated for approximately 10 seconds to 280°C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330°C.
2. Pure, dry nitrogen should be used as the heat source.
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Supply lines should be decoupled with 100pF capacitors. Larger planar capacitors could be used if available.
5. Aluminium wire must not be used.

Disclaimer

The information contained herein is believed to be reliable; however, Arralis makes no warranties regarding the information and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information is subject to change without notice, therefore customers should obtain the latest relevant information before placing orders for Arralis products. The information contained herein does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights.

This information does not constitute a warranty with respect to the product described, and Arralis disclaims any and all warranties either expressed or implied, relating to sale and/or use of Arralis products including liability or warranties relating to fitness for a particular purpose, consequential or incidental damages, merchantability, or infringement of any patent, copyright or other intellectual property right.

Without limiting the generality of the foregoing, Arralis products are not warranted or authorised for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2021 © Arralis

	E band Datasheet	E-LNA-7782	Issue date: 30 April 2021	DOC REV 4	Page 7 of 8
---	------------------	------------	---------------------------	-----------	-------------

©2021 Arralis Ltd. All rights reserved. Trademarks and registered trademarks are the property of their respective owners.

Arralis European Offices
t: +(44) 1793 239670 (UK)
e: sales@arralis.com

arralis.com

Arralis USA Office
+(1) 386 301 3249 (USA)
e: emilie.wren@arralis.com

	E band Datasheet	E-LNA-7782	Issue date: 30 April 2021	DOC REV 4	Page 8 of 8
---	-------------------------	-------------------	---------------------------	------------------	-------------

No licence is granted under any patent or any patent rights of Arralis. Information furnished by Arralis is believed to be accurate. No responsibility is assumed by Arralis for its use, nor for any infringements on the rights of other parties that may result for the use of the information herein. All specifications are subject to change without notice.