

Ka band MMIC Upconverter Core Chip

Ka-UC-2731 Previously named LE-Ka1360304

GaAs PHEMT Upconverter Core Chip 27 – 31GHz

Overview

Ka-UC-2731 is an integrated IQ mixer and medium power amplifier MMIC that upconverts frequencies from 3 – 7GHz into the 27 - 31GHz frequency band. With an integrated amplifier to allow lower LO signal levels, this MMIC provides >10dB gain with a maximum output power of 20dBm while running from a +3V supply voltage and at less than 235mA.

All bond pads and the die underside are gold plated. The MMIC is compatible with conventional die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown herein is provisional and is measured with the chip in a 50 Ohm environment and contacted with RF probes.

Features

- 27 – 31GHz output.
- 3 – 7GHz input.
- >10dB conversion gain.
- 20dBm saturated output power.

Applications

- High speed data communications.
- Space communications.
- IOT.
- Security.
- Frequency translation.

	Ka band Datasheet	Ka-UC-2731	Issue date: 30 April 21	DOC REV 3	Page 1 of 8
---	--------------------------	-------------------	-------------------------	------------------	-------------

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Output Frequency	27		31	GHz
IF Frequency	3		7	GHz
Conversion Gain		10		dB
LO Frequency		24		GHz
LO Power	7	10		dBm
Power Output			20	dBm
Drain Voltages (VD and LOAMP)		3		V
Total Current* (ID and ILOAMP)		235		mA

Notes

The tests indicated have all been performed with a 10Ω / 120pF de-coupling network on all bias pads.

All tests are carried out at 25°C.

*VG is set to allow 210mA to be drawn from VD.

Absolute Maximum Ratings



Parameter	Rating
LO Power	15 dBm
IF Power	15 dBm
VD / LOAMP	5V
ID	260mA
Storage Temperature	-65°C to +175°C
Channel Temperature	+175°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

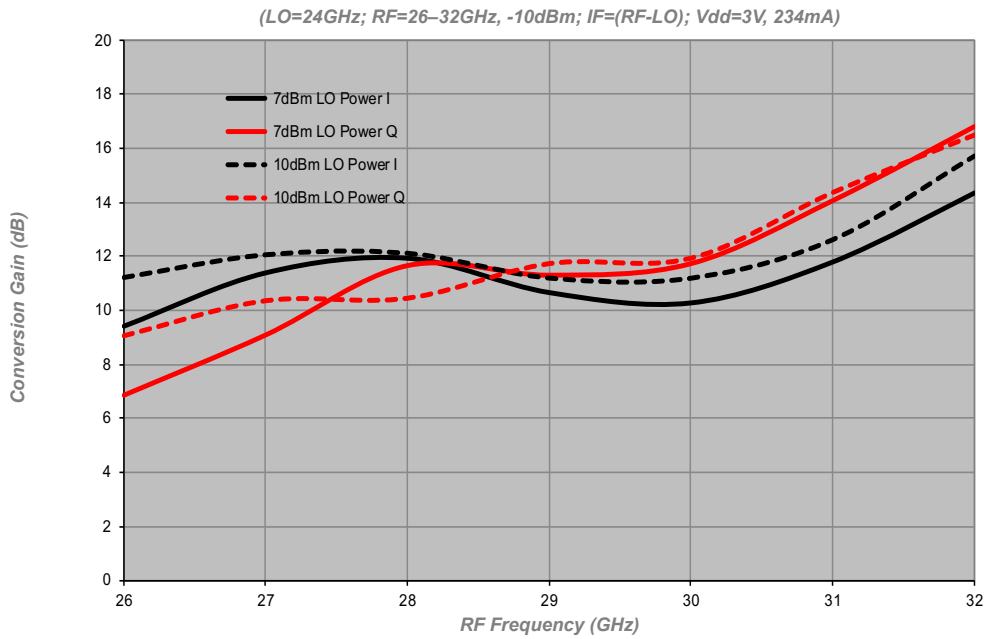


Figure 1
 Conversion Gain v RF Frequency

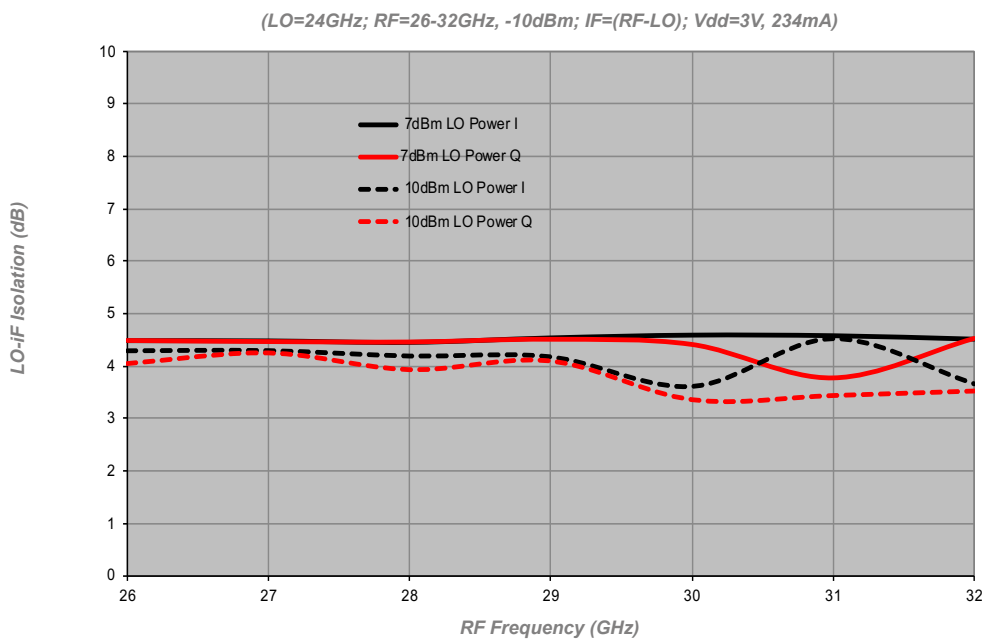


Figure 2
 LO-iF Isolation

Measured Performance Data

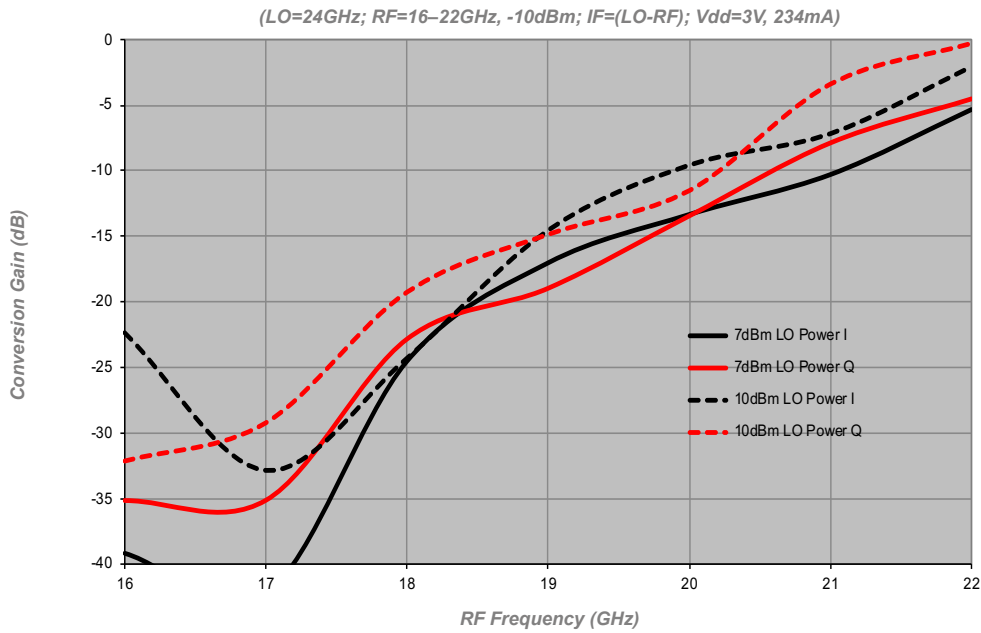


Figure 3
 Image Conversion Gain

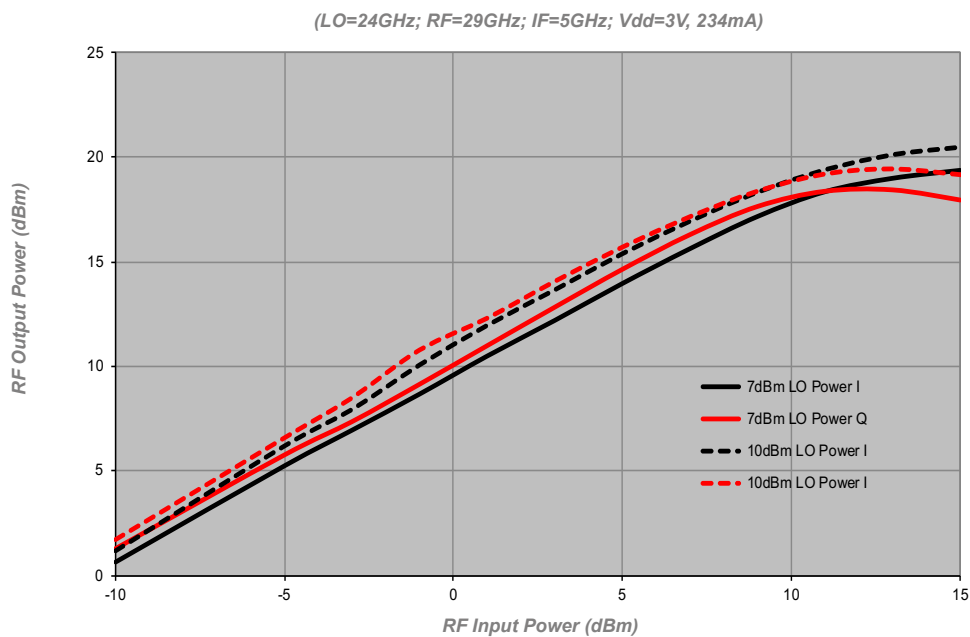
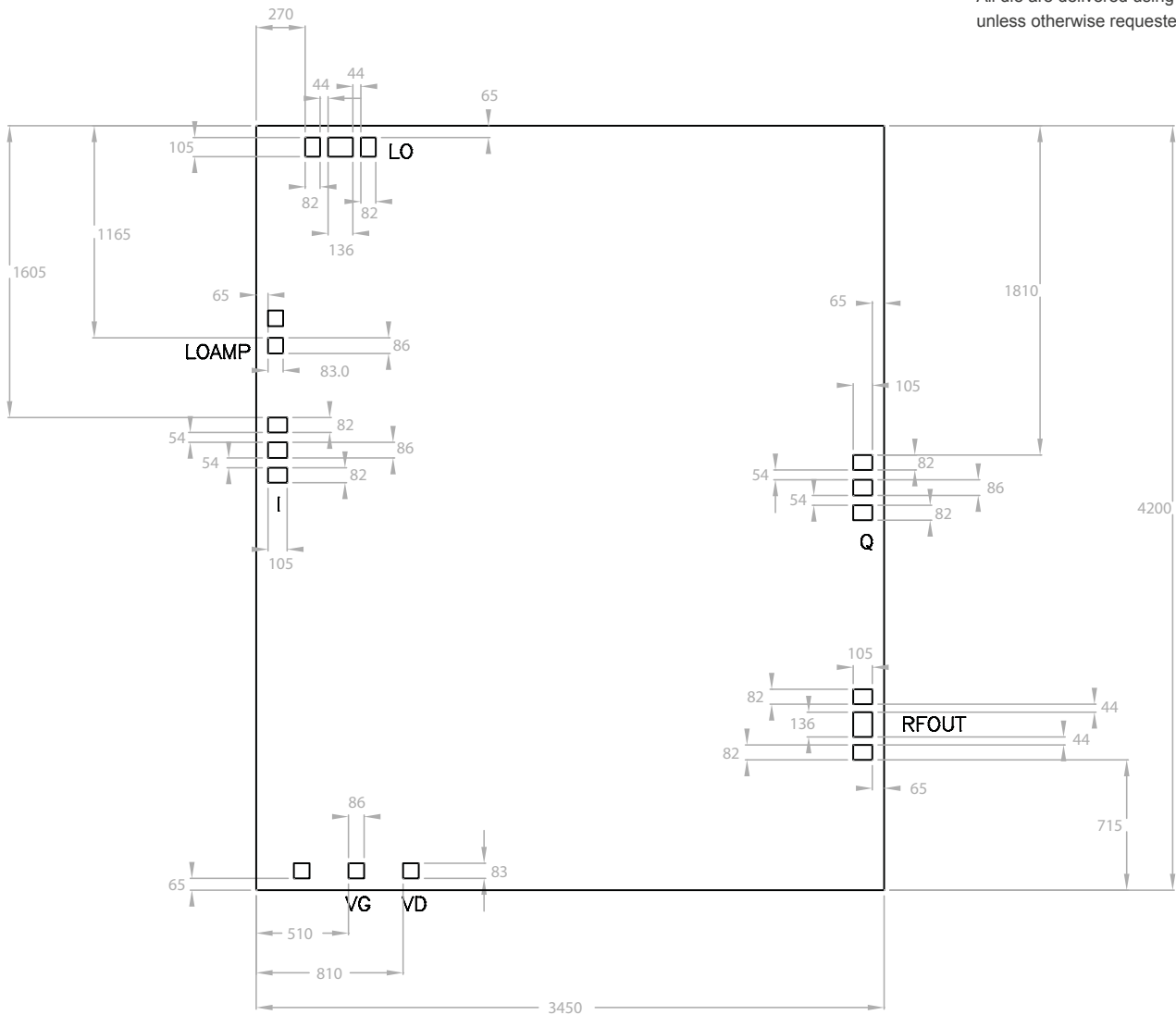


Figure 4
 Pin v Pout

Outline Drawing

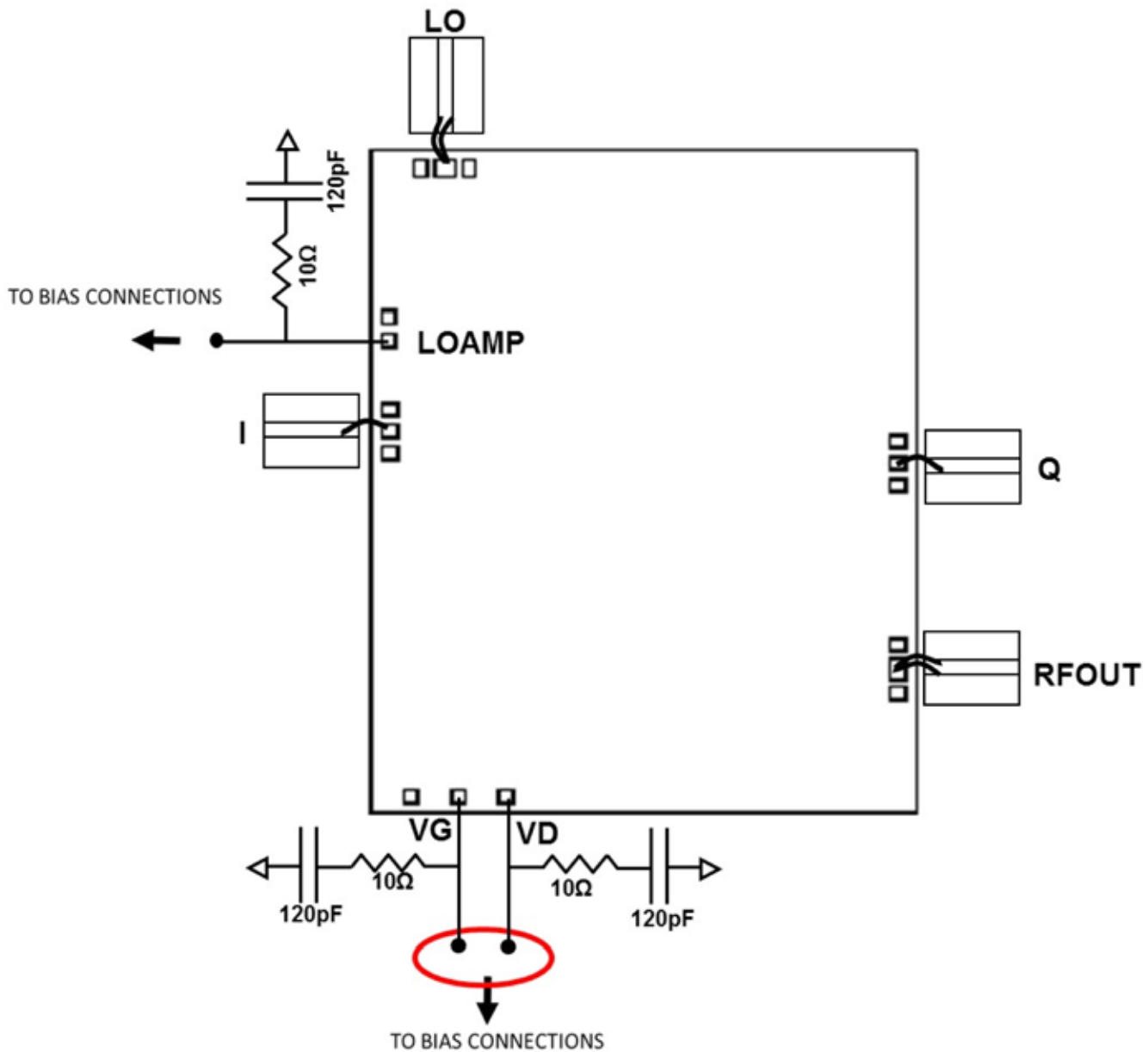
Die Packing Information
All die are delivered using gel-paks unless otherwise requested.



Notes

1. All dimensions are in μm.
2. DC bond pads are 86 x 83μm.
3. LO and rfout bond pads are 105 x 136μm.
4. I and Q bond pads are 105 x 86μm.
5. All pads have gold metalisation.
6. Gold backside metalisation.
7. Backside metal is ground.
8. Connections are not required for unlabeled bond pads.
9. Die thickness is 100μm.

Connection Configurations



Pad Descriptions

Name	Description
LO	LO signal input pad. This pad is AC coupled.
RFOUT	RF output pad. This pad is AC coupled.
I	I pad. This pad is DC coupled.
Q	Q pad. This pad is DC coupled.
VD	Drain Voltage pad.
VG	Gate Voltage pad.
LOAMP	LO amplifier bias pad.
BOTTOM	The die backside must be connected to RF/DC ground.

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.

	Ka band Datasheet	Ka-UC-2731	Issue date: 30 April 21	DOC REV 3	Page 7 of 8
---	-------------------	------------	-------------------------	-----------	-------------

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

©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

	Ka band Datasheet	Ka-UC-2731	Issue date: 30 April 21	DOC REV 3	Page 8 of 8
---	--------------------------	-------------------	-------------------------	------------------	-------------