

# K band MMIC Frequency Divider

**K-FD-2325**      Previously named LE-Ka1310307  
**GaAs PHEMT MMIC Frequency Divider 23.9 – 24.8GHz**

## Overview

K-FD-2325 is a bare die frequency divider MMIC that covers input frequencies from 23.9GHz to 24.8GHz. This MMIC outputs the divided frequencies from 11.95GHz to 12.4GHz. With its built-in amplification stage, this MMIC delivers more than 3dBm output power. The supply voltage is 3V with 40mA current consumption.

The MMIC is fully passivated for additional protection and has all bond pads and backside 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 and contacted with RF probes.

## Features

- 23.9 – 24.8GHz input range.
- >3dBm output power.

## Applications

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

	K band Datasheet	K-FD-2325	Issue date: 30 April 21	DOC REV 4	Page 1 of 8
---	------------------	-----------	-------------------------	-----------	-------------

## Specification Overview

Parameter	Min.	Typ.	Max.	Units
Input Frequency	23.9		24.8	GHz
Output Frequency	11.95		12.4	GHz
Output Power	3.1	4	5	dBm
Supply Voltage, VD		3		V
Supply Voltage, VDIO		0.9		V
Nominal Gate Voltage, VG		-0.2		V
Current		40		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
Supply Voltage (VD)	3V
Supply Voltage (VDIO)	2V
Drain Current (ID)	50mA
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

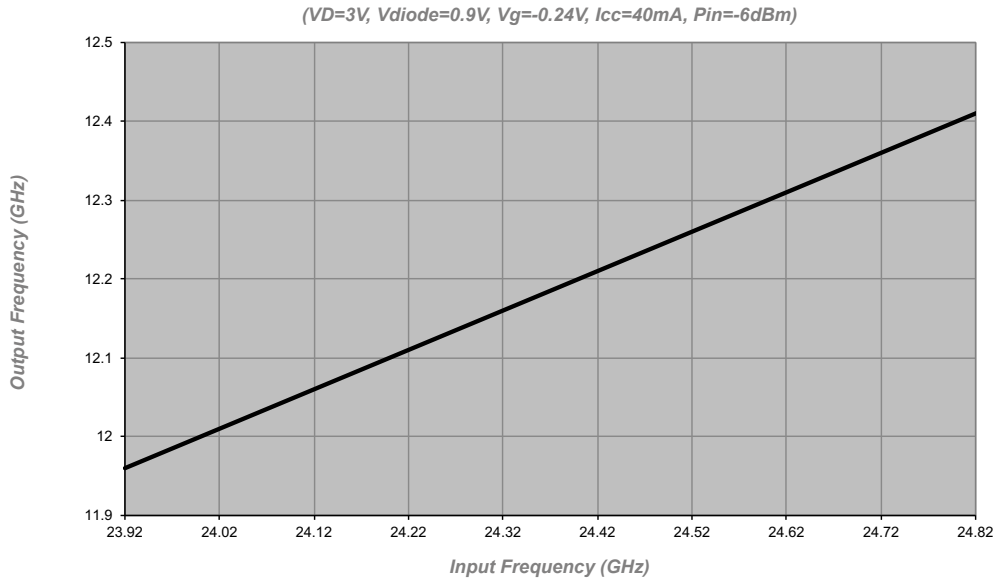


Figure 1  
Output Frequency

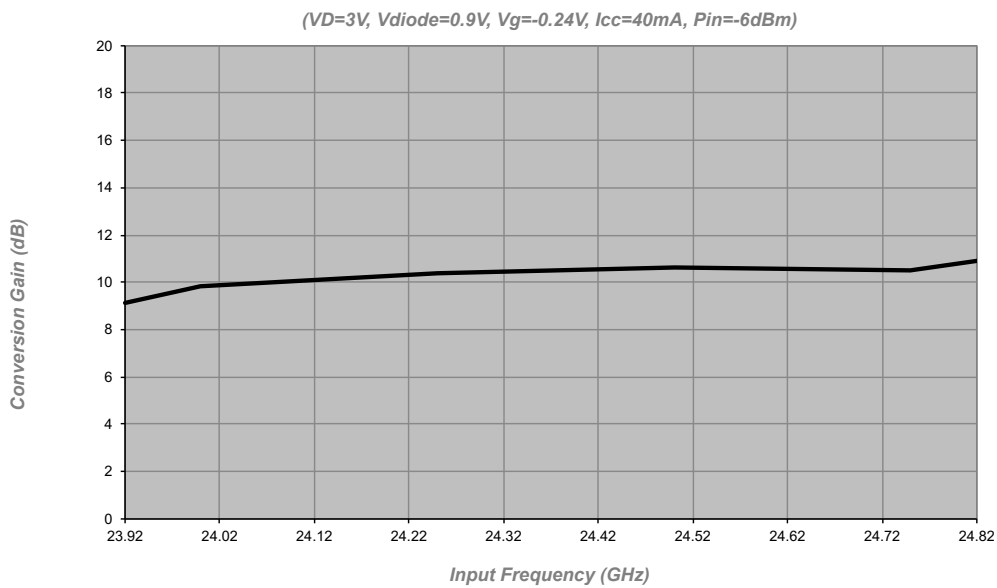


Figure 2  
Conversion Gain

## Measured Performance Data

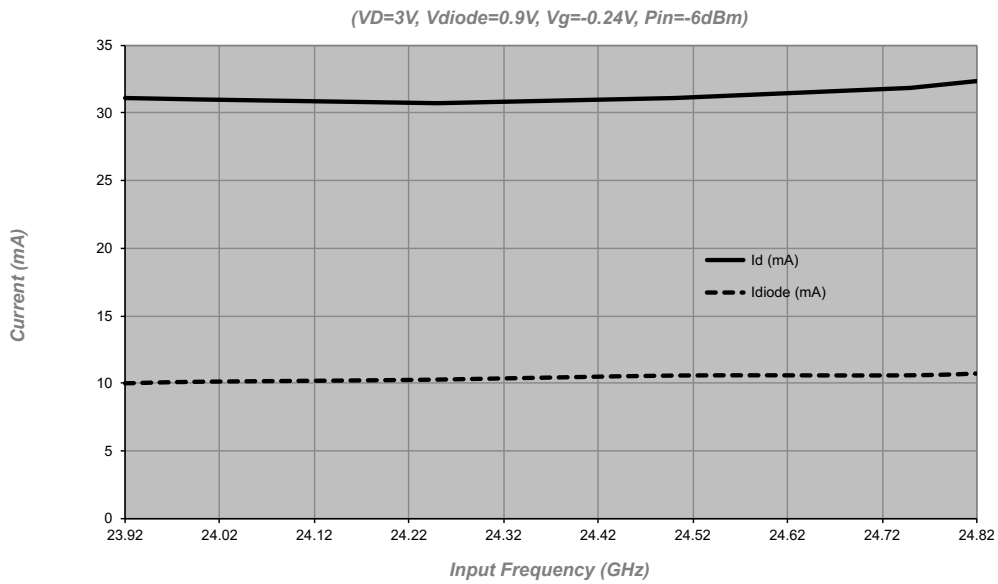
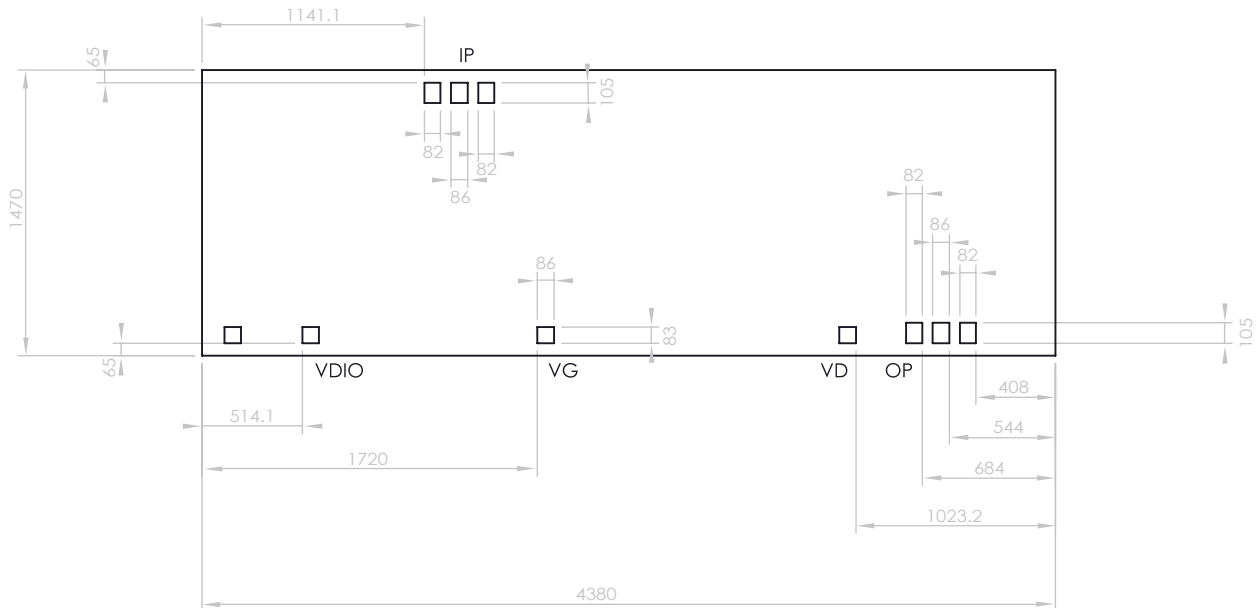


Figure 1  
Current Draw

## Outline Drawing



## Notes

1. All dimensions are in um.
2. Typical DC bond pads are 80um square.
3. RF bond pads are 105 x 86um.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabelled bond pads.
8. Die thickness is 100um

## Die Packing Information

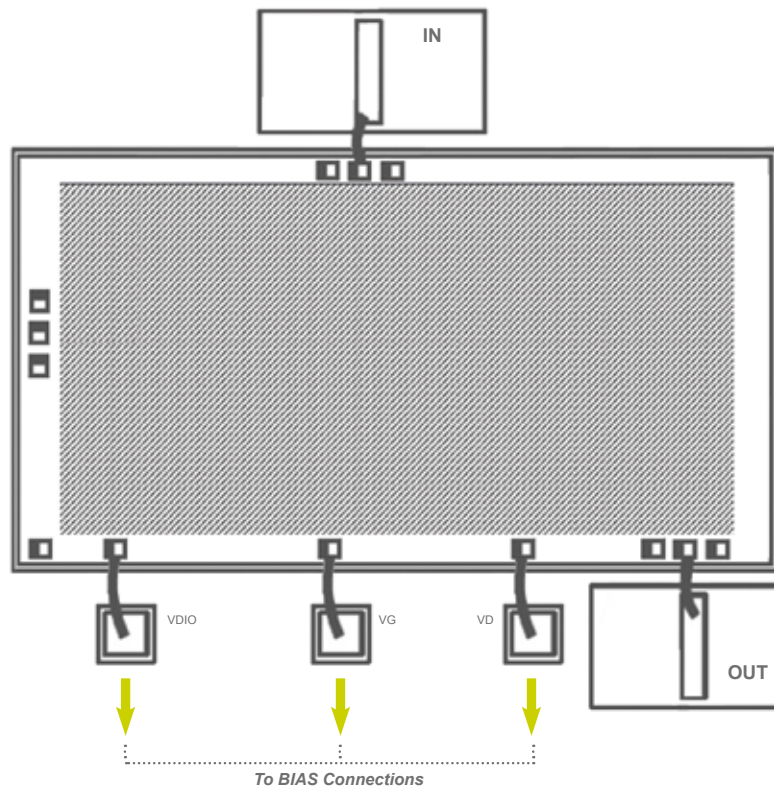
All die are delivered using gel-paks unless otherwise requested.

	K band Datasheet	K-FD-2325	Issue date: 30 April 21	DOC REV 4	Page 5 of 8
---	------------------	-----------	-------------------------	-----------	-------------

## Pad Descriptions

Name	Description
OP	Input RF pad for fundamental frequency (F). This pad is AC coupled
IP	Output RF pad for divided frequency (F/2). This pad is DC coupled
VDIO	Diode bias pad
VD	Drain bias pad
VG	Gate bias pad
BOTTOM	The die backside must be connected to RF/DC ground

## Connection Configurations



(Not actual die – these rules are applied to all MMICs unless otherwise stated)

## 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

	<b>K band Datasheet</b>	<b>K-FD-2325</b>	Issue date: 30 April 21	<b>DOC REV 4</b>	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

	<b>K band Datasheet</b>	<b>K-FD-2325</b>	Issue date: 30 April 21	<b>DOC REV 4</b>	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.