Leonis Ka-band MMIC

LE-Ka1330306

GaAs PHEMT MMIC POWER AMPLIFIER 27-31GHz

Overview

LE-Ka1330306 is a 3-stage MMIC power amplifier that covers frequencies from 27GHz to 31GHz. The LE-Ka1330306 provides 20dBm of saturated power and > 17% PAE, with 3dBm input power, from a 3V supply voltage and 210mA current. The small signal gain is > 20dB, and both the input and output are matched to 50 ohm.

The MMIC is fully passivated for additional protection and has all bond pads and backside gold plated. The LE-Ka1330306 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.

Features

- 27 – 31GHz
- > 20dBm Saturated Output Power
- > 17% PAE
- > 20dB Small Signal Gain
- < 1.0dB Gain Flatness
- Unconditionally Stable

Applications

- High Speed Data Communications
- Space Communications
- IOT
- Security

Specification Overview

Parameter	Low.	Typ.	High.	Units
Frequency	27		31	GHz
Gain	20.3	23.5	25	dB
Input Return Loss		10	4	dB
Output Return Loss		20	8	dB
Pout	20.3	20.9	21.5	dBm
Drain Voltage		3		V
Current		210		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
Drain Voltage	6V
Drain Current	400mA
RF Input Power	7dBm
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

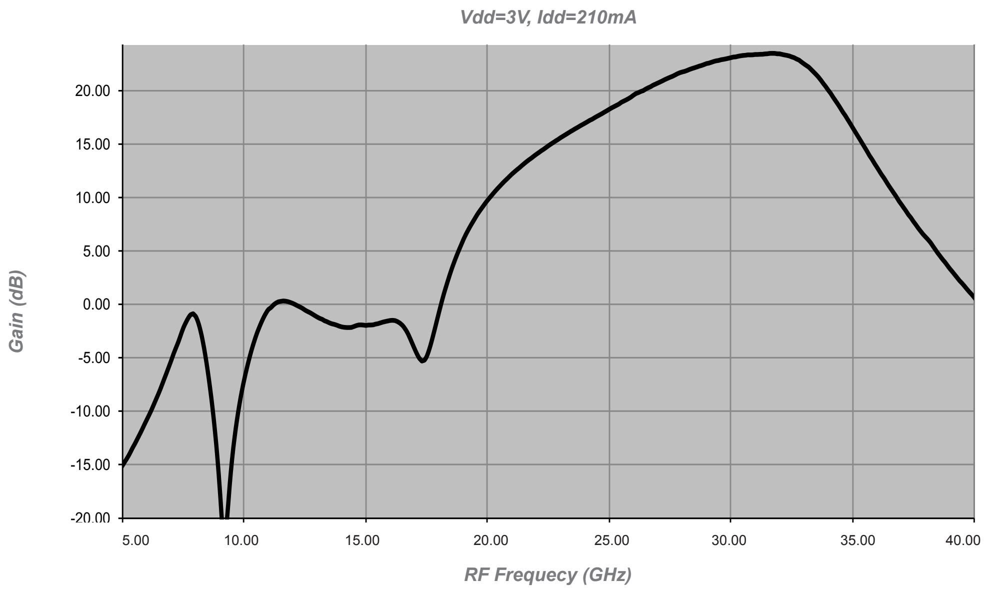


Figure 1
LE-Ka1330306
Gain

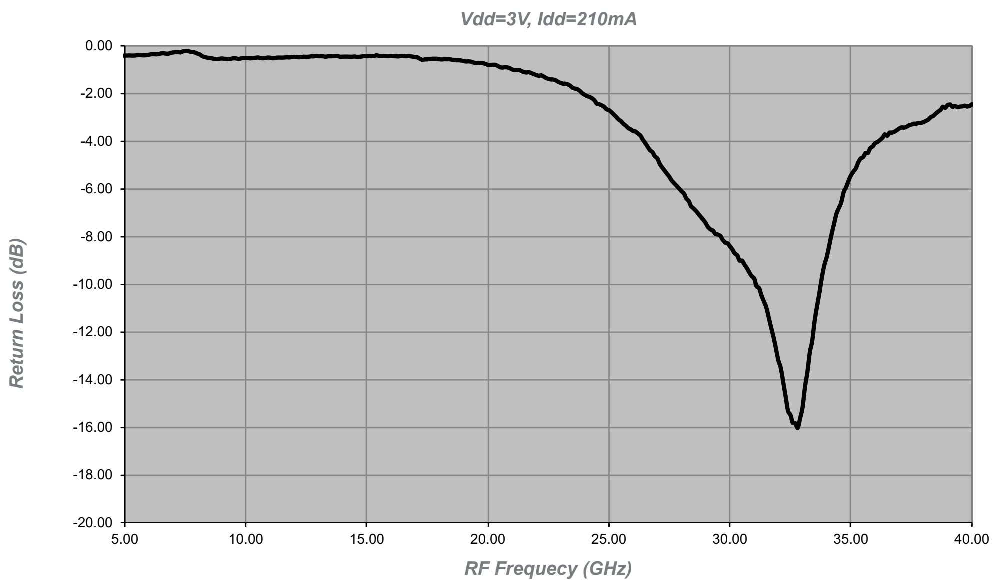


Figure 2
LE-Ka1330306
Input Return Loss

Measured Performance Data

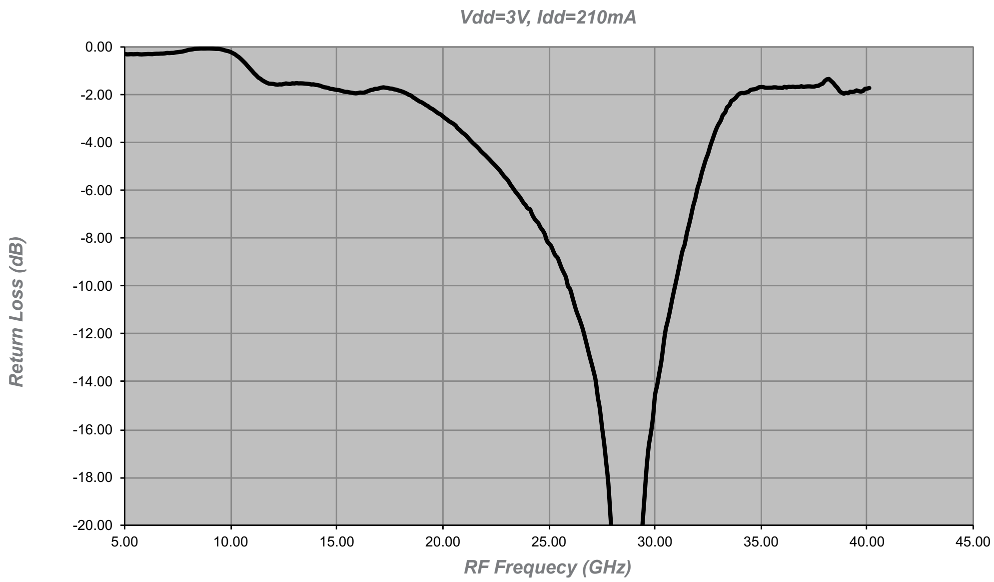


Figure 3
LE-Ka1330306
Output Return Loss

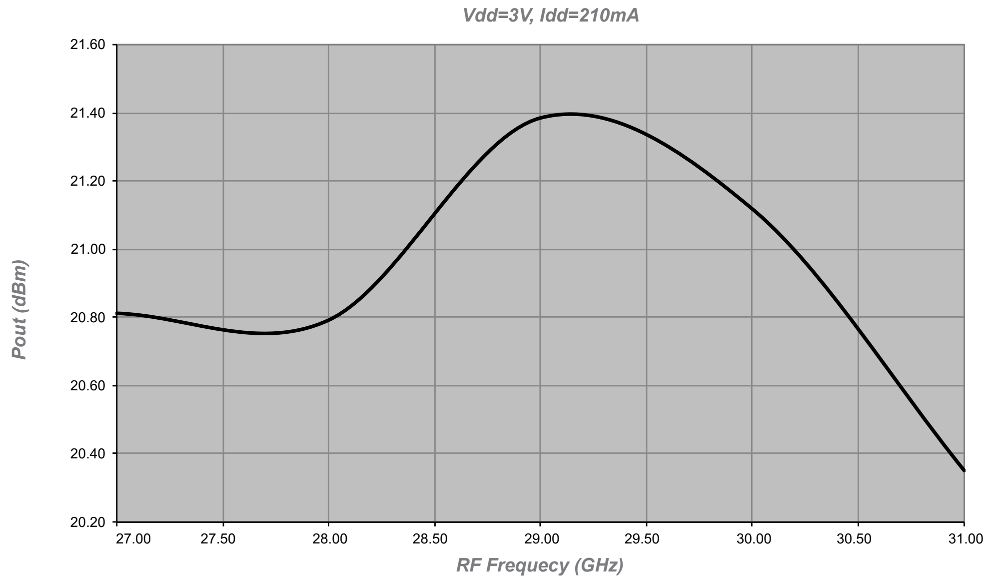


Figure 4
LE-Ka1330306
Saturated Output Power

Measured Performance Data

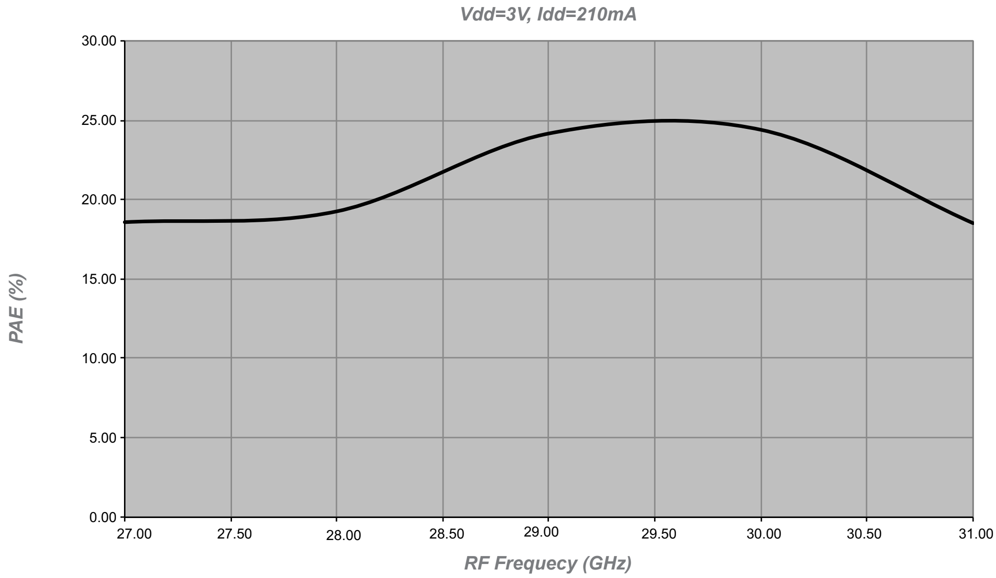


Figure 5
LE-Ka1330306
PAE

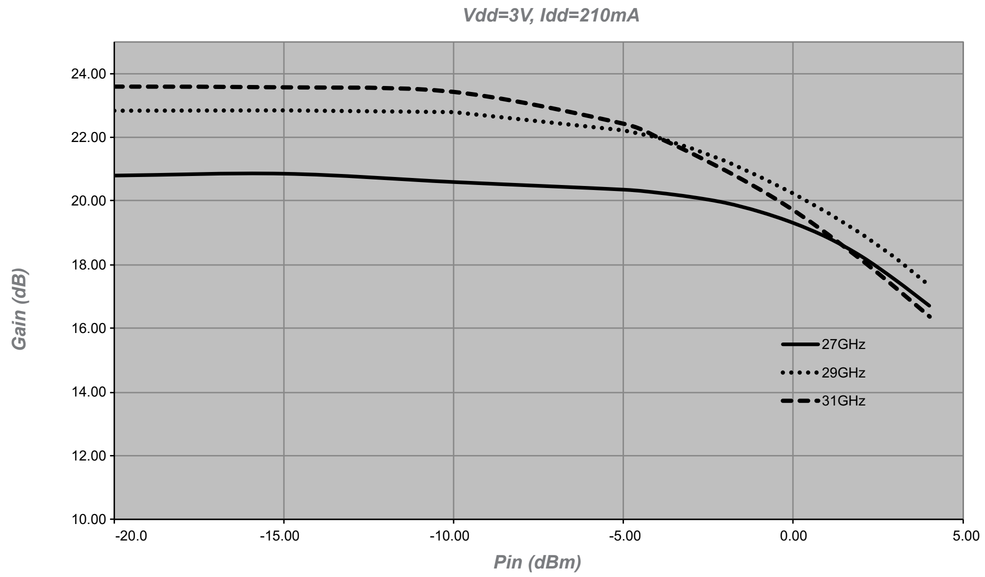


Figure 6
LE-Ka1330306
Power Gain

Measured Performance Data

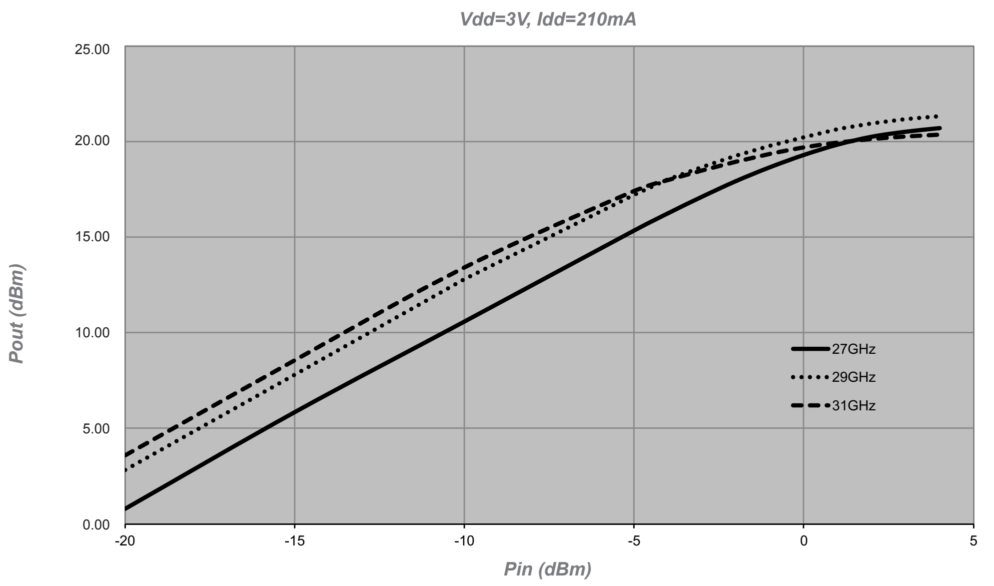


Figure 7
LE-Ka1330306
Output Power

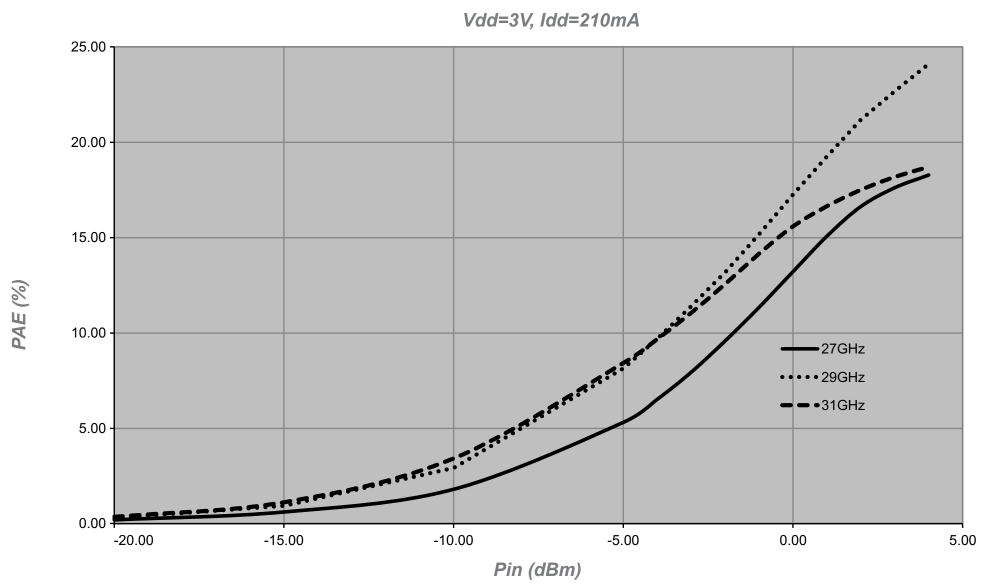
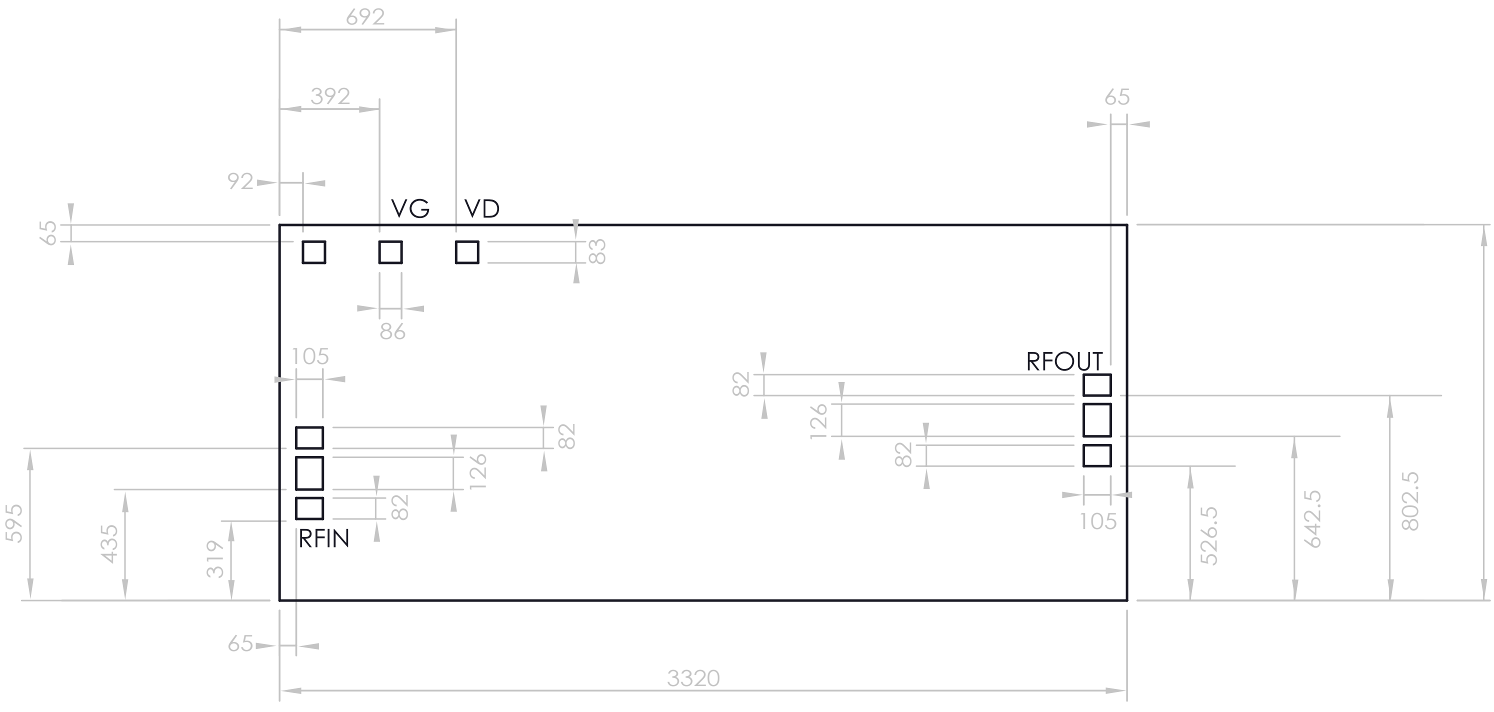


Figure 8
LE-Ka1330306
PAE

Outline Drawing



Notes

1. All dimensions are in um.
2. Typical dc bond pads are 80um square.
3. RF bond pads are 105 x 120um square.
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

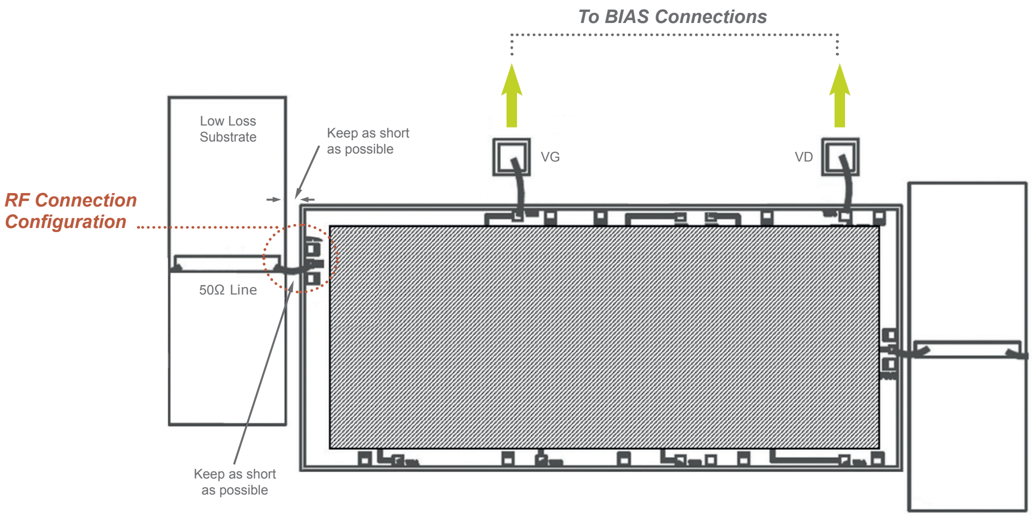
Die Packing Information

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

Pad Descriptions

Name	Description
RFIN	Input RF pad. This pad is ac coupled
RFOUT	Output RF pad. This pad is ac coupled
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.

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