

E band MMIC Power Amplifier

E-PA2-7781 Previously named CO-E1330309
GaAs PHEMT MMIC Power Amplifier 77-81GHz

Overview

E-PA2-7781 is a 4-stage MMIC power amplifier that covers frequencies from 77GHz to 81GHz. This MMIC provides more than 20dB of stable gain and a power output of more than 20dBm from a 3.5V supply voltage. All bond pads and the die backside 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 and contacted with RF probes

Features

- 77 – 81GHz.
- 20dBm output power.
- 20dB gain.
- Unconditionally stable.

Applications

- Narrow bandwidth millimeter-wave imaging.
- High resolution radar.
- Sensing.
- P2P communications; short haul/high capacity/lowinterference links.
- Medical.
- High power amplifier.
- Automotive radar.

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Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	77		81	GHz
Gain	20			dB
Input Return Loss		5		dB
Output Return Loss		8		dB
Maximum OP Power			20	dBm
Drain Voltage		3.5		V
Current			125	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
Gate Voltage	-5V to 0.2V
Drain Voltage	5V
Drain Current	300mA
Storage Temperature	-65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	-40°C to +85°C
RF Input Power	+5dBm

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

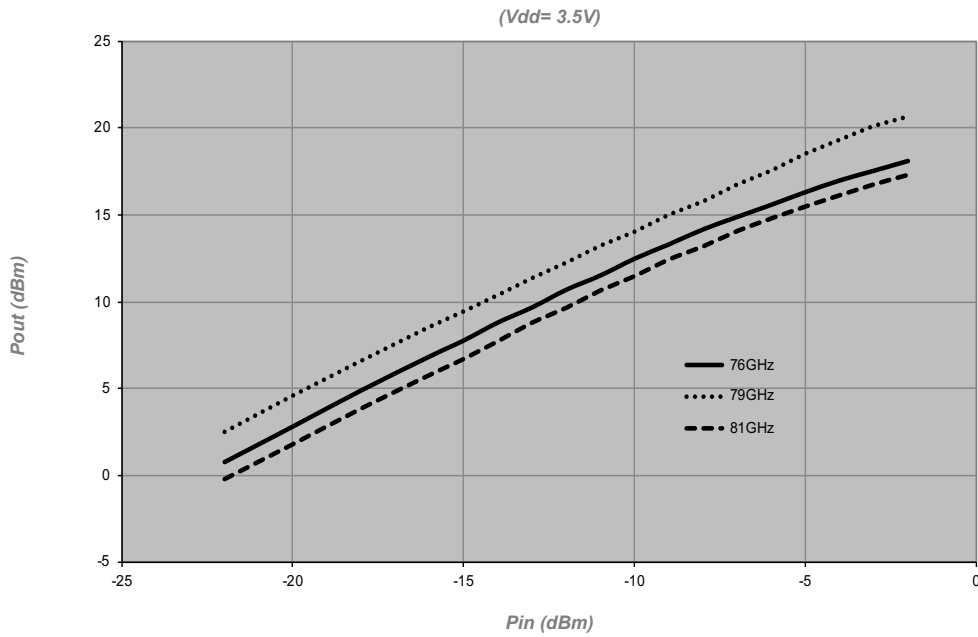


Figure 1
Power Characteristic

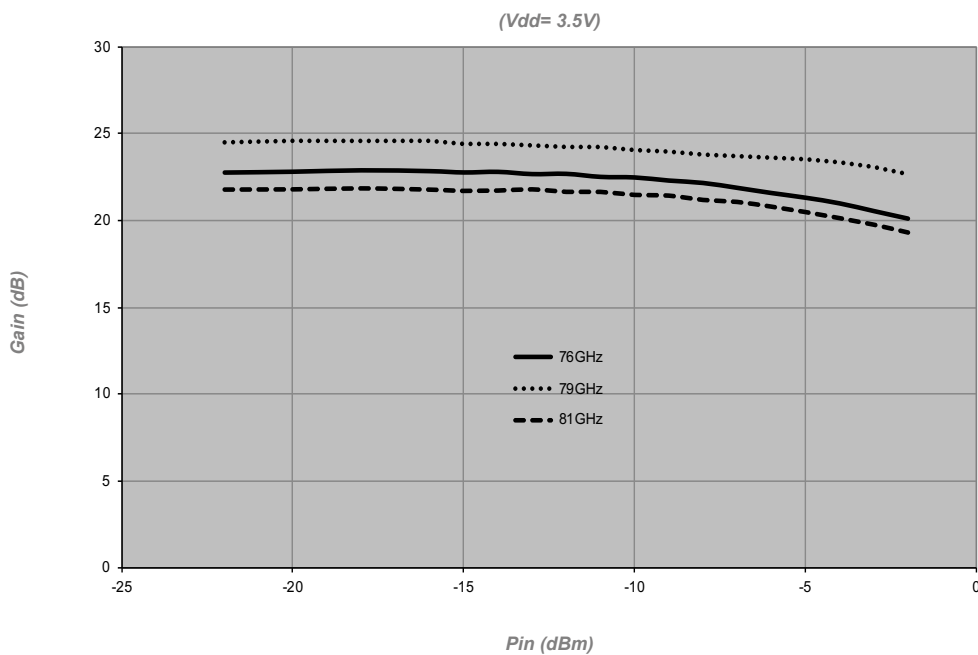


Figure 2
Gain Compression

Measured Performance Data

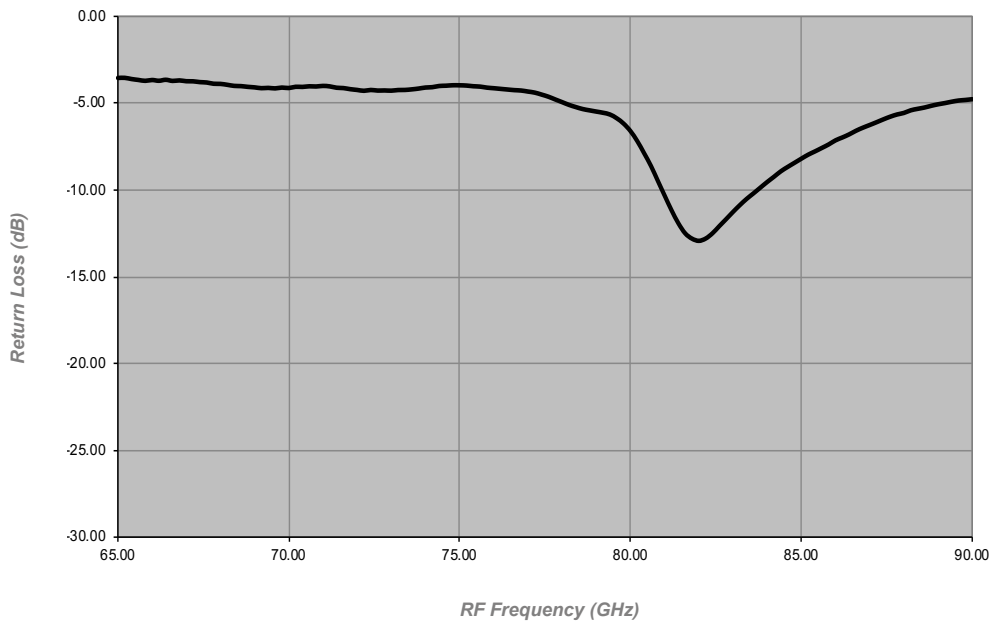


Figure 3
Input Return Loss

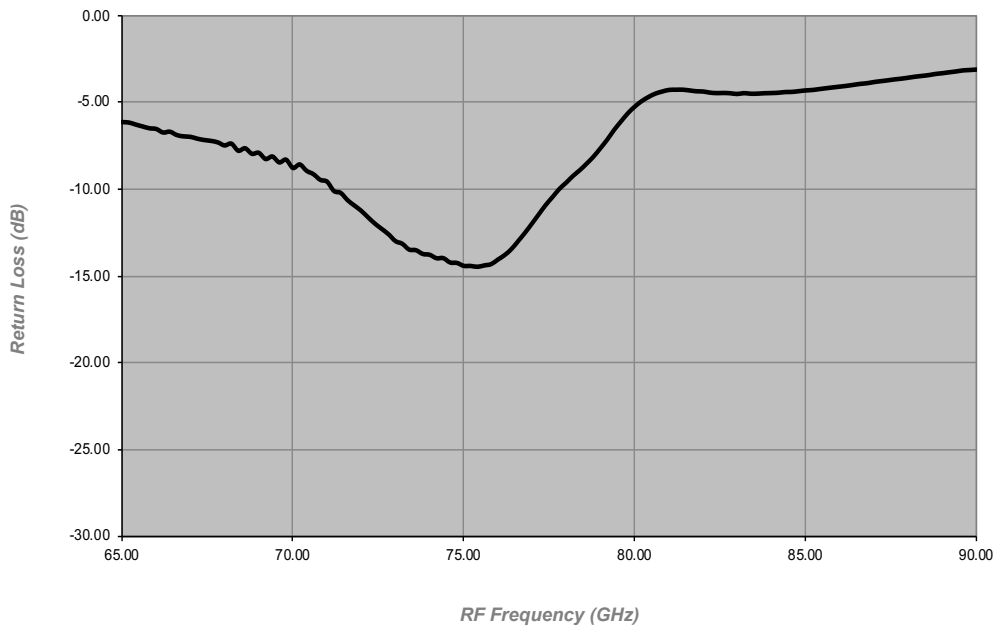


Figure 4
Output Return Loss

Measured Performance Data

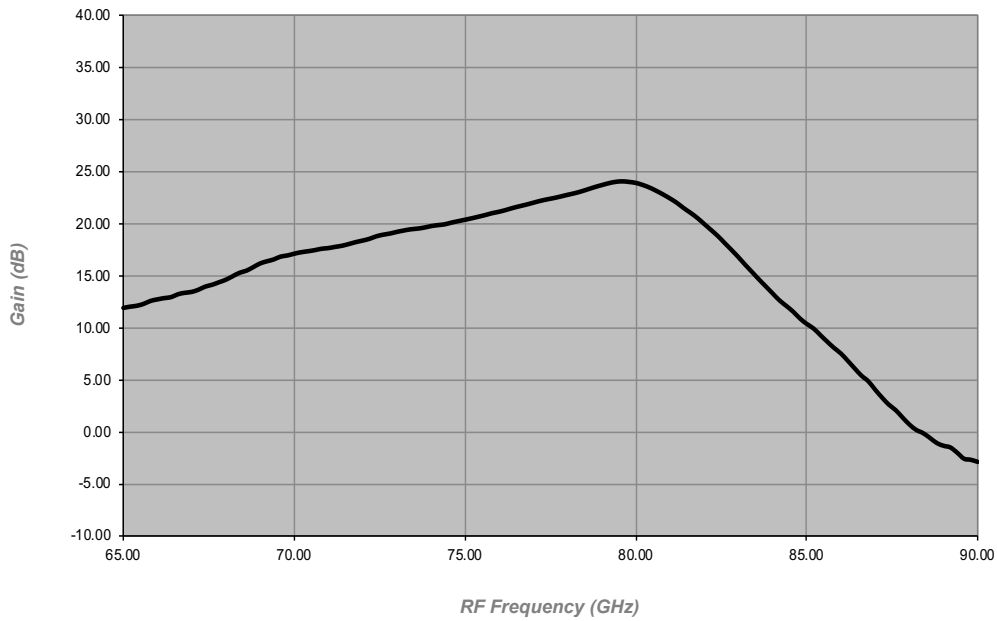


Figure 5
Gain

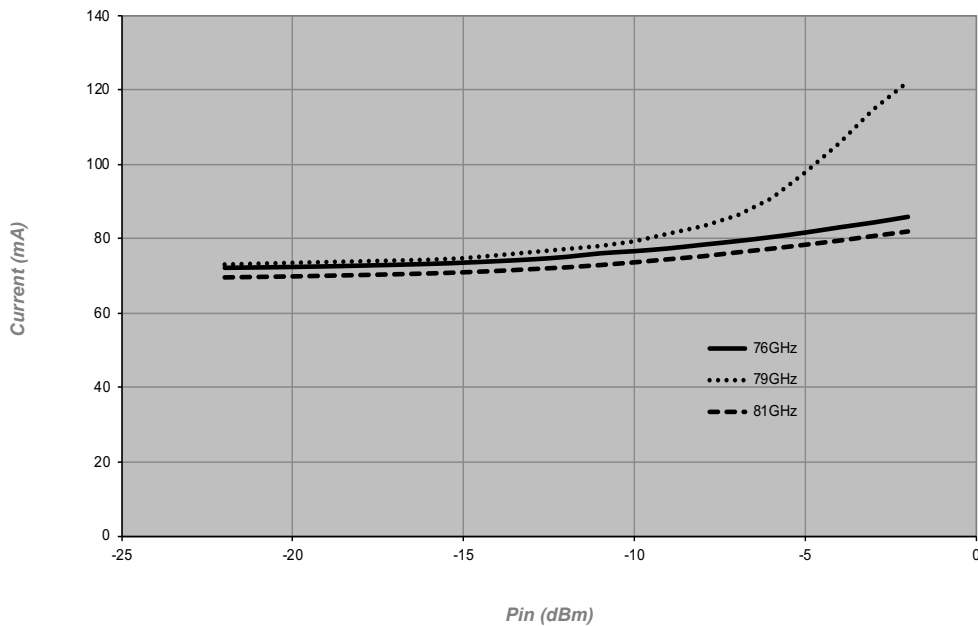
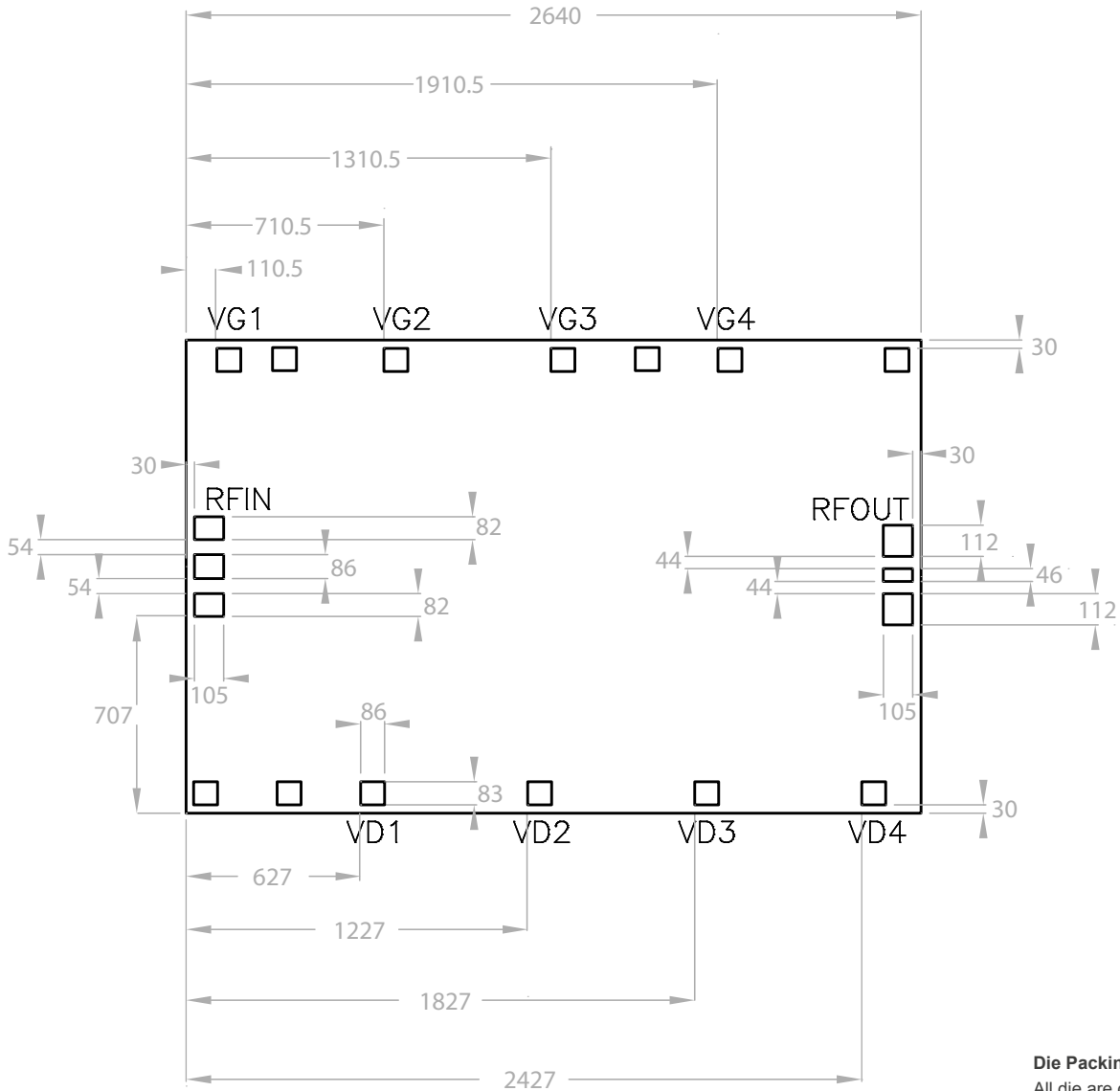


Figure 6
Current Draw

Outline Drawing



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

Notes

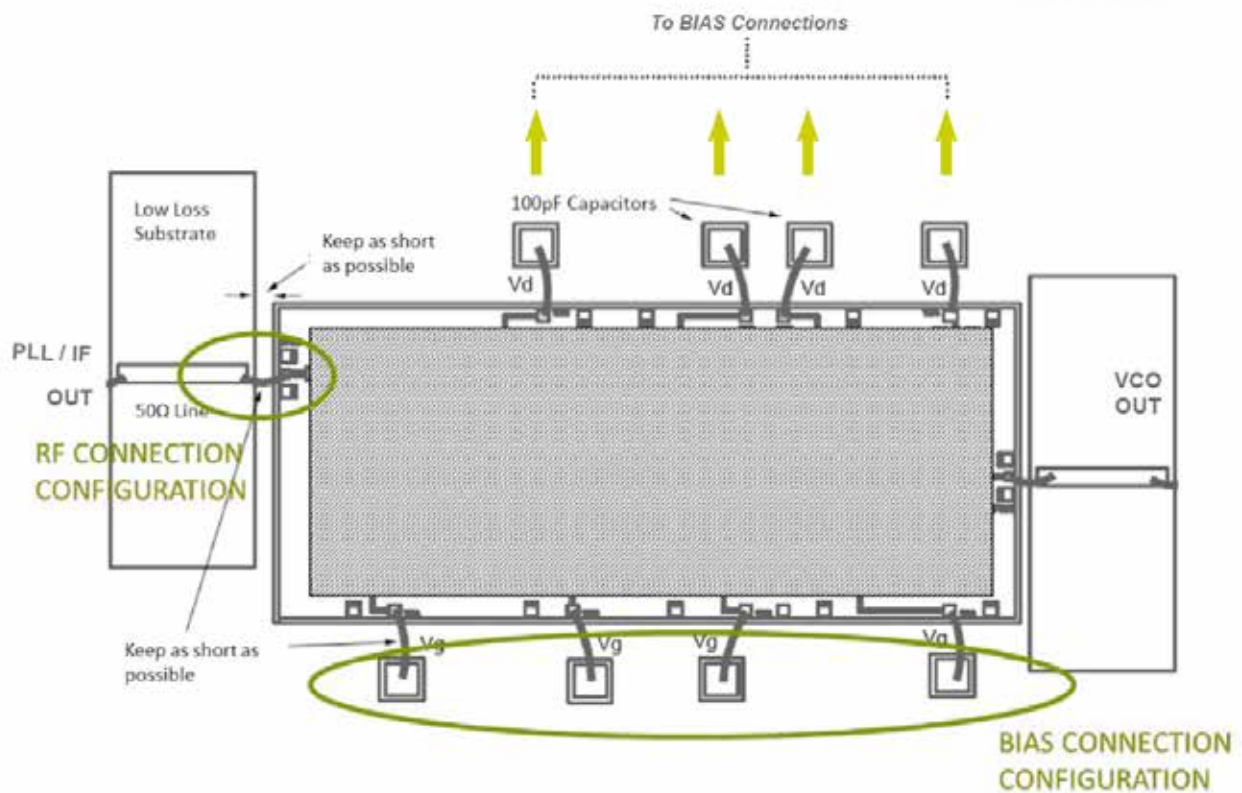
1. All dimensions are in μm.
2. Typical DC bond pads are 83 x 86μm.
3. RF bond pads are 86 x 105μm and 46 x 105μm.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabelled bond pads.
8. Die thickness is 70μm

Pad Descriptions

Name	Description
RFIN	Input RF pad. This pad is AC coupled
RFOUT	Output RF pad. This pad is AC coupled
VDx	Drain bias pad for amplifier stage x
VGx	Gate bias pad for amplifier stage x
BOTTOM	The die backside must be connected to RF/DC ground

Connection Configurations

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



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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