XP1031-QK-AN0T

Power Amplifier
37.0 - 39.5 GHz

Rev. V1

Features

- Linear Power Amplifier
- Output Power Adjust
- 23 dB Small Signal Gain
- +25 dBm P1dB Compression Point
- +35.5 dBm OIP3
- Lead-Free 7 mm 28-lead SMD Package
- RoHS* Compliant and 260°C Reflow Compatible

Description

The XP1031-QK-AN0T is a four stage 37.0-39.5 GHz SMD GaAs MMIC power amplifier that has a small signal gain of 23 dB with a +35.5 dBm Output Third Order Intercept Point.

This MMIC uses M/A-COM Technology Solutions GaAs pHEMT device model technology, and is based upon electron beam lithography to ensure high repeatability and uniformity.

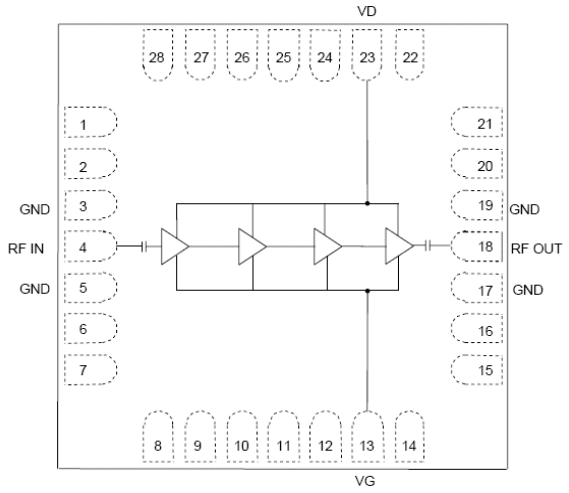
The device comes in a RoHS compliant 7x7mm QFN Surface Mount Package offering excellent RF and thermal properties. The package incorporates a tuning stub for improved output return loss. This device has been designed for use in 38 GHz Point-to-Point Microwave Radio applications.

Ordering Information [1]

Part Number	Package
XP1031-QK-AN0T	500 Piece Tape & Reel

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration [2]

Pin No.	Function	Pin No.	Function
3	Ground	18	RF Output
4	RF Input	19	Ground
5	Ground	23	Drain Bias
13	Gate Bias	All other pins	Not Connected
17	Ground		

2. The exposed pad centered on the package bottom must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

Power Amplifier
37.0 - 39.5 GHz

Rev. V1

Electrical Specifications: Vd = 4.5 V, Idq = 600 mA (T_A = 25°C)

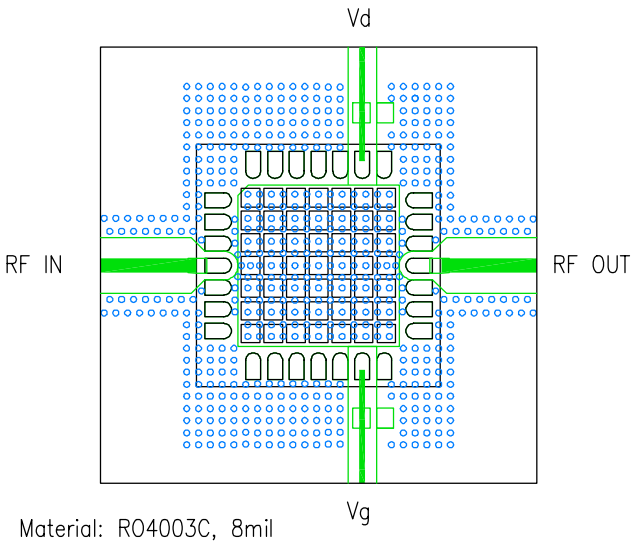
Parameter	Units	Min.	Typ.	Max.
Frequency Range	GHz	37.0	-	39.5
Output Power for 1dB Compression Point (P1dB)	dBm	-	25	-
Small Signal Gain (S21)	dB	21	23	-
Output IMD3 with Pout (scl) = 18 dBm	dBc	-	37	-
Output IMD3 with Pout (scl) = 15 dBm	dBc	39.5	42	-
Input Return Loss (S11)	dB	-	10	-
Output Return Loss (S22)	dB	-	10	-
Gate Bias Voltage (Vg)	VDC	-0.65	-0.3	-0.05

Absolute Maximum Ratings [3]

Parameter	Absolute Max.
Supply Voltage (Vd)	+5.5 V
Supply Current (Id)	800 mA
Gate Bias Voltage (Vg)	-1.5V < Vg < 0V
Input Power (Pin)	+2 dBm
Absolute Max. Junction/Channel Temp	175°C
Recommended Max. Operating Junction/Channel Temp	150°C
Continuous Power Dissipation (Pdiss) @ 85°C	2.80 W
Thermal Resistance (Tchannel=150 °C)	23°C/W
Operating Temperature (Ta)	-40°C to +85°C
Storage Temperature (Tstg)	-65°C to +150°C
ESD Min. - Machine Model (MM)	Class A
ESD Min. - Human Body Model (HBM)	Class 1A
MSL Level	MSL3

3. Channel temperature directly affects a device's MTTF. Channel temperature should be kept as low as possible to maximize lifetime.

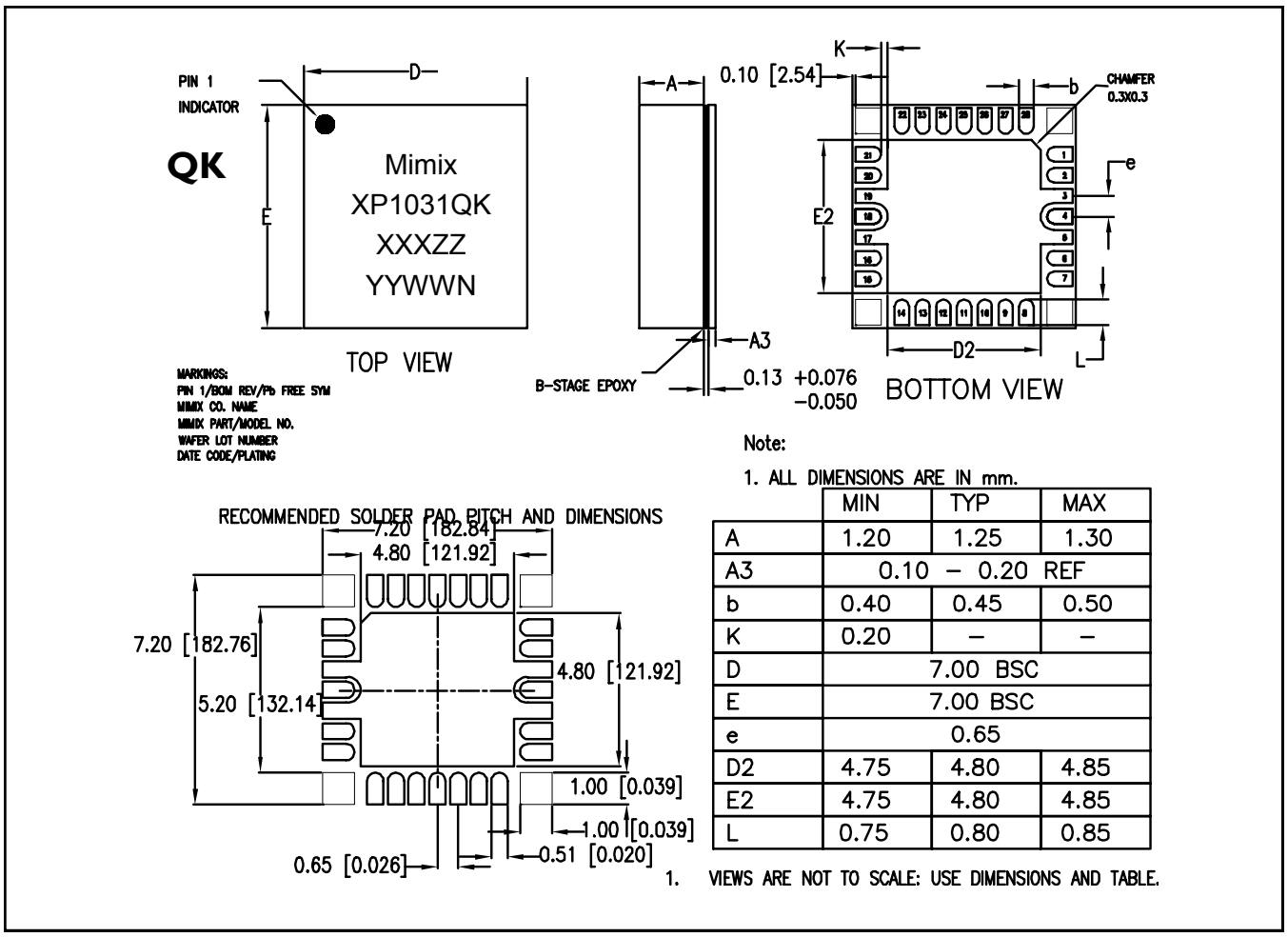
Recommended Layout



App Note [1] Biasing - It is recommended to bias the amplifier with Vd=4.5 V and Id=600 mA. It is also recommended to use active biasing to keep the currents constant as the RF power and temperature vary; this gives the most reproducible results. Depending on the supply voltage available and the power dissipation constraints, the bias circuit may be a single transistor or a low power operational amplifier, with a low value resistor in series with the drain supply used to sense the current. The gate of the pHEMT is controlled to maintain correct drain current and thus drain voltage. The typical gate voltage needed to do this is -0.3V. Typically the gate is protected with Silicon diodes to limit the applied voltage. Also, make sure to sequence the applied voltage to ensure negative gate bias is available before applying the positive drain supply.

App Note [2] Bias Arrangement - Each DC pin (Vd and Vg) needs to have DC bypass capacitance (10 nF/1 µF) as close to the package as possible.

Lead-Free 7 mm 28-Lead SMD†



Note:

1. ALL DIMENSIONS ARE IN mm.

	MIN	TYP	MAX
A	1.20	1.25	1.30
A3		0.10 – 0.20 REF	
b	0.40	0.45	0.50
K	0.20	–	–
D		7.00 BSC	
E		7.00 BSC	
e		0.65	
D2	4.75	4.80	4.85
E2	4.75	4.80	4.85
L	0.75	0.80	0.85

1. VIEWS ARE NOT TO SCALE: USE DIMENSIONS AND TABLE.

† Reference Application Note S2083 for lead-free solder reflow recommendations.
Plating is 100% matte tin over copper.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.