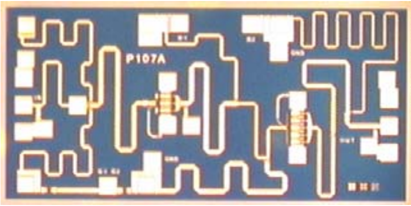
UPDATED 05/08/2008

EMP107

5.9 – 7.9 GHz Power Amplifier MMIC

FEATURES

- **5.9 – 7.9 GHz Operating Frequency Range**
- **24dBm Output Power at 1dB Compression**
- **19.0 dB Typical Small Signal Gain**
- **-41dBc OIMD3 @Each Tone Pout 14 dBm**



Dimension: 1130um X 2250um
Thickness: 85um ± 15um

APPLICATIONS

- **Point-to-point and point-to-multipoint radio**
- **Military Radar Systems**

Caution! ESD sensitive device.

ELECTRICAL CHARACTERISTICS

(Tb = 25 °C, 50 ohm, Vds = 7 V, Idsq = 200 mA, Unless Otherwise Specified)

SYMBOL	PARAMETER/TEST CONDITIONS	MIN	TYP	MAX	UNITS
F	Operating Frequency Range	5.9		7.9	GHz
P1dB	Output Power at 1dB Gain Compression	23	24		dBm
Gss	Small Signal Gain	17.0	19.0		dB
OIMD3	Output 3rd Order Intermodulation Distortion Δf=10MHz, Each Tone Pout 14dBm, 7V, 60%±10%Idss		-41	-38	dBc
Input RL	Input Return Loss		-12	-8	dB
Output RL	Output Return Loss		-6		dB
Idss	Saturated Drain Current Vds =3V, V_{GS} =0V	245	285	330	mA
Vds	Drain to Source Voltage		7	8	V
NF	Noise Figure @7GHz		8		dB
Rth	Thermal Resistance (Au-Sn Eutectic Attach)		44		°C/W
Tb	Operating Base Plate Temperature	- 35		+ 85	°C

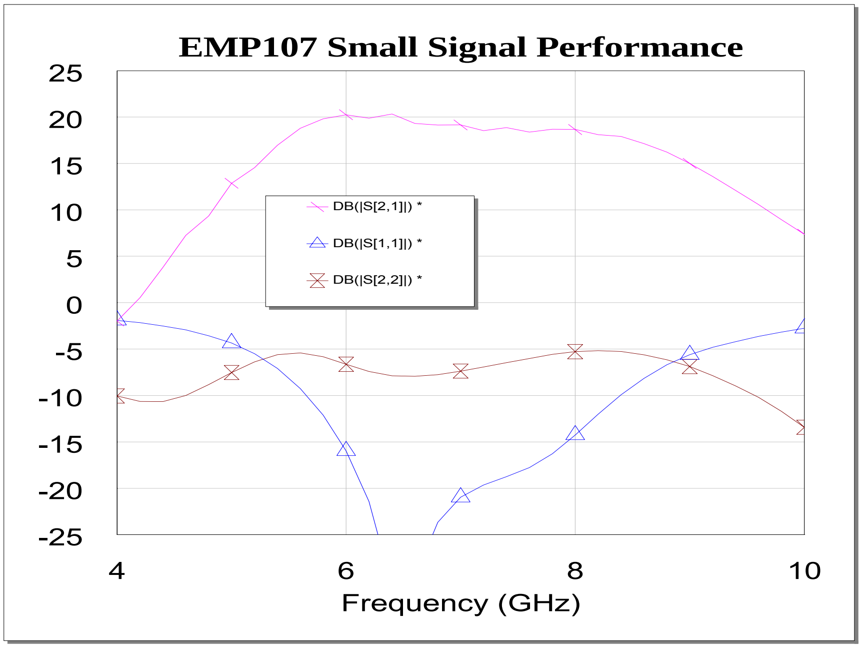
MAXIMUM RATINGS AT 25°C[1,2]

SYMBOL	CHARACTERISTIC	ABSOLUTE	CONTINUOUS
Vds	Drain to Source Voltage	12V	8 V
V_{GS}	Gate to Source Voltage	-8V	- 4 V
Ids	Drain Current	Idss	325mA
I_{GSF}	Forward Gate Current	28mA	4.5 mA
P_{IN}	Input Power	21dBm	@ 3dB compression
T_{CH}	Channel Temperature	175°C	150°C
T_{STG}	Storage Temperature	-65/175°C	-65/150°C
P_T	Total Power Dissipation	3.1W	2.6W

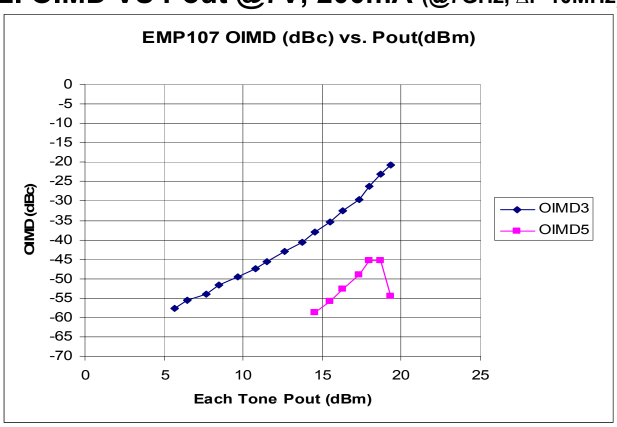
1. Operating the device beyond any of the above rating may result in permanent damage.
2. Bias conditions must also satisfy the following equation Vds*Ids < $(T_{CH} - Tb)/R_{TH}$

Typical Performance:

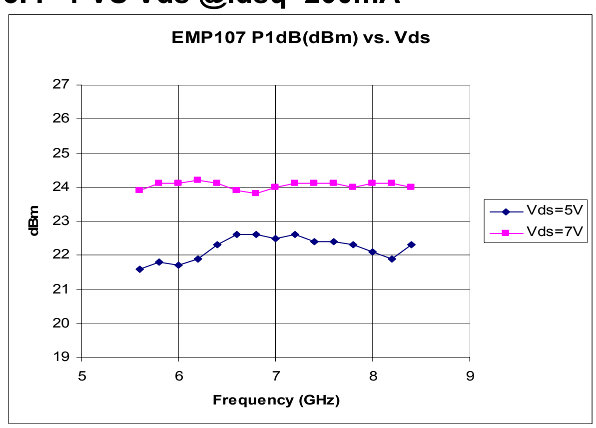
1. Small Signal Performance (@7V, 200mA)



2. OIMD VS Pout @7V, 200mA (@7GHz, Δf=10MHz)



3. P-1 VS Vds @Idsq=200mA



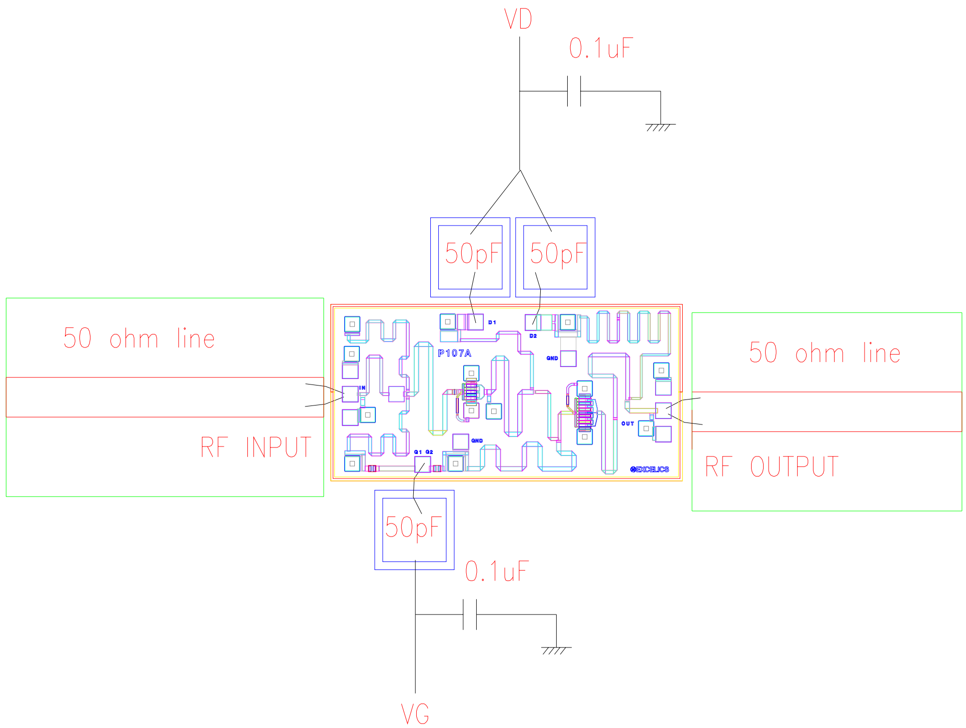
APPLICATION INFORMATION (CAUTION: THIS IS AN ESD SENSITIVE DEVICE)

Chip carrier should match GaAs thermal coefficienat of expansion and have high thermal conductivity, such as copper tungsten or copper molybdenum. The chip carrier should be nickel-gold plated and capable of withstanding 325ºC for 20 minutes.

Die attach should be done with Gold/Tin (80/20) eutectic alloy in inert ambient gas. The backside is used as heatsinking, DC, and RF contacts.

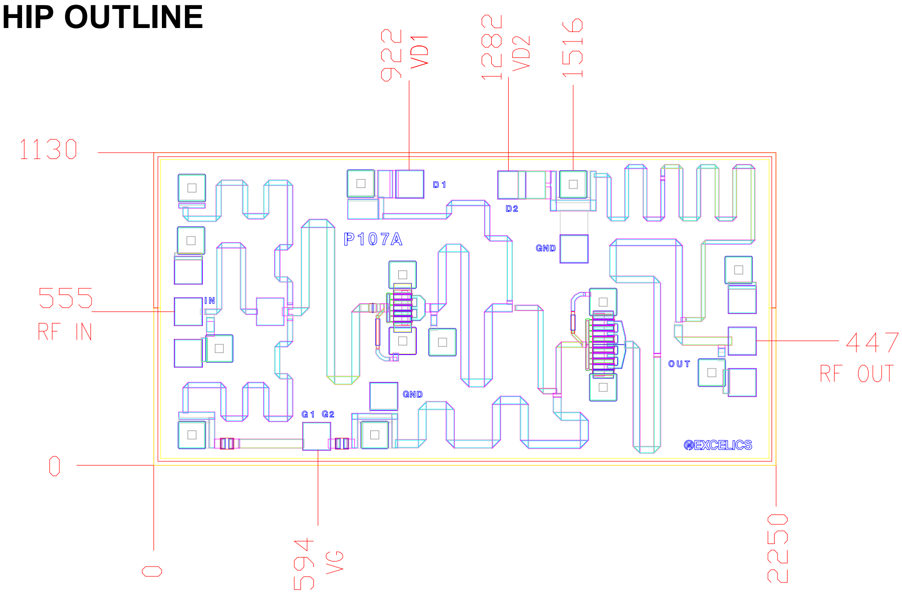
All die attach and wire bond equipment, especially the tools which touch a die, should be well grounded to avoid accidental discharge through a die.

ASSEMBLY DRAWING



The length of RF wires should be as short as possible. Use at least two wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

CHIP OUTLINE



Chip Size 1130um X 2250um
Chip Thickness: 85 ± 15 microns
PAD Dimensions: 100 x 100 microns
All Dimensions in Microns

DISCLAIMER
EXCELICS SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. EXCELICS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN.

LIFE SUPPORT POLICY
EXCELICS SEMICONDUCTOR PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF EXCELICS SEMICONDUCTOR, INC.
AS HERE IN:
1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.