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EMP213

12.5 – 15.5 GHz Power Amplifier MMIC

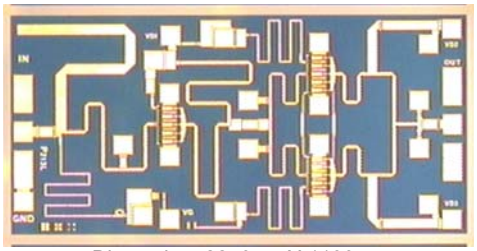
UPDATED 05/08/2008

FEATURES

- **12.5 – 15.5 GHz Operating Frequency Range**
- **27.0dBm Output Power at 1dB Compression**
- **16.0 dB Typical Small Signal Gain**
- **-41dBc OIMD3 @Each Tone Pout 17dBm**

APPLICATIONS

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



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

Caution! ESD sensitive device.

ELECTRICAL CHARACTERISTICS (T_a = 25 °C, 50 ohm, VDD=7V, IDQ=400mA)

SYMBOL	PARAMETER/TEST CONDITIONS	MIN	TYP	MAX	UNITS
F	Operating Frequency Range	12.5		15.5	GHz
P1dB	Output Power at 1dB Gain Compression	26.0	27.0		dBm
Gss	Small Signal Gain	14.0	16.0		dB
OIMD3	Output 3rd Order Intermodulation Distortion @Δf=10MHz, Each Tone Pout 17dBm Ids = 60% ±10%Idss		-41	-38	dBc
Input RL	Input Return Loss		-12	-8	dB
Output RL	Output Return Loss		-8	-5	dB
NF	Noise Figure		9		dB
Idss	Saturated Drain Current V_{DS} =3V, V_{GS} =0V	475	620	750	mA
V_{DD}	Drain Voltage		7	8	V
Rth	Thermal Resistance (Au-Sn Eutectic Attach)		22		°C/W
Tb	Operating Base Plate Temperature	-35		+85	ºC

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	650mA
I_{GSF}	Forward Gate Current	57mA	9.5 mA
P_{IN}	Input Power	24dBm	@ 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	6.2W	5.2W

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}

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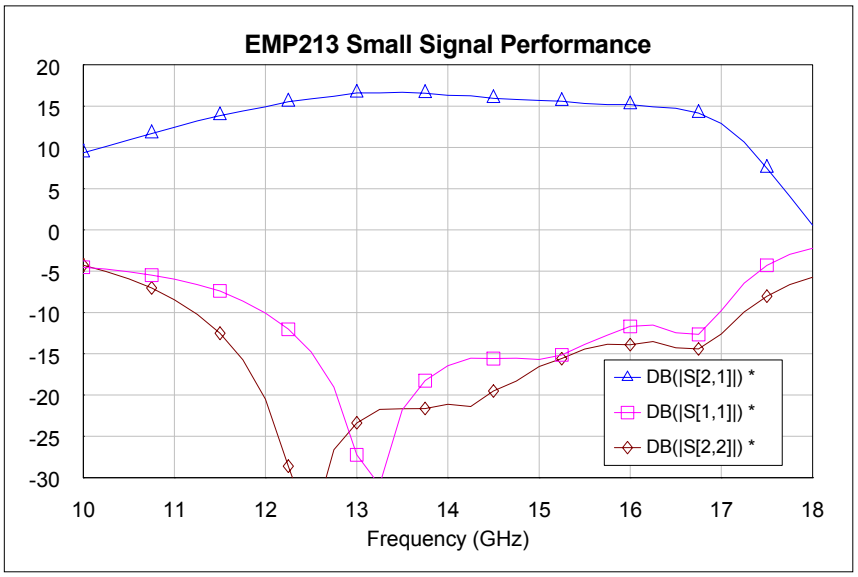
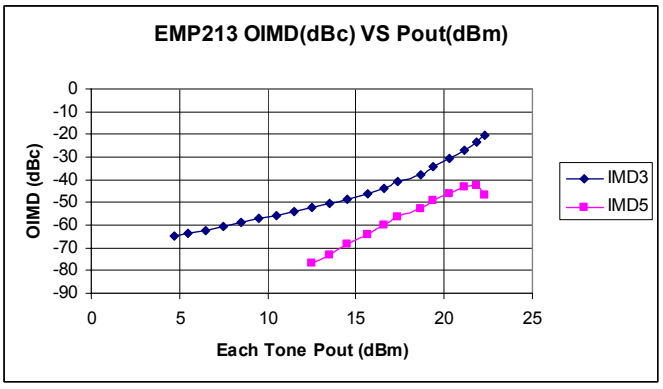
Typical Performance:

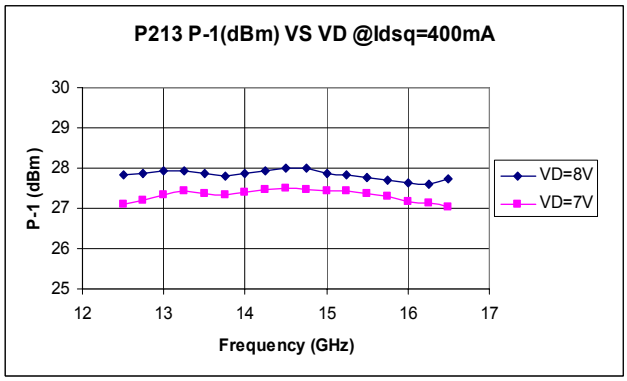
1. Small Signal Performance (@7V, 400mA)



2. OIMD VS Pout @7V 400mA (@15GHz, ∆f=10MHz)



3. P-1 VS VD @Idsq=400mA



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.

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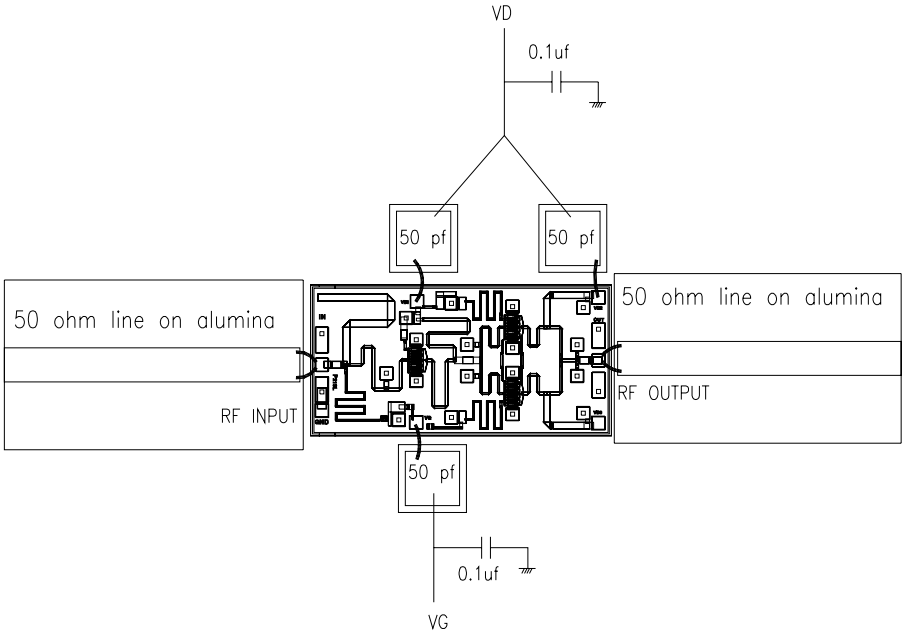
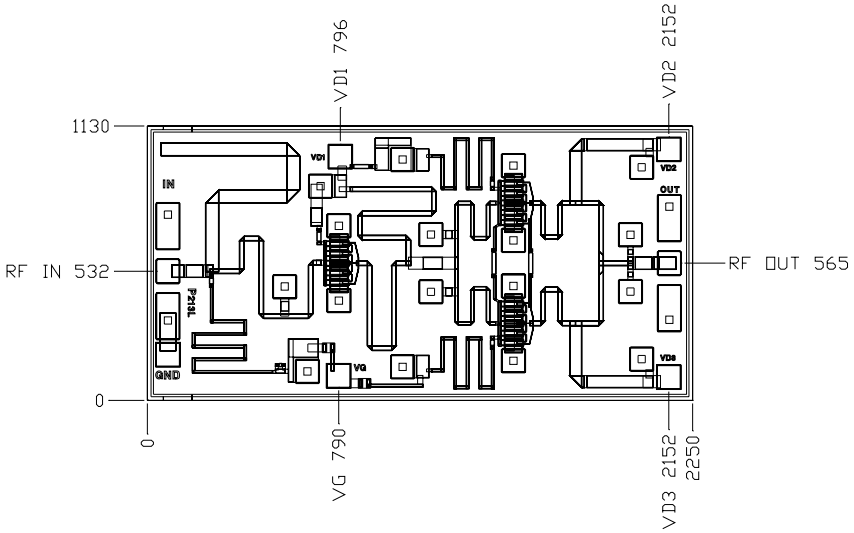
ASSEMBLY DRAWING



The length of RF wires should be as short as possible. Use at least two 1.0mil gold wires between RF pad and 50 ohm line and separate the wires to minimize the mutual inductance.

CHIP OUTLINE



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

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