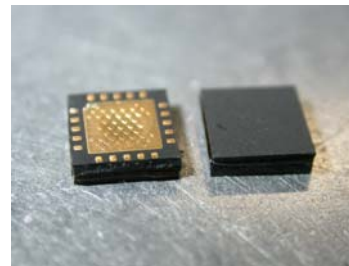


FEATURES

- 21.0 – 24.0 GHz Operating Frequency Range
- 28.0dBm Output Power at 1dB Compression
- 11.0 dB Typical Small Signal Gain
- -40dBc OIMD3 @Each Tone Pout 18dBm

APPLICATIONS

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



Caution! ESD sensitive device.

ELECTRICAL CHARACTERISTICS ($T_b = 25\text{ }^\circ\text{C}$, 50 ohm, VDD=7V, IDQ=760mA)

SYMBOL	PARAMETER/TEST CONDITIONS	MIN	TYP	MAX	UNITS
F	Operating Frequency Range	21.0		24.0	GHz
P1dB	Output Power at 1dB Gain Compression	26.5	28.0		dBm
Gss	Small Signal Gain	8.0	11.0		dB
OIMD3	Output 3 rd Order Intermodulation Distortion @ $\Delta f=10\text{MHz}$, Each Tone Pout 18dBm $V_{DS} = 7\text{V}$, $I_{DS} = 60\%$ to 70% I_{DSS}		-40	-37	dBc
Input RL	Input Return Loss		-10		dB
Output RL	Output Return Loss		-10		dB
Idss	Saturate Drain Current $V_{DS} = 3\text{V}$, $V_{GS} = 0\text{V}$	860	1070	1290	mA
V_{DD}	Power Supply Voltage		7	8	V
Rth	Thermal Resistance		10		$^\circ\text{C/W}$
Tb	Operating Base Plate Temperature	-35		+85	$^\circ\text{C}$

MAXIMUM RATING ($T_b = 25\text{ }^\circ\text{C}$)

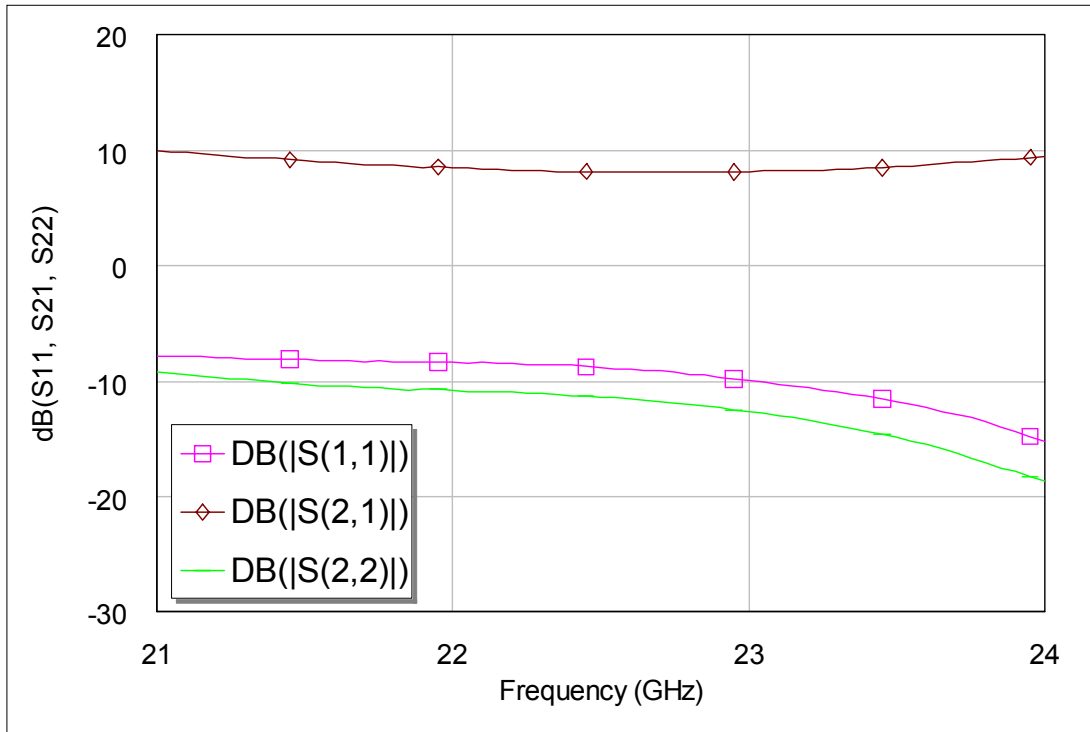
Symbol	Characteristic	ABSOLUTE ¹	OPERATING ²
V_{DS}	Drain-Source Voltage	8.5 V	8 V
V_{GS}	Gate-Source Voltage	-4 V	-3 V
I_{DD}	Drain Current	I_{DSS}	70% I_{DSS}
I_{Gsf}	Forward Gate Current	93 mA	15 mA
P_{IN}	Input Power	@ 3dB compression	@ 3dB compression
T_{CH}	Channel Temperature	175 $^\circ\text{C}$	150 $^\circ\text{C}$
T_{STG}	Storage Temperature	-65 $^\circ\text{C}$ to +175 $^\circ\text{C}$	-65 $^\circ\text{C}$ to +175 $^\circ\text{C}$
P_T	Total Power Dissipation	15.0 W	12.6 W

Note: 1. Exceeding any of the above ratings may result in permanent damage.
 2. Exceeding any of the above ratings may reduce MTTF below design goals.

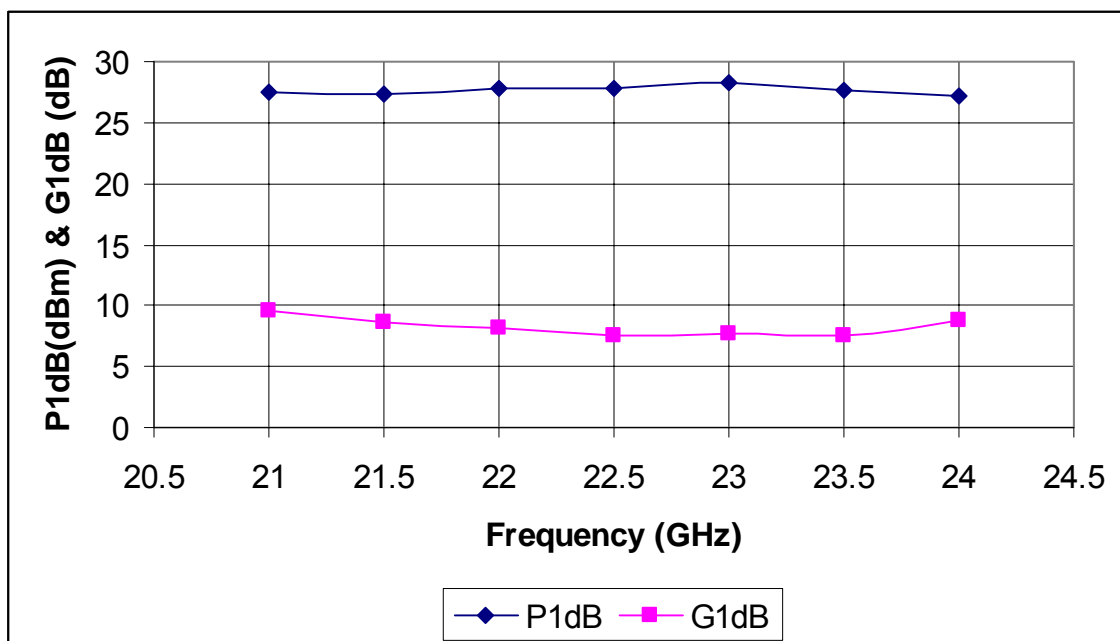
Specifications are subject to change without notice.

Typical Performance:

1. Small-Signal Parameters (@Vds = 7V, Ids = 760mA)



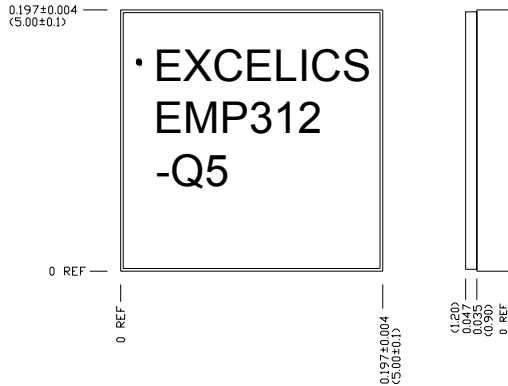
2. P1-dB & G1-dB (@Vds = 7V, Ids = 760mA)



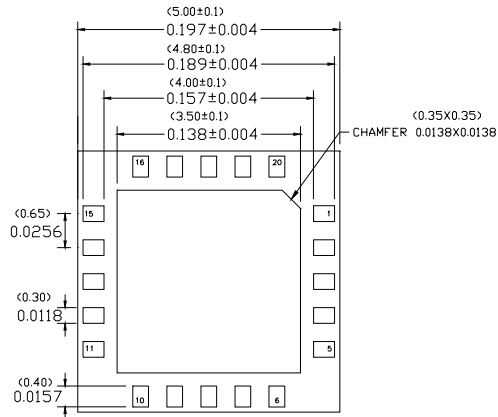
Specifications are subject to change without notice.

CHIP OUTLINE AND PIN ASSIGNMENT

Top View



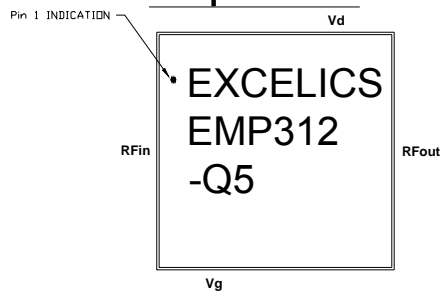
Bottom View



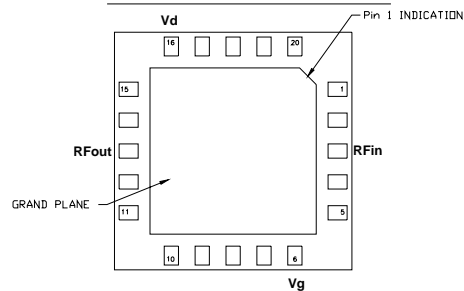
Additional Notes:

- 1) Ground Plane must be soldered to PCB RF ground
- 2) All dimensions are in inches
- 3) Refer to Excelics application notes on QFNs for further guidelines
- 4) Pin Assignment:

Top View



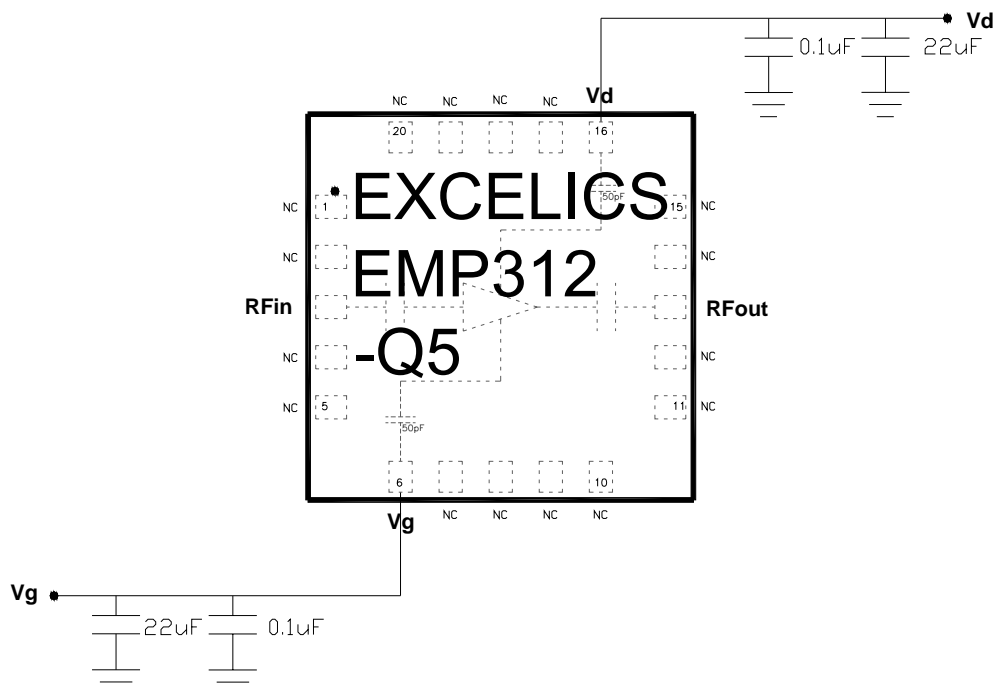
Bottom View



Pin	Assignment
1, 2, 4, 5	NC
3	RF_{in}
6	V_g
7, 8, 9, 10, 11, 12, 14, 15	NC
13	RF_{out}
16	V_d
17, 18, 19, 20	NC

Specifications are subject to change without notice.

Recommended Circuit Schematic:



Notes:

- 1) External bypass capacitors should be placed as close to the package as possible.
- 2) Dual biasing sequence required:
 - a. Turn-on Sequence: Apply $V_g = -2.5V$, followed by $V_d = 7V$, lastly increase V_g until required I_{dq}
 - b. Turn-off Sequence: Turn off V_d , followed by V_g
- 3) Demonstration board available upon request.



Specifications are subject to change without notice.



EMP312-Q5

21.0 – 24.0 GHz Surface-Mounted PA

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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.

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