

# TQP7M9104 –1.2-1.4GHz Reference Design

## Product Overview

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The TQP7M9104 is a high linearity driver amplifier in industry standard, RoHS compliant, QFN surface mount package. This InGaP / GaAs HBT delivers high performance across 600 – 2700 MHz range of frequencies with 15.8 dB Gain, +49.5 dBm OIP3 and +32.5 dBm P1dB at 2.14 GHz while only consuming 435 mA quiescent collector current. All devices are 100% RF and DC tested.

The TQP7M9104 incorporates on-chip features that differentiate it from other products in the market. The amplifier integrates an on-chip DC over-voltage and RF over-drive protection. This protects the amplifier from electrical DC voltage surges and high input RF input power levels that may occur in a system.

The TQP7M9104 is targeted for use as a driver amplifier in wireless infrastructure where high linearity, medium power, and high efficiency are required. The device is an excellent candidate for transceiver line cards and high power amplifiers in current and next generation multi carrier 3G / 4G base stations.

## Referenced Documents

The reference documents below take precedence over the contents of this application note and should always be consulted for the latest information.

TQP7M9104 Data Sheet.

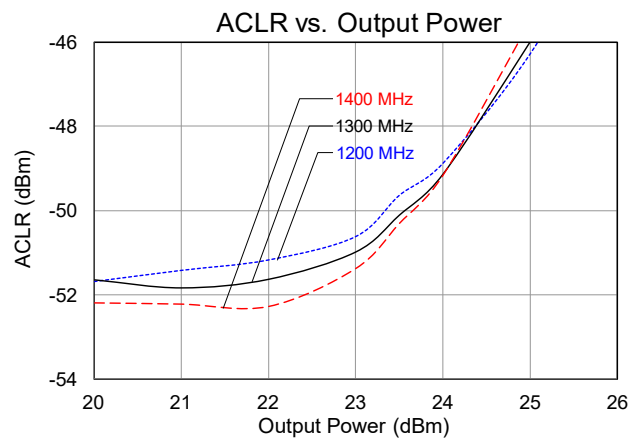
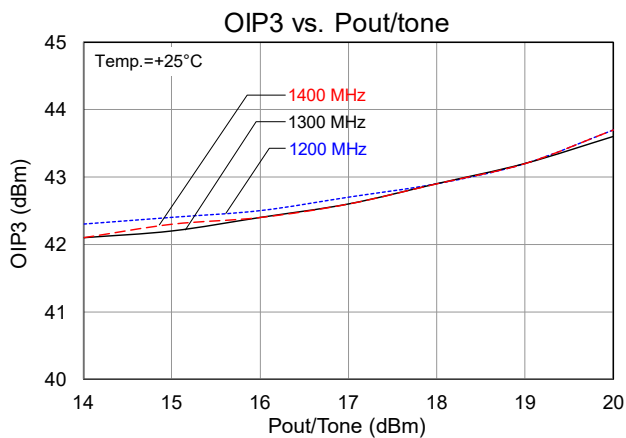
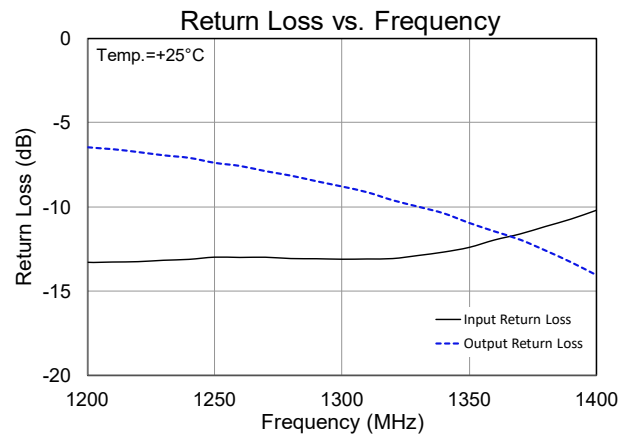
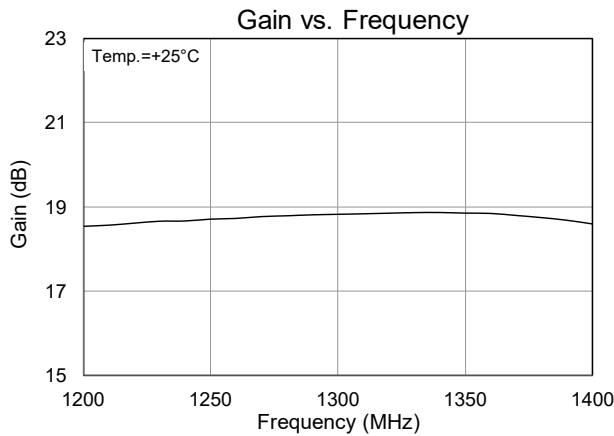
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## Application Electrical Performance

Qorvo Field and Factory Applications Engineers are available to provide technical assistance for determining appropriate matching networks for a particular application.

Parameter	Conditions	Typical Value			Units
		1200	1300	1400	
Frequency		1200	1300	1400	MHz
Gain		18.5	18.8	18.6	dB
Input Return Loss		13.0	13.0	10.0	dB
Output Return Loss		6.4	8.8	14.0	dB
Output P1dB		33.4	33.6	33.6	dBm
OIP3	Pout=+17 dBm/tone, $\Delta f=1$ MHz	42.7	42.6	42.6	dBm
WCDMA Channel Power	At -50 dBc ACLR	23.5	23.5	23.5	dB
Device Current, I <sub>DD</sub>		440			mA

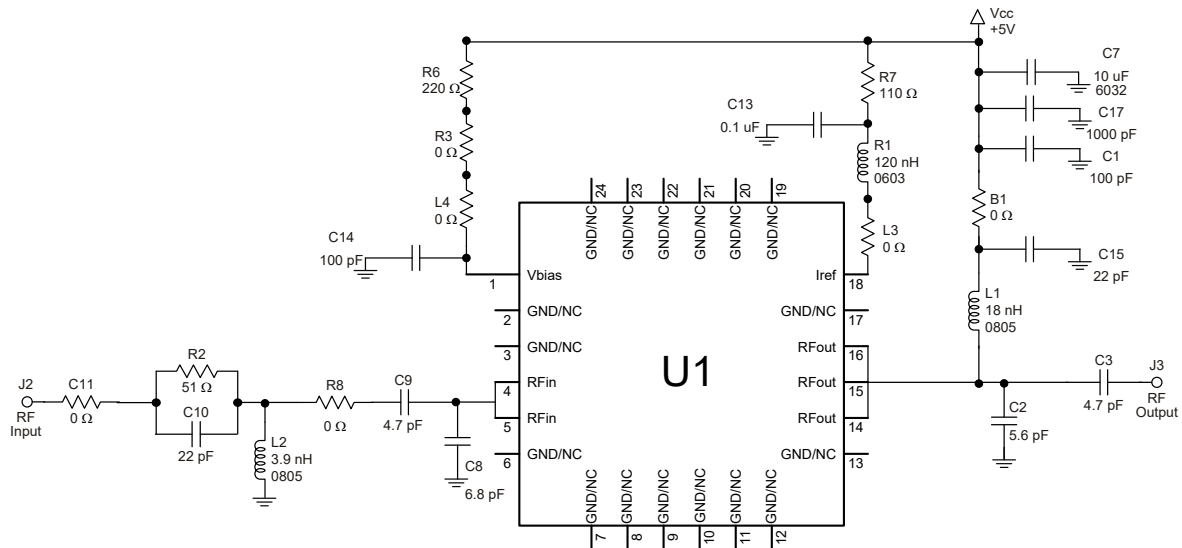
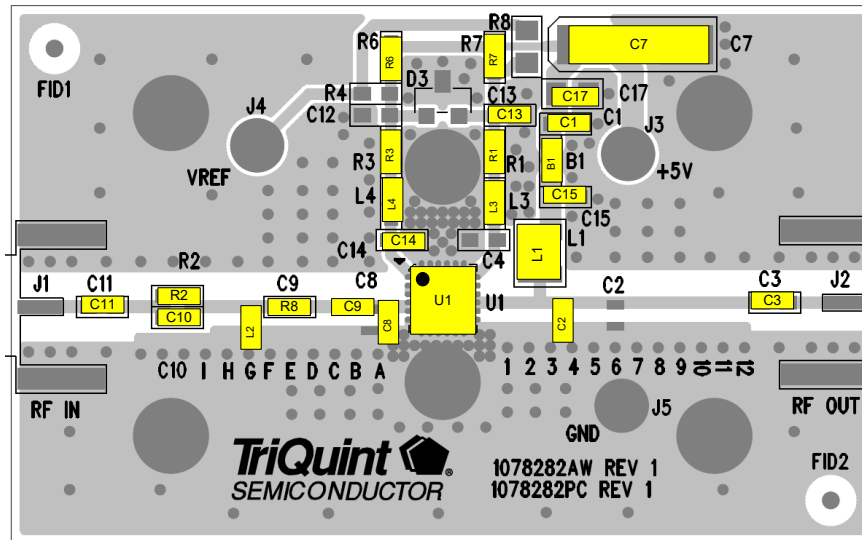
Test conditions unless otherwise noted: V<sub>cc</sub> = +5V, Temp = +25°C, 50 Ω system.



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## Evaluation Board Information

### Evaluation Board and Schematic



#### Notes:

1. See Evaluation Board PCB Information section for material and stack-up.
2. Critical component placement locations:
3. Distance between center of C8 and TQP7M9104 (U1) device package is 57 mil.
4. Distance between center of C2 and TQP7M9104 (U1) device package is 170 mil.
5. Distance between center of C9 and TQP7M9104 (U1) device package is 115 mil.
6. Distance between center of L2 and TQP7M9104 (U1) device package is 312 mil.

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## Evaluation Board – Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
n/a	n/a	Printed Circuit Board	Qorvo	
U1	n/a	2W High Linearity Amplifier	Qorvo	TQP7M9104
D3	n/a	Zener, dual, SOT-23	Various	
C8	6.8 pF	Capacitor, Chip, 0603, $\pm 0.05\text{pF}$ , 50V, Accu-P	AVX	06035J1R5ABSTR
C3, C9	4.7 pF	Capacitor, Chip, 0603, $\pm 0.05\text{pF}$ , 50V, Accu-P	AVX	06035J2R4ABSTR
C2	5.6 pF	Capacitor, Chip, 0603, $\pm 0.05\text{pF}$ , 50V, Accu-P	AVX	06035J2R7ABSTR
B1, L3, L4, R3, R8, C11	0 $\Omega$	Resistor, Chip, 0603, 5%, 1/16W	Various	
C10, C15	22 pF	Capacitor, Chip, 0603, 5%, 50V, NPO/COG	Various	
C1, C14	100 pF	Capacitor, Chip, 0603, 5%, 50V, NPO/COG	Various	
L1	18 nH	Inductor, 1008, 5%, Ceramic	Various	
L2	3.9 nH		Various	
C17	1000 pF	Capacitor, Chip, 0603, 10%, 50V, NPO/COG	Various	
C13	0.1 $\mu\text{F}$	Capacitor, Chip, 0603, 10%, 50V, X5R	Various	
C7	10 $\mu\text{F}$	Capacitor, Tantalum, 6032, 20 %, 50V	Various	
R2	51 $\Omega$	Resistor, Chip, 0603, 5%, 1/16W	Various	
R6	220 $\Omega$	Resistor, Chip, 0603, 1%, 1/16W	Various	
R7	110 $\Omega$	Resistor, Chip, 0603, 1%, 1/16W	Various	
R1	120 nH	Inductor, 0603, 5%	Various	
R4, C12, C4, D3	n/a	DNP	Various	

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## Additional Information

For information on ESD, Soldering Profiles, Packaging Standards, Handling and Assembly, please contact Qorvo for general guidelines.

## Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

**Web:** [www.qorvo.com](http://www.qorvo.com)

**Tel:** 1-844-890-8163

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