

# TQP7M9104 –1.93-1.99GHz 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 multicarrier 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.

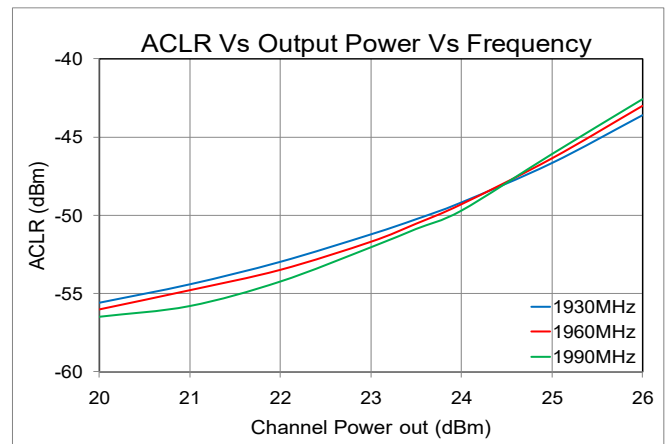
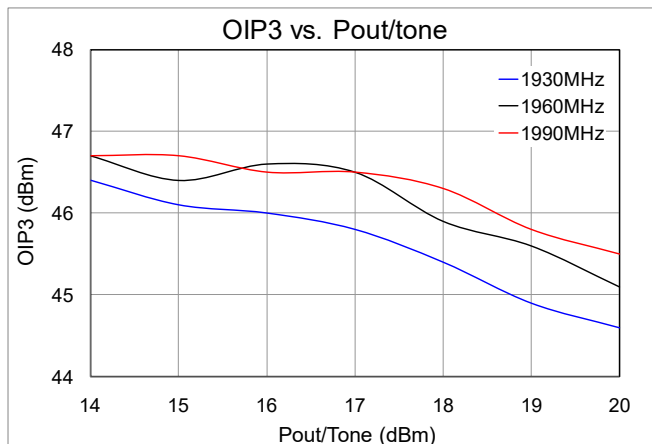
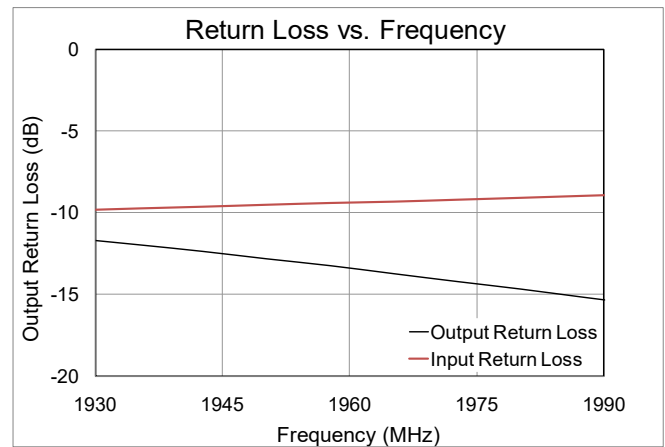
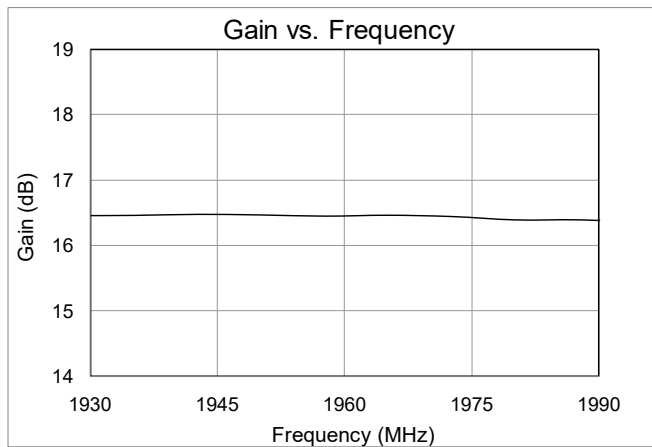
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## Application Electrical Performance

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
		1930	1960	1990	
Frequency		1930	1960	1990	MHz
Gain		16.5	16.4	16.4	dB
Input Return Loss		9.8	9.3	8.9	dB
Output Return Loss		11.5	13.2	15.1	dB
Output P1dB		33.7	33.2	33.4	dBm
OIP3	Pout=+17 dBm/tone, Δf=1 MHz	46.0	46.5	47.0	dBm
WCDMA Channel Power	At -50 dBc ACLR	23.5	23.5	23.5	dB
Device Current, I <sub>DD</sub>		440			mA

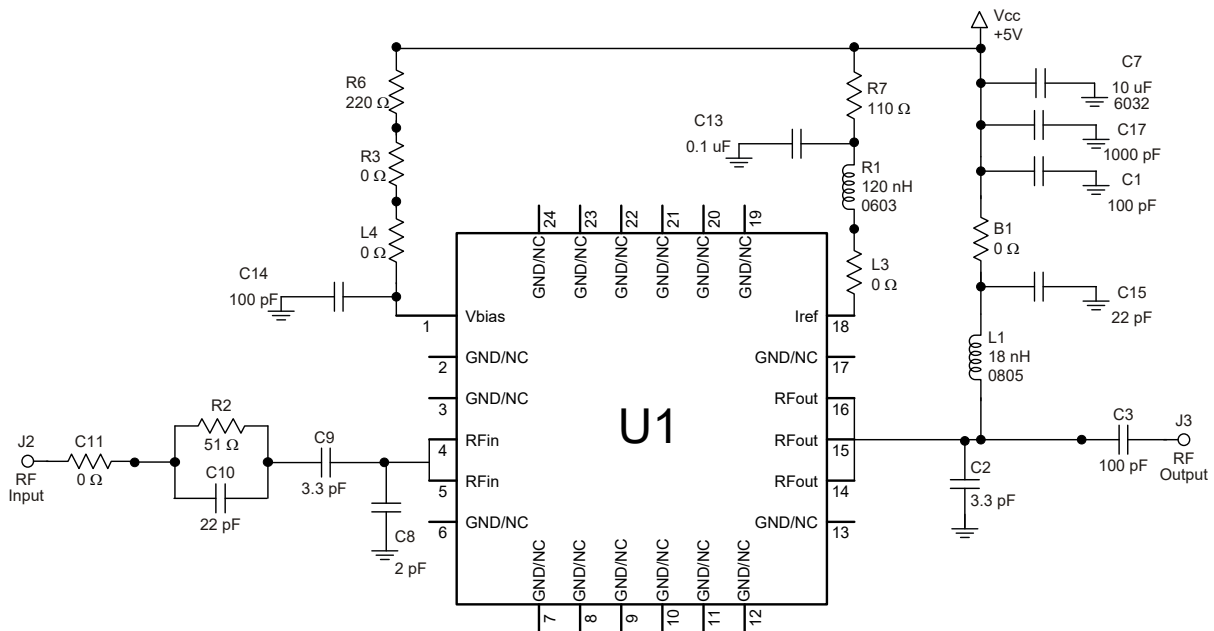
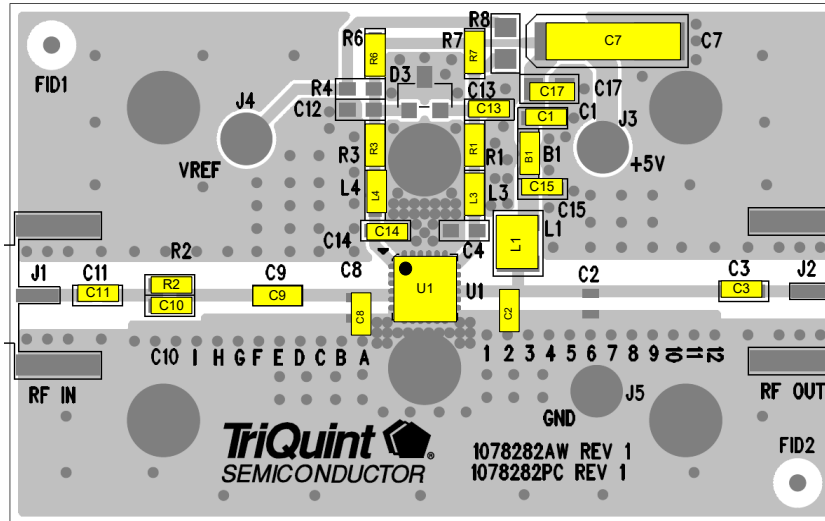
Test conditions unless otherwise noted: V<sub>cc</sub> = +5V, Temp = +25°C, 50 Ω system.



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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 30 mil.
4. Distance between center of C2 and TQP7M9104 (U1) device package is 132 mil.
5. Distance between center of C9 and TQP7M9104 (U1) device package is 275 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	2.0 pF	Capacitor, Chip, 0603, $\pm 0.05\text{pF}$ , 50V, Accu-P	AVX	
C2, C9	3.3 pF	Capacitor, Chip, 0603, $\pm 0.05\text{pF}$ , 50V, Accu-P	AVX	
B1, C11, L3, L4, R3, R8	0 $\Omega$	Resistor, Chip, 0603, 5%, 1/16W	Various	
C10, C15	22 pF	Capacitor, Chip, 0603, 5%, 50V, NPO/COG	Various	
C1, C3, C14	100 pF	Capacitor, Chip, 0603, 5%, 50V, NPO/COG	Various	
L1	18 nH	Inductor, 1008, 5%, Ceramic	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:

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**Email:** [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

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