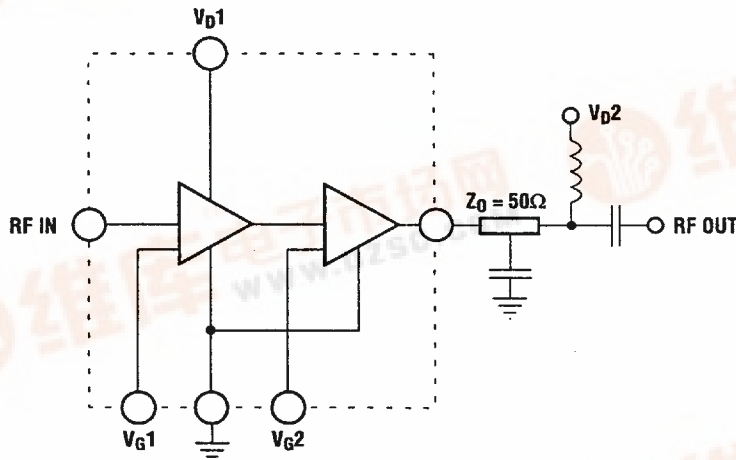


Block Diagram**Product Description**

The TQ9147 is a highly efficient power amplifier developed for portable terminals operating in the AMPS cellular band (824 - 849 MHz). It provides over 24 dB power gain at rated output power with excellent receive channel noise characteristics. More than 25 dB power control range can be attained by using either V_{d1} or V_{g2} as control voltages. The power amplifier is packaged in a space efficient, low cost SOIC-16 plastic package. The part is designed to require minimal external circuitry for matching or bias, simplifying design and keeping board space and cost to a minimum.

Electrical Specifications

Test Conditions: $V_{DD} = 4.6\text{ V}$, $V_{G1} = -1.5\text{ V}$, $V_{G2} = -2.2\text{ V}$, $T_A = 25^\circ\text{C}$

Parameter	Min	Typ	Max	Units
Frequency Range	824		849	MHz
Output Power ¹		+31		dBm
Efficiency ¹		60		%

Note 1: Pin = +7 dBm

TQ9147

2-Stage AMPS Power Amplifier IC

Features

- High Efficiency
- +31 dBm Power Output
- Low-Voltage Operation
- SO-16 Package
- 50 Ω Matched Input
- Monolithic Power Amp

Applications

- AMPS Mobile Phones
- CDPD Modems

TQ9147

Operating Range

Parameter	Conditions	Min	Typ	Max	Units
Frequency	Tuned for cellular band	824		849	MHz
Supply Voltage (V _{DD})		2.7	4.6	6.0	V
Temperature	Measured at case	-30	25	85	°C

Electrical Specifications

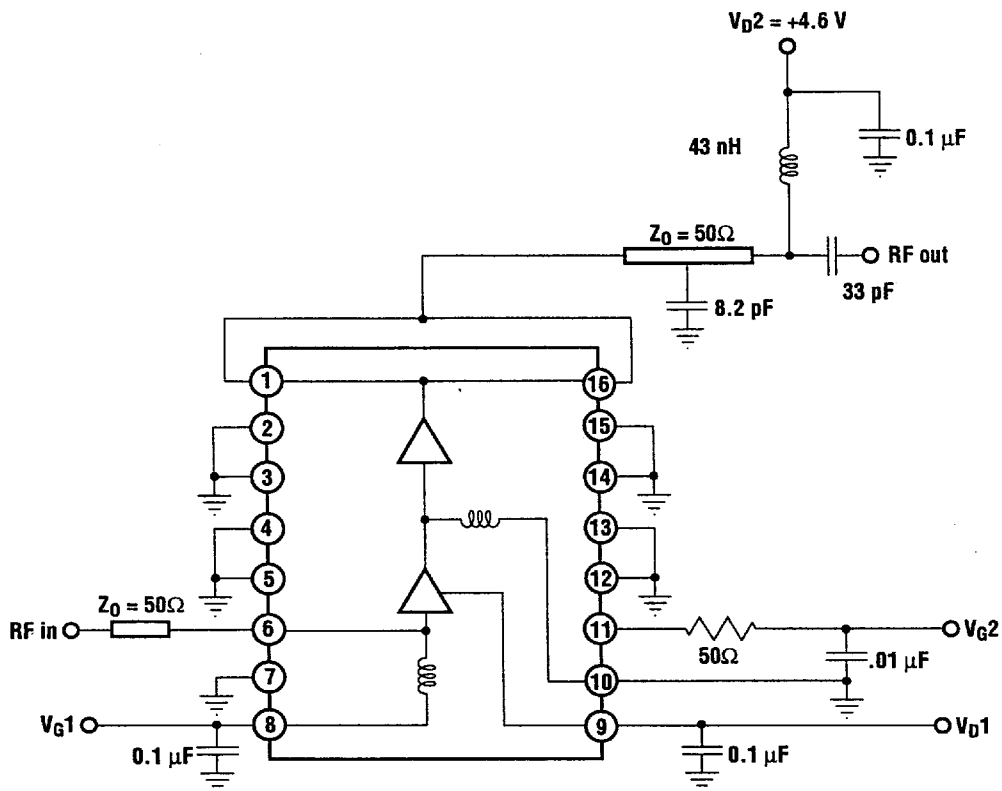
Test Conditions: V_{DD} = 4.6 V, T_A = 25° C, P_{OUT} = +31 dBm, V_{G1} = -1.5 V, V_{G2} = -2.2 V

Parameter	Conditions	Min	Typ	Max	Units
Output Power	V _{DD} = 4.6 V		31		dBm
	V _{BATT} = 4.2 V		TBD		dBm
Efficiency	P _{OUT} = 31 dBm		60		%
Output 2nd Harmonic	P _{OUT} = +31 dBm		-30		dBc
3rd Harmonic			-35		dBc
4th Harmonic			-35		dBc
Spurious Levels Stability (spurious outputs) ¹	P _{IN} = -30 to +7 dBm		-80		dBc
Noise in Rx band ²	P _{IN} = -30 to +7 dBm		-90		dBm
Gain (small signal)	P _{IN} = -10 dBm		32		dB
Input Return Loss	P _{IN} = -30 to +7 dBm		10		dB
Input Power required	P _{OUT} = 31 dBm		7		dBm
RF Off isolation			TBD		dB
Ruggedness ³					

1. Load VSWR set to 7:1 and the angle varied 360 deg. All broadband spurious outputs will be less than -80 dBc. No large signal oscillations permitted.
2. Noise power is measured in 30 KHz band width at the transmit frequency plus 45 MHz.
3. Burnout testing. Load set to 50 ohm, output power measured at nominal test conditions. Load VSWR set to 10:1 and the angle varied 360 degrees over 60 seconds. Load set to 50 ohm, output power remeasured and compared with the first measurement to check for no degradation from the first measurement.

TQ9147

Test Circuit



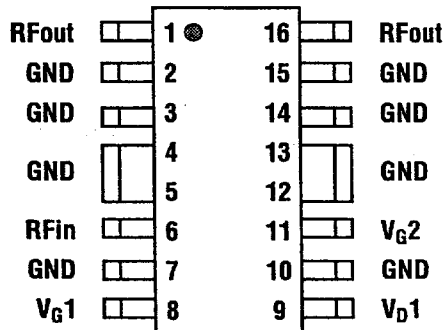
ICs

TQ9147

Pin Descriptions

Pin Name	Pin #	Description
RF out	1,16	Power Amplifier output and second stage supply voltage. Critical but simple matching circuit required. Bias choke for Vd2 required and local bypass cap recommended.
RF in	6	Power amplifier input. Matched to 50 W. Internal DC block.
V _G 1	8	First stage gate voltage. Local bypass cap needed. Set V _G 1 = -1.5V.
V _D 1	9	First stage supply voltage. Local bypass cap recommended. Use same voltage as V _D 2.
V _G 2	11	Second stage gate voltage. Local bypass cap needed. Requires 50 W series resistor near device for stability. Set V _G 2 = -2.2 V
GND	2,3,4,5 7,10,12 13, 14, 15	Ground connection. Very important to place multiple via holes immediately adjacent to the pins. Provides thermal path for heat dissipation and RF grounding.

TQ9147 Pinout

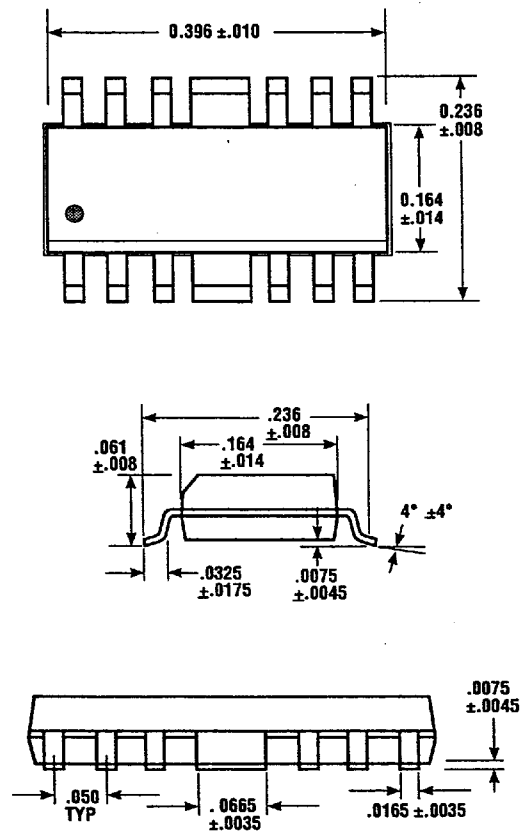


Absolute Maximum Ratings

Parameter	Value	Units
DC Gate Voltage	-5.0	V
RF Input Power	TBD	dBm
Storage Temperature	-55 to 150	°C
Operating Temperature (case)	-40 to 100	°C

ICs

Package Type (SO-16 with thermal tab)



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