

QCPM-9801 Rev. B Feb 10<sup>th</sup> 2000 Preliminary  
Specification is subject to change with no prior notification



**Agilent Technologies**  
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# PCS/AMPS Dual-Band Dual-Mode Power Amplifier Module

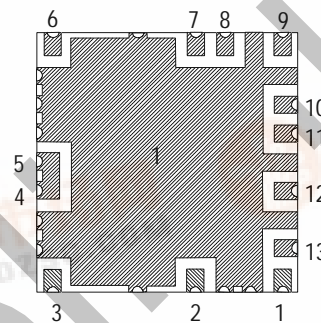
## QCPM-9801

### Features

- **Operating frequency:**  
PCS: 1850 - 1910 MHz  
AMPS: 824 - 849 MHz
- **Typical Output Power @ 3.4V:**  
PCS : 28.5 dBm  
AMPS: 29 dBm
- **Internal 50 ohm matching networks for both RF IN/OUT**
- **3.4 - 4.2 V operation**  
(reduced performance at 3V)
- **Dynamic bias controls**  
optimize PAE at low output power for PCS
- **11.5 mm x 11.5 mm SMT RF MultiPak**
- **Dual Band CDMA handsets**

### Package Pin Configuration

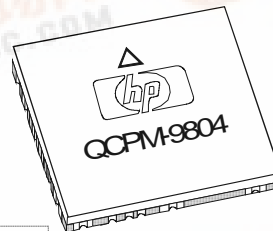
(Back side)



### Applications

- Wireless Data terminals
- WLL
- Driver for Base station

### Small SMT Multipak



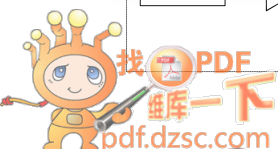
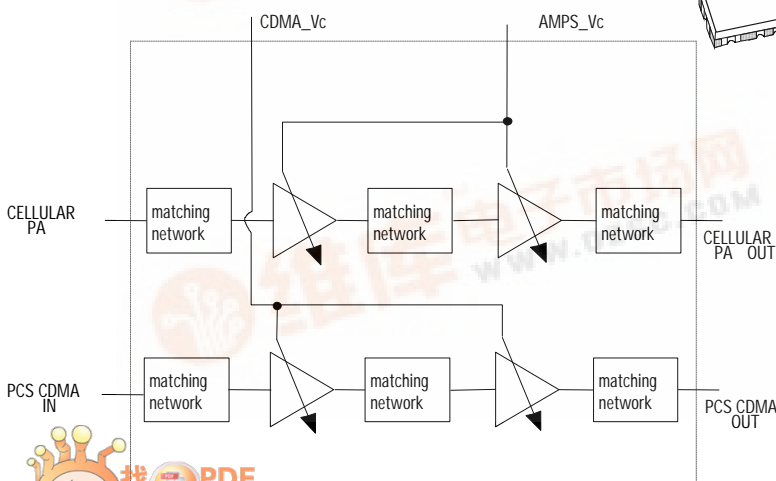
### General Description

The Dual-Band Dual-Mode Power Amplifier Module (PAM) offers a highly integrated solution for CDMA dual-band Dual-mode handsets. The integrated solution leads to improvements in cost, size, performance, and reliability. This PAM also offers several features that will make handset design more flexible and robust. The module contains two power amplifiers (PCS and Cellular PAs), two driver amplifiers with power control and bias circuits.

The cellular power amplifiers provides : 29 dBm Pout and 44% Power Added Efficiency (PAE) at 3.4 V in AMPS mode. While the PCS power amplifier achieves 28.5 dBm Pout and 28 % PAE at 3.4V in PCS mode. The PAM is designed with dynamic bias control to optimize the PAE at low output power in PCS mode to maximize the system talk time.

The surface mount RF MultiPak insures cost, size, and high volume manufacturing advantages over other traditional approaches.

### Functional Block Diagram



## QCPM-9801 Absolute Maximum Ratings<sup>1</sup>

Parameter	Cellular		PCS	
	Min.	Max.	Min.	Max.
V <sub>cc</sub> supply voltage		4.5 V		4.5 V
Power Dissipation <sup>2,3</sup>		2.5 W		2.5 W
Bias Current		1.5 A		1.5 A
Amplifier Input RF Power		10 dBm		10 dBm
Junction temperature		+150 °C		+150 °C
Storage temperature (case temperature)	-40 °C	+120 °C	-40 °C	+120 °C

$$\text{Thermal Resistance}^2 \theta_{jc} = X \text{ } ^\circ\text{W}$$

Notes:

1. Operation of this device in excess of any of these limits may cause permanent damage.

2. T<sub>case</sub> = 25 °C

3. Derate at X mW/°C for T<sub>case</sub> > 85 °C

Recommended operating range of V<sub>cc</sub> = 3.4 to 4.2 V, T<sub>a</sub> = - 30 to + 85 °C (reduced performance at 3.0 V and 110 °C)

## QCPM-9801 Standard Test Conditions

All test are done in 50Ω system at 25 °C , unless noted otherwise.

V<sub>cc</sub> = 3.4V

$$ACPR = \frac{\text{Channel Power in the 1.2288MHz band}}{\text{Power in a 30KHz band @}\pm 1.25\text{MHz away from the center of the channel}}$$

## QCPM-9801 Summary Characterization Information

Parameter	Units	Min	Typ	Max	Comments
PCS Mode					
Frequency Range	MHz	1850		1910	
Gain (P <sub>out</sub> = 28.5 dBm)	dB	22	24		V <sub>c</sub> = 2.5V
Gain (P <sub>out</sub> = 16 dBm)	dB	19	21		V <sub>c</sub> = 1.8V
Output Power	dBm	28	28.5		
Power Added Efficiency					
P <sub>out</sub> = 28.5 dBm	%	TBA	28		V <sub>c</sub> = 2.5V
P <sub>out</sub> = 16 dBm	%	TBA	6		V <sub>c</sub> = 1.8V
Input VSWR (P <sub>out</sub> = 28.5 dBm)			2.0:1		
Input VSWR (P <sub>out</sub> = 16 dBm)			2.5:1		
Power Down Current	μA		40		
ACPR @ ± 1.25 MHz offset	dBc/30kHz	-45	-46		



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ACPR @ $\pm 2.25$ MHz offset		dBc/30kHz	-58		
Noise Power @ 80 MHz offset in 1930-1990 MHz )		dBm/Hz		-139	
Stability (Spurious): Load VSWR 5:1		dBc		55	All phases
Harmonics: 2Fo, 3Fo		dBc		-30	
AMPS mode					
Frequency Range		MHz	824	849	
Output Power		dBm		29	
Power Added Efficiency ( $P_{out}$ = 29 dBm)		%	TBA	44	Vc = 1.6V
Noise Power @ 45 MHz offset in RX band (869-894MHz)		dBm/Hz		-136	
Harmonics: 2Fo, 3Fo		dBc		-30	
Input VSWR				2:1	
Switching Time					
	DC ON/OFF	$\mu$ s		40	
	RF ON/OFF	$\mu$ s		6	



QCPM-9801 Pin Description Table

No.	Mnemonic	Description	Typical Signal	Notes
1	CDMA_IN	Input RF for PCS CDMA	RF input	
2		Not connect		
3	CDMA OUT	RF PCS CDMA output	RF Output	
4	CDMA Vcc	Supply voltage for CDMA	DC	
5	AMPS Vcc	Supply voltage for AMPS and cellular CDMA	DC	
6	AMPS OUT	RF AMPS and cellular CDMA output	RF Output	
7		Not connect		
8		Not connect		
9	AMPS IN	RF AMPS and cellular CDMA input	RF	
10	AMPS_Vc	Bias control for AMPS and cellular CDMA PA		
11	Vcc_IC	Supply voltage for control and driver	DC	
12		Not connect		
13	CDMA_Vc	Bias control for PCS CDMA PA		
14	GND	Ground plane (back of the module)		

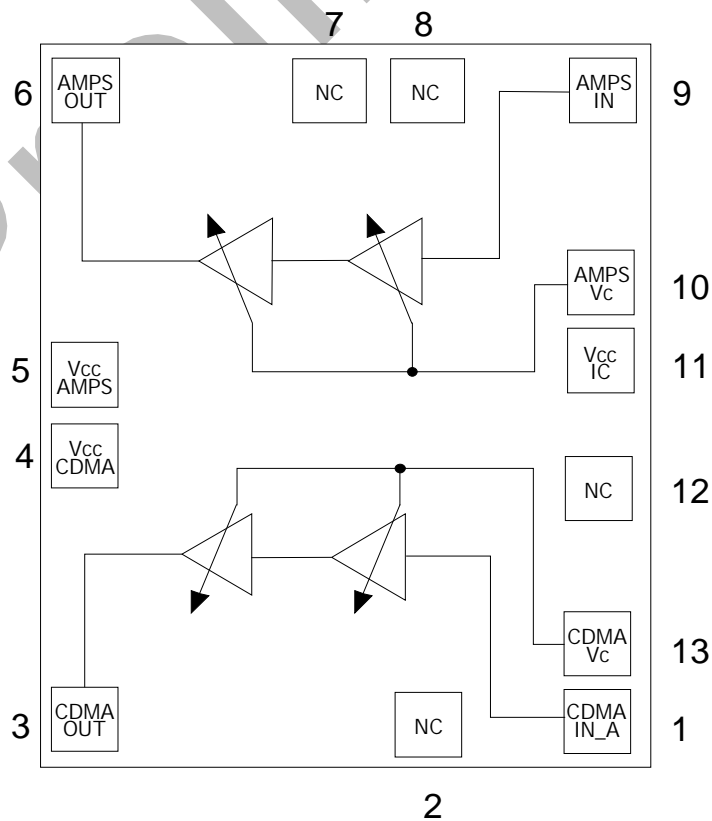


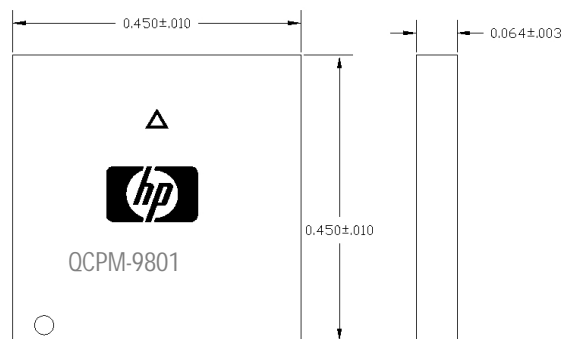
Figure 1 Internal block diagram with pinout (back side)

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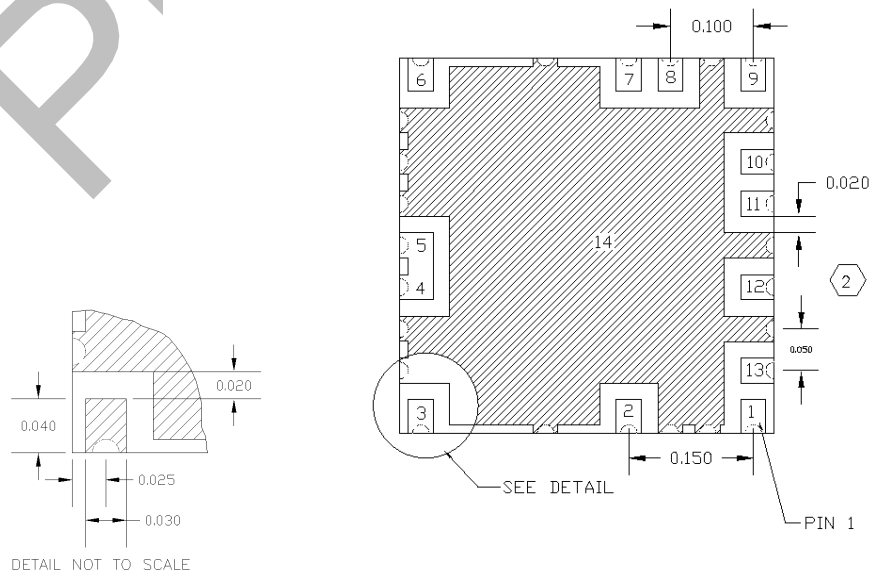
## Part Number Ordering Information

Part Number	No. of Devices	Container
QCPM-9801		

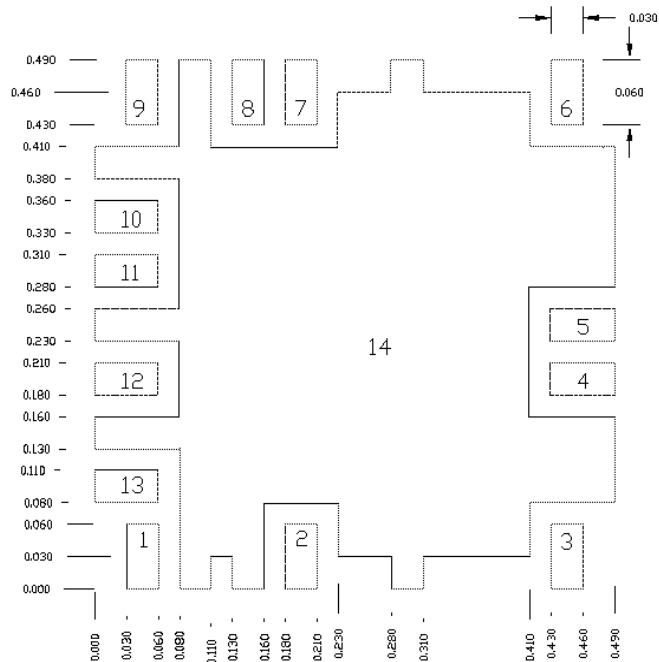
## Package Dimensions Small MultiPak-16 Package (in inches)



## Land Pattern Recommendation:



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**Notes:**

1. All pads are 50 mil pitch with 20 mil spacing
2. Module to be centered on the land pattern
3. Pins 1, 3, 6, and 9 are 50  $\Omega$
4. Pins 1 and 9 are DC shorts

for more information:  
United States: call your local HP sales office  
listed in your telephone directory.  
Ask for a components representative.

Canada: (416) 206-4725

Europe: (44) 276-685783

Asia Pacific / Australia: (65) 290-6360

Japan: (81) 3 3331-6111  
Data subject to change

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