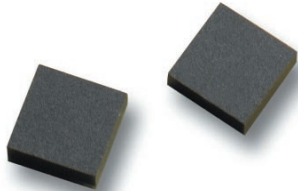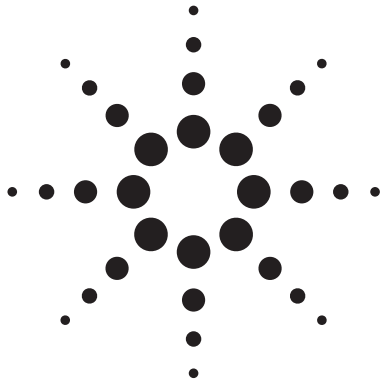# Agilent ACPM-7813
CDMA/AMPS Power Amplifier
Preliminary Data Sheet

Features
- **Operating frequency: 824 – 849 MHz**
- **28.5 dBm linear output power @ 3.4 V**
- **High efficiency: 40% PAE**
- **Very low quiescent current with single control voltage or**
- **Dynamic bias control**
- **Internal 50 ohm matching networks for both RF IN/OUT**
- **3.2 – 4.2V linear operation**
- **cdma2000 1xRTT capable**
- **Only 3 SMT parts needed**
- **4.0 x 4.0 x 1.1 mm SMT package**

Applications
- **CDMA handsets**
- **Datacards**
- **PDAs**

Description

The ACPM-7813 is a fully matched CDMA Power amplifier module. Designed around Agilent Technologies' new Enhancement Mode pHEMT process, the ACPM-7813 offers premium performance in a very small form factor. Fully matched to 50 Ohms on the input and output.

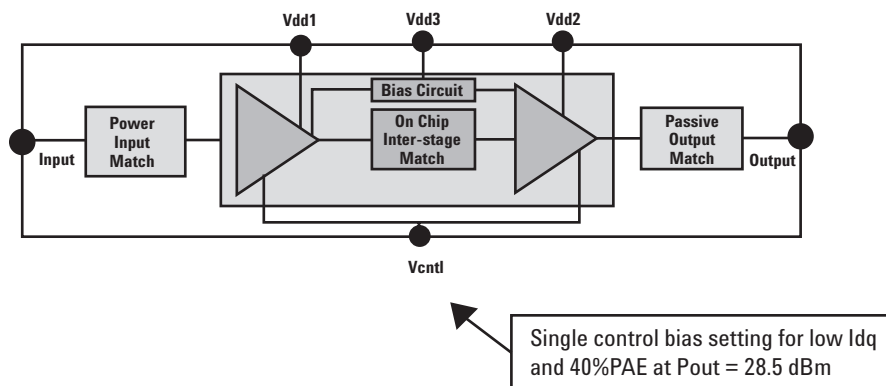The amplifier has excellent ACPR and efficiency performance at max Pout and low quiescent current with a single bias control voltage. For even lower quiescent current, a dynamic bias control circuit can be used; Vcntl = 1.2V to 2.5V.

Designed in a surface mount RF package, the ACPM-7813 is cost and size competitive.

The ACPM-7813 is another key component of the Agilent **CDMAdvantage** RF chipset.

Single control bias setting for low Idq and 40%PAE at Pout = 28.5 dBm

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Maximum Ratings[1]

Parameter	Min.	Max.
Vdd Supply Voltage		5.0 V
Power Dissipation [2, 3]		2.5 W
Bias Current		1.5 A
Control Voltage (Vcntl)		3.0 V
Amplifier Input RF Power		10 dBm
Junction Temperature		+150°C
Storage Temperature (case temperature)	-30°C	+100°C

Notes:
1. Operation of this device in excess of any of these limits may cause permanent damage.
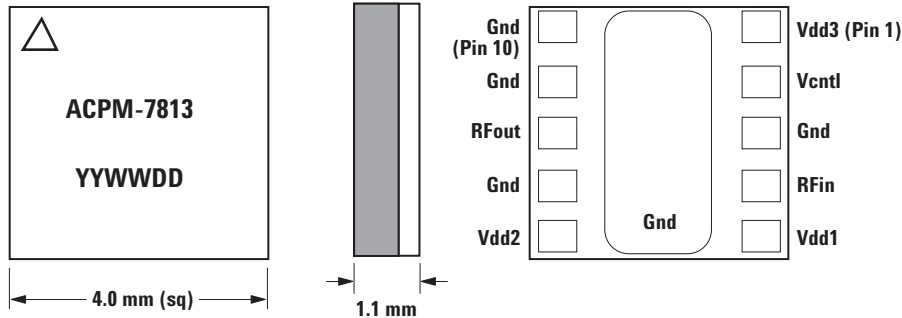2. Tcase = 25°C
3. Derate at TBD mW/°C for Tcase >85°C

Thermal Resistance[2] θ_{jc} = TBD°C/W

Recommended operating range of Vdd = 3.2 to 4.2 V, Ta = -30 to +85°C

Package Marking and Dimensions

△

ACPM-7813

YYWWDD

4.0 mm (sq)

1.1 mm

Gnd (Pin 10)
Gnd
RFout
Gnd
Vdd2

Gnd

Vdd3 (Pin 1)
Vcntl
Gnd
RFin
Vdd1

Electrical Characterization Information

All tests are done in 50Ω system at V_{dd} = 3.4V, 25°C , unless noted otherwise.

Parameter	Units	Min	Typ	Max	Comments
Cellular CDMA					
Frequency Range	MHz	824		849	
Gain (Fixed Cntl Voltage)					
(P_{out} = 28.5 dBm)	dB		26		Vcntl= 2.5V
Power Added Efficiency					
P_{out} = 28.5 dBm	%		40		Vcntl= 2.5V
P_{out} = 16 dBm	%		8.5		Vcntl= 1.8V
Total Supply Current	mA		520		P_{out} = 28.5 dBm, Vcntl= 2.5V
ACPR @ ± 0.885 MHz offset	dBc/30 kHz		-48		$P_{out} \leq$ 28.5 dBm
ACPR @ ± 1.98 MHz offset	dBc/30 kHz		-59		$P_{out} \leq$ 28.5 dBm
Quiescent Current	mA		80		$P_{out} \leq$ 28.5 dBm, Vcntl= 2.5V
Input VSWR (P_{out} = 28.5 dBm)			2.0:1		
Input VSWR (P_{out} = 16 dBm)			2.5:1		
Noise Figure	dB		4.5		
Noise Power @ 45 MHz offset in 869−894 MHz	dBm/Hz		-141		
Stability (Spurious): Load VSWR 5:1	dBc		-50		All phases
Harmonic Suppression: 2Fo	dBc		-40		
AMPS					
Frequency Range	MHz	824		849	
Gain (P_{out} = 31.0 dBm)	dB		26		Vcntl= 2.5V
Power Added Efficiency					
P_{out} = 31.0 dBm	%		51		Vcntl= 2.5V

ACPR Measurement Method

$$ACPR = \frac{\text{Channel Power in the 1.2288 MHz band}}{\text{Power in a 30 kHz band @ 885 kHz away from the center of the channel}}$$

Demoboard Application Information

The demoboard has a 10-pin header to apply/measure the various DC signals associated with the Power Amplifier. Each pin has a label next to it. A description for each pin is shown in the table below.

Demoboard Pin (DC header)	Function/Applied Signal
Top of Demoboard	
Gnd	Ground
Vdd1	Bias voltage, typically 3.4V
Vdd3	Bias voltage, typically 3.4V
Gnd	Ground
Vdd2	Bias voltage, typically 3.4V
Bottom of Demoboard	
Vdd1 (S)	Voltage sense line for Vdd1 (can be left unconnected)
Vcntl	Control line (0V=off, 1.8V=med pwr, 2.5V=full pwr)
Vdd3 (S)	Voltage sense line for Vdd3 (can be left unconnected)
Gnd	Ground
Vdd2 (S)	Voltage sense line for Vdd2 (can be left unconnected)

Operating Instructions

1. Connect RFin and RFout
2. Apply Gnd to demoboard
3. Apply Vcntl = 0V
4. Apply Vdd1, Vdd2, Vdd3
5. Increase Vcntl to desired value (1.8V for medium power operation or 2.5V for full power operation)

www.agilent.com/semiconductors

For product information and a complete list of distributors, please go to our web site.

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or (408) 654-8675

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (+65) 6271 2451

India, Australia, New Zealand: (+65) 6271 2394

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (+65) 6271 2194

Malaysia, Singapore: (+65) 6271 2054

Taiwan: (+65) 6271 2654

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