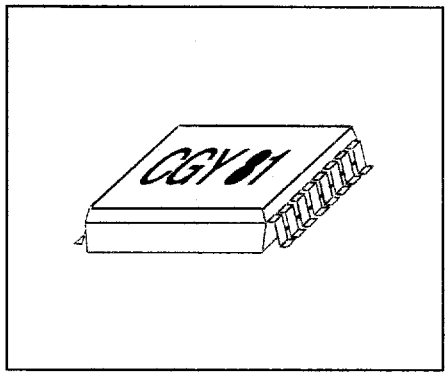
GaAs MMIC

- Tri mode power amplifier for AMPS/ CDMA /TDMA portable cellular phones
- 31 dBm saturated output power @ **PAE**=55% typ. 29 dBm linear output power@ **PAE**=40% typ.
- Fully integrated 2 stage amplifier
- Power ramp control
- Input matched to 50 ohms, simple output match



ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

Type	Marking	Ordering code (taped)	Package
CGY 81	CGY 81	Q627002G0078	MW 16

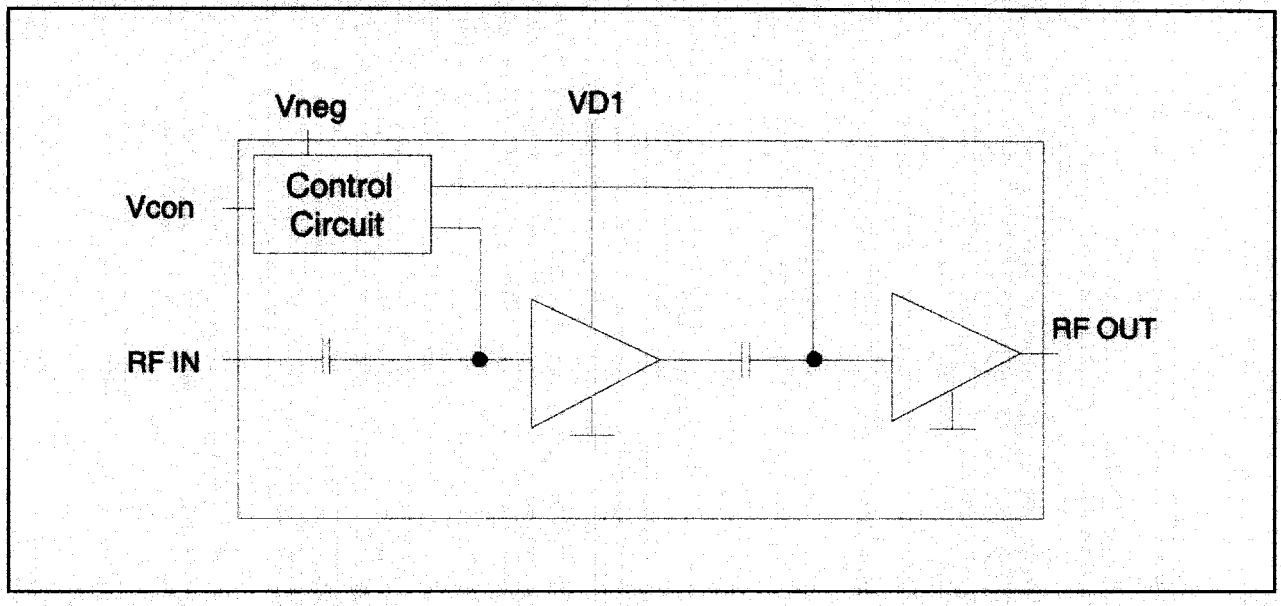
Maximum Ratings

Characteristics	Symbol	max. Value	Unit
Positive supply voltage	V_D	9	V
Supply current	I_D	4	A
Channel temperature	T_{Ch}	150	°C
Storage temperature	T_{stg}	-55...+150	°C
Pulse peak power dissipation	P_{Pulse}	tbd	W
Total power dissipation *(Ts ≤ 80 °C)* *Ts: Temperature at soldering point*	P_{tot}	Tbd	W

Thermal Resistance

Characteristics	Symbol	max. Value	Unit
Channel-soldering point	R_{thChS}	11	K/W

Functional Block Diagram:



Pin Configuration:

Pin #	Name	Configuration
1	VD Cell	Drain voltage preamplifier stage
2	n. c.	
3	RF IN Cell	RF IN
4	n. c.	
5	Vneg	Negative voltage
6	Vcon	Control voltage
7	n. c.	
8	n. c.	
9	n. c.	
10	n. c.	
11	RF out	RF out / drain voltage final stage
12	RF out	RF out / drain voltage final stage
13	RF out	RF out / drain voltage final stage
14	RF out	RF out / drain voltage final stage
15	n. c.	
16	n. c.	

Electrical Characteristics

(T_A = 25°C , Z_S=Z_L=50 Ohm, VD=3.5V, I_{dq}=300mA, unless otherwise specified)

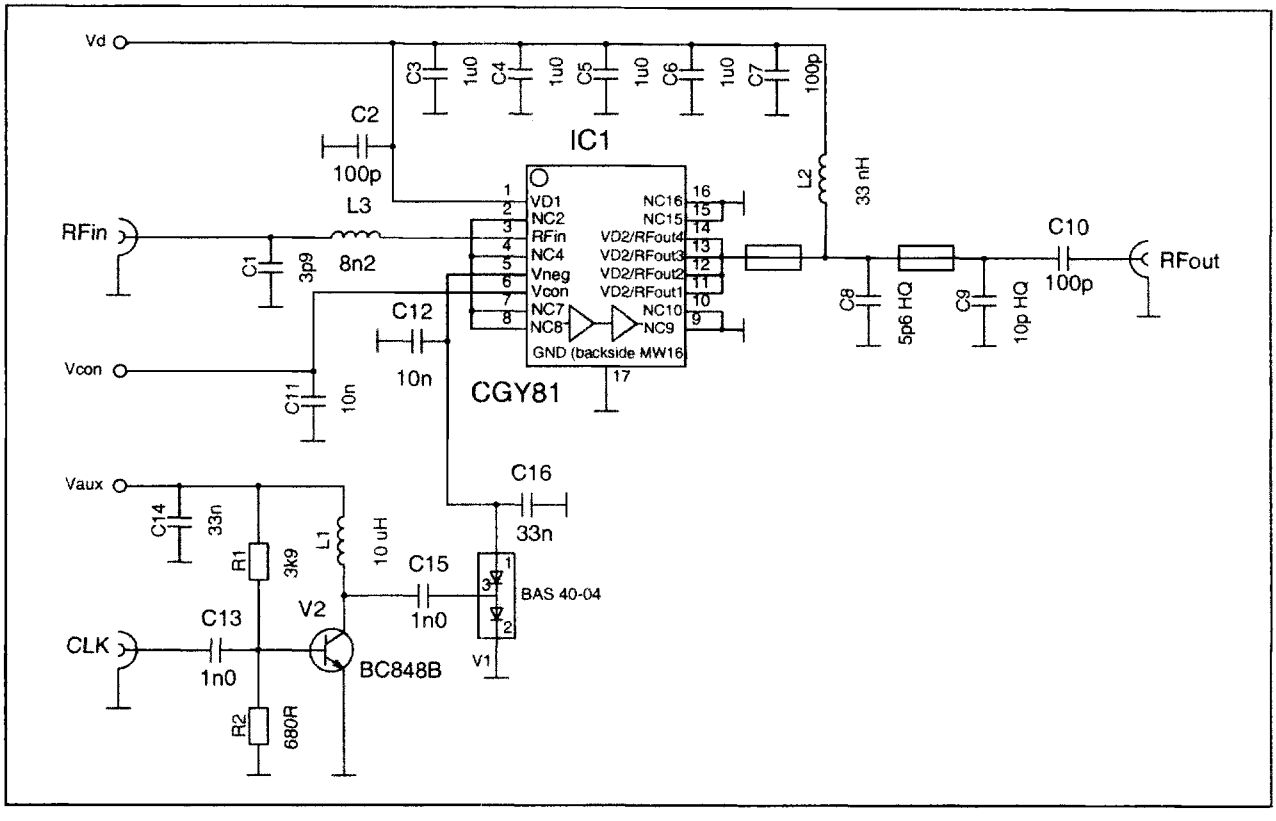
Characteristics	Symbol	min	typ	max	Unit
Frequency range	f	824		849	MHz
Duty cycle	t_{ON}/t_{OFF}			100	%
AMPS output power	P		31,5		dBm
TDMA output power	P		30		dBm
AMPS gain at max. output	G		24		dB
TDMA gain at max. output	G		27		dB
CDMA output power	P		28		dBm
CDMA gain at max. output	G		28		dB
Power ramping characteristic Full output power Pinch off	V_{contr}		 2.5 0.5		V
Adjacent Channel Power CDMA 900kHz offset 1.98 MHz offset	P_{adj}/P_{main}			 -45 -54	dBc @ 30kHz
Adjacent channel power TDMA adjacent alternate 2nd alternate	P_{adj}/P_{main}			-28 –45 -45	dBc @ 30kHz
AMPS efficiency	PAE		55		%
TDMA DC to RF efficiency @Padj=-26dBc at max. output	PAE		 40		%
CDMA DC to RF efficiency @Padj=-42dBc at max. output at Pout=10 dBm (Iq set to 100mA)	PAE		 35 8		%
Receive band noise power density (869 to 894 MHz)	P_{RX}			-137	dBm/Hz
Drain supply voltage range	VD	2.7	3.5	4.0	V
Negative supply voltage range	Vneg	-5.0		-7	V
Standby current @Vcon=0V	$I_{pwr\ dwn}$		500		µA
Quiescent current	I_Q		300		mA
Current consumption at V_{Contr}	$I_{Control}$		2		mA
Current consumption at V_{NEG}	I_{NEG}		2		mA
Operating temperature range	υ	-30		+85	°C

Power on sequence:

1. connect negative voltage to PA
2. connect control voltage to PA
3. turn on Vd
4. turn on Pin

To switch off the device please use reverse sequence.

Application Circuit:

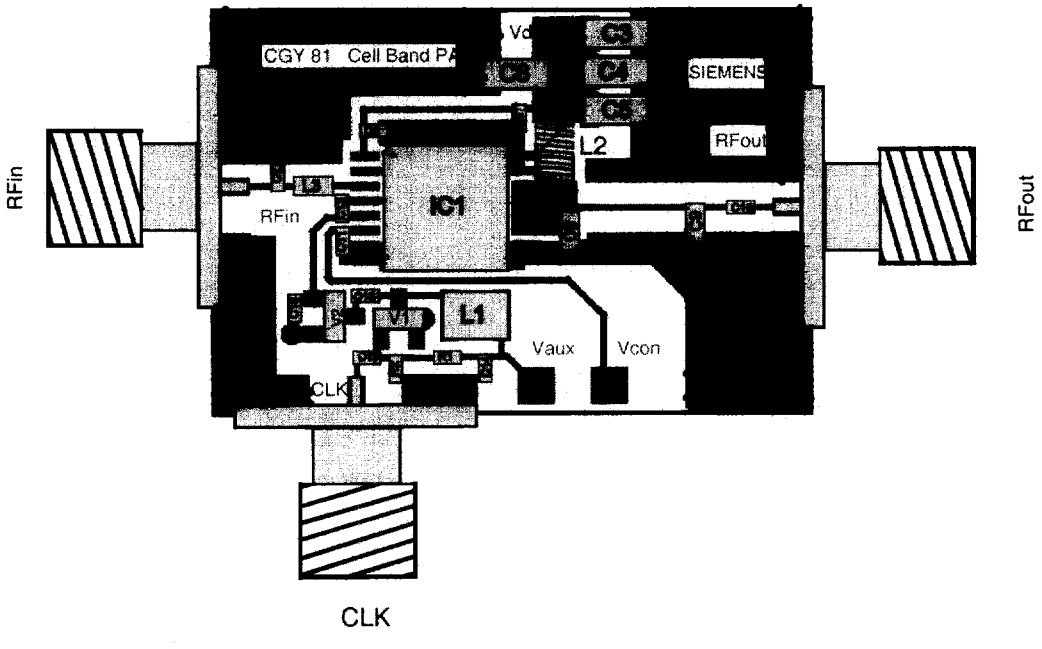


Evaluation Board Parts List

Part Type	Position	Description	Manufacturer	Part Number
Capacitor	C1	3.9pF 0402	Siemens	
Capacitor	C2, C7, C10	100pF 0402	Siemens	
Capacitor	C3, C4, C5, C6	1uF 1206	Siemens	
Capacitor	C8	5.6pF 0603 HQ	AVX	06035J5R6GBT
Capacitor	C9	10pF 0603 HQ	AVX	06035J100GBT
Capacitor	C11, C12	10 nF 0402	Siemens	
Capacitor	C13, C15	1 nF 0402	Siemens	

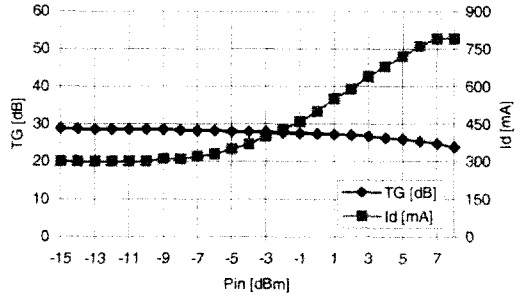
Part Type	Position	Description	Manufacturer	Part Number
Capacitor	C14, C16	33nF 0402	Siemens	
Inductor	L1	10uH	Siemens	
Inductor	L2	33nH Air Coil	H. David GmbH	PN/BV 1250
Inductor	L3	8.2nH 0603		
Resistor	R1	3.9k 0402		
Resistor	R2	680 Ohm 0402		
Diode	V1	BAS40-04W	Siemens	
Transistor	V2	BC848B	Siemens	
Substrate		FR4, h=0.2mm, ε_r=4.5	Siemens	

Evaluation Board:

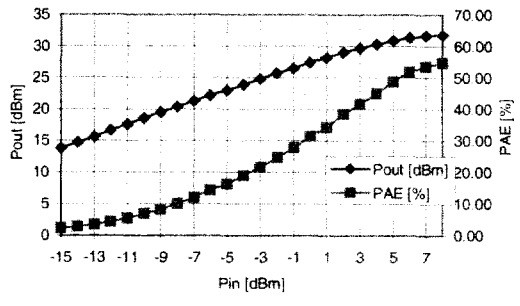


Typical Performance in AMPS Operation Mode

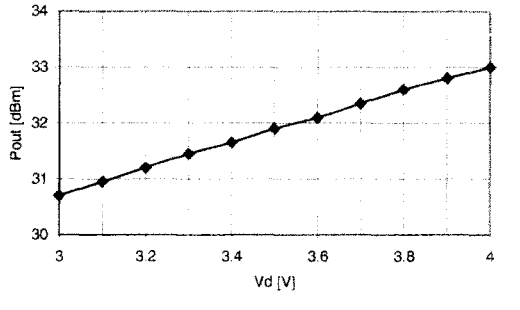
AMPS Mode: TG & Id vs. Pin
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



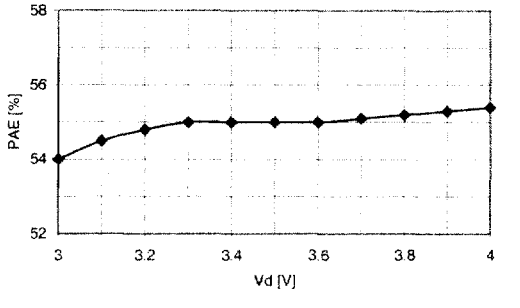
AMPS Mode: PAE & Pout vs. Pin
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



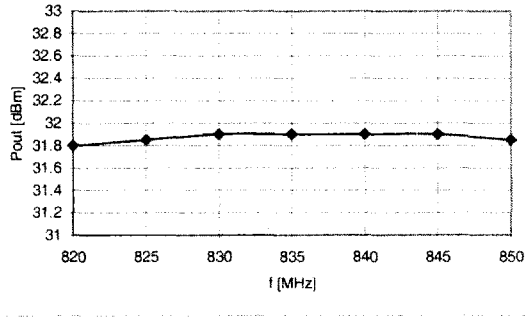
AMPS Mode: Pout vs. Vd
Iq=300mA, f=836,5 MHz, Pin=8dBm, T=25°C



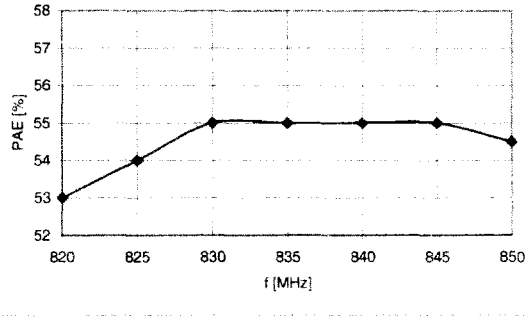
AMPS Mode: PAE vs. Vd
Iq=300mA, f=836,5 MHz, Pin=8dBm, T=25°C



AMPS Mode: Pout vs. f
Iq=300mA, Vd=3.5V, Pin=8dBm, T=25°C

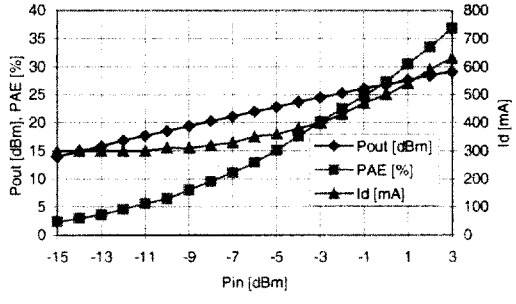


AMPS Mode: PAE vs. f
Iq=300mA, Vd=3.5V, Pin=8dBm, T=25°C

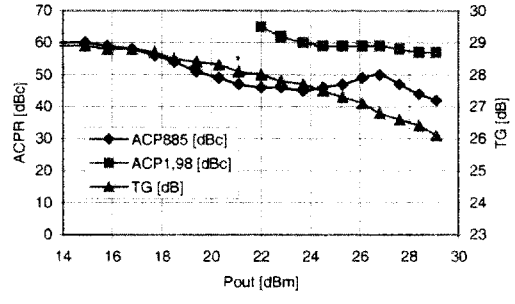


Typical Performance in CDMA Operation Mode:

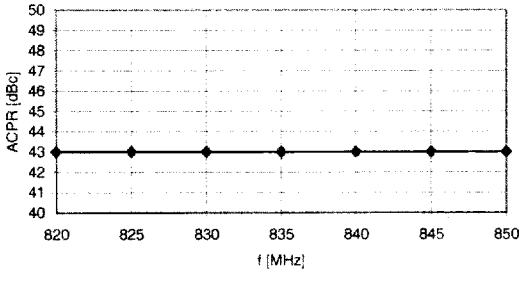
CDMA Mode: Pout, PAE & Id vs. Pin
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



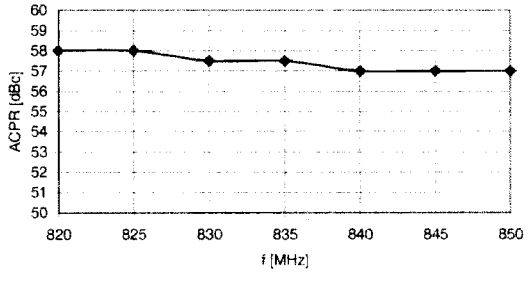
CDMA Mode: ACPR & TG vs. Pout
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



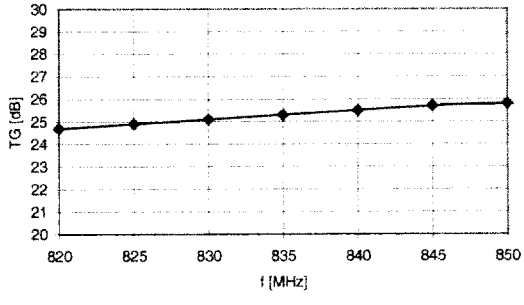
CDMA Mode: ACPR @885kHz Offset vs. f
Vd=3,0V, Pout=27,5dBm, Iq=300mA



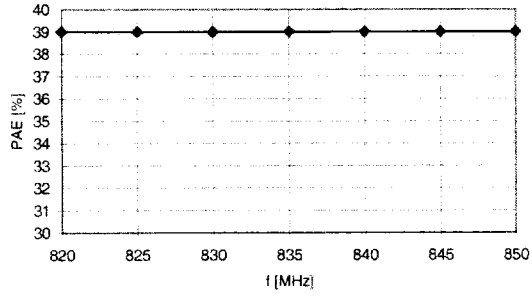
CDMA Mode: ACPR @1,98MHz Offset vs. f
Vd=3,0V, Pout=27,5dBm, Iq=300mA



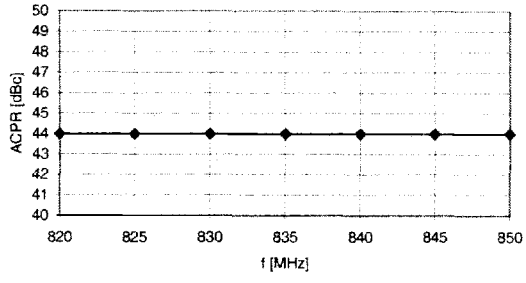
CDMA Mode: Gain vs. f
Vd=3,0V, Pout=27,5dBm, Iq=300mA



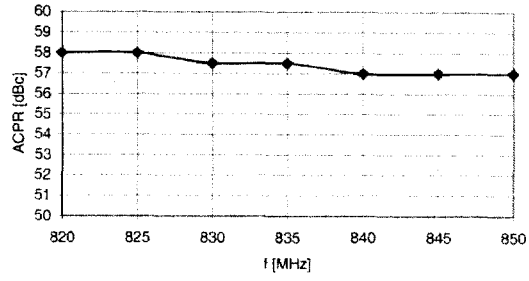
CDMA Mode: PAE vs. f
Vd=3,0V, Pout=27,5dBm, Iq=300mA



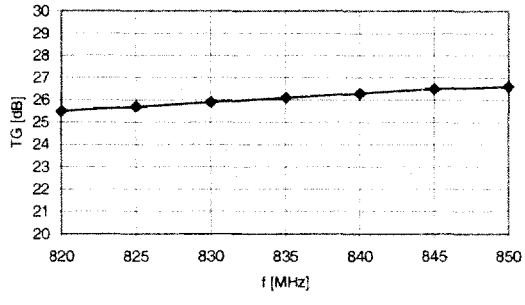
CDMA Mode: ACPR @885kHz Offset vs. f
Vd=3,5V, Pout=28,5dBm, Iq=300mA



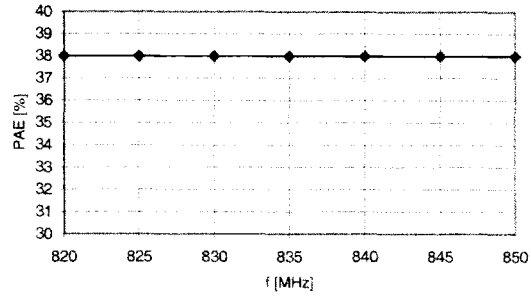
CDMA Mode: ACPR @1,98MHz Offset vs. f
Vd=3,5V, Pout=28,5dBm, Iq=300mA



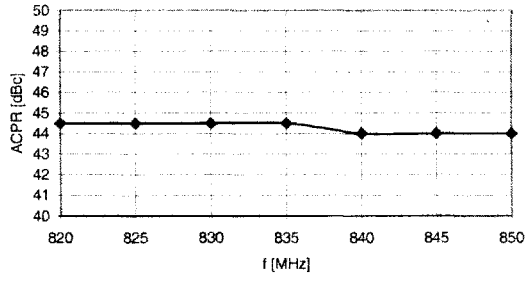
CDMA Mode: Gain vs. f
Vd=3,5V, Pout=28,5dBm, Iq=300mA



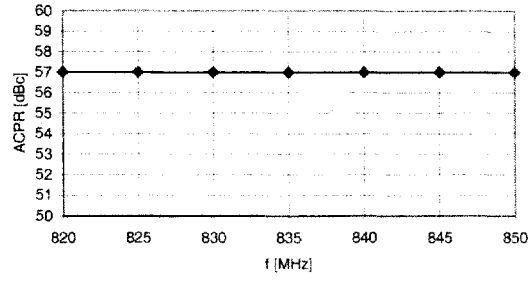
CDMA Mode: PAE vs. f
Vd=3,5V, Pout=28,5dBm, Iq=300mA



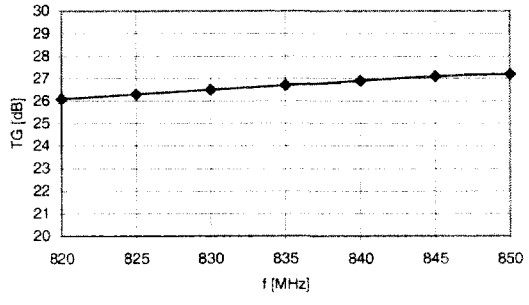
CDMA Mode: ACPR @885kHz Offset vs. f
Vd=4V, Pout=29,5dBm, Iq=300mA



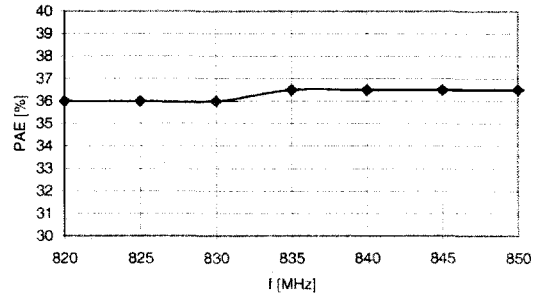
CDMA Mode: ACPR @1,98MHz Offset vs. f
Vd=4V, Pout=29,5dBm, Iq=300mA



CDMA Mode: Gain vs. f
Vd=4V, Pout=29,5dBm, Iq=300mA

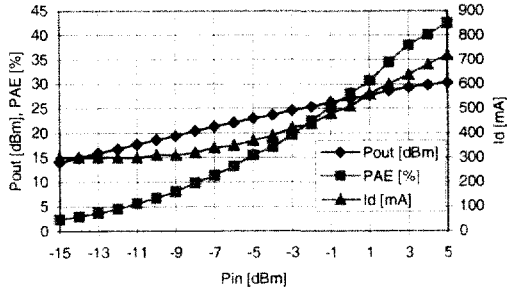


CDMA Mode: PAE vs. f
Vd=4V, Pout=29,5dBm, Iq=300mA

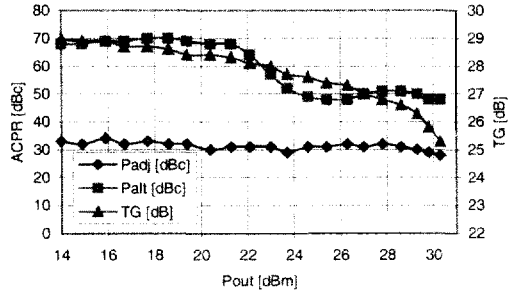


Typical Performance in TDMA Operation Mode

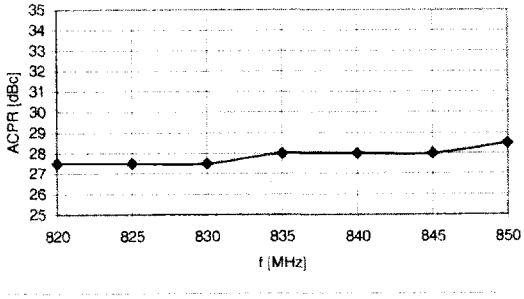
TDMA Mode: Pout, PAE & Id vs. Pin
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



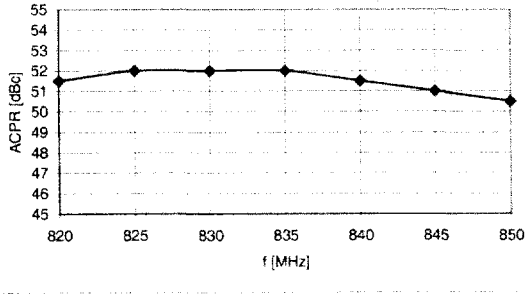
TDMA Mode: ACPR & TG vs. Pout
Vd=3,5V, Iq=300mA, f=836,5 MHz, T=25°C



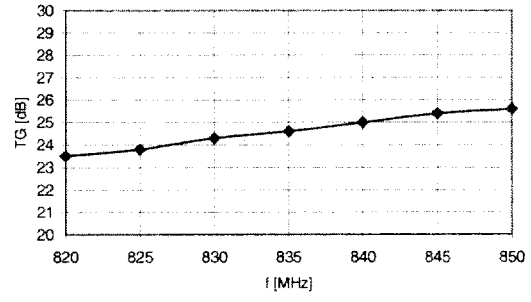
TDMA Mode: Padj vs. f
Vd=3,0V, Pout=29dBm, Iq=300mA



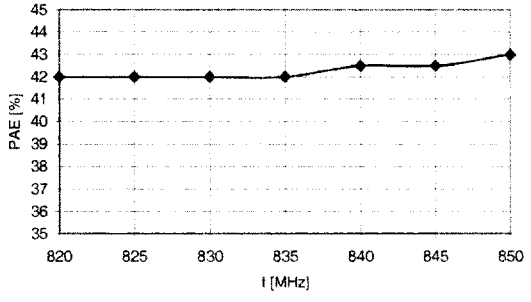
TDMA Mode: Palt vs. f
Vd=3,0V, Pout=29dBm, Iq=300mA



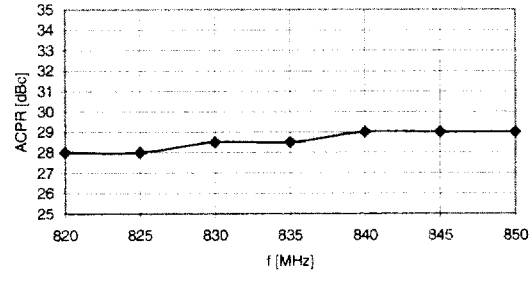
TDMA Mode: Gain vs. f
Vd=3V, Pout=29dBm, Iq=300mA



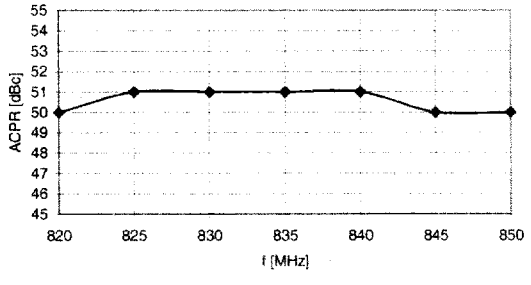
TDMA Mode: PAE vs. f
Vd=3V, Pout=29dBm, Iq=300mA



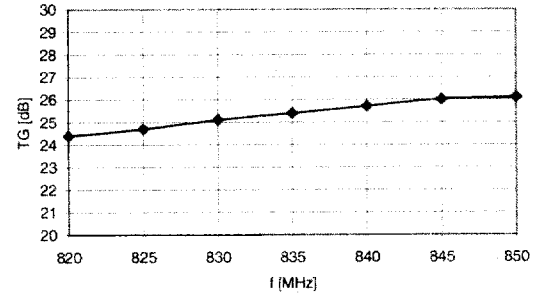
TDMA Mode: Padj vs. f
Vd=3,5V, Pout=30dBm, Iq=300mA



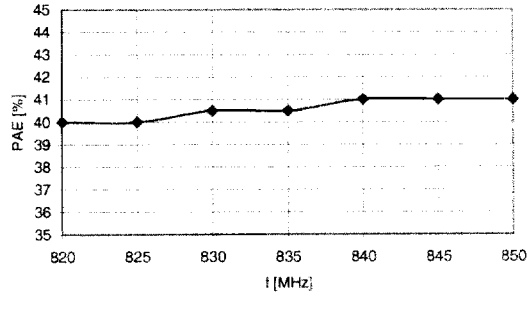
TDMA Mode: Palt vs. f
Vd=3,5V, Pout=30dBm, Iq=300mA



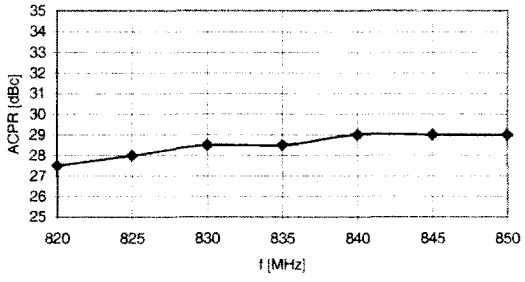
TDMA Mode: Gain vs. f
Vd=3,5V, Pout=30dBm, Iq=300mA



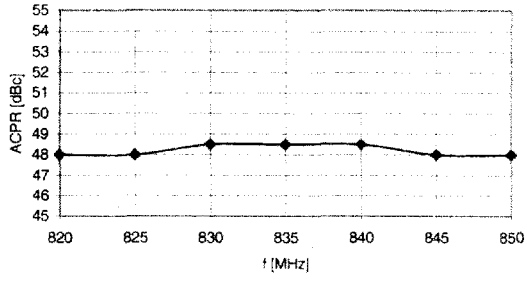
TDMA Mode: PAE vs. f
Vd=3,5V, Pout=30dBm, Iq=300mA



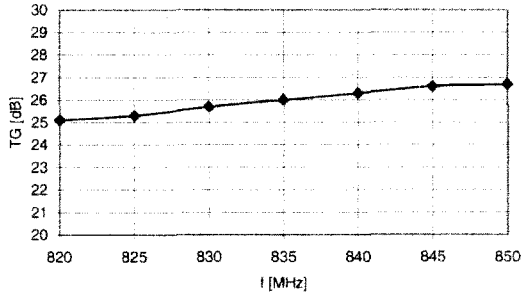
TDMA Mode: Padj vs. f
Vd=4V, Pout=31dBm, Iq=300mA



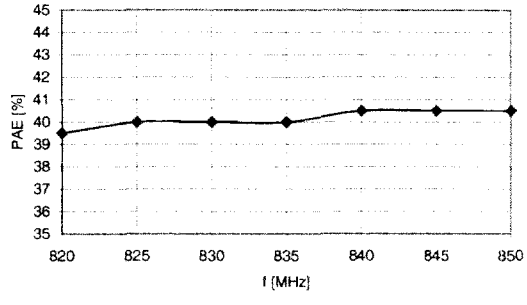
TDMA Mode: Palt vs. f
Vd=4V, Pout=31dBm, Iq=300mA

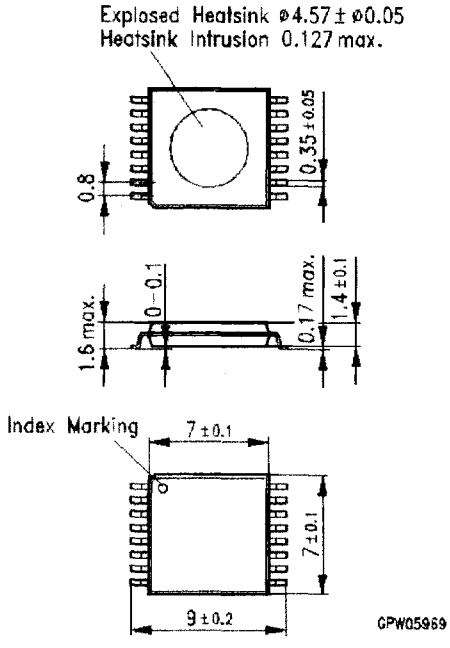


TDMA Mode: Gain vs. f
Vd=4V, Pout=31dBm, Iq=300mA



TDMA Mode: PAE vs. f
Vd=4V, Pout=31dBm, Iq=300mA





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