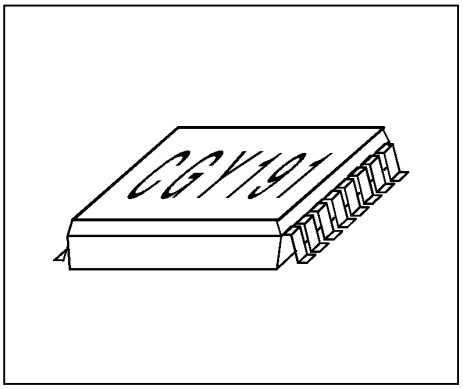
GaAs MMIC

- Dual mode power amplifier for CDMA /TDMA portable cellular phones
- 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 191	CGY 191	Q62702G74	MW 16

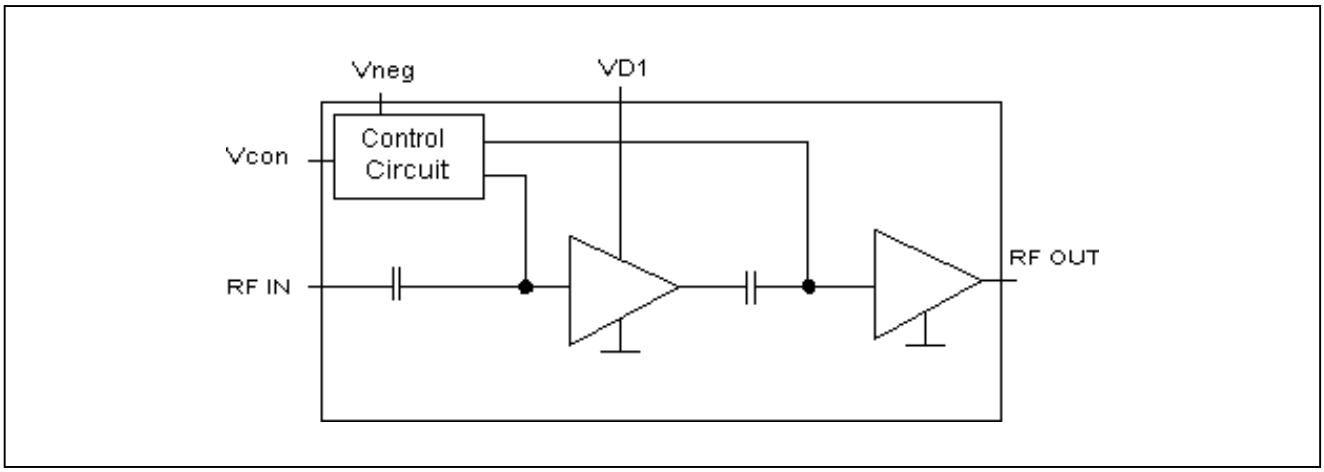
Maximum ratings

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 #		Configuration
1	n. c.	
2	n. c.	
3	Vcon	Control voltage
4	Vneg	Negative voltage
5	n. c.	
6	RF IN	RF IN PCS Band
7	n. c.	
8	VD 1	Drain voltage preamplifier stage
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*	1850		1910	MHz
Duty cycle	t_{ON}/t_{OFF}			100	%
TDMA output power	*P*		29		dBm
TDMA gain at max. output	G		24		dB
CDMA output power	P		29		dBm
CDMA gain at max. output	G		24		dB
Power ramping characteristic Full output power Pinch off	V_{contr}		 2.5 0.5		V
Adjacent Channel Power CDMA 1.25 MHz offset (PCS band) 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
TDMA DC to RF efficiency @Padj=-26dBc at max. output	PAE		 40		%
CDMA DC to RF efficiency @Padj=-42dBc at max. output at 10 dBm output power	PAE		 40 4		%
Receive band noise power density (1930 to 1990 MHz)	P_{RX}			-145	dBm/Hz
DC supply voltage range	VD	2.9	3.5	4.0	V
Negative supply voltage range	Vneg	-5.0		-7.0	V
Standby current @Vcon=0V	$I_{pwr\ dwn}$		500		µA

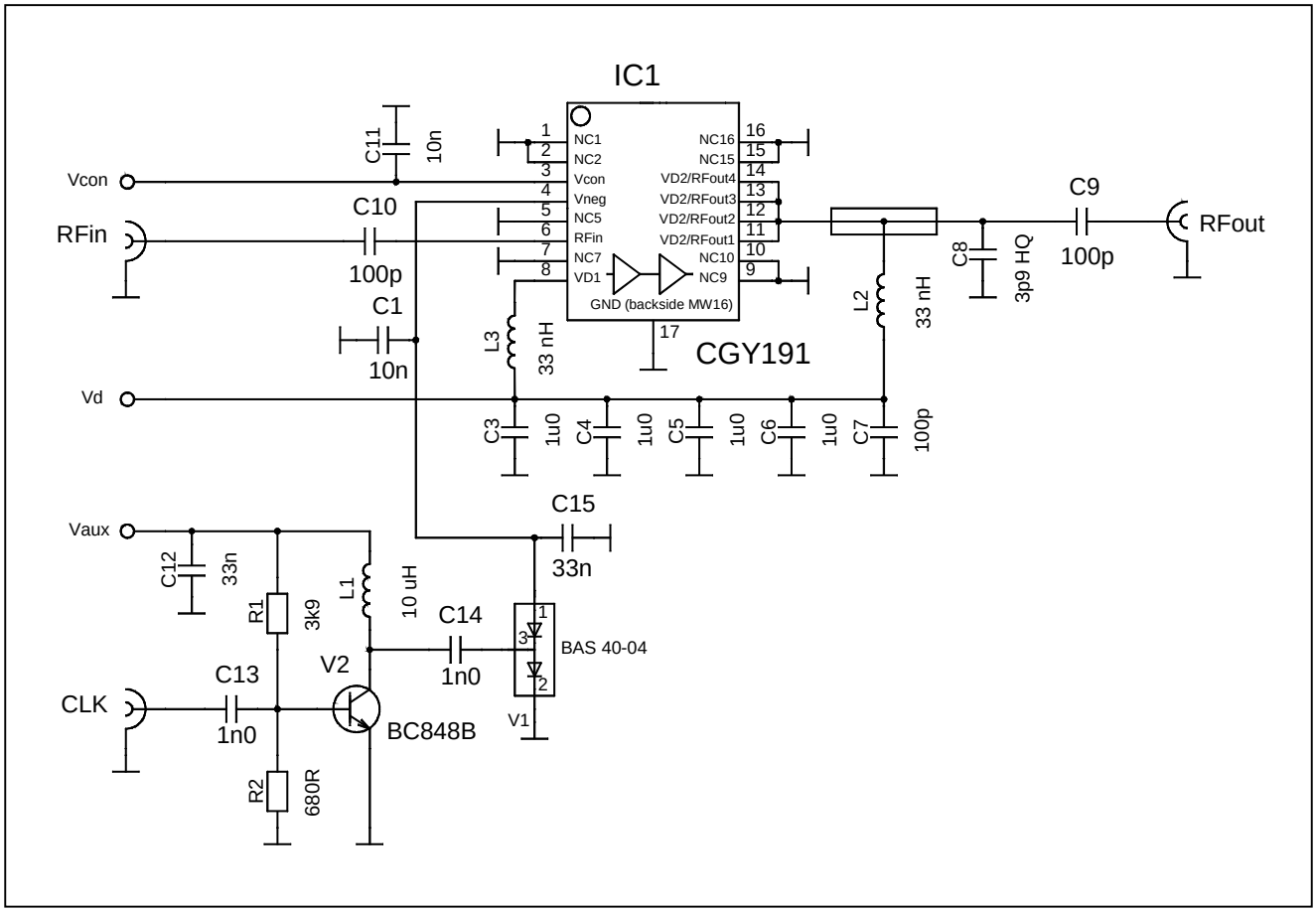
Characteristics	Symbol	min	typ	max	Unit
Quiescent current			300		mA
Current consumption at V_{Contr}	$I_{Control}$		2		mA
Current consumption at V_{NEG}	I_{NEG}		2		mA
Operating temperature range	υ	-30		+85	°C

Power on sequence:

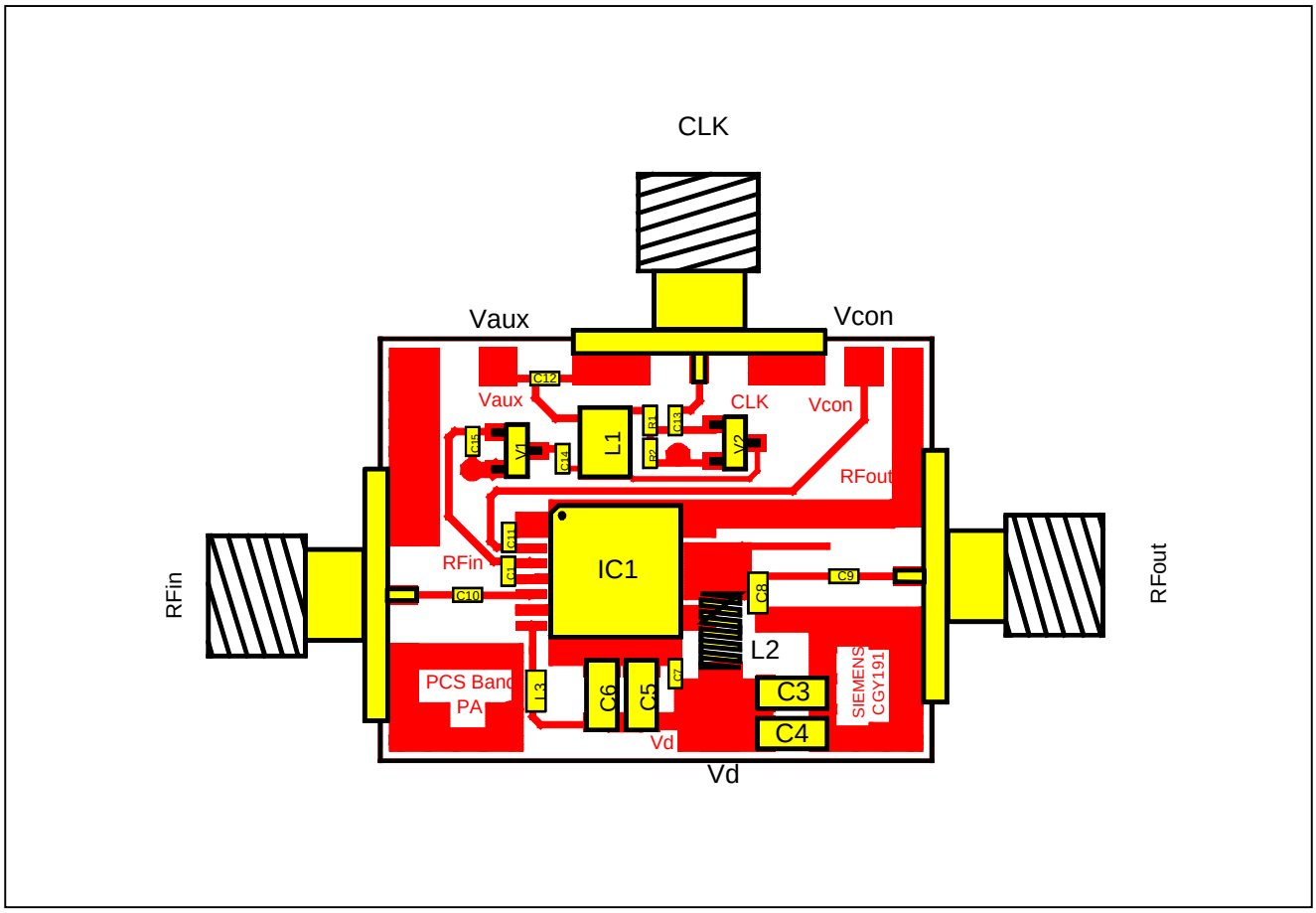
1. connect negative voltage to PA
2. connect control voltage to PA
3. turn on Vd
4. turn on Pin

To switch off the device please use reverse sequence.

Application Circuit:



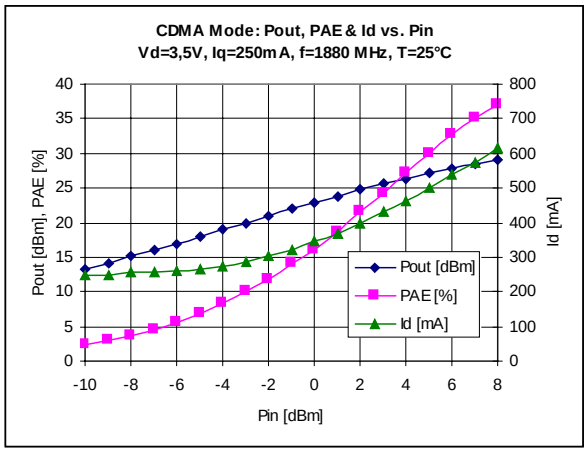
Evaluation Board:

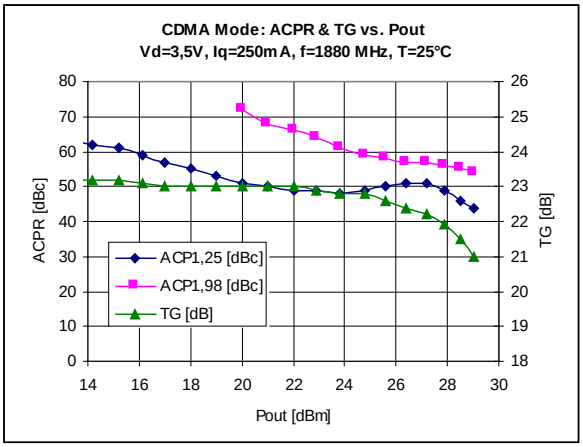


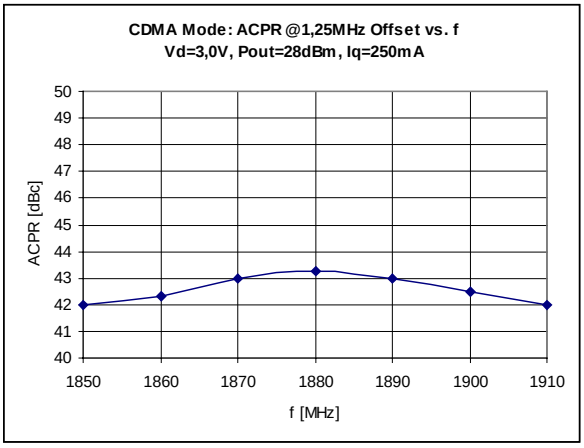
Evaluation Board Parts List:

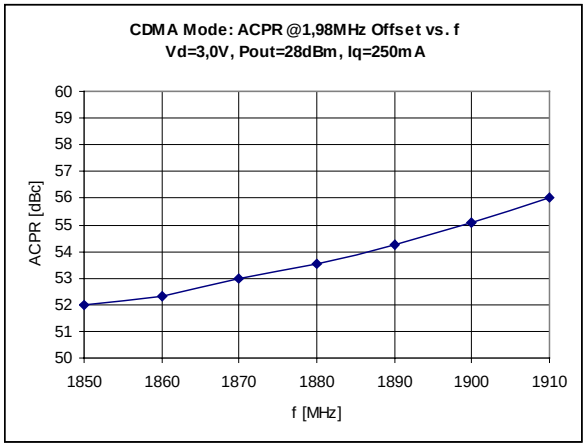
Part Type	Position	Description	Manufacturer	Part Number
Capacitor	C1, C11	10nF 0402	Siemens	
Capacitor	C7, C9, C10	100pF 0402	Siemens	
Capacitor	C8	3,9pF 0603 High Q	AVX	06035J3R9BBT
Capacitor	C3, C4, C5, C6	1uF 1206	Siemens	
Capacitor	C12, C15	33nF 0402	Siemens	
Capacitor	C13, C14	1nF 0402	Siemens	
Inductor	L1	10uH	Siemens	
Air Coil	L2	33nH	Horst David GmbH	PN/BV 1250
Inductor	L3	33nH 0603	Toko	
Resistor	R1	3,9k	Siemens	
Resistor	R2	680 Ohm	Siemens	
Diode	V1	BAS40-04W	Siemens	
Transistor	V2	BC848B	Siemens	
Substrate		FR4, h=0.2mm,ε_r=4.5	Siemens	

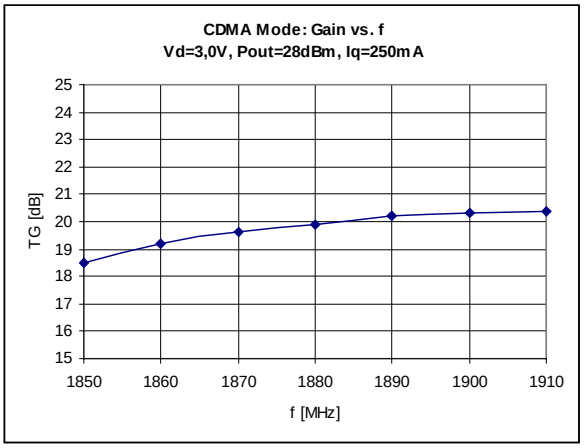
Typical Performance in CDMA Operation Mode:

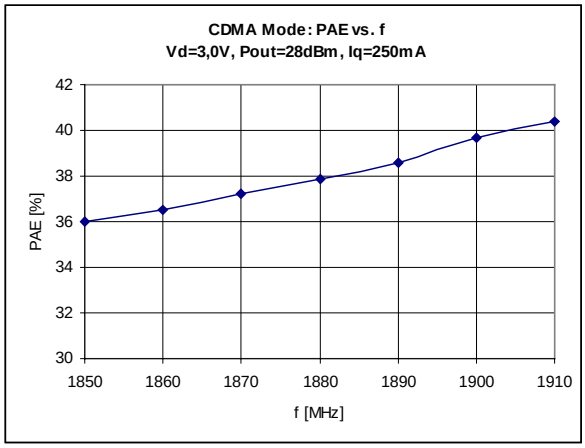


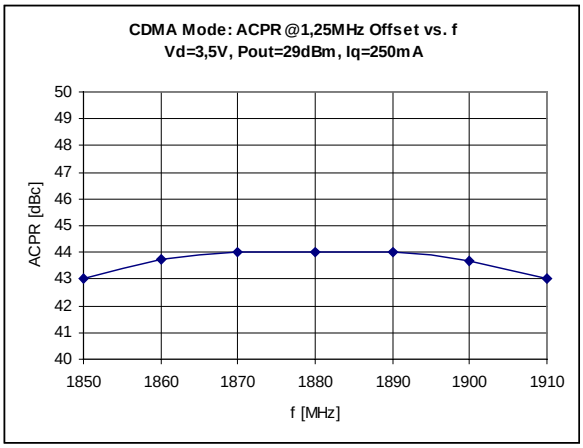











CDMA Mode: ACPR @1,25MHz Offset vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
ACPR [dBc]
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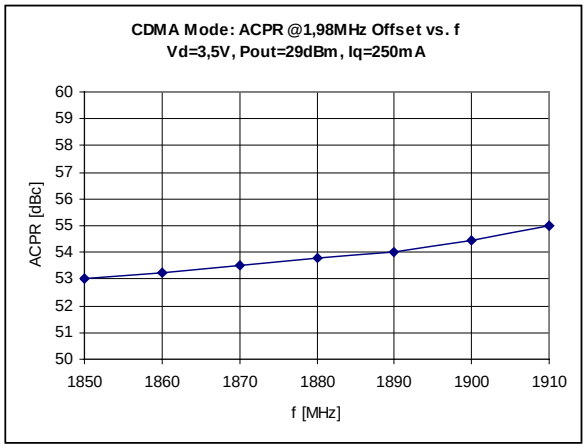
f [MHz]


CDMA Mode: ACPR @1,98MHz Offset vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
ACPR [dBc]
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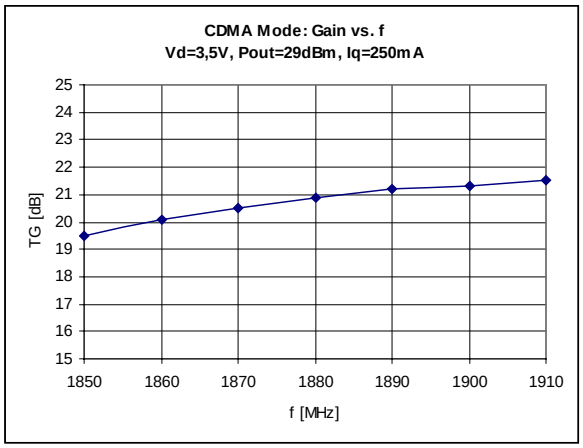
f [MHz]


CDMA Mode: Gain vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
TG [dB]
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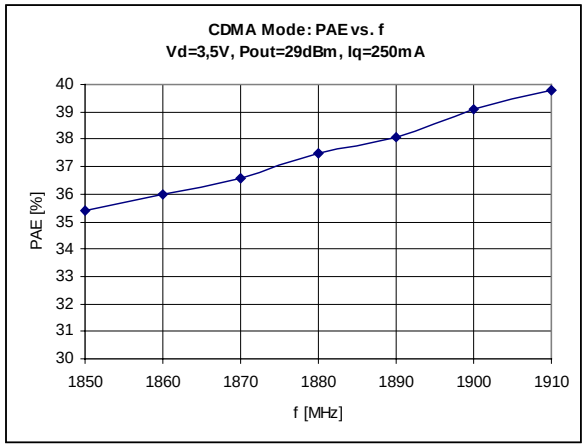
f [MHz]


CDMA Mode: PAE vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
PAE [%]
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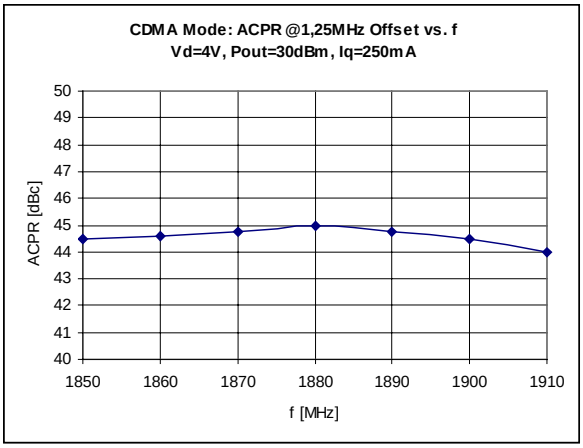
f [MHz]


CDMA Mode: ACPR @1,25MHz Offset vs. f
Vd=4V, Pout=30dBm, Iq=250mA
ACPR [dBc]
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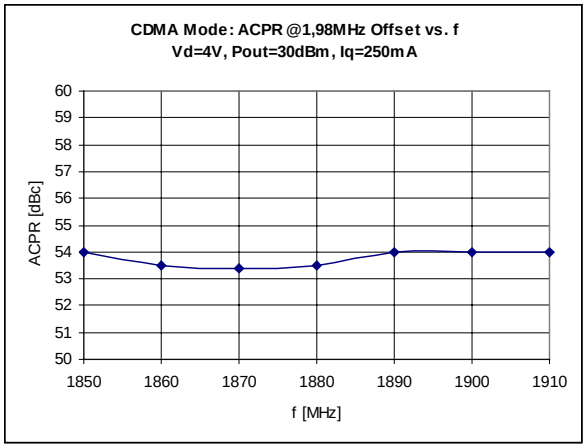
1910
f [MHz]


CDMA Mode: ACPR @1,98MHz Offset vs. f
Vd=4V, Pout=30dBm, Iq=250mA
ACPR [dBc]
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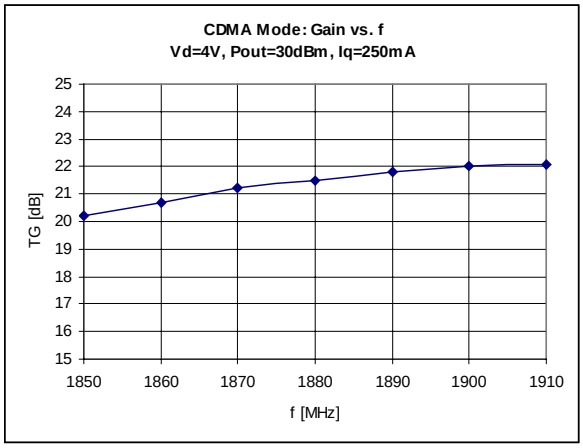
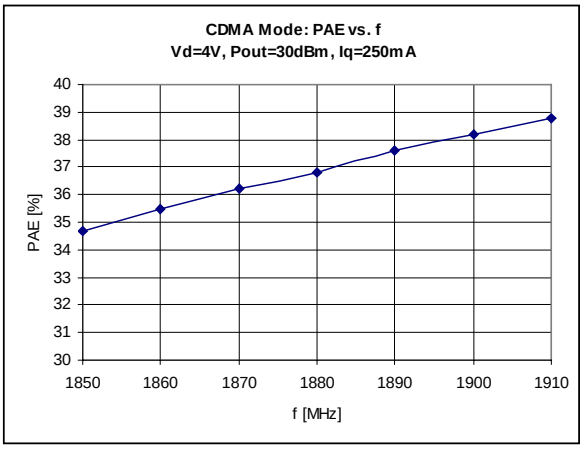
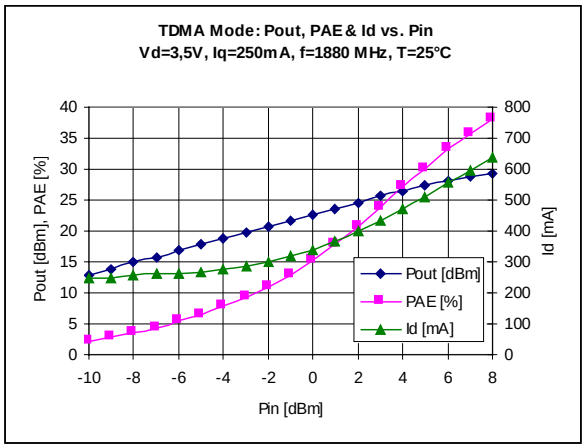
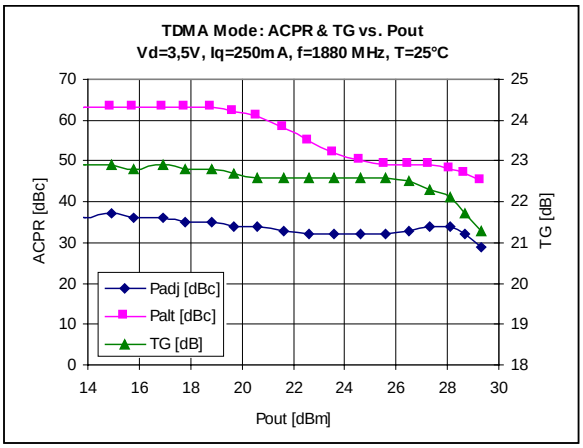
f [MHz]

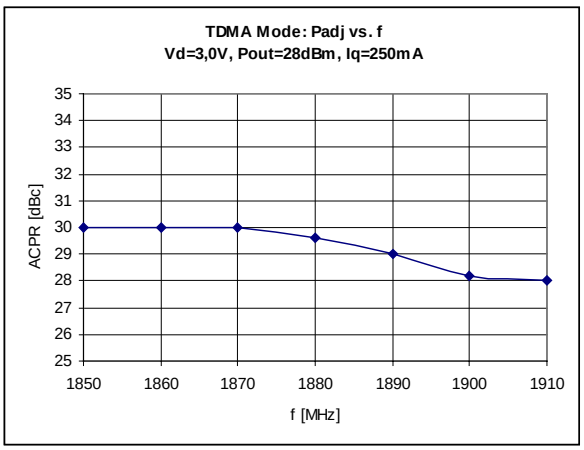


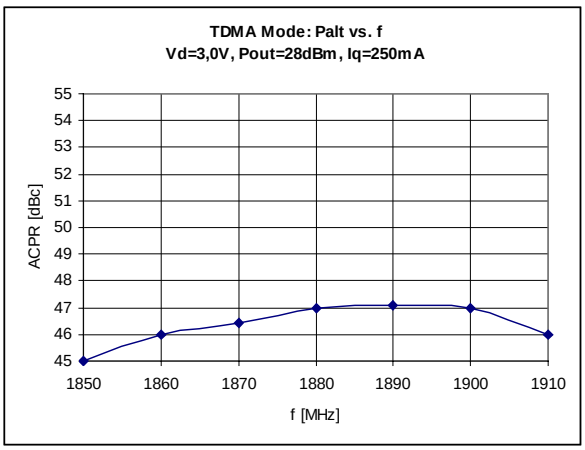


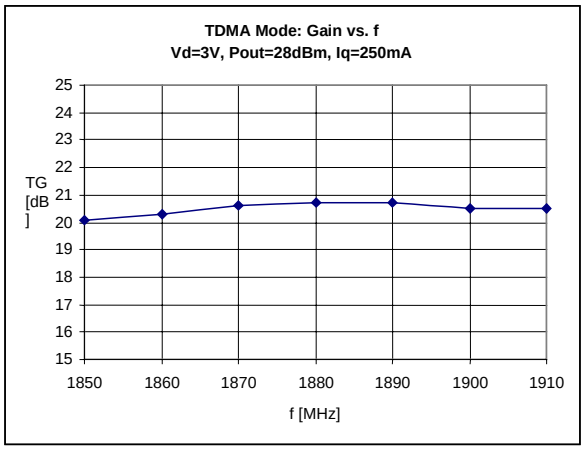
Typical Performance in TDMA Operation Mode:










TDMA Mode: Gain vs. f
Vd=3V, Pout=28dBm, Iq=250mA
TG [dB]
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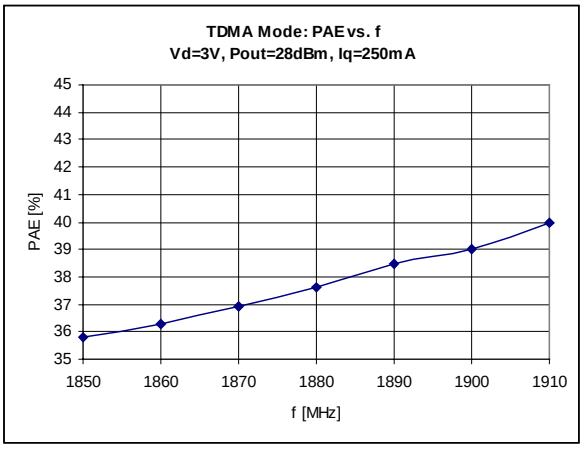
f [MHz]


TDMA Mode: PAE vs. f
Vd=3V, Pout=28dBm, Iq=250mA
PAE [%]
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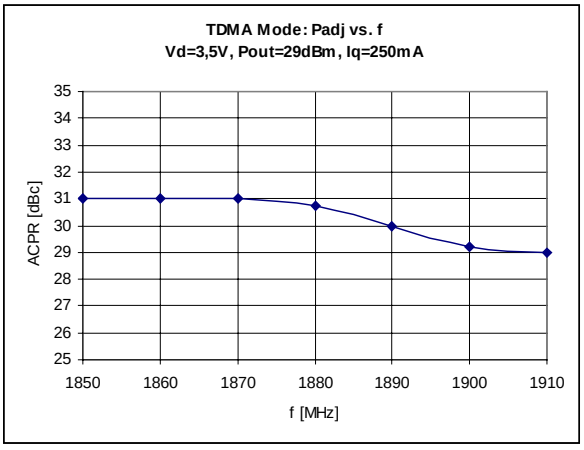
f [MHz]


TDMA Mode: Padj vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
ACPR [dBc]
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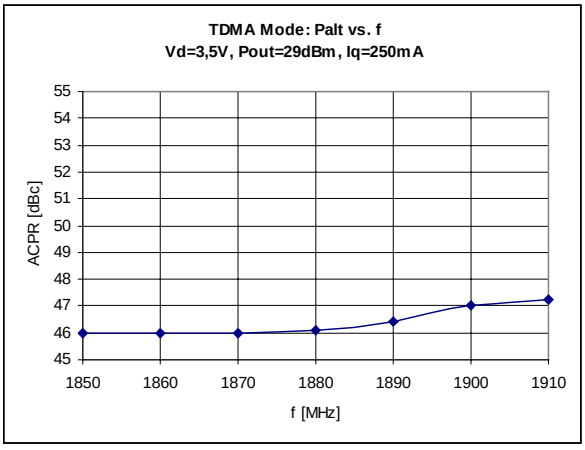
1910
f [MHz]


TDMA Mode: Palt vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
ACPR [dBc]
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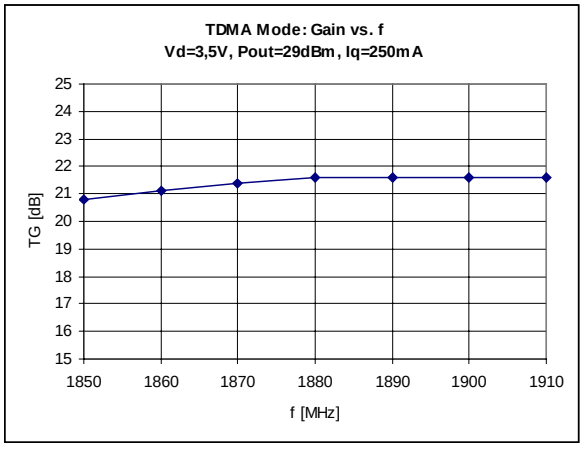
f [MHz]


TDMA Mode: Gain vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
TG [dB]
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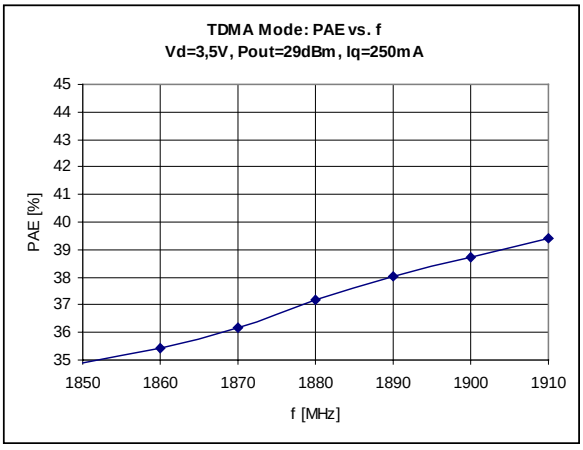
TDMA Mode: PAE vs. f
Vd=3,5V, Pout=29dBm, Iq=250mA
PAE [%]
45
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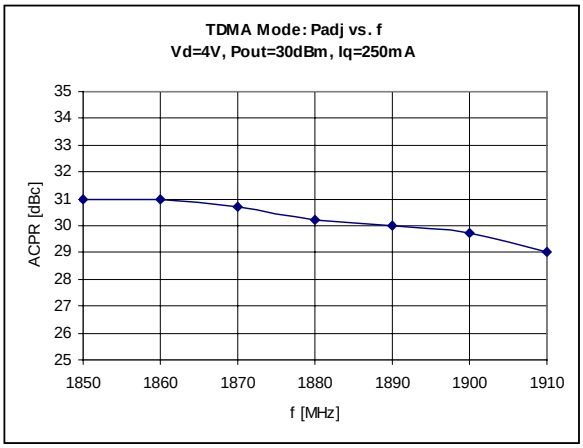
f [MHz]


TDMA Mode: Padj vs. f
Vd=4V, Pout=30dBm, Iq=250mA
ACPR [dBc]
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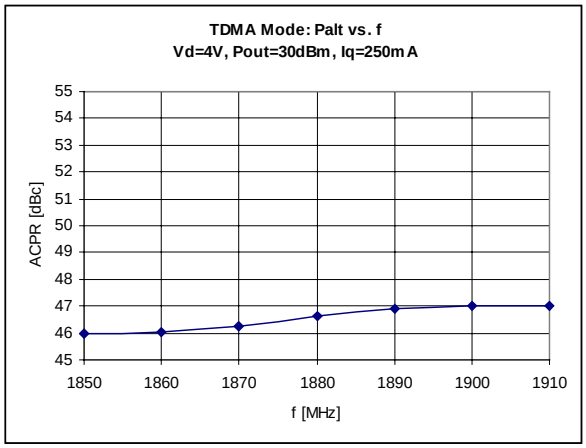
TDMA Mode: Palt vs. f
Vd=4V, Pout=30dBm, Iq=250mA
ACPR [dBc]
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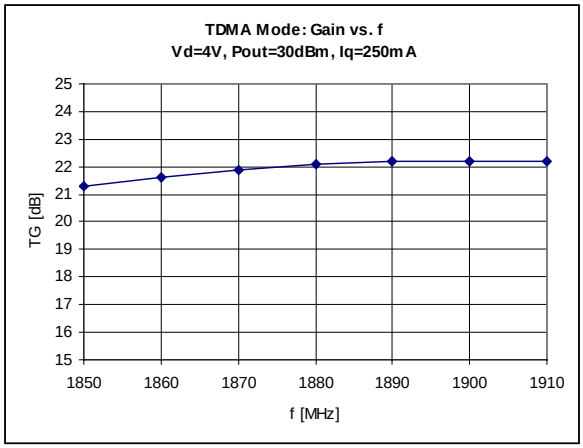
f [MHz]


TDMA Mode: Gain vs. f
Vd=4V, Pout=30dBm, Iq=250mA
TG [dB]
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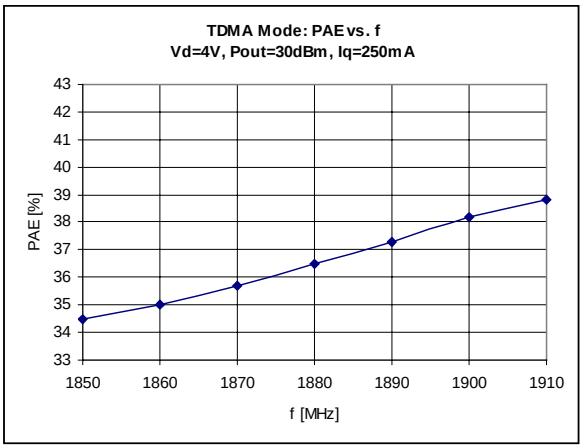
TDMA Mode: PAE vs. f
Vd=4V, Pout=30dBm, Iq=250mA
PAE [%]
43
42
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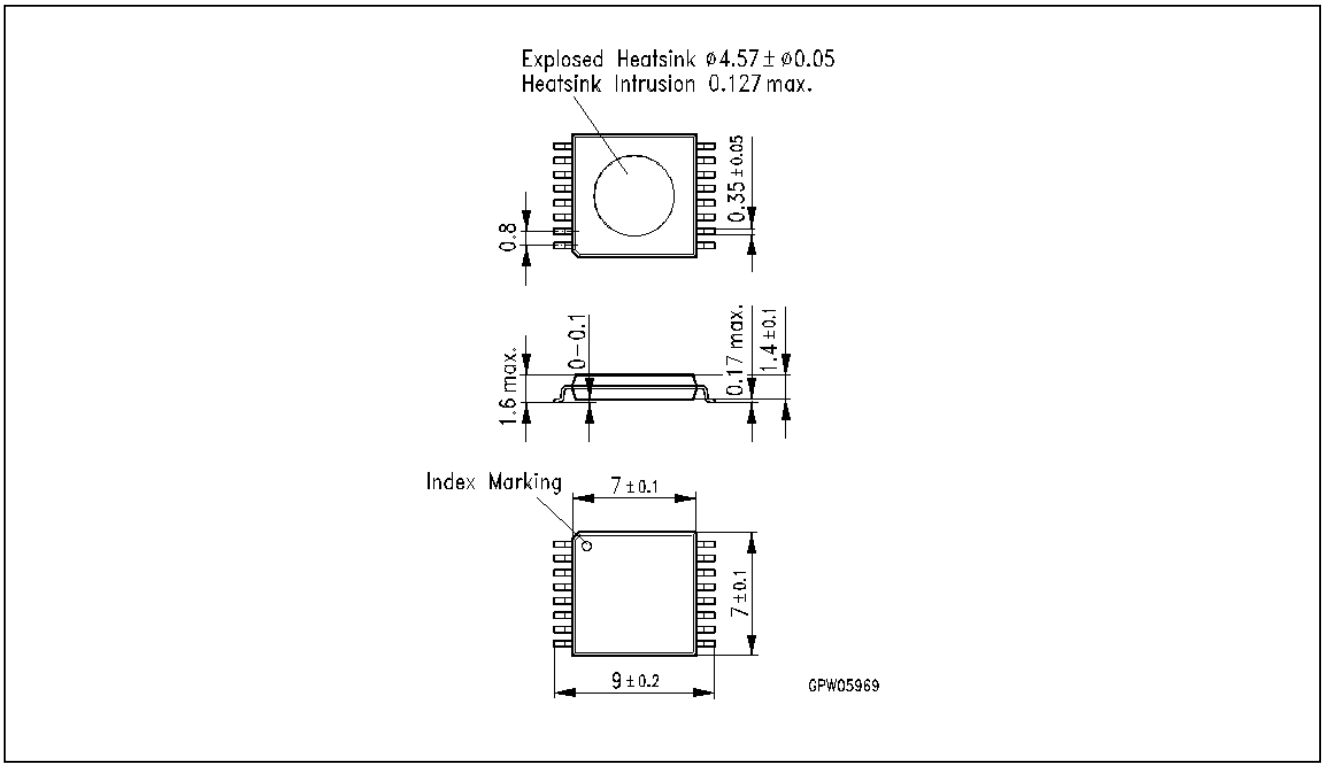

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