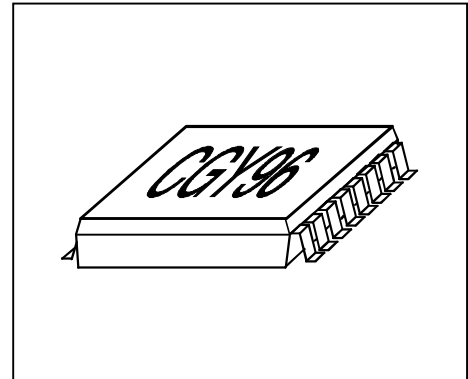


## GaAs MMIC

- Power amplifier for GSM class 4 phones
- 3.2 W (35dBm) output power at 3.5 V
- Overall power added efficiency 50 %
- Fully integrated 3 stage amplifier
- Power ramp control
- Input matched to 50 ohms, simple output match



ESD: **E**lectrostatic **d**ischarge sensitive device, observe handling precautions!

Type	Marking	Ordering code (taped)	Package
CGY 96	CGY 96	Q62702G63	MW 16

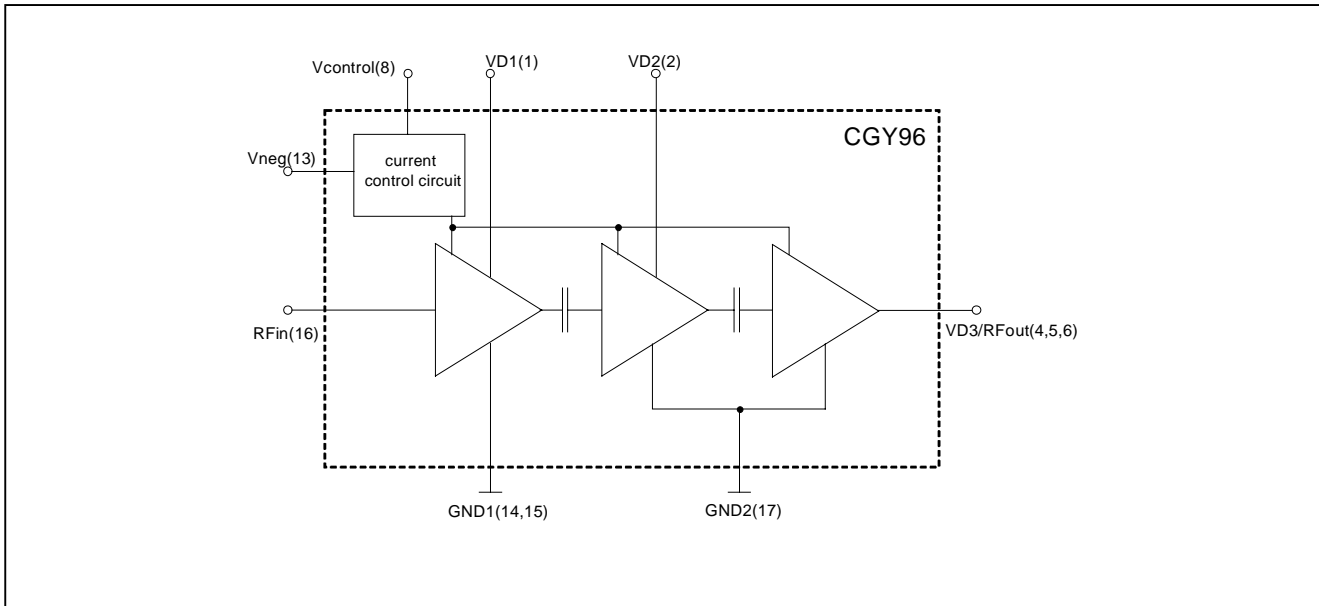
## Maximum ratings

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 <i>duty cycle 12.5%, <math>t_{on}=0.577ms</math></i>	$P_{Pulse}$	tbd	W
Total power dissipation ( $T_s \leq 80\text{ °C}$ ) <i><math>T_s</math>: Temperature at soldering point</i>	$P_{tot}$	tbd	W

## Thermal Resistance

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

## Functional block diagramm:



Pin #	Name	Configuration
1	<b>VD1</b>	Drain voltage 1st stage
2	<b>VD2</b>	Drain voltage 2nd stage
3	<b>n.c.</b>	-
4,5,6	<b>VD3 / RFout</b>	Drain 3rd stage and RF-output
7	<b>n.c.</b>	-
8	<b>Vcontrol</b>	Control voltage for power ramping
9,10,11,12	<b>n.c.</b>	-
13	<b>Vneg</b>	negative voltage for current control circuit
14,15	<b>Gnd1</b>	Ground pin 1st stage
16	<b>RFin</b>	RF Input
(17)	<b>GND2</b>	Ground (backside of MW16 package)

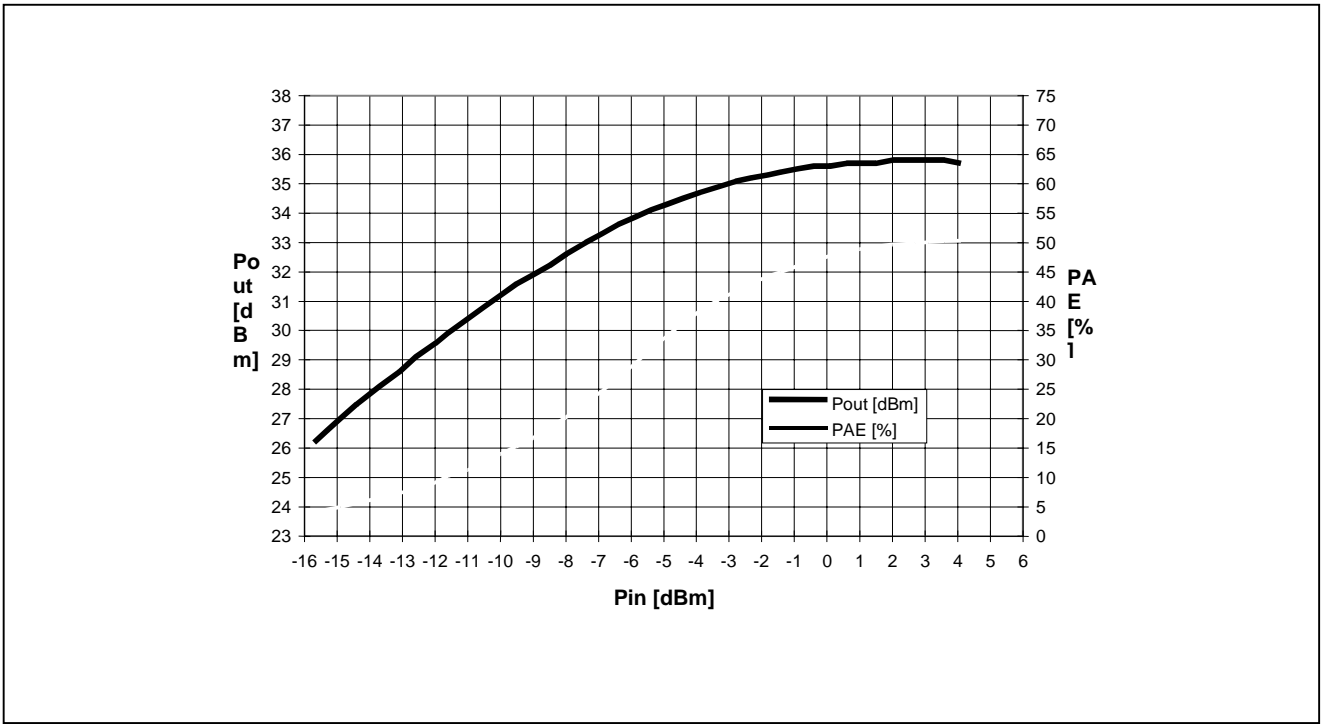
## Electrical characteristics

( $T_A = 25^\circ\text{C}$ ,  $V_{\text{neg}} = -5\text{V}$ ,  $V_{\text{control}} = 2.2\text{V}$ ; duty cycle 12.5%,  $t_{\text{on}} = 577\mu\text{sec}$ )

Characteristics	Symbol	min	typ	max	Unit
Frequency range	$f$	880	-	915	MHz
Supply current $P_{\text{in}} = 0\text{dBm}$	$I_D$	-	1.8	-	A
Supply current neg. voltage gener. $V_{\text{aux}} = 3.5\text{V}$	$I_{\text{AUX}}$	-	10	-	mA
Gain (small signal)	$G$	-	40	-	dB
Power gain $P_{\text{in}} = 0\text{dBm}$	$G_P$	-	35	-	dB
Output Power $P_{\text{in}} = 0\text{dBm}$ , $V_{\text{control}} = 2.0\text{V} \dots 2.5\text{V}$	$P_{\text{OUT}}$	-	35	-	dBm
Overall Power added Efficiency $P_{\text{in}} = 0\text{dBm}$	$\eta$	-	50	-	%
Dynamic range output power $V_{\text{control}} = 0.2 \dots 2.2\text{V}$		-	80	-	dB
Harmonics $P_{\text{in}} = 0\text{dBm}$	$H(2f_0)$	-	-40	-	dBc
	$H(3f_0)$	-	-43	-	dBc
	$H(4f_0)$	-	-44	-	dBc
Noise Power in RX (935-960MHz) $P_{\text{in}} = 0\text{dBm}$ , $P_{\text{out}} = 35\text{dBm}$ , 100kHz RBW	$N_{\text{RX}}$	-	-81	-	dBm
Stability all spurious outputs < -60dBc, VSWR load, all phase angles		-	10 : 1	-	-
Input VSWR		-	1.7 : 1	-	-

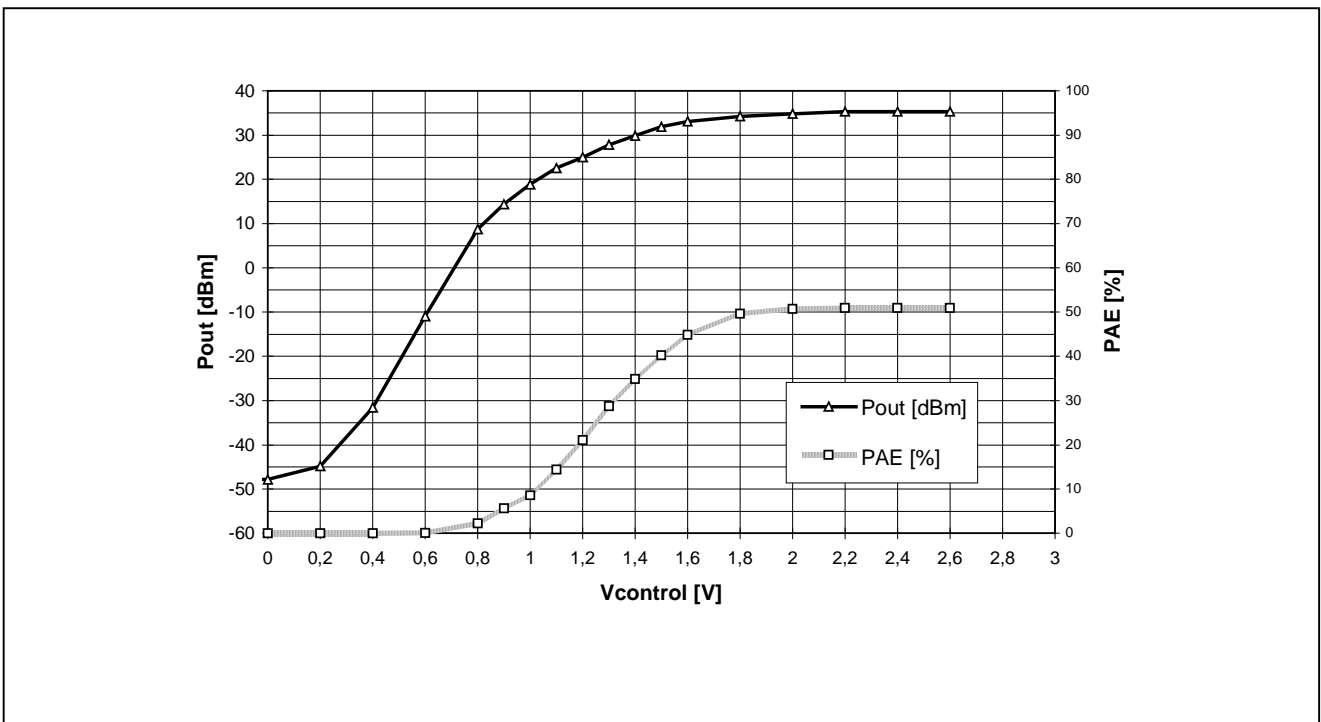
**Output Power and PAE vs. Input Power**

( $V_d=3.5V$ ,  $V_{control}=2.2V$ ,  $f=900MHz$ , duty cycle 12.5%,  $t_{on}=577\mu s$ )



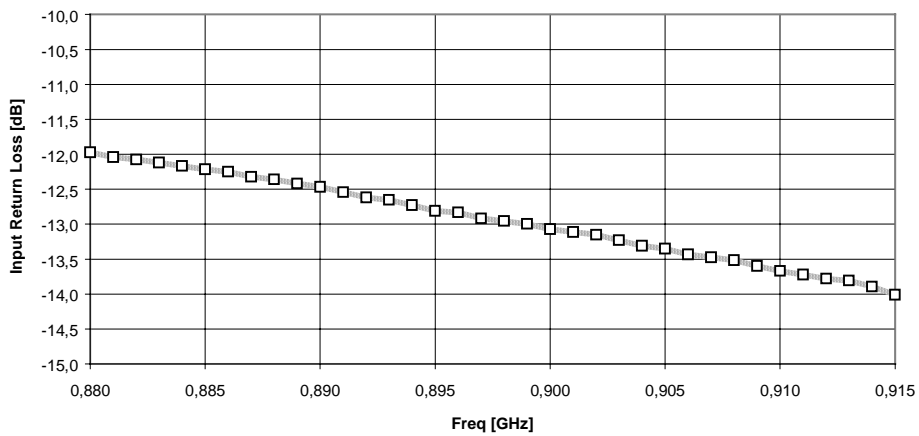
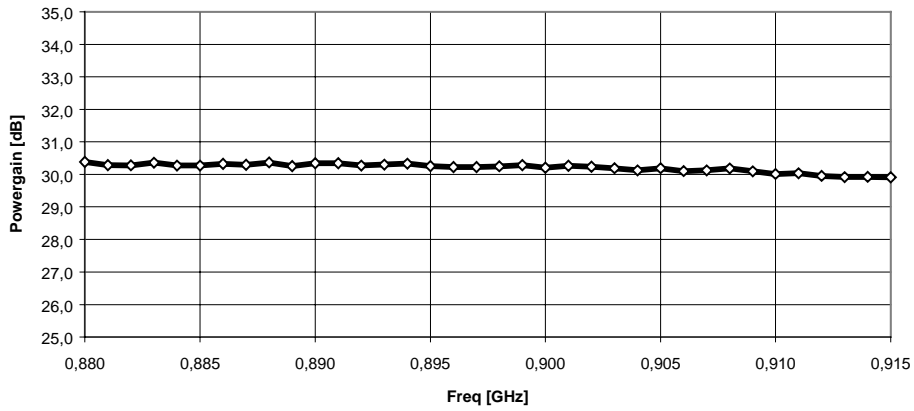
**Output Power and PAE vs. Control Voltage:**

( $V_d=3.5V$ ,  $P_{in}=0dBm$ ,  $f=900MHz$ , duty cycle 12.5%,  $t_{on}=577\mu s$ )



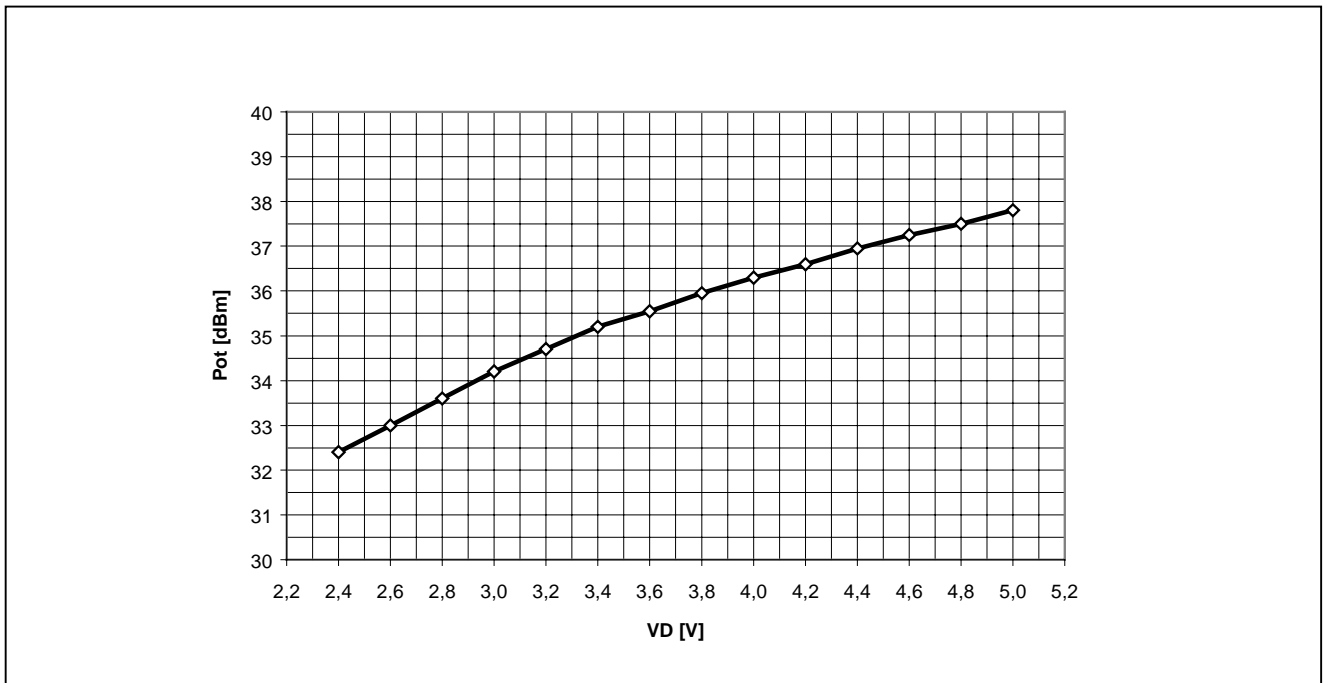
**Power Gain and Input Return Loss vs. Frequency**

(Vd=3.5V, Vcontrol=2.2V, Pin=5dBm, duty cycle 12.5%, ton=577μs)



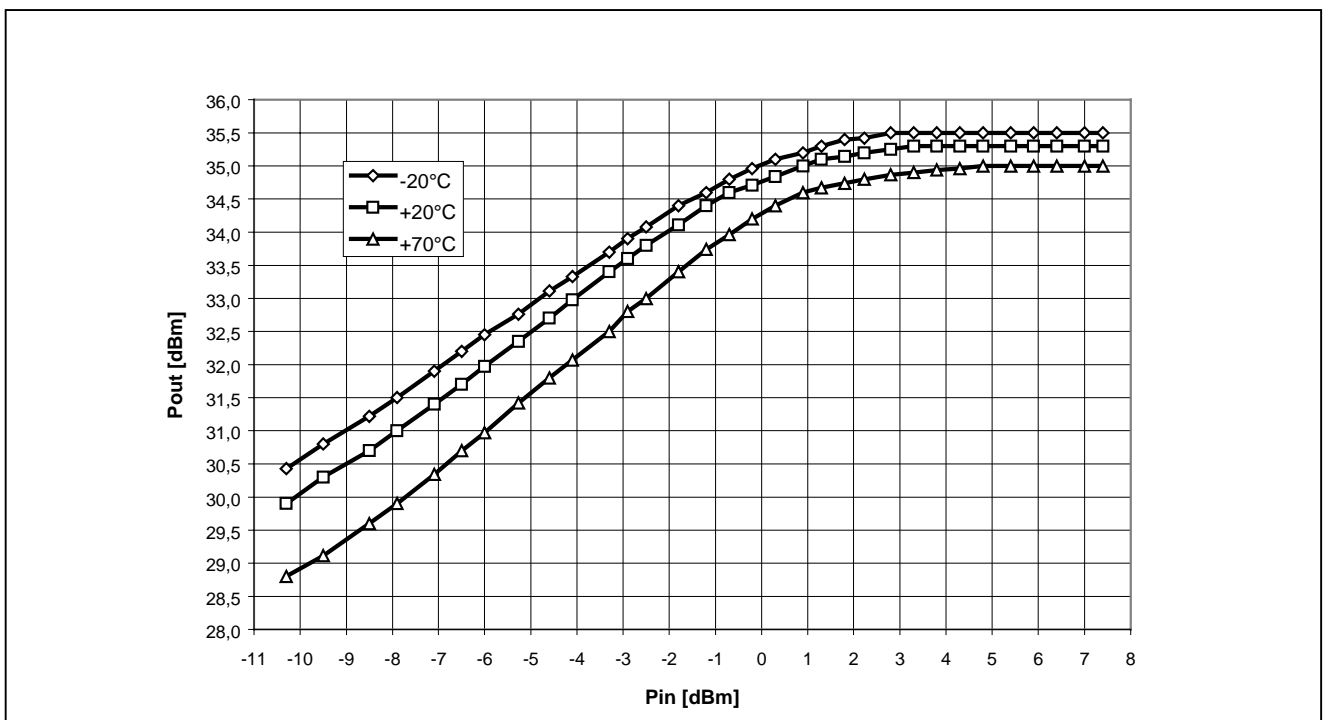
**Output Power vs. Drain Voltage**

(matched for VD=3.5V, Vcontrol=2.2V, Pin=0dBm, duty cycle 12.5%, ton=577μs)



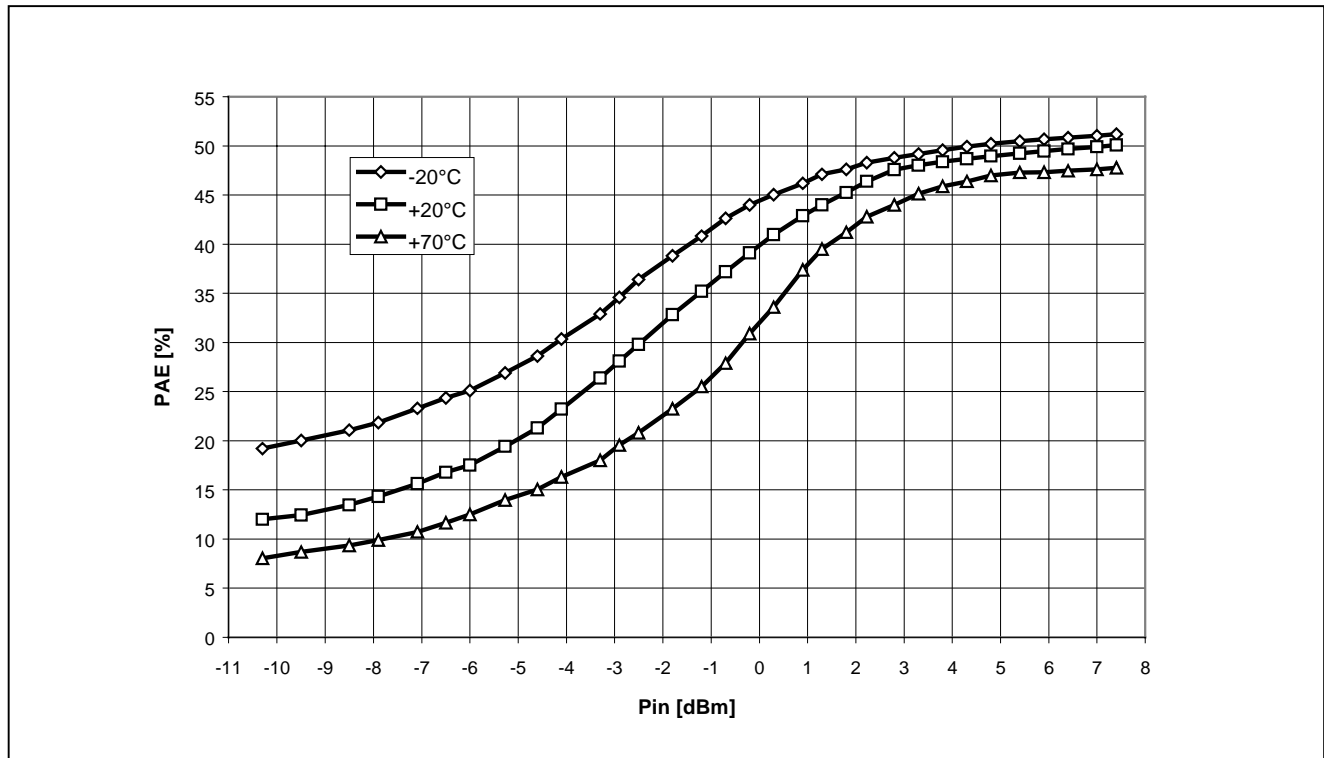
**Output Power at different Temperatures**

(Vd=3.5V, Vcontrol=2.2V, f=900MHz, duty cycle 12.5%, ton=577μs)

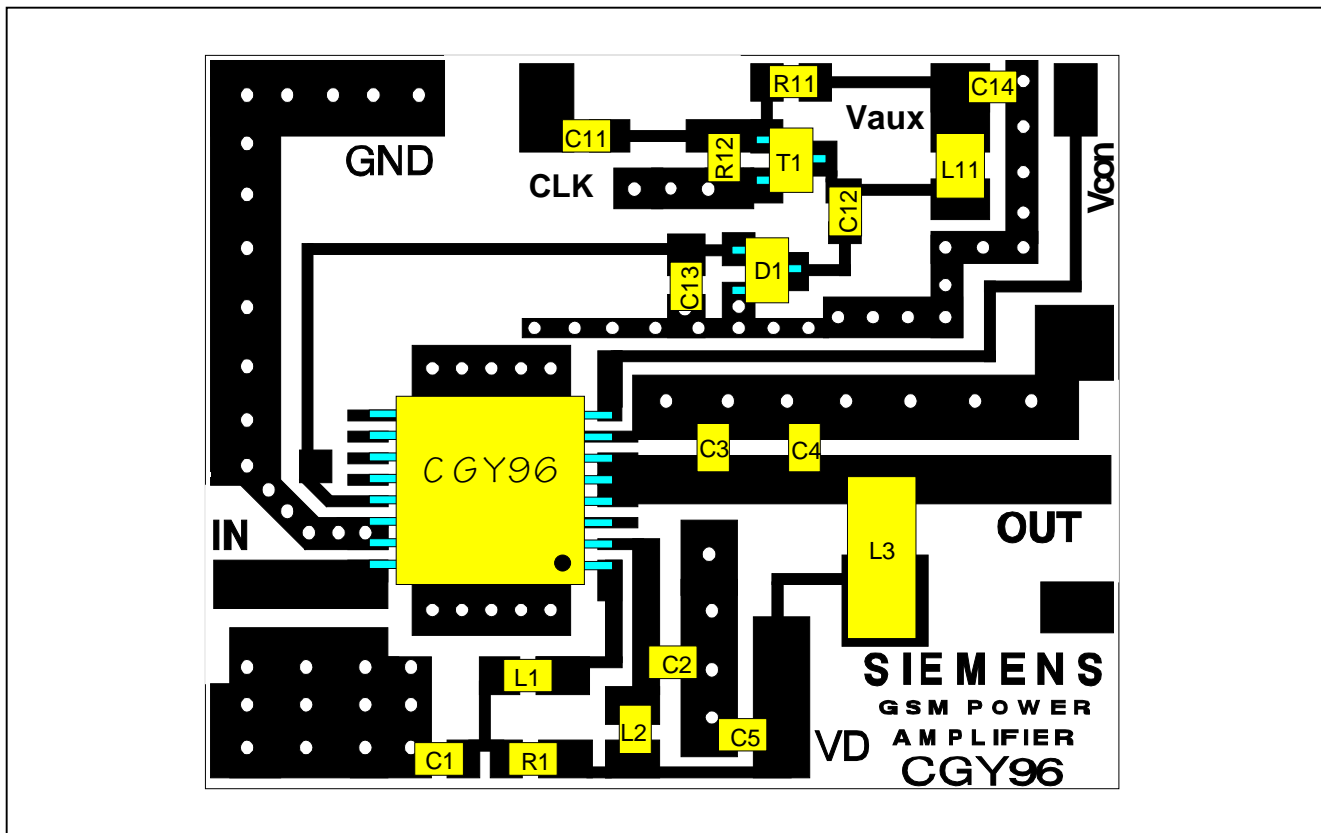


## PAE at different Temperatures

( $V_d=3.5V$ ,  $V_{control}=2.2V$ ,  $f=900MHz$ , duty cycle 12.5%,  $t_{on}=577\mu s$ )



## CGY 96 Evaluation Board



(Size 34mm x 27mm)

### Connections:

- Vd 2.7 to 6VDC, pulsed (GSM: 12,5% duty cycle,  $t_{on}=0.577ms$ )
- Vaux 2.7 to 6VDC
- Vcontrol 0.2 to 2.2 VDC (0.2V: min Pout, 2.2V: max Pout)
- CLK 5 MHz to 15 MHz (with a 10uH inductor)  
or 150 kHz to 250 kHz (with a 100uH inductor instead of the 10uH)  
(rectangular signal, 50% duty, 0 Volt to Vd voltage level)

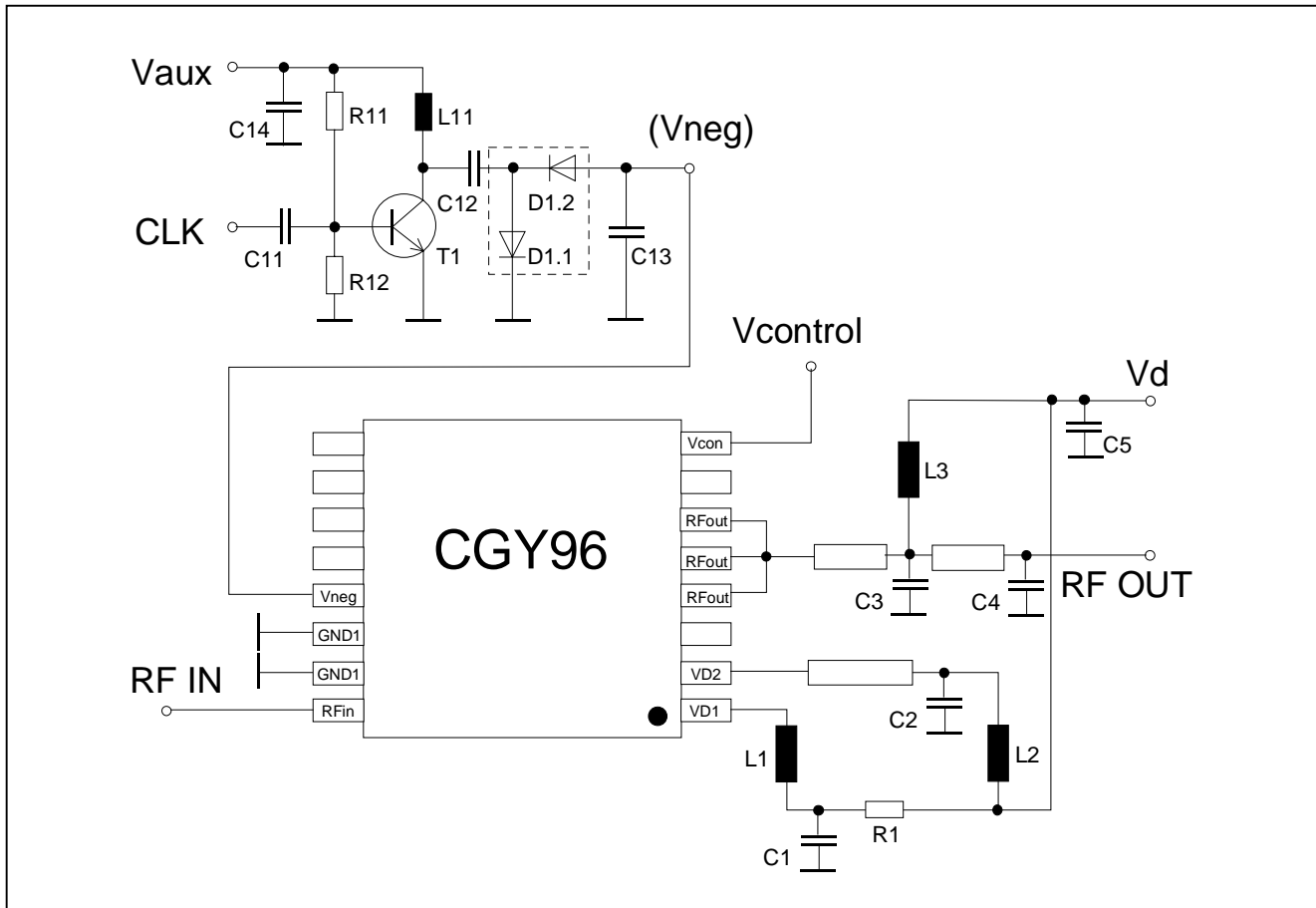
### Power on sequence:

1. continuous clock (CLK) on
2. turn on Vaux ==> check negative voltage at pin#13 (-5.....-10V)
3. turn on Vcontrol (may be at the same time as 2)  
turn on Drainvoltage Vd  
turn on Input Power

### Operation without using the negative voltage generator:

Operation without using the on board negative voltage generator is possible. In that case apply -5....-8 V directly at pin#13 (Vneg-Pin). The devices in front of pin 13 are not necessary in that case.





### Part List:

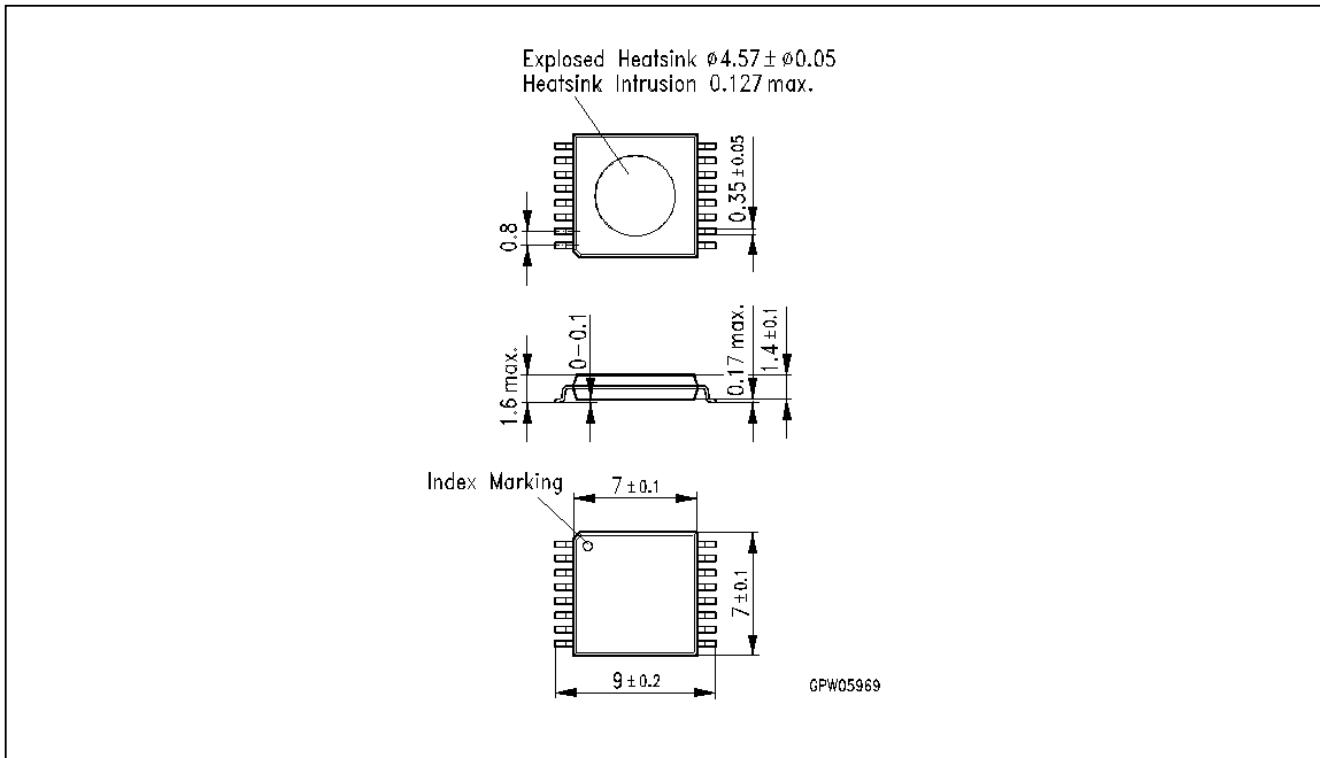
CGY96		Negative Voltage Generator	
L1	33nH	D1	BAS40-04W
L2	33nH	T1	BC848B
L3	33nH*	L11	10uH
C1	1nF	C11	1nF
C2	12pF	C12	1nF
C3	10pF**	C13	47nF
C4	2.2pF**	C14	1nF
C5	1nF	R11	3.8kOhm
R1	3.30hm	R12	680Ohm

\* 33nH SMD-Inductor for drain3: Part Number BV1250  
distribution by

*Horst David GmbH, 85375 Neufarn, Germany  
Phone-No ..8165/9548-0 , Fax-No ..8165/9548-28*

\*\* for maximum efficiency use high quality capacitors for  
the output matching: Part Number ACCU-P0603  
distribution by

*AVX GmbH, 85757 Karlsfeld, Germany  
Phone-No ..8131/9004-0*



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