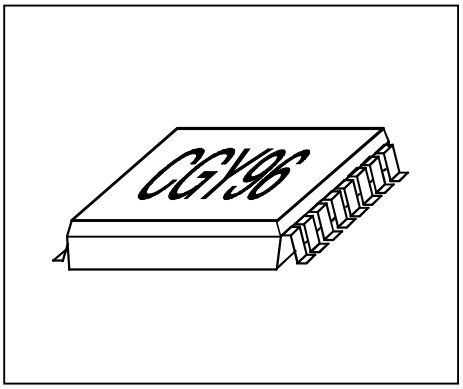
GaAs MMIC

- 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**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

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

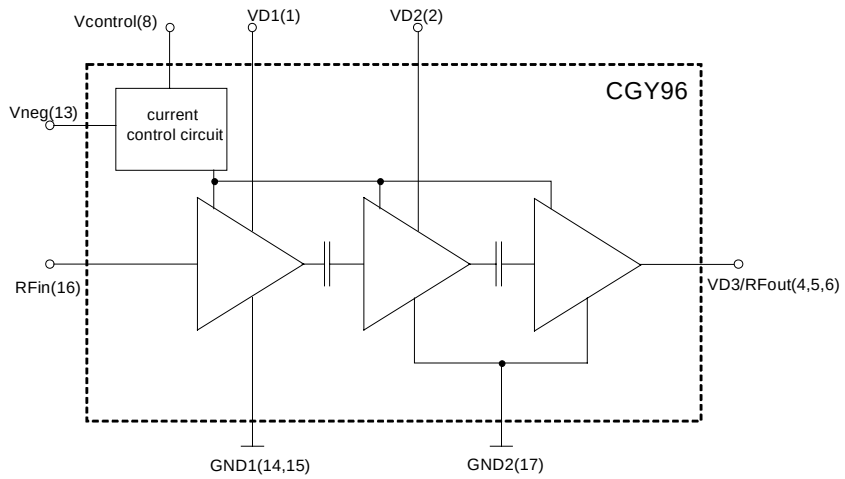
Maximum ratings

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 *duty cycle 12.5%, ton=0.577ms*	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}	tbd	K/W

Functional block diagramm:



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

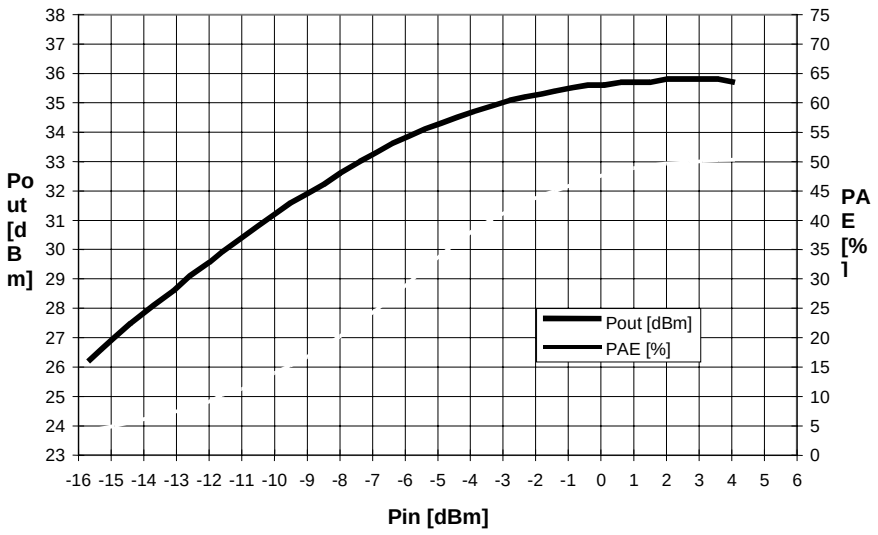
Electrical characteristics

(T_A = 25°C, Vneg=-5V, Vcontrol=2.2V; duty cycle 12.5%, ton=577µsec)

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

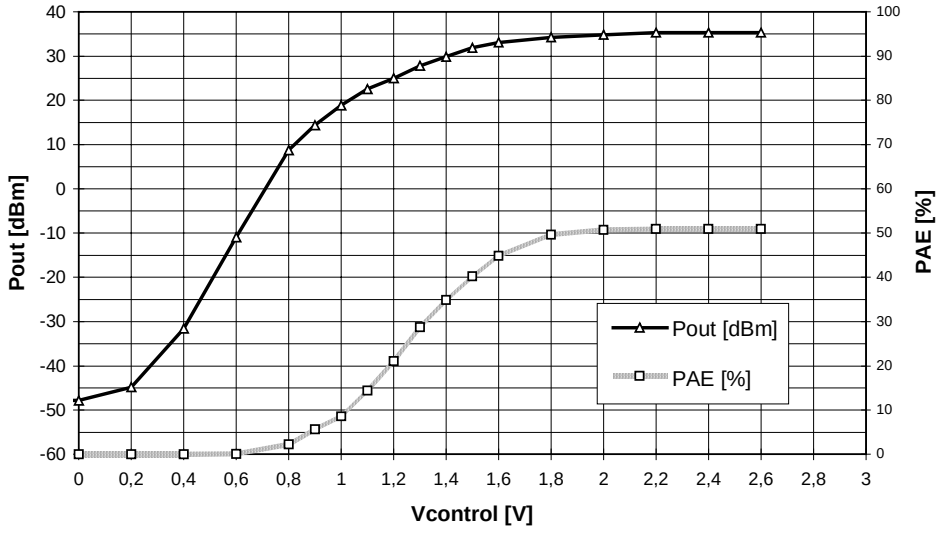
Output Power and PAE vs. Input Power

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

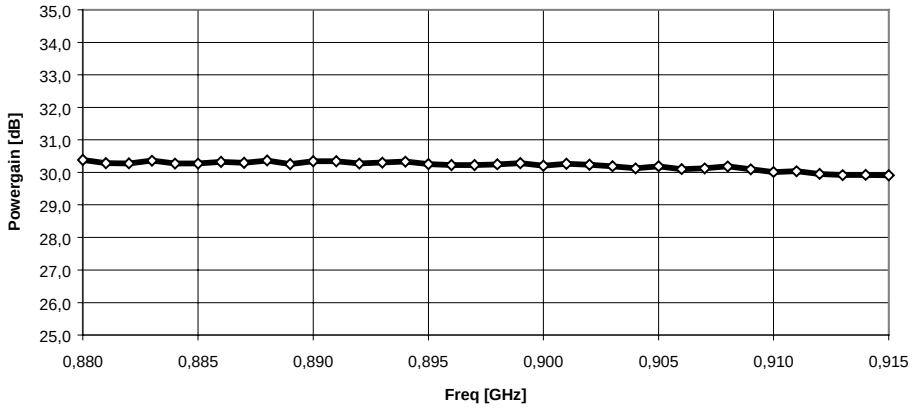


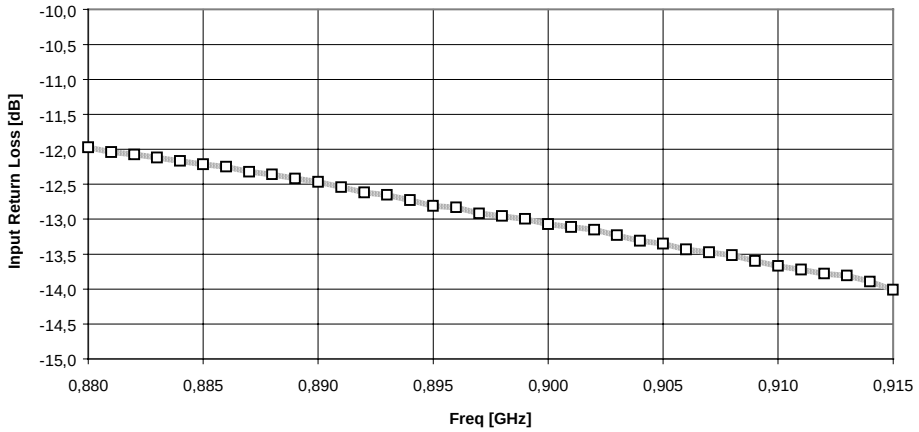
Output Power and PAE vs. Control Voltage:

(Vd=3.5V, Pin=0dBm, f=900MHz, duty cycle 12.5%, ton=577µs)

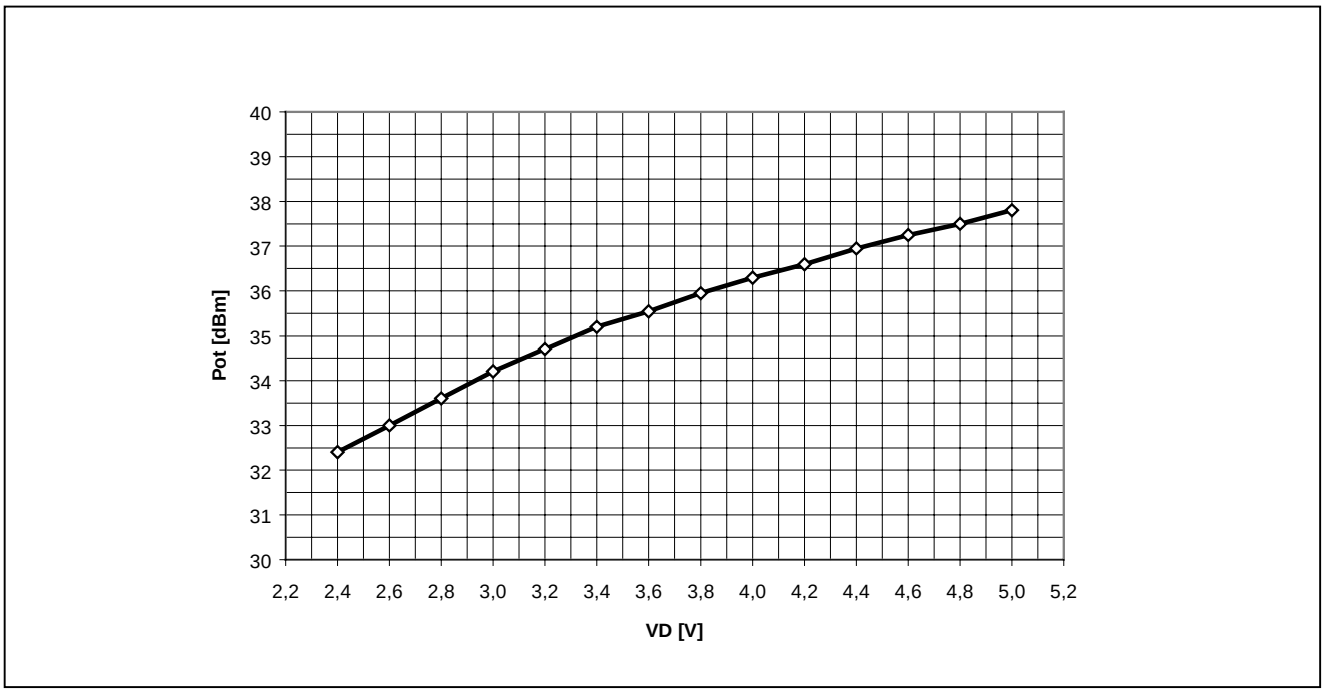


Power Gain and Input Return Loss vs. Frequency
(Vd=3.5V, Vcontrol=2.2V, Pin=5dBm, duty cycle 12.5%, ton=577µs)

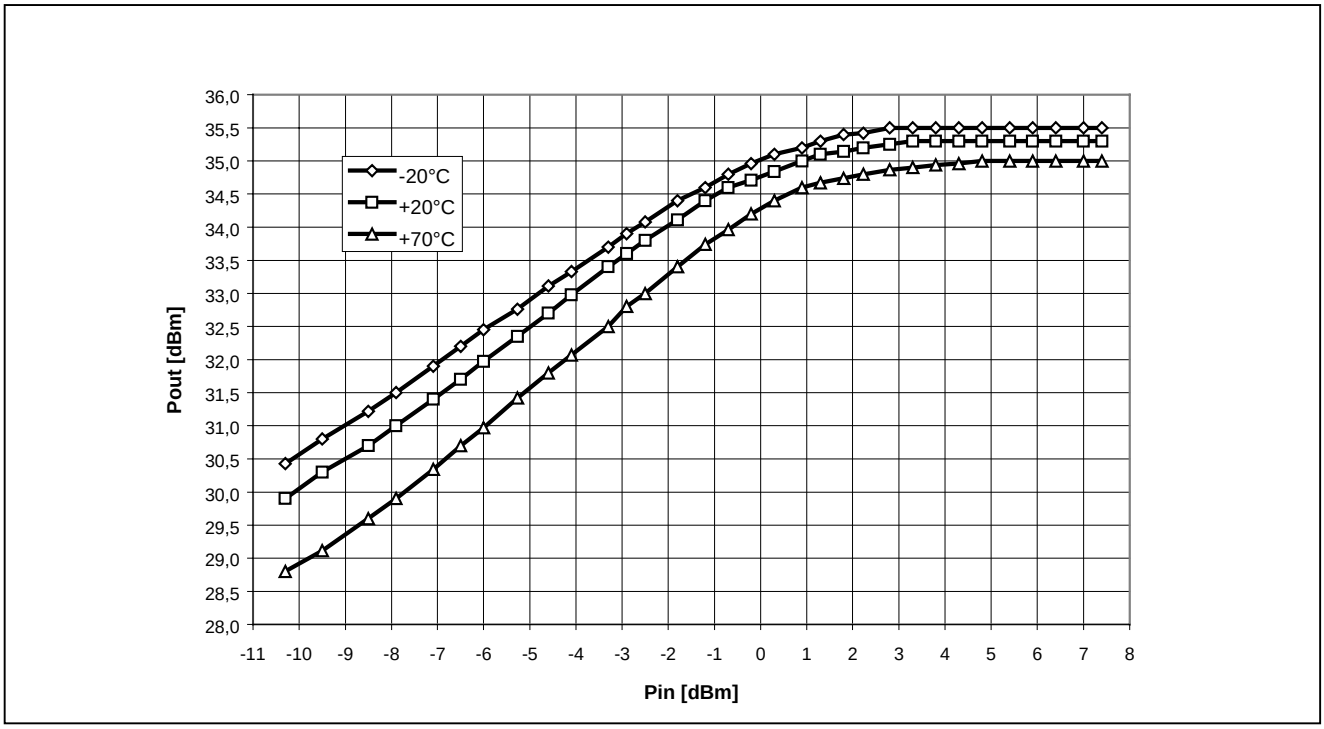




Output Power vs. Drain Voltage
(matched for VD=3.5V, Vcontrol=2.2V, Pin=0dBm, duty cycle 12.5%, ton=577µs)

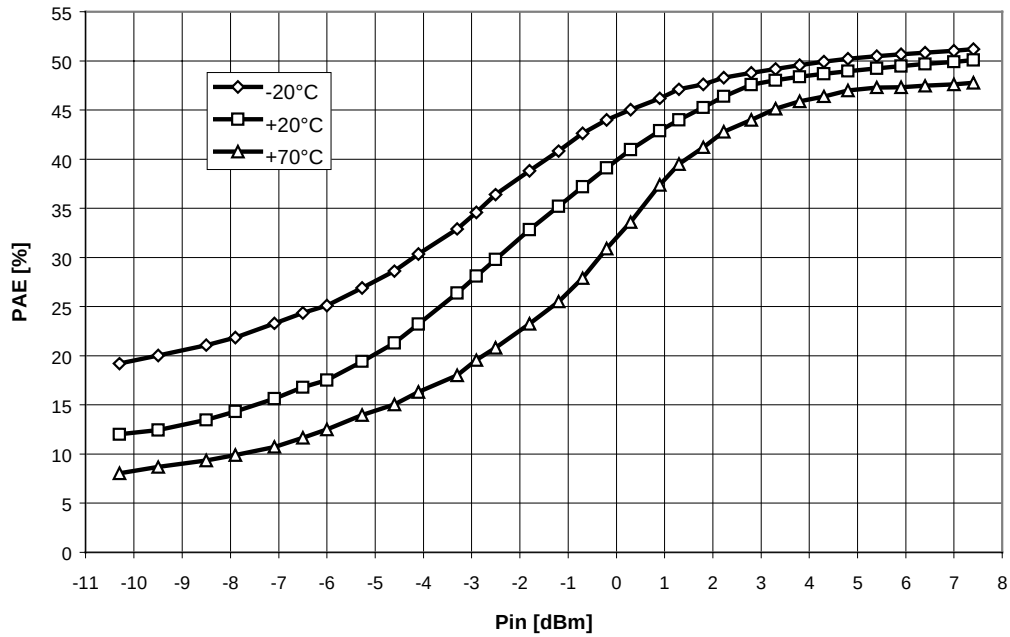


Output Power at different Temperatures
(Vd=3.5V, Vcontrol=2.2V, f=900MHz, duty cycle 12.5%, ton=577µs)

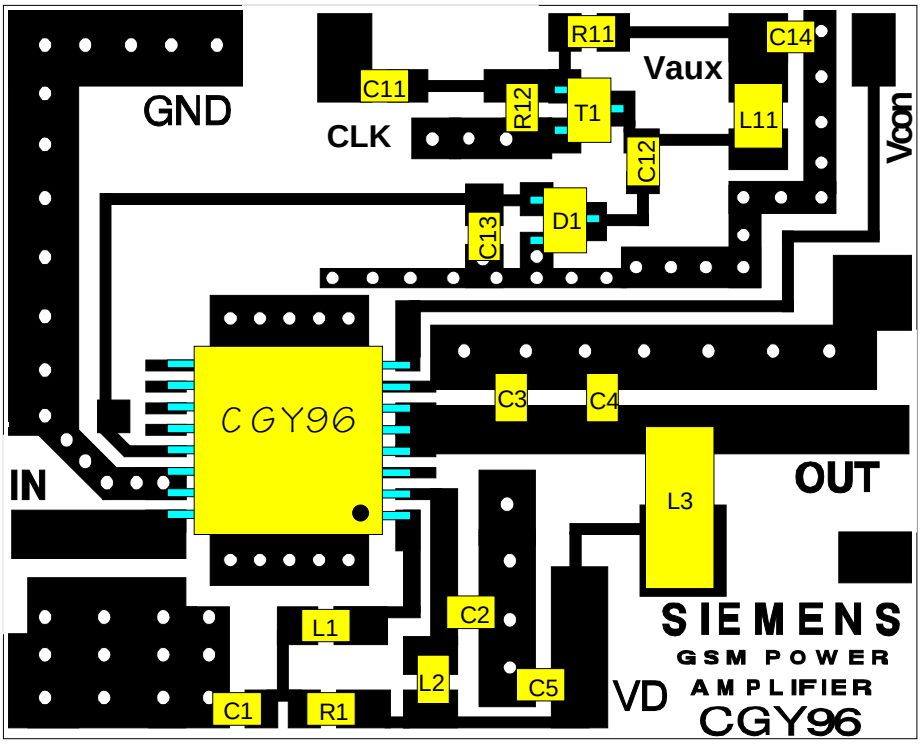


PAE at different Temperatures

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



CGY 96 Evaluation Board



(Size 34mm x 27mm)

Connections:

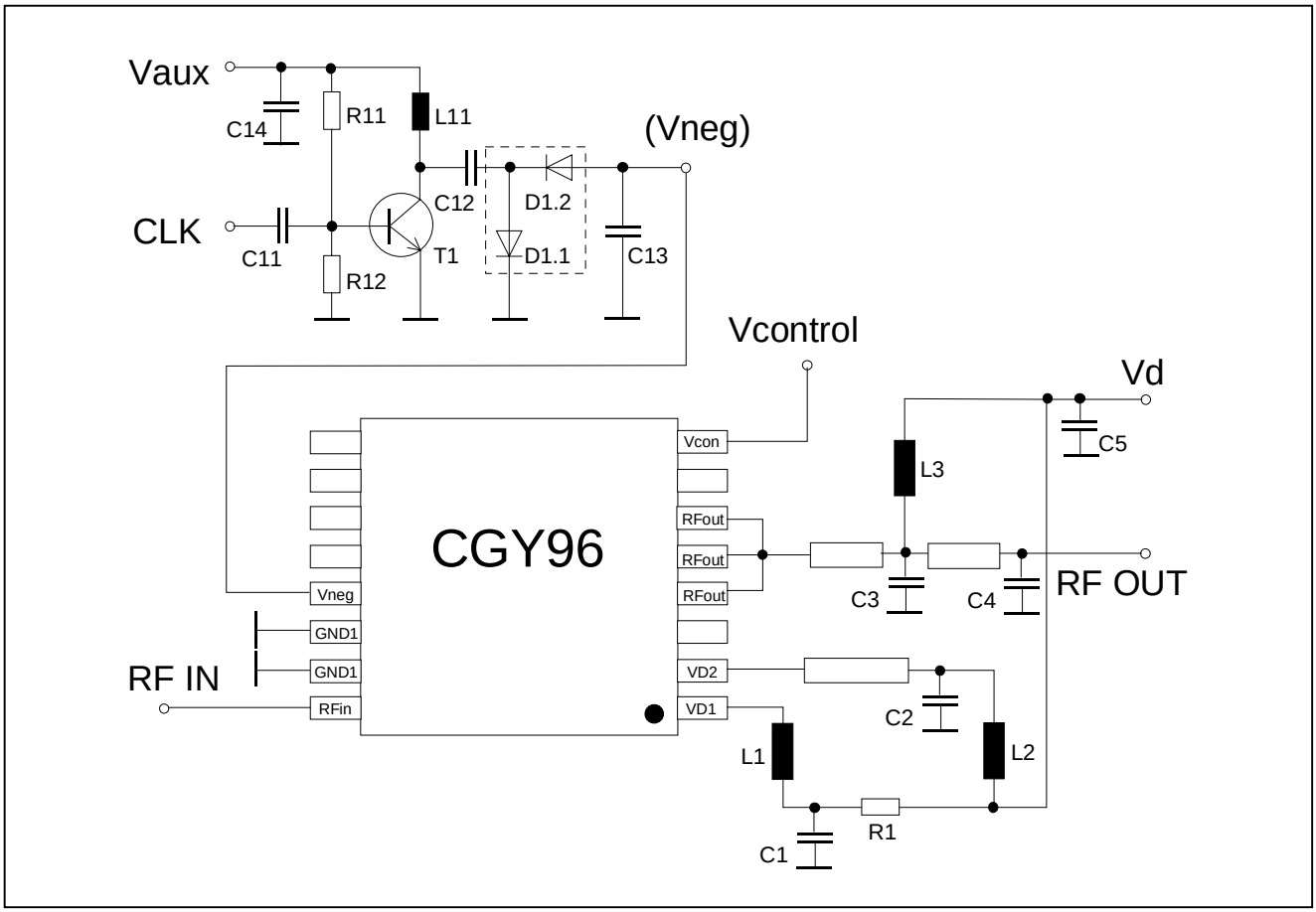
- Vd 2.7 to 6VDC, pulsed (GSM: 12,5% duty cycle, ton=0.577ms)
- Vaux 2.7 to 6VDC
- Vcontrol 0.2 to 2.2 VDC (0.2V: min Pout, 2.2V: max Pout)
- CLK 5 MHz to 15 MHz (with a 10uH inductor)
  or 150 kHz to 250 kHz (with a 100uH inductor instaed of the 10uH)
  (rectangular signal, 50% duty, 0 Volt to Vd voltage 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 decvices in front of pin 13 are not necessary in that case.

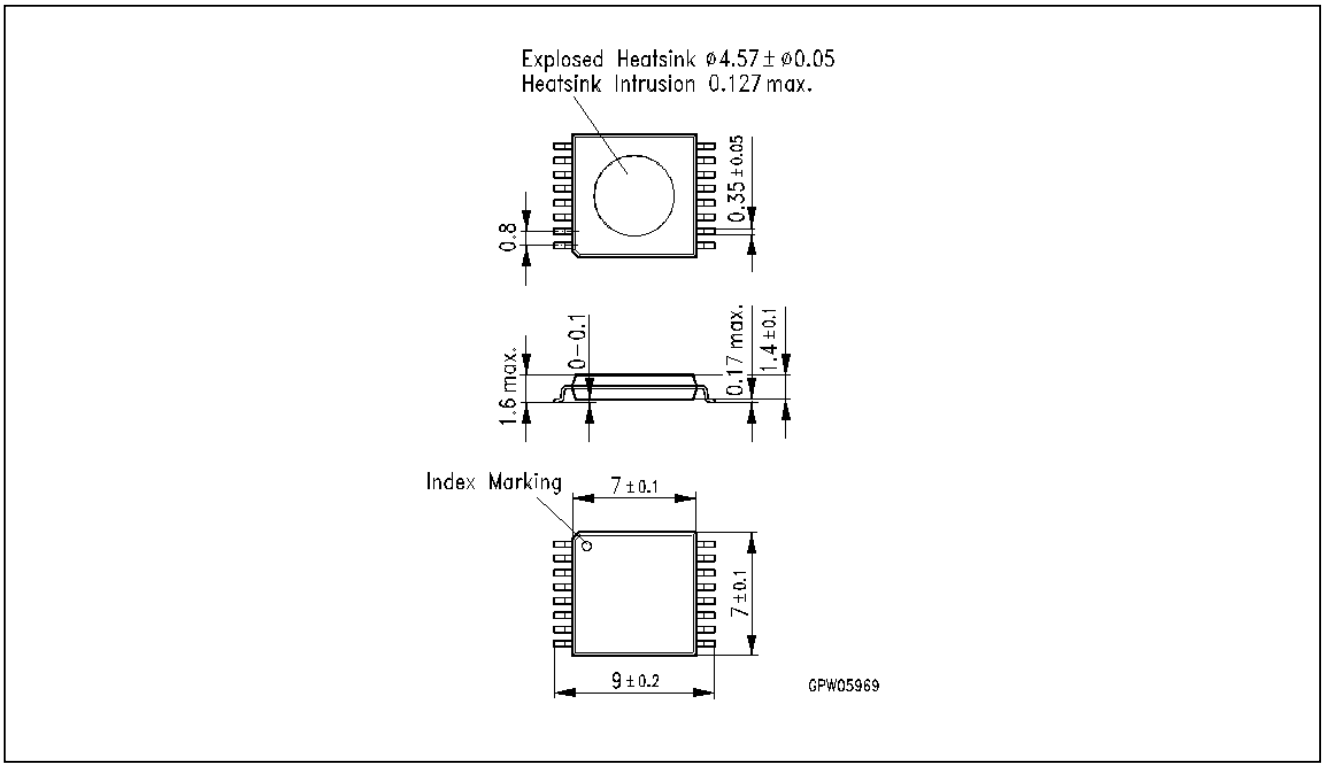


Part List:

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	3.3Ohm	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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