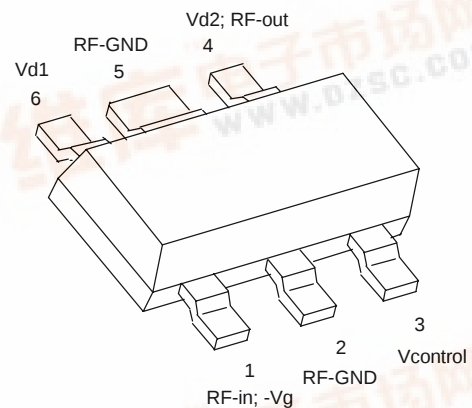


SIEMENS GaAs MMIC**CGY 120***Datasheet*

- * Monolithic microwave IC (MMIC-Amplifier) for mobile communication
- * Variable gain amplifier for GSM/PCN applications
- * Gain Control range over 50dB
- * 50Ω input and output matched
- * Low power consumption
- * Operating voltage range: 2.7 to 6 V
- * Frequency range 800 MHz ... 2.5 GHz

ESD: Electrostatic discharge sensitive device, observe handling precautions!



Type	Marking	Ordering code (taped)	Package 1)
CGY 120	Y8	Q62702-G44	MW-6

Maximum ratings	Symbol		Unit
Drain voltage	V_D	8	V
Negative supply voltage	V_g, V_{con}	-3	V
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	-55...+150	°C
Total power dissipation ($T_S \leq 84^\circ\text{C}$) ²⁾	P_{tot}	600	mW
Thermal resistance			
Channel-soldering point (GND)	R_{thchS}	≤ 110	K/W

1) Dimensions see chapter Package Outlines

2) Please care for sufficient heat dissipation on the pcb!

Rev 2

Electrical characteristics $T_A = 25^\circ\text{C}$ $f = 900\text{ MHz}$ $R_S = R_L = 50\ \Omega$ unless otherwise specified

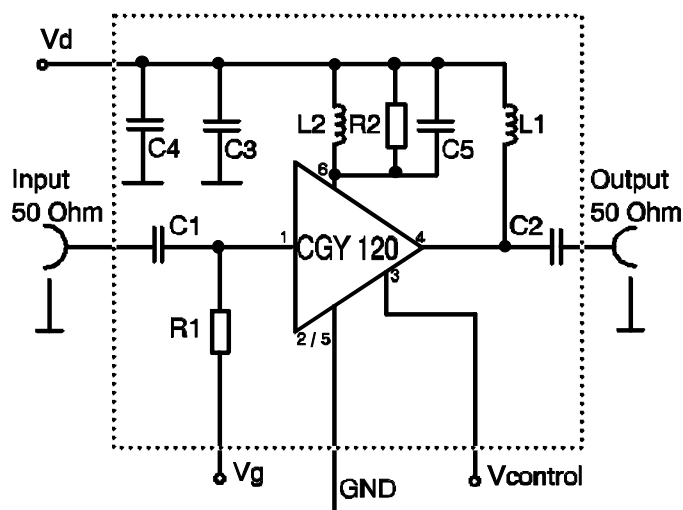
Characteristics	Symbol	min	typ	max	Unit
Power Gain Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	G	- -	22 24	- -	dB
Input return loss Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	RL_{in}	- -	14 15	- -	dB
Output return loss Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	RL_{out}	- -	11 11	- -	dB
Gain Control Range Vcon=2 V ... -2V; Vd=3V; I=45mA	dG	50	55	-	dB
1dBm gain compression Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	P_{1dB}		14 21		dBm

Electrical characteristics $T_A = 25^\circ\text{C}$ $f = 1800\text{ MHz}$ $R_S = R_L = 50\ \Omega$ unless otherwise specified

Characteristics	Symbol	min	typ	max	Unit
Power Gain Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	G	- -	20 22	- -	dB
Input return loss Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	RL_{in}	- -	10 10	- -	dB
Output return loss Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	RL_{out}	- -	8 8	- -	dB
Gain Control Range Vcon=2 V ... -2V; Vd=3V; I=45mA	dG	50	55	-	dB
1dBm gain compression Vd=3V; I=45mA; Vcon=2V Vd=5V; I=70mA; Vcon=2V	P_{1dB}		14 20		dBm

Application Circuit

$f=800\text{MHz to }2\text{GHz}$



Frequency	900 MHz	1.8 GHz
L1	27 nH	27 nH
L2	22 nH	22 nH
C1	12 pF	12 pF
C2	12 pF	12 pF
C3	680 pF	680 pF
C4	22 pF	22 pF
C5		680 pF
R1	470 Ohm	470 Ohm
R2	510 Ohm	510 Ohm

C1 , C2 Siemens B37490-K5120-J62

C4 Siemens B37940-K5220-J62

C3 , C5 Siemens B37940-K5681-J62

R1 Siemens B54102-A1471-J60

R2 Siemens B53102-A1511-J60

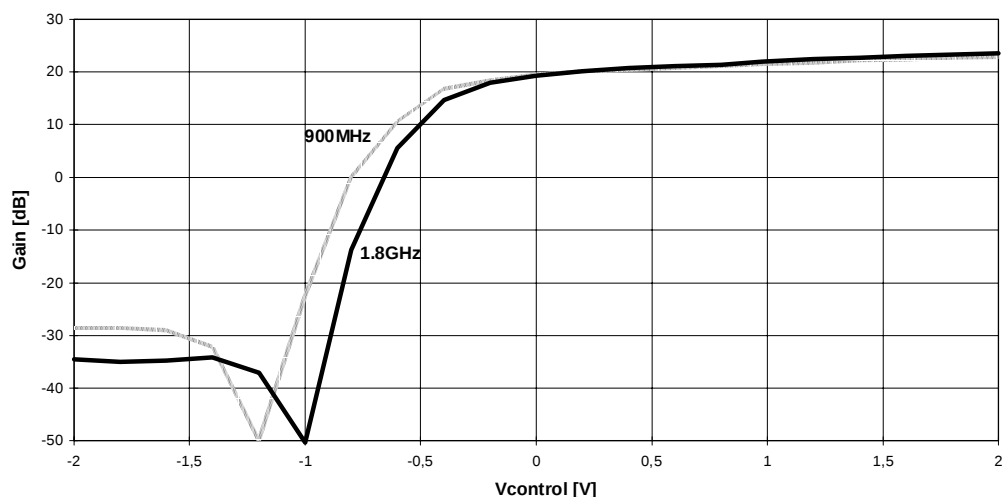
L1 Coilcraft 0805CS-270XMBC

L2 Coilcraft 0805CS-220XMBC

For optimized device performance, V_g has to be adapted ($V_g \approx -1\text{V} \dots 0\text{V}$) to $I \approx 45\text{mA}$ at V_d -supply under condition $V_{\text{control}}=+2\text{V}$.

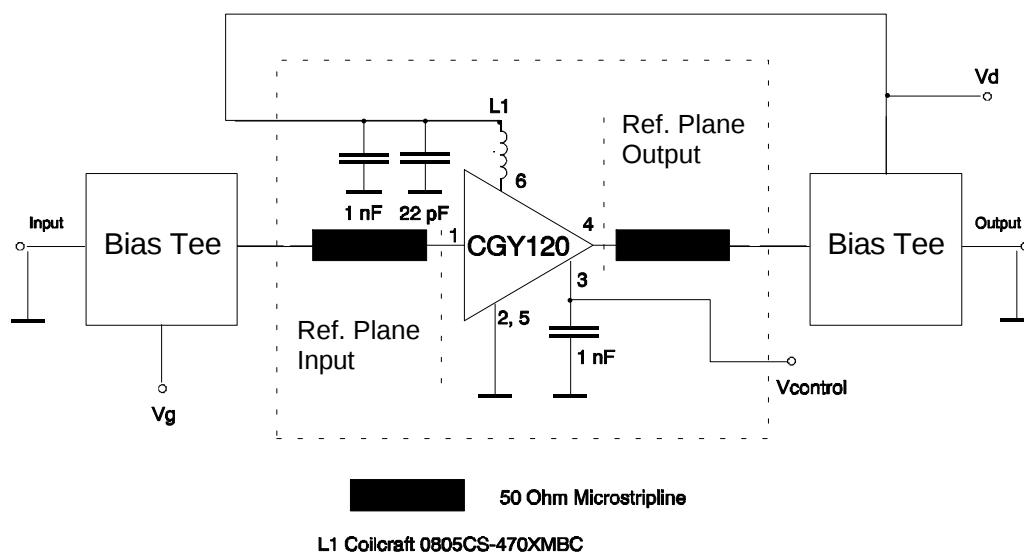
Gain vs. Vcontrol

Operating Conditions : $V_d=3\text{V}$, $I_d=45\text{mA}$, $P_{\text{in}}=-20\text{dBm}$



Test setup for measuring S-parameters

f=10MHz to 3GHz

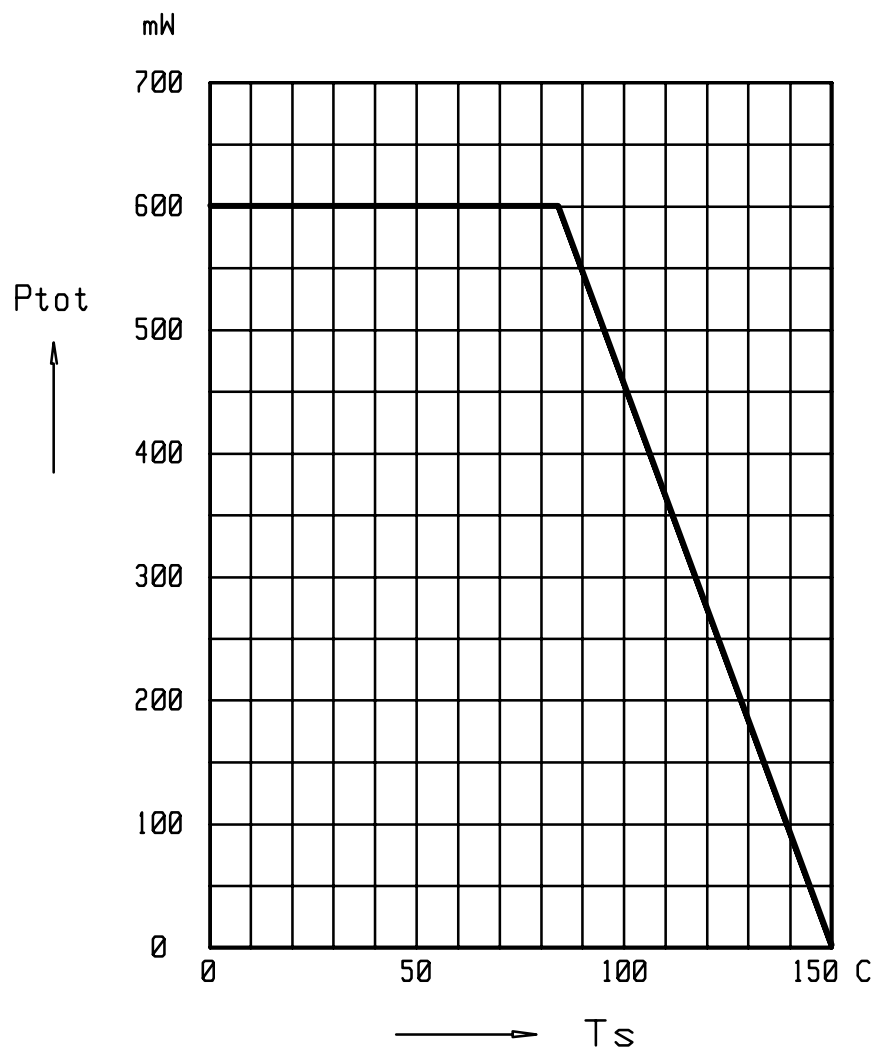


For optimized device performance, V_g has to be adapted ($V_g \approx -1V \dots 0V$) to $I \approx 45mA$ at V_d -supply under condition $V_{control}=+2V$.

Measurement conditions: Vd=3V, Id=45mA, Vcon=2V

GHz S MA R 50

!f GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.100	0.84	-31.2	4.97	85.4	0.00512	155.7	0.31	81.6
0.200	0.68	-60.8	11.53	49.2	0.01753	100.4	0.32	2.9
0.300	0.51	-80.7	14.66	21.6	0.02396	71.8	0.30	-45.5
0.400	0.41	-96.1	16.30	1.7	0.02601	57.7	0.28	-76.5
0.500	0.34	-110.9	17.39	-15.1	0.02739	51.2	0.27	-99.4
0.600	0.29	-127.3	18.25	-30.4	0.02791	46.5	0.27	-118.4
0.700	0.29	-148.9	19.28	-43.7	0.02873	41.7	0.26	-141.0
0.800	0.24	-179.9	19.69	-60.9	0.02804	40.0	0.25	-159.3
0.900	0.21	146.5	19.56	-78.2	0.02608	40.9	0.21	-179.2
1.000	0.20	120.6	18.58	-94.5	0.02722	43.4	0.18	169.0
1.100	0.23	93.7	17.31	-110.6	0.02705	43.1	0.16	147.5
1.200	0.26	71.8	15.51	-125.2	0.02537	44.5	0.14	124.4
1.300	0.29	55.1	13.62	-138.6	0.02493	49.1	0.12	100.0
1.400	0.32	42.2	11.80	-150.5	0.02380	55.7	0.12	74.7
1.500	0.35	31.4	10.12	-160.7	0.02389	63.9	0.12	51.9
1.600	0.37	22.4	8.55	-170.6	0.02441	69.4	0.14	31.2
1.700	0.36	13.2	7.46	-174.4	0.02464	79.2	0.12	6.7
1.800	0.36	9.4	6.65	177.5	0.02872	87.1	0.12	7.1
1.900	0.36	6.6	5.88	170.8	0.03307	90.8	0.13	2.5
2.000	0.37	3.9	5.20	164.3	0.03675	94.9	0.14	-0.5
2.100	0.37	1.3	4.59	158.3	0.04202	97.5	0.15	-2.8
2.200	0.37	-1.2	4.13	152.9	0.04801	99.2	0.16	-4.7
2.300	0.37	-3.5	3.67	147.5	0.05315	100.8	0.17	-8.1
2.400	0.37	-5.1	3.31	142.6	0.05874	101.6	0.17	-10.9
2.500	0.37	-6.9	2.95	138.3	0.06440	101.6	0.17	-12.9
2.600	0.36	-10.0	2.74	134.1	0.07210	102.5	0.17	-14.8
2.700	0.35	-13.2	2.51	129.8	0.07855	102.5	0.16	-18.7
2.800	0.33	-14.5	2.34	124.8	0.08686	103.1	0.15	-20.6
2.900	0.32	-16.4	2.16	119.1	0.09724	102.5	0.15	-21.5
3.000	0.30	-17.9	1.97	113.8	0.10700	101.6	0.15	-25.0

Total Power Dissipation $P_{\text{tot}} = f(T_s)$ 

Permissible Pulse Load $P_{\text{tot_max}} / P_{\text{tot_DC}} = f(t_p)$ 