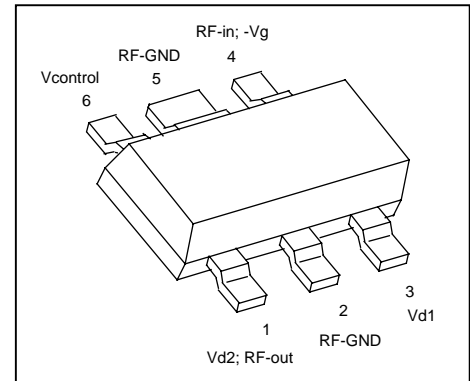


## GaAs MMIC

### Preliminary Datasheet

- Variable gain amplifier (MMIC-Amplifier) for mobile communication
- Typical Gain Control range over 50dB
- Positive Control Voltage
- 50Ω input and output matched
- Low power consumption
- Operating voltage range: 2.7 to 6 V
- Frequency range 800 MHz ... 2.5 GHz



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

Type	Marking	Ordering code (taped)	Package <sup>1)</sup>
CGY 121 A	Y9S	Q-62702-G66	MW-6

### Maximum ratings

Characteristics	Symbol	max. Value	Unit
Drain voltage	$V_D$	8	V
Neg. supply voltage	$V_G$	-8	V
Pos. control voltage	$V_{con}$	4	V
Channel temperature	$T_{Ch}$	150	°C
Storage temperature range	$T_{stg}$	-55...+150	°C
Total power dissipation ( $T_S \leq 81^\circ\text{C}$ ) <sup>2)</sup>	$P_{tot}$	550	mW

### Thermal resistance

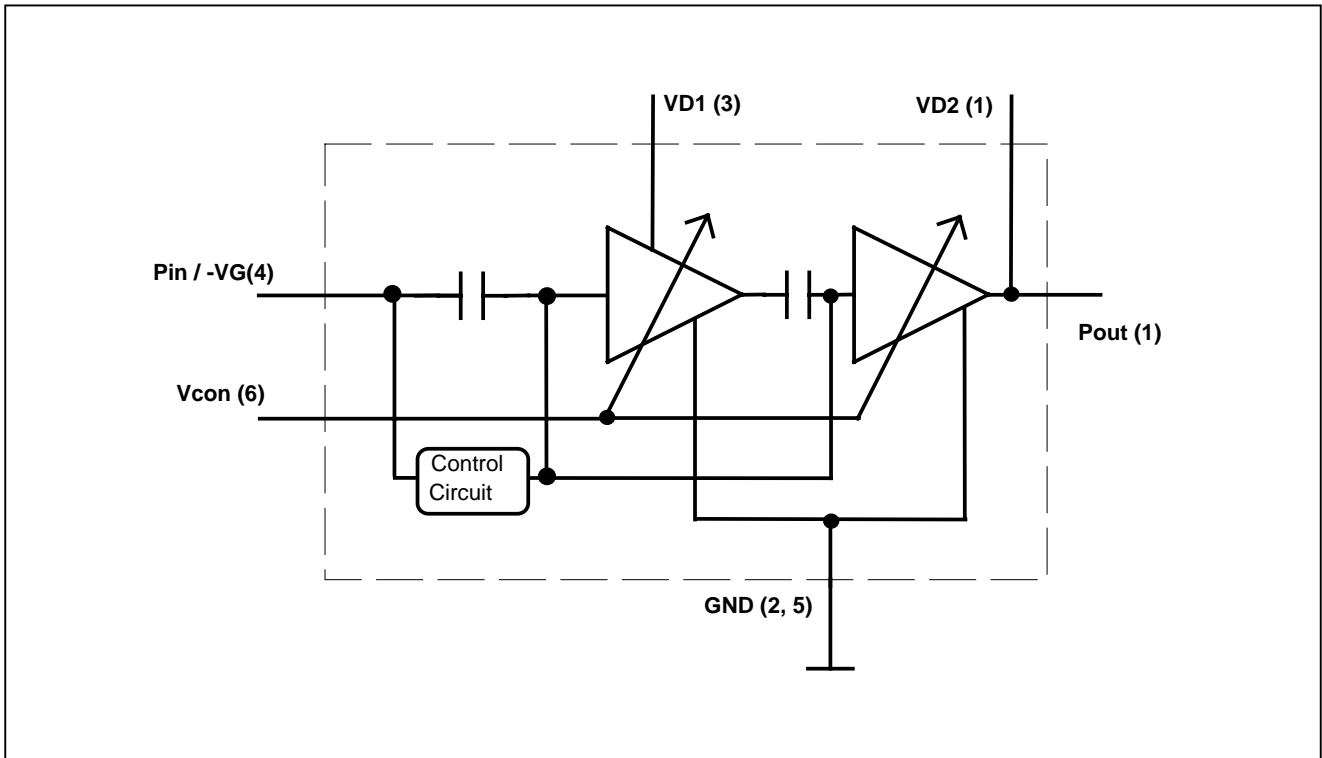
Characteristics	Symbol	max. Value	Unit
Channel-soldering point (GND)	$R_{thChS}$	125	K/W

<sup>1)</sup> Dimensions see page 9.

<sup>2)</sup> Please care for sufficient heat dissipation on the pcb!

<sup>\*)</sup> Pin-out changed compared to CGY120: 180° rotation

**Functional block diagram:**



Pin #	Name	Configuration
1	<b>VD2 / Pout</b>	Drain voltage 2nd stage / RF-Output
2	<b>RF-Gnd</b>	
3	<b>VD1</b>	Drain voltage 1st stage
4	<b>VG / Pin</b>	Negative voltage at current control circuit (-4V) / RF-Input
5	<b>RF-Gnd</b>	
6	<b>Vcontrol</b>	Positive voltage for gain control (0V....3V)

### Electrical characteristics

( $T_A = 25^\circ\text{C}$ ,  $f = 900\text{ MHz}$ ,  $V_g = -4\text{V}$ ,  $R_S = R_L = 50\ \Omega$  unless otherwise specified)

Characteristics	Symbol	min	typ	max	Unit
Power Gain $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$G$	17	19	-	dB
Input return loss $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$RL_{in}$	-	11	-	dB
Output return loss $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$RL_{out}$	-	10	-	dB
Gain Control Range $V_{con}=3\text{ V} \dots 0\text{V}$ ; $V_d=3\text{V}$ ; $I=45\text{mA}$	$dG$	48	53	-	dB
1dB gain compression $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$P_{1dB}$	-	14	-	dBm

### Electrical characteristics

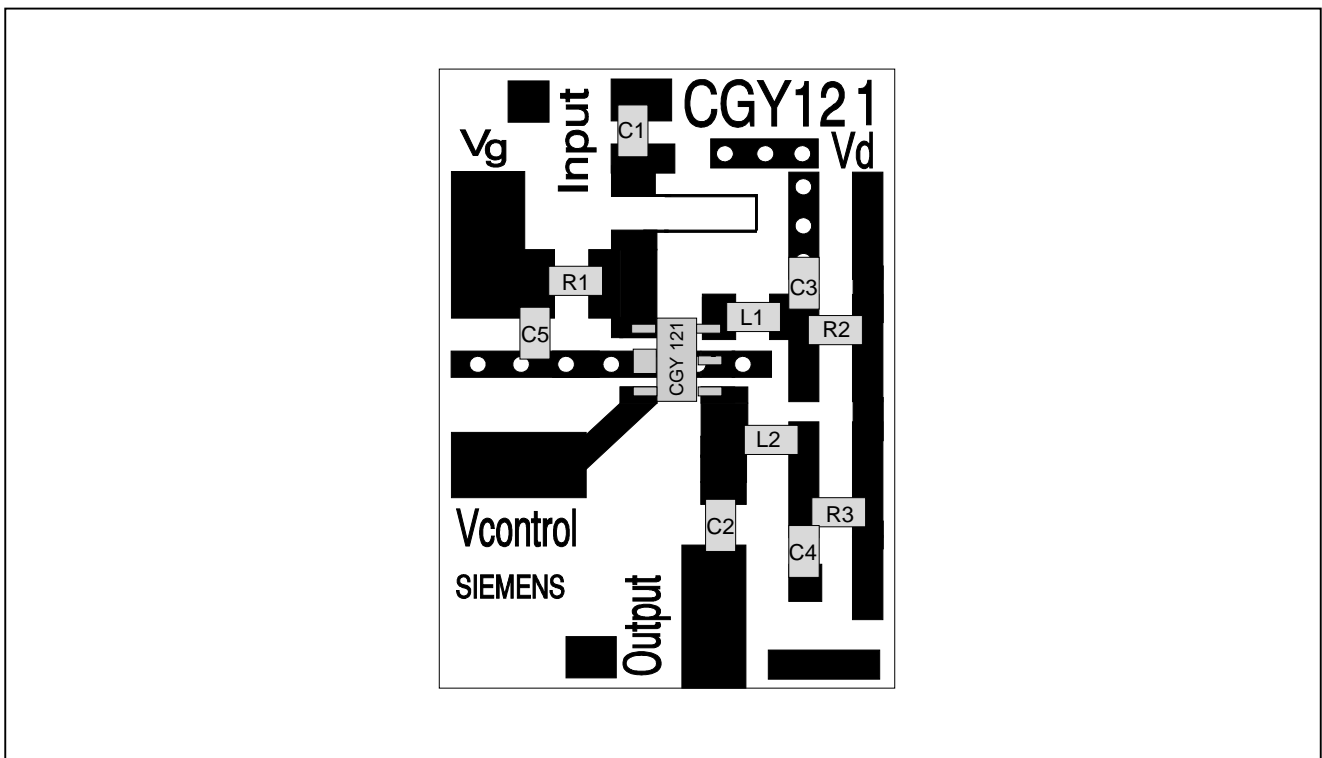
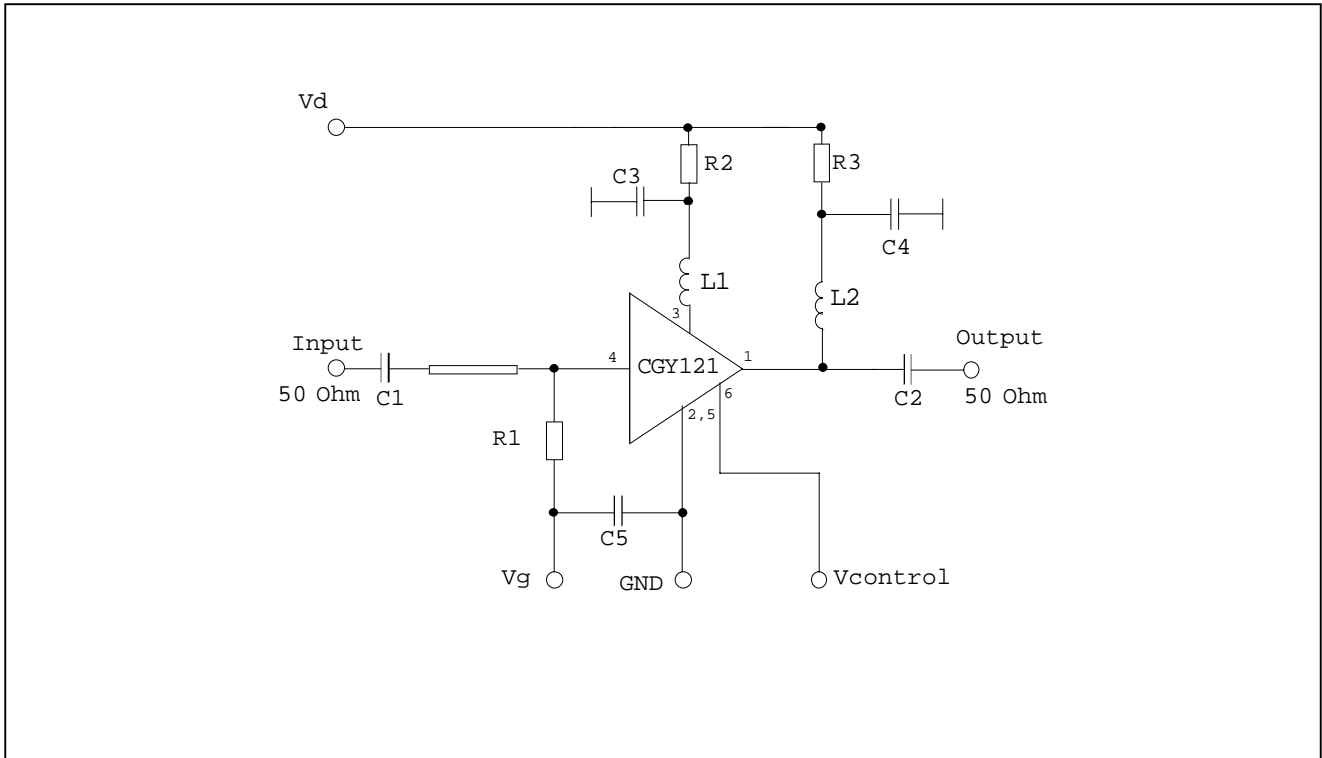
( $T_A = 25^\circ\text{C}$ ,  $f = 1800\text{ MHz}$ ,  $V_g=-4\text{V}$ ,  $R_S = R_L = 50\ \Omega$  unless otherwise specified)

Characteristics	Symbol	min	typ	max	Unit
Power Gain $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$G$	15.5	17.5	-	dB
Input return loss $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$RL_{in}$	-	10	-	dB
Output return loss $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$RL_{out}$	-	8.5	-	dB
Gain Control Range $V_{con}=3\text{ V} \dots 0\text{V}$ ; $V_d=3\text{V}$ ; $I=45\text{mA}$	$dG$	48	53	-	dB
1dB gain compression $V_d=3\text{V}$ ; $I=45\text{mA}$ ; $V_{con}=3\text{V}$	$P_{1dB}$	-	14	-	dBm

### DC characteristics

Characteristics	Symbol	min	typ	max	Unit
Gate current (Pin 4) $V_g=-4\text{V}$	$I_g$	-	1.0	-	mA
Control current (Pin 6) $V_g=-4\text{V}$ ; $V_{con}=0\text{V}\dots3\text{V}$	$I_c$	-	0.5	-	mA
Supply current $V_g = -4\text{V}$ ; $V_{con} = 3\text{V}$	$I_d$	-	45	-	mA

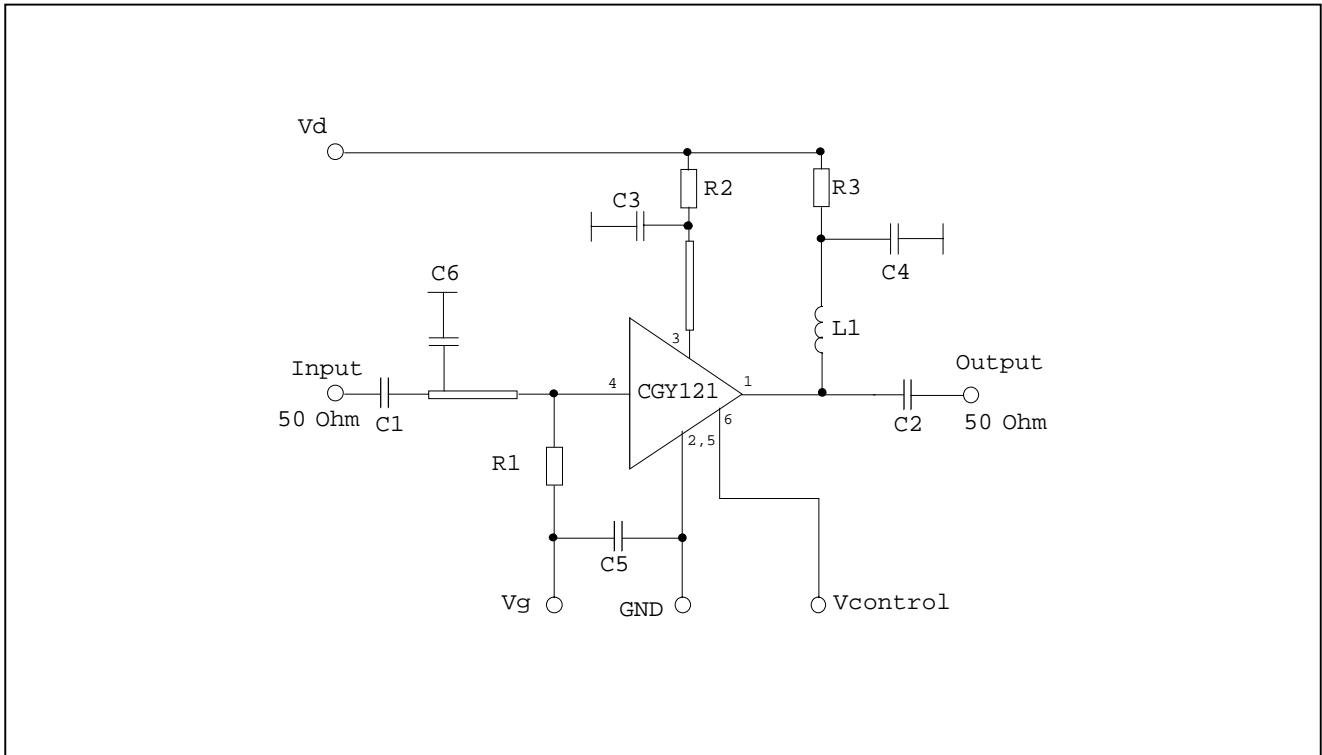
## Application Circuit f = 900 MHz

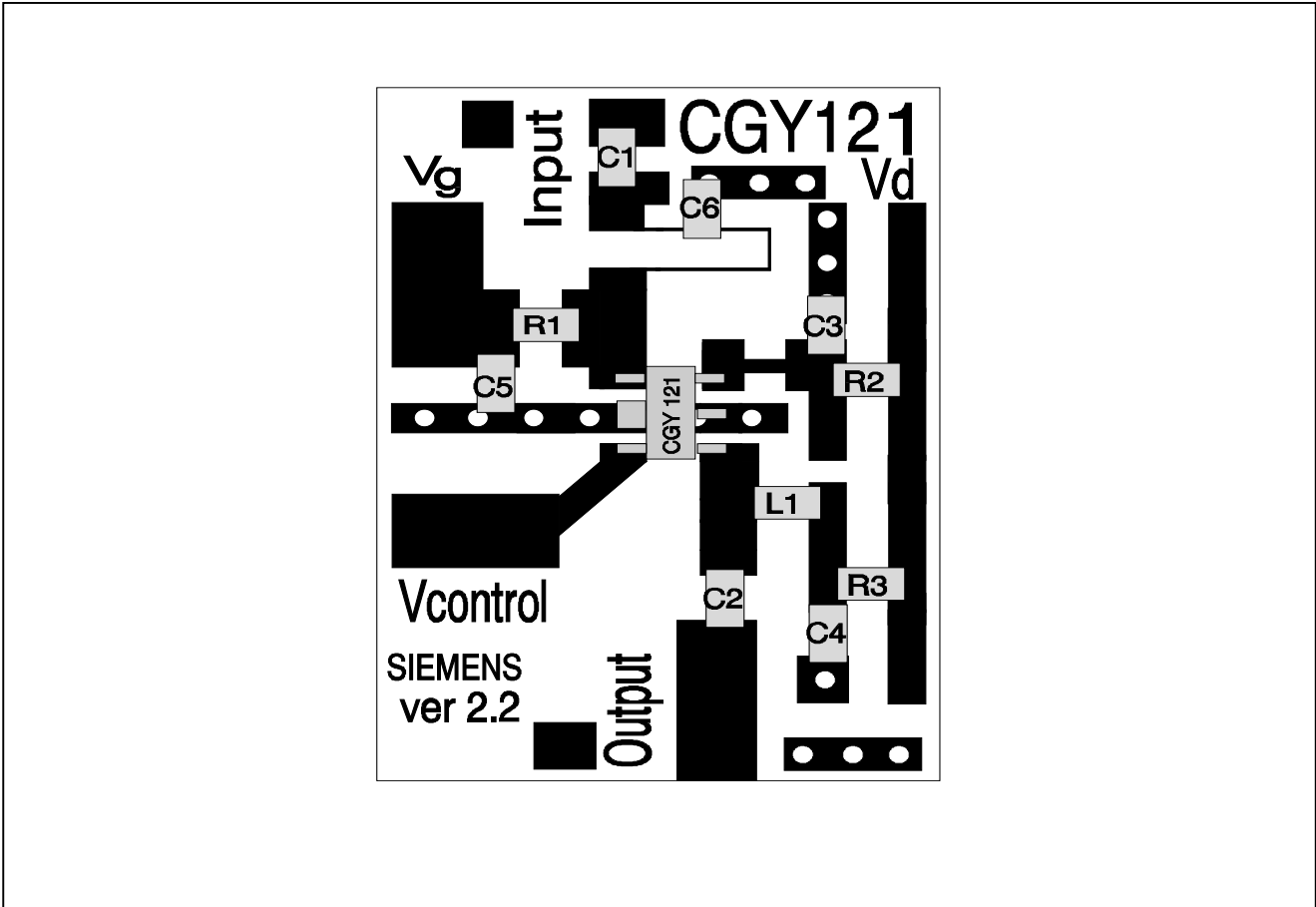


## Parts List

Frequency	900 MHz	
C1, C2 (Siemens Size 0603)	22 pF	0603
C3, C4 (Siemens Size 0603)	100 nF	0603
C5 (Siemens Size 0603)	47 nF	0603
L1 (Coilcraft 0805CS-150XKBC)	15 nH	0805
L2 (Coilcraft 0805CS-270XMBC)	27 nH	0805
R1 (Siemens B 54102-A1271-J60)	270 Ohm	0805
R2 (Siemens B 54102-A1120-J60)	12 Ohm	0805
R3	6.8 Ohm	0805

## Application Circuit f = 1900 MHz



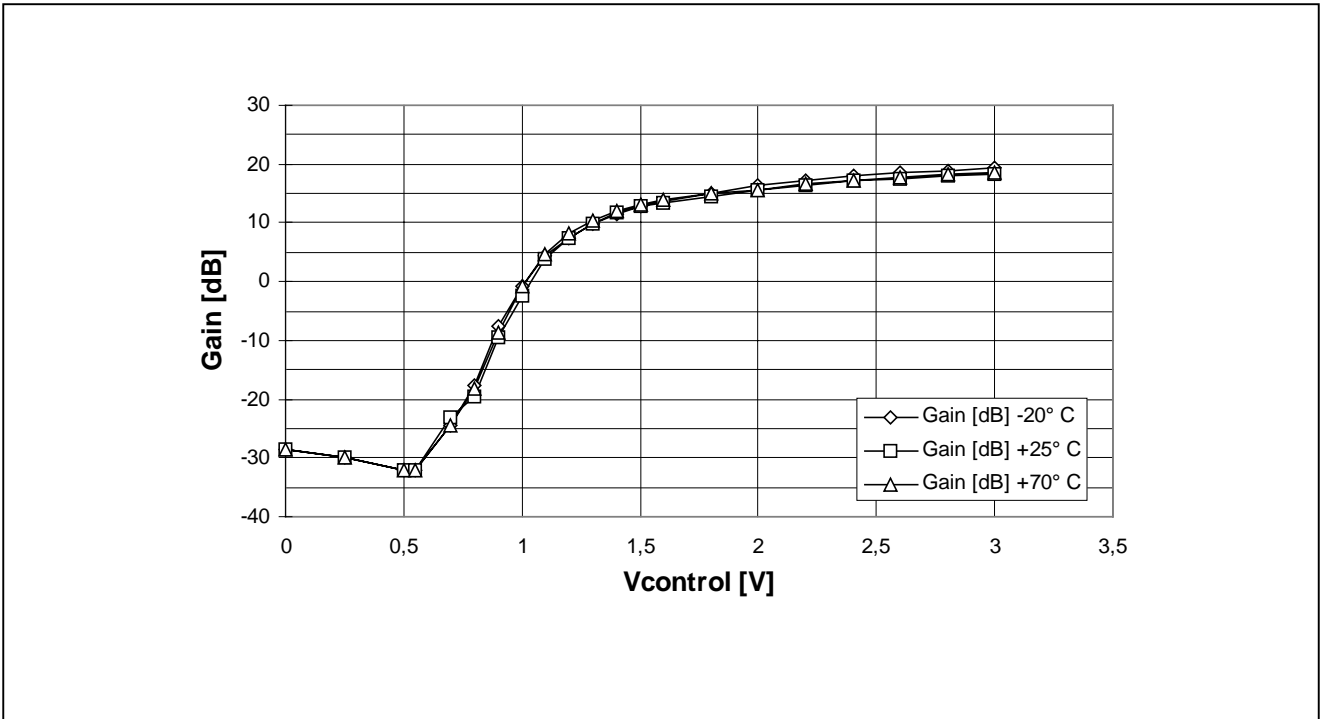


### Parts List

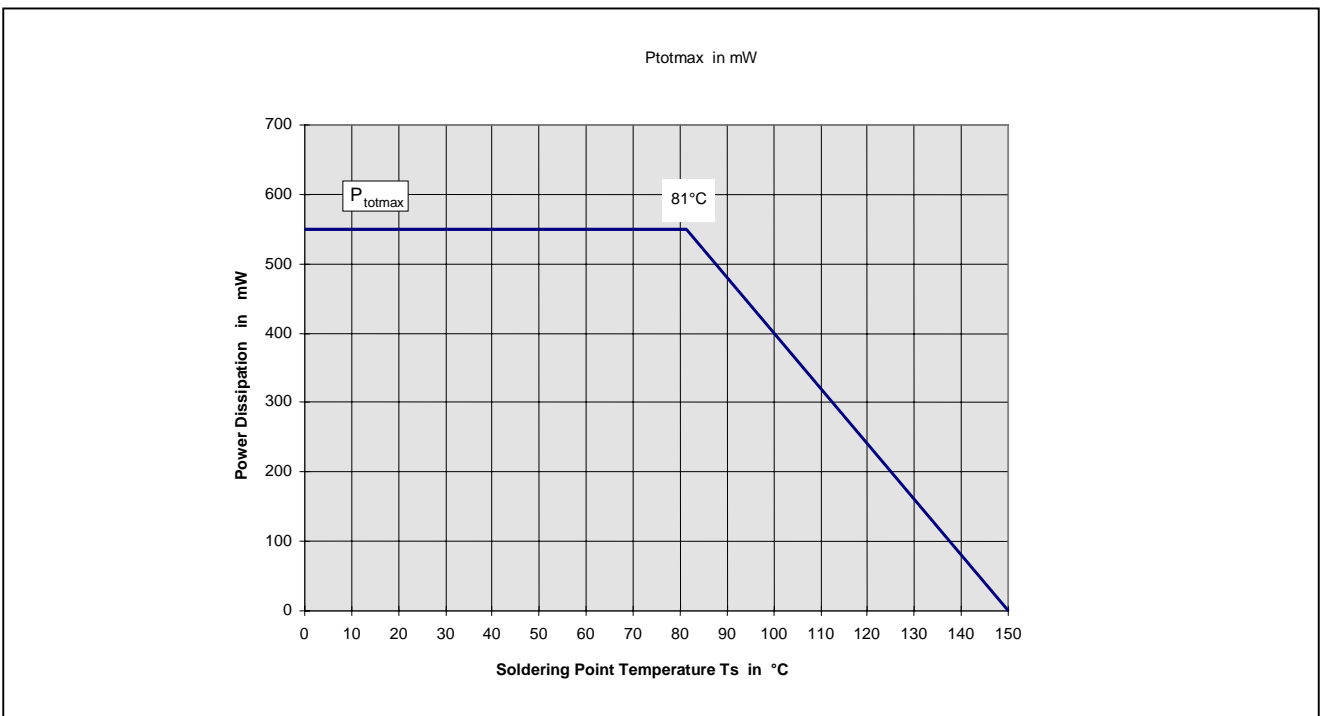
Frequency	1900 MHz	
C1, C2 (Siemens size 0603)	12 pF	0603
C3, C4 (Siemens size 0603)	100 nF	0603
C5 (Siemens size 0603)	47 nF	0603
C6 (Siemens size 0603)	1.2 pF	0603
L1 (Coilcraft 0805CS-150XKBC)	15 nH	0805
R1 (Siemens B 54102-A1271-J60)	270 Ohm	0805
R2 (Siemens B 54102-A1120-J60)	12 Ohm	0805
R3	2.7 Ohm	0805

Gain vs. Vcontrol

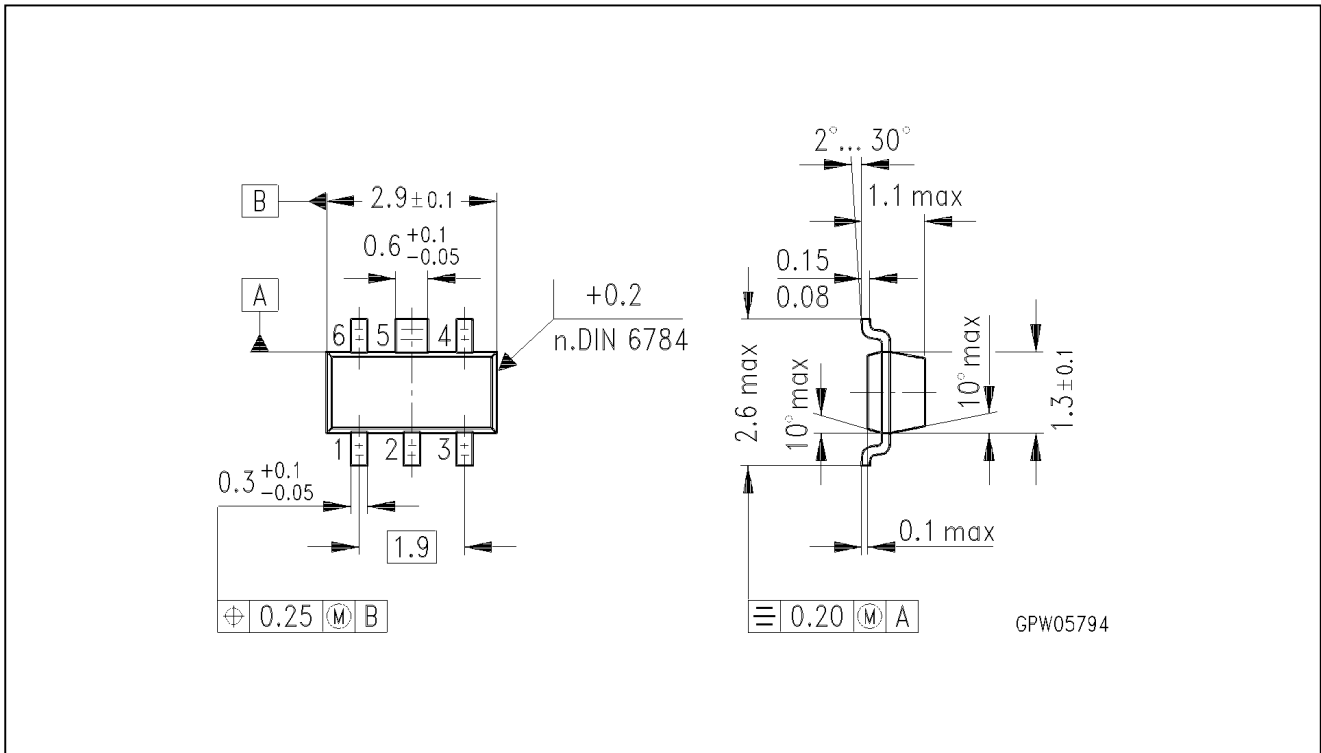
Operating Conditions : Vd=3V, Vg=-4V, f = 1.9GHz, Pin=-10dBm



Total Power Dissipation Ptot = f(Ts)



**Semiconductor Device Outline MW-6**



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