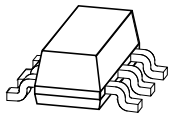
GaAs MMIC

CGY 121 A

Data Sheet

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



MW-6

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

Type	**Marking**	**Ordering Code** (taped)	**Package**[1)]
CGY 121 A	Y9S	Q62702-G66	MW-6

1) Dimensions see **Page 11**.

Maximum Ratings	**Symbol**	**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 ($T_S \leq 81$ °C)[1)]	P_{tot}	550	mW

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

Thermal Resistance	**Symbol**	**Value**	**Unit**
Channel-soldering point (GND)	R_{thChS}	125	K/W

Functional Block Diagram

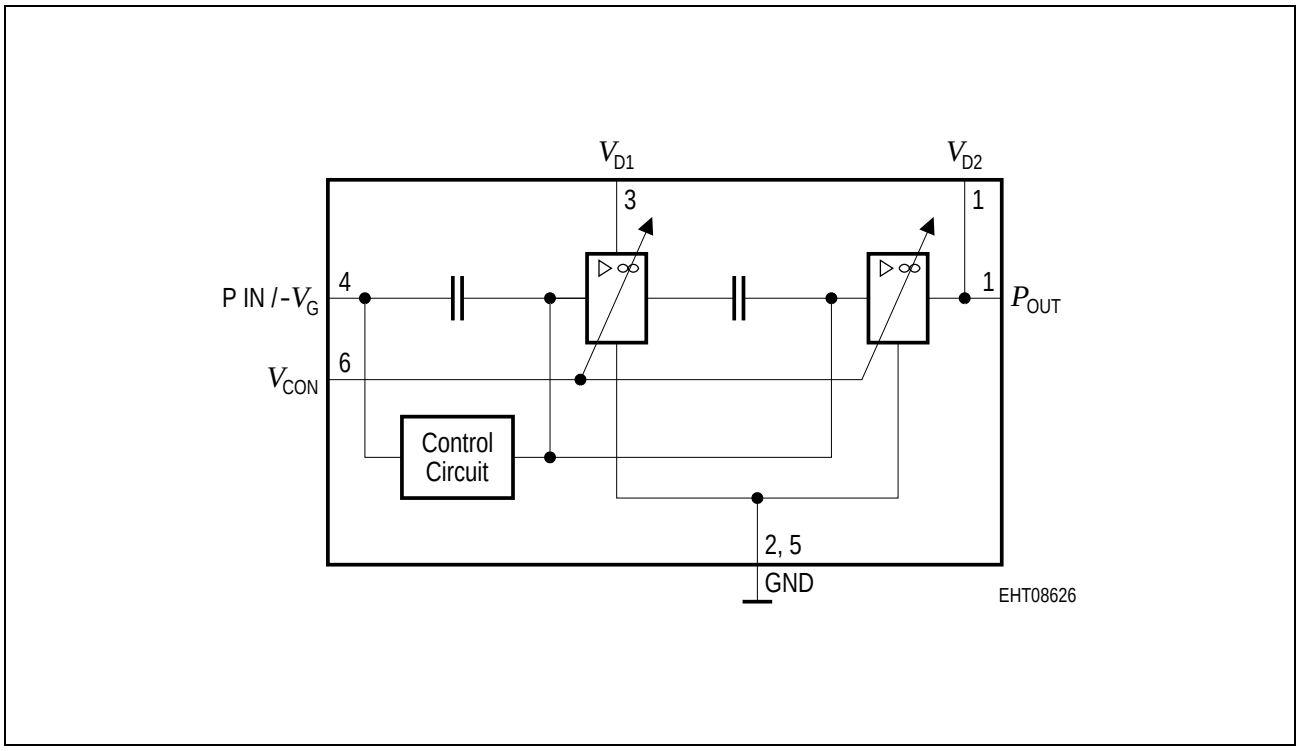


Figure 1

Pin #	Symbol	Configuration
1	VD2/Pout	Drain voltage 2nd stage/RF-0utput
2	RF-Gnd	–
3	VD1	Drain voltage 1st stage
4	VG/Pin	Negative voltage at current control circuit (– 4 V)/RF-Input
5	RF-Gnd	–
6	Vcontrol	Positive voltage for gain control (0 V … 3 V)

Electrical Characteristics

T_A = 25 °C, f = 900 MHz, V_g = – 4 V, R_S = R_L = 50 Ω; unless otherwise specified

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Power Gain	G	17	19	–	dB	V_d = 3 V; V_{con} = 3 V
Input return loss	RL_{in}	–	11	–	dB	V_d = 3 V; V_{con} = 3 V
Output return loss	RL_{out}	–	10	–	dB	V_d = 3 V; V_{con} = 3 V
Gain Control Range	dG	48	54	–	dB	V_{con} = 3 V … 0 V; V_d = 3 V
1 dB gain compression	$P_{1dB\ out}$	–	14	–	dBm	V_d = 3 V; V_{con} = 3 V

Electrical Characteristics

T_A = 25 °C, f = 1800 MHz, V_g = – 4 V, R_S = R_L = 50 Ω; unless otherwise specified

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Power Gain	G	16.5	18.5	–	dB	V_d = 3 V; V_{con} = 3 V
Input return loss	RL_{in}	–	10	–	dB	V_d = 3 V; V_{con} = 3 V
Output return loss	RL_{out}	–	9.0	–	dB	V_d = 3 V; V_{con} = 3 V
Gain Control Range	dG	48	53	–	dB	V_{con} = 3 V … 0 V; V_d = 3 V
1 dB gain compression	$P_{1dB\ out}$	–	14	–	dBm	V_d = 3 V; V_{con} = 3 V

DC Characteristics

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Gate current (Pin 4)	I_g	–	1.0	–	mA	V_d = 3 V, V_g = – 4 V
Control current (Pin 6)	I_c	–	0.5	–	mA	V_d = 3 V, V_g = – 4 V, V_{con} = 0 V … 3 V
Supply current	I_d	–	45	–	mA	V_d = 3 V, V_g = – 4 V, V_{con} = 3 V

Electrical Characteristics

T_A = 25 °C, f = 900 MHz, V_g = – 4 V, R_S = R_L = 50 Ω; unless otherwise specified

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Power Gain	G	17.5	20	–	dB	V_d = 5 V; V_{con} = 3 V
Input return loss	RL_{in}	–	11	–	dB	V_d = 5 V; V_{con} = 3 V
Output return loss	RL_{out}	–	10	–	dB	V_d = 5 V; V_{con} = 3 V
Gain Control Range	dG	48	54	–	dB	V_{con} = 3 V … 0 V; V_d = 5 V
1 dB gain compression	$P_{1dB\ out}$	–	15	–	dBm	V_d = 5 V; V_{con} = 3 V

Electrical Characteristics

T_A = 25 °C, f = 1800 MHz, V_g = – 4 V, R_S = R_L = 50 Ω; unless otherwise specified

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Power Gain	G	17.0	19	–	dB	V_d = 5 V; V_{con} = 3 V
Input return loss	RL_{in}	–	10	–	dB	V_d = 5 V; V_{con} = 3 V
Output return loss	RL_{out}	–	8.5	–	dB	V_d = 5 V; V_{con} = 3 V
Gain Control Range	dG	48	53	–	dB	V_{con} = 3 V … 0 V; V_d = 5 V
1 dB gain compression	$P_{1dB\ out}$	–	15	–	dBm	V_d = 5 V; V_{con} = 3 V

DC Characteristics

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Gate current (Pin 4)	I_g	–	1.3	–	mA	V_d = 5 V, V_g = – 4 V
Control current (Pin 6)	I_c	–	0.8	–	mA	V_d = 5 V, V_g = – 4 V, V_{con} = 0 V … 3 V
Supply current	I_d	–	48	–	mA	V_d = 5 V, V_g = – 4 V, V_{con} = 3 V

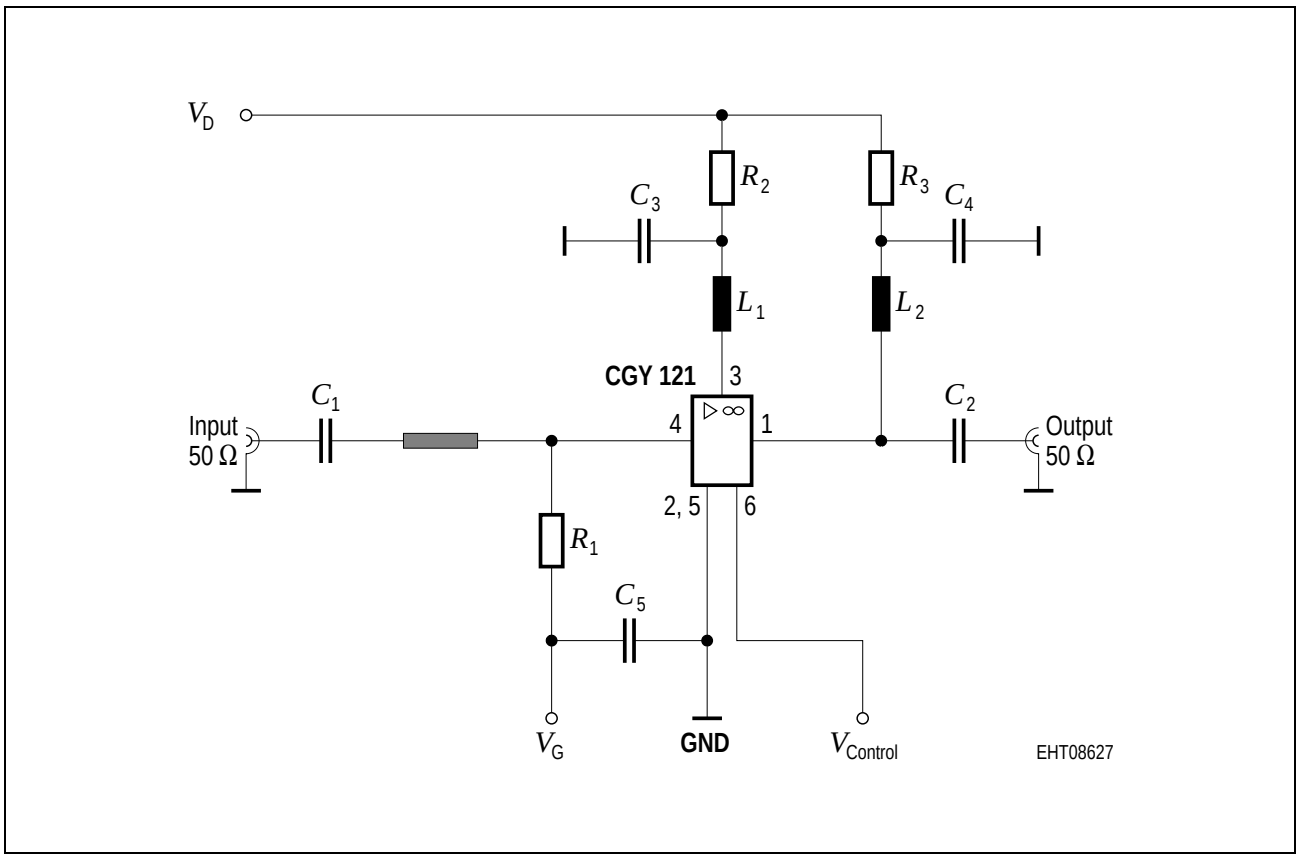


Figure 2 Application Circuit (*f* = 900 MHz)

Parts List (Frequency: 900 MHz)

C_1, C_2	22 pF	L_2	27 nH
C_3, C_4	100 nF	R_1	270 Ω
C_5	47 nF	R_2	12 Ω
L_1	15 nH	R_3	6.8 Ω

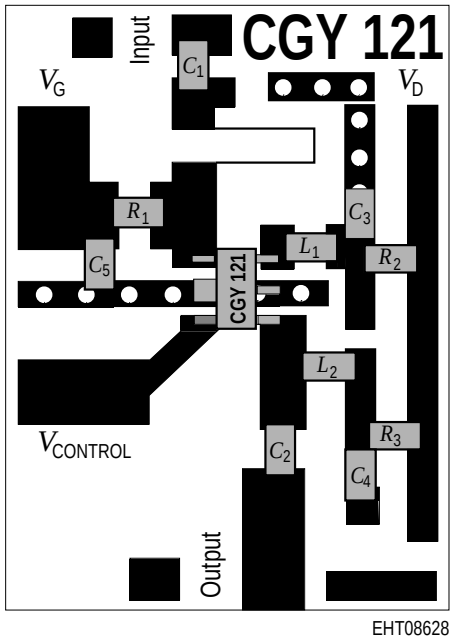


Figure 3

L_1 Coilcraft 0805CS-150XKBC

L_2 Coilcraft 0805CS-270XMBC

R_2 Epcos B 54102-A1120-J60

C_1 ... C_5 Epcos Size 0603

R_1 Epcos B 54102-A1271-J60

R_3 Epcos Size 0805

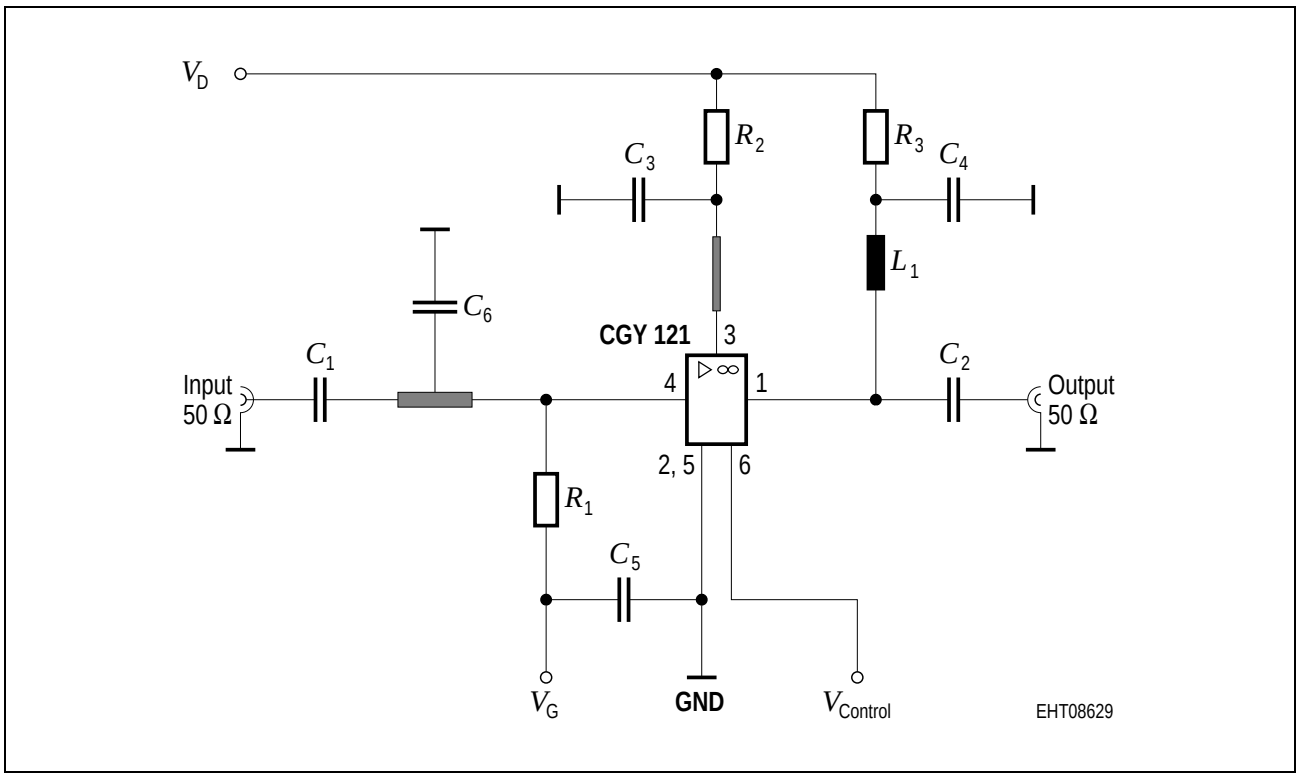


Figure 4 Application Circuit (*f* = 1800 MHz)

Parts List (Frequency: 1900 MHz)

C_1, C_2	12 pF	L_1	15 nH
C_3, C_4	100 nF	R_1	270 Ω
C_5	47 nF	R_2	12 Ω
C_6	1.2 pF	R_3	2.7 Ω

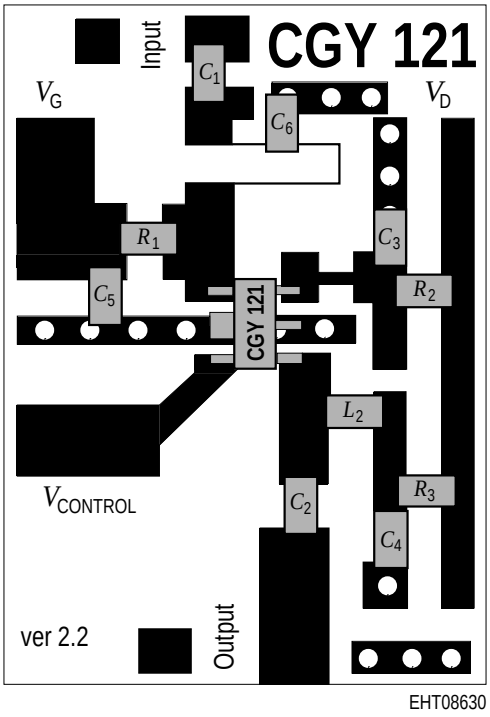


Figure 5

L_1 Coilcraft 0805CS-150XKBC

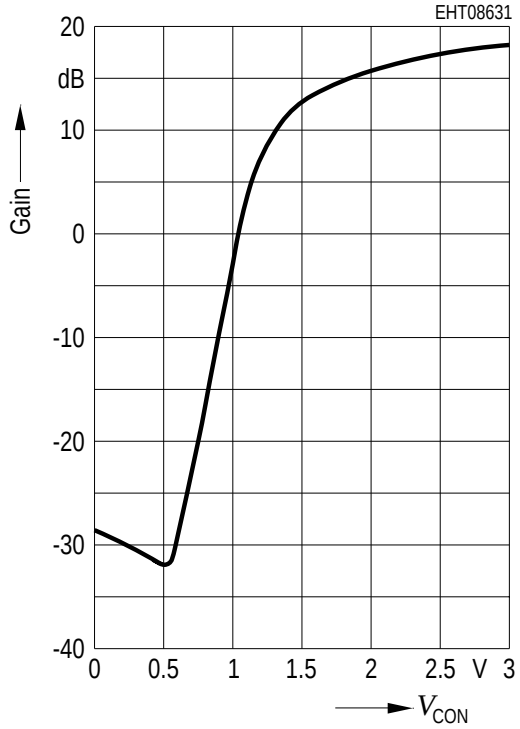
C_1 … C_6 Epcos size 0603

R_1 Epcos B 54102-A1271-J60

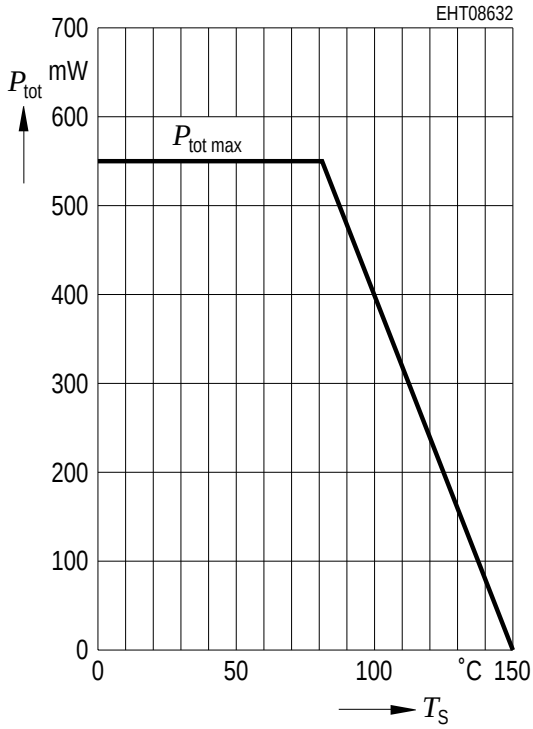
R_2 Epcos B 54102-A1120-J60

R_3 Epcos Size 0805

Gain vs. $V_{control}$, Operating Conditions:
V_d = 3 V, V_g = – 4 V, f = 1.9 GHz,
P_{in} = – 10 dBm

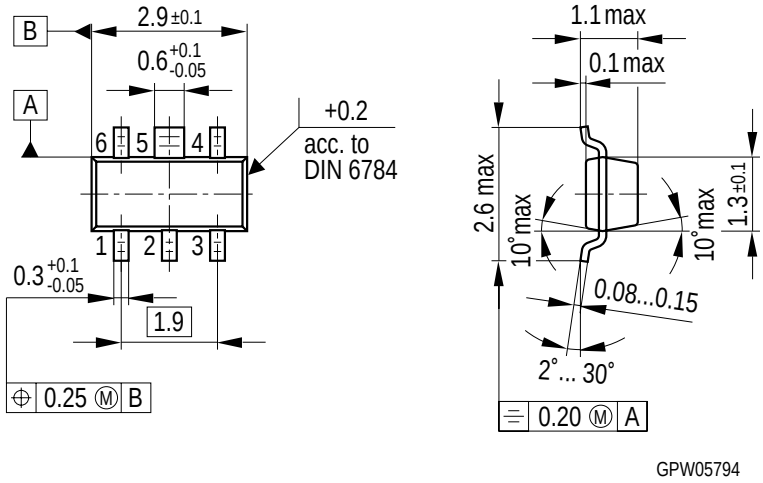


Total Power Dissipation
$P_{tot} = f(T_s)$



Package Outlines

MW-6
(Special Package)



Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm