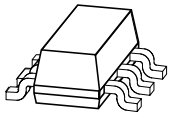
GaAs MMIC

CGY 121 B

Data Sheet

- Variable gain amplifier (MMIC-Amplifier) for mobile communication
- 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 B	Y0S	Q62702-G0071	MW-6

1) Dimensions see **Page 11**.

Maximum Ratings

Parameter	**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

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

Functional Block Diagram

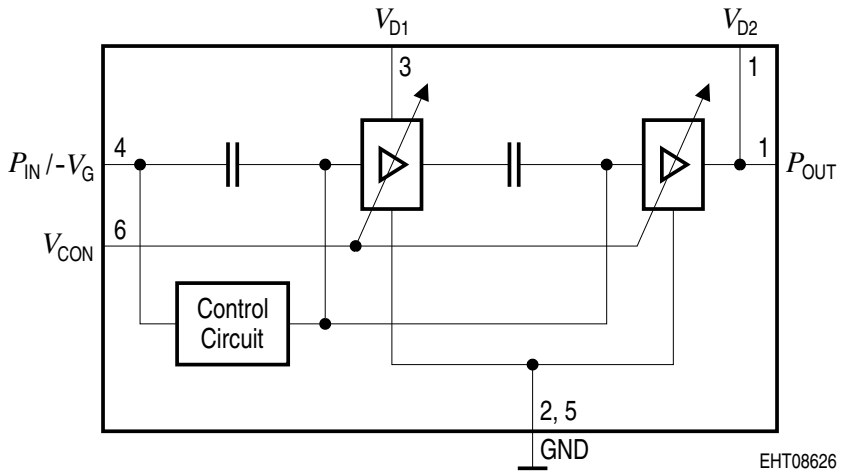


Figure 1

Pin Configuration

Pin No.	Symbol	Configuration
1	V_{D2}/P_{OUT}	Drain voltage 2nd stage/RF-0utput
2	RF-GND	–
3	V_{D1}	Drain voltage 1st stage
4	V_G/P_{IN}	Negative voltage at current control circuit (– 4 V)/RF-Input
5	RF-GND	–
6	$V_{Control}$	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	–	20.5	–	dB	V_D = 3 V; V_{CON} = 3 V
Input return loss	RL_{IN}	–	13	–	dB	V_D = 3 V; V_{CON} = 3 V
Output return loss	RL_{OUT}	–	11	–	dB	V_D = 3 V; V_{CON} = 3 V
Gain Control Range	dG	–	54	–	dB	V_{CON} = 3 V … 0 V; V_D = 3 V
1 dB gain compression	$P_{1dB\ OUT}$	–	15	–	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	–	19.5	–	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	–	dB	V_D = 3 V; V_{CON} = 3 V
Gain Control Range	dG	–	53	–	dB	V_{CON} = 3 V … 0 V; V_D = 3 V
1 dB gain compression	$P_{1dB\ OUT}$	–	15	–	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	–	70	–	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	–	21	–	dB	V_D = 5 V; V_{CON} = 3 V
Input return loss	RL_{IN}	–	13	–	dB	V_D = 5 V; V_{CON} = 3 V
Output return loss	RL_{OUT}	–	11	–	dB	V_D = 5 V; V_{CON} = 3 V
Gain Control Range	dG	–	54	–	dB	V_{CON} = 3 V … 0 V; V_D = 5 V
1 dB gain compression	$P_{1dB\ OUT}$	–	16	–	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	–	20	–	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}	–	9	–	dB	V_D = 5 V; V_{CON} = 3 V
Gain Control Range	dG	–	54	–	dB	V_{CON} = 3 V … 0 V; V_D = 5 V
1 dB gain compression	$P_{1dB\ OUT}$	–	16	–	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	–	75	–	mA	V_D = 5 V, V_G = – 4 V, V_{CON} = 3 V

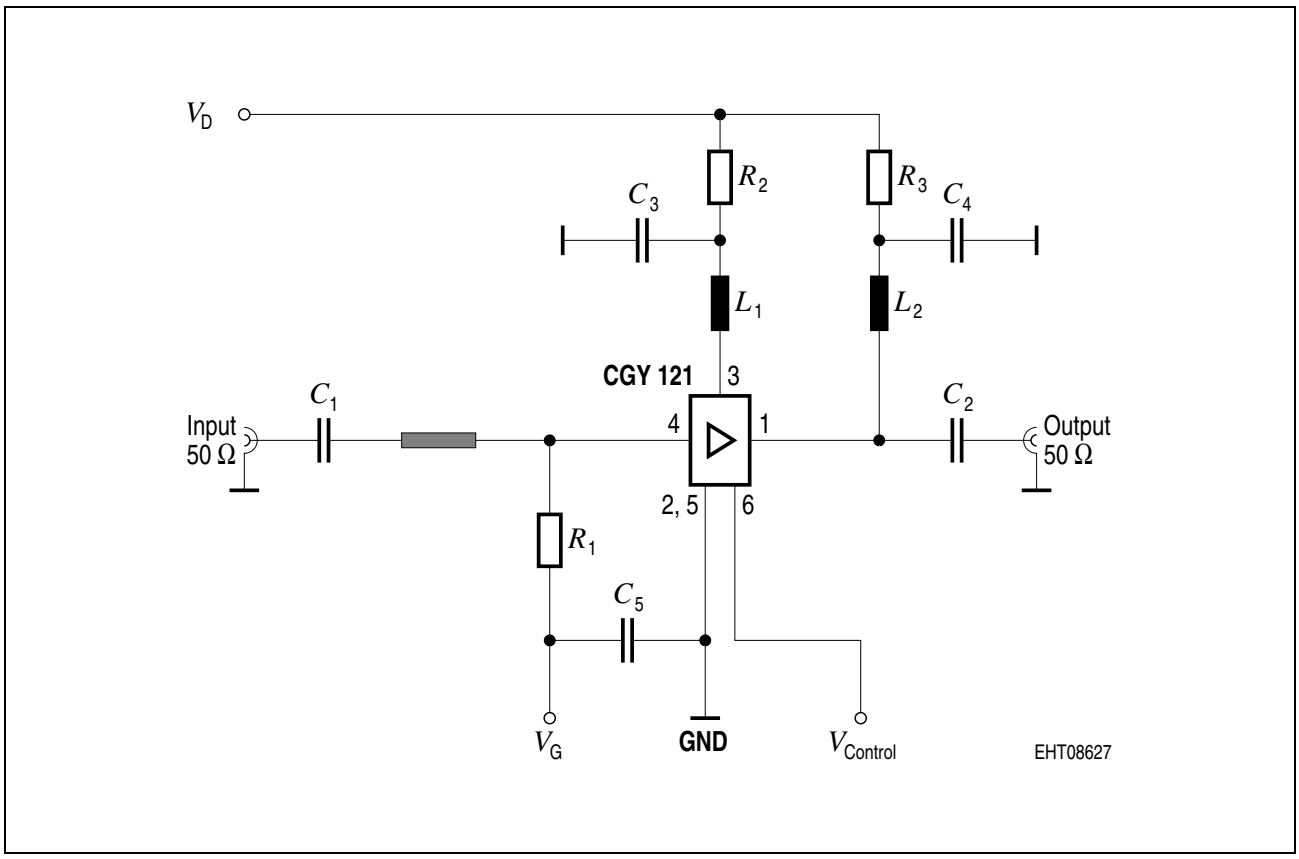


Figure 2 Application Circuit: f = 900 MHz

Parts List (f = 900 MHz)

C_1, C_2	22 pF	C_1 … C_5 Epcos Size 0603
C_3, C_4	100 nF	
C_5	47 nF	
L_1	15 nH	Coilcraft 0805CS-150XKBC
L_2	27 nH	Coilcraft 0805CS-270XMBC
R_1	270 Ω	Epcos B 54102-A1271-J60
R_2	12 Ω	Epcos B 54102-A1120-J60
R_3	6.8 Ω	Epcos Size 0805

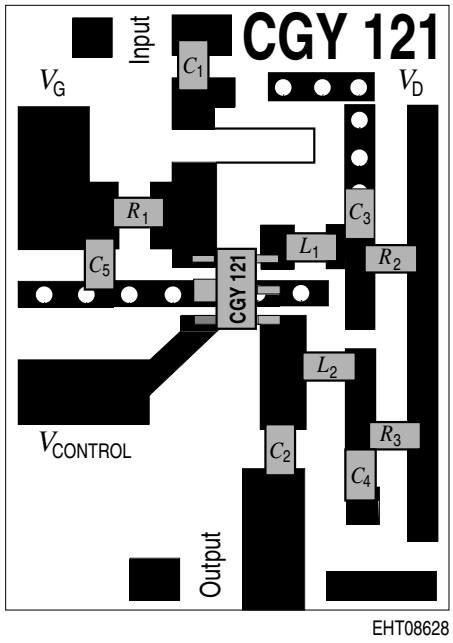

CGY 121
Input
C_1
V_G
V_D
R_1
C_3
L_1
R_2
C_5
CGY 121
L_2
R_3
$V_{CONTROL}$
C_2
C_4
Output
EHT08628

Figure 3

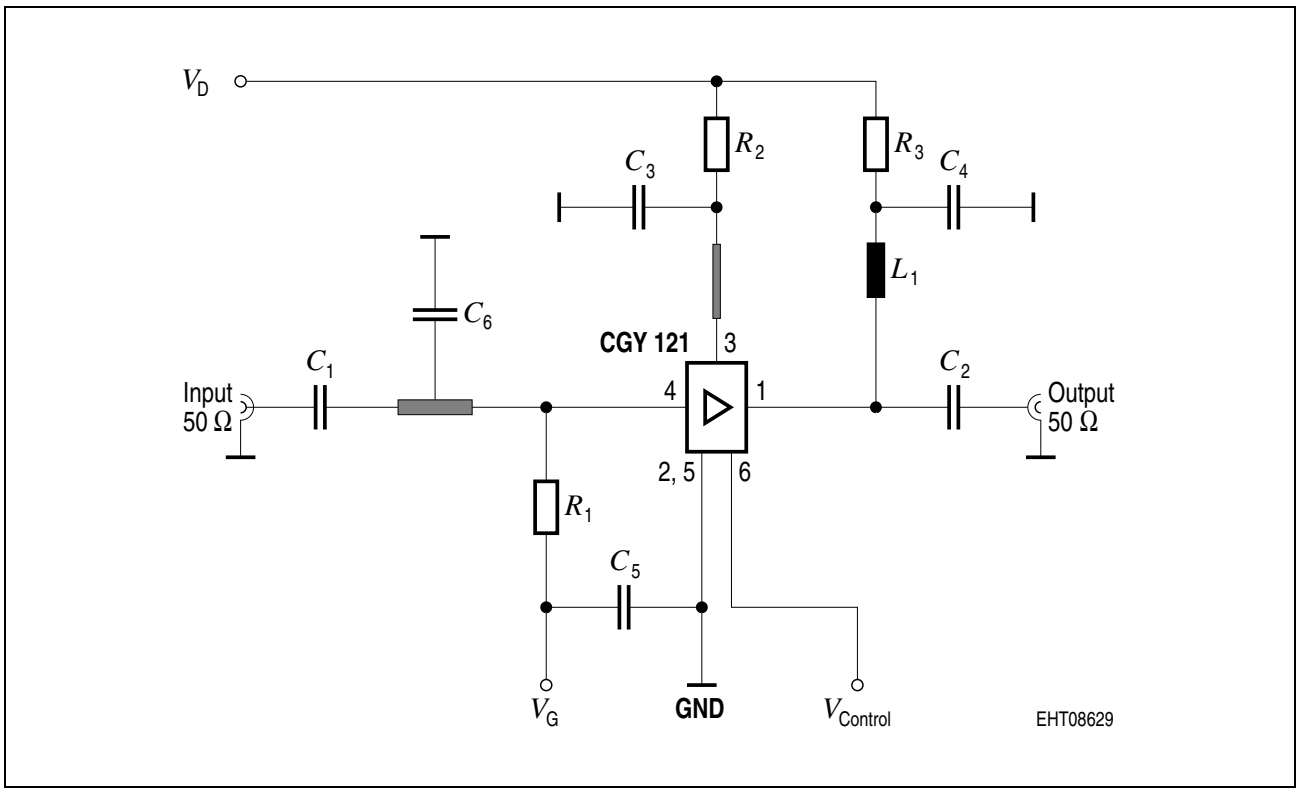


Figure 4 Application Circuit: f = 1800 MHz

Parts List (f = 1800 MHz)

C_1, C_2	12 pF	C_1 … C_6 Epcos size 0603
C_3, C_4	100 nF	
C_5	47 nF	
C_6	1.2 pF	
L_1	15 nH	L_1 Coilcraft 0805CS-270XKBC
R_1	270 Ω	R_1 Epcos B 54102-A1271-J60
R_2	12 Ω	R_2 Epcos B 54102-A1120-J60
R_3	6.8 Ω	R_3 Epcos Size 0805

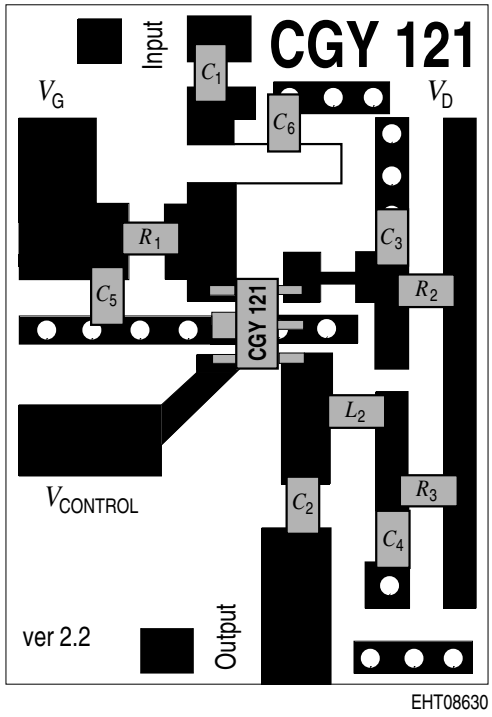
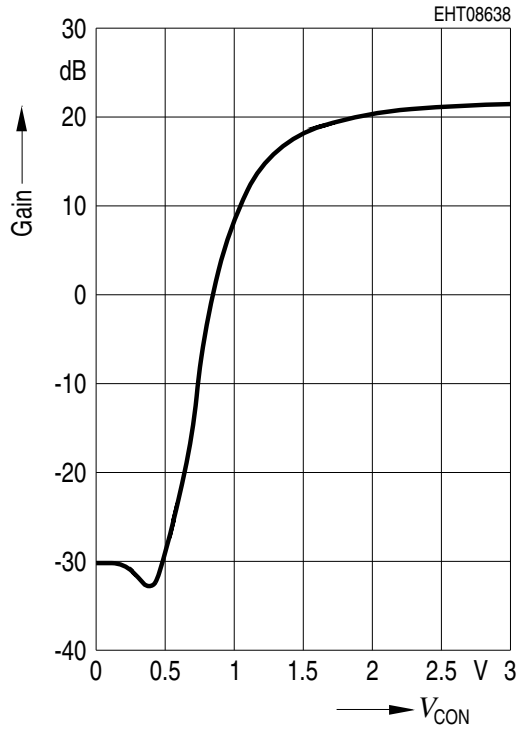
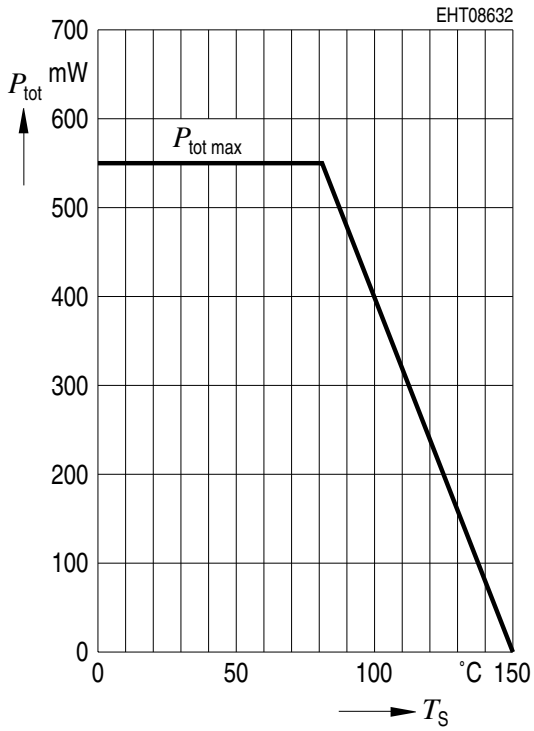

CGY 121
Input
V_G
V_D
C_1
C_6
R_1
C_3
C_5
CGY 121
R_2
L_2
$V_{CONTROL}$
C_2
R_3
C_4
ver 2.2
Output
EHT08630

Figure 5

Gain vs. $V_{Control}$, Operating Conditions:
V_D = 3 V, V_G = – 4 V, f = 900 MHz,
P_{IN} = – 10 dBm

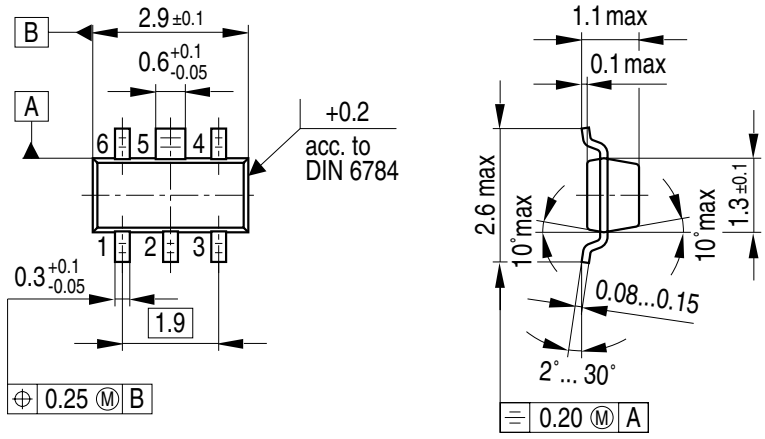


Total Power Dissipation
$P_{tot} = f(T_S)$



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