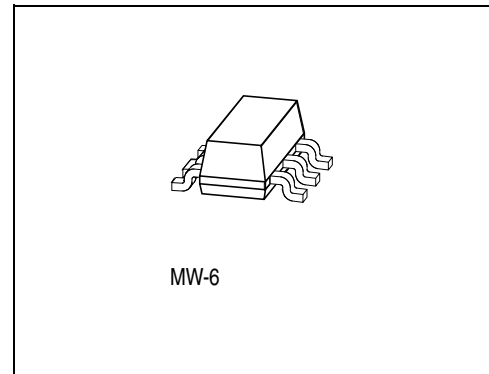


GaAs MMIC

Data Sheet

CGY 121 A

- 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



ESD: Electrostatic discharge 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

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	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	- 55 ... + 150	$^{\circ}\text{C}$
Total power dissipation ($T_S \leq 81 \text{ }^{\circ}\text{C}$) 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

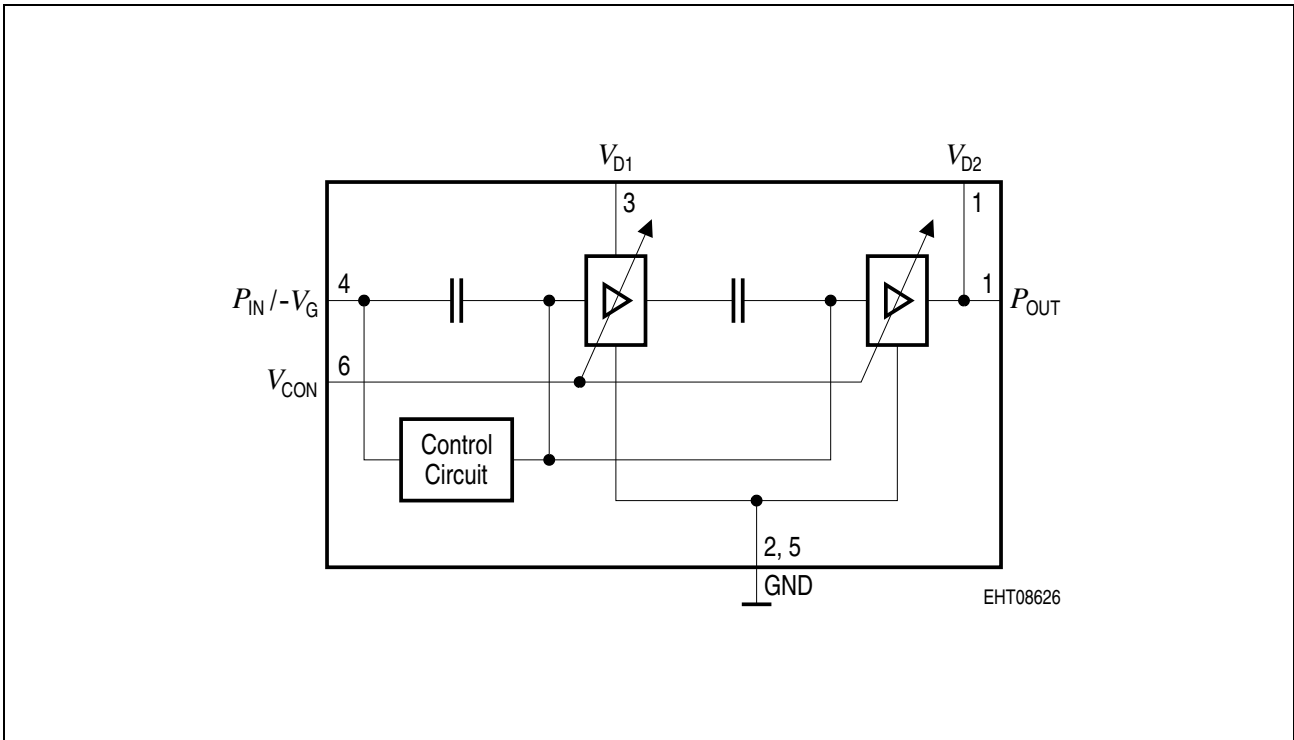


Figure 1

Pin Configuration

Pin No.	Symbol	Configuration
1	V_{D2}/P_{OUT}	Drain voltage 2 nd stage/RF-Output
2	RF-GND	–
3	V_{D1}	Drain voltage 1 st 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
 $T_A = 25\text{ °C}$, $f = 900\text{ MHz}$, $V_G = -4\text{ V}$, $R_S = R_L = 50\text{ }\Omega$; unless otherwise specified

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

Electrical Characteristics
 $T_A = 25\text{ °C}$, $f = 1800\text{ MHz}$, $V_G = -4\text{ V}$, $R_S = R_L = 50\text{ }\Omega$; unless otherwise specified

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

DC Characteristics

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Gate current (Pin 4)	I_G	–	1.0	–	mA	$V_D = 3\text{ V}$, $V_G = -4\text{ V}$
Control current (Pin 6)	I_C	–	0.5	–	mA	$V_D = 3\text{ V}$, $V_G = -4\text{ V}$, $V_{CON} = 0\text{ V} \dots 3\text{ V}$
Supply current	I_D	–	45	–	mA	$V_D = 3\text{ V}$, $V_G = -4\text{ V}$, $V_{CON} = 3\text{ V}$

Electrical Characteristics
 $T_A = 25\text{ °C}$, $f = 900\text{ MHz}$, $V_G = -4\text{ V}$, $R_S = R_L = 50\text{ }\Omega$; unless otherwise specified

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

Electrical Characteristics
 $T_A = 25\text{ °C}$, $f = 1800\text{ MHz}$, $V_G = -4\text{ V}$, $R_S = R_L = 50\text{ }\Omega$; unless otherwise specified

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

DC Characteristics

Characteristics	Symbol	Limit Values			Unit	Test Conditions
		min.	typ.	max.		
Gate current (Pin 4)	I_G	–	1.3	–	mA	$V_D = 5\text{ V}$, $V_G = -4\text{ V}$
Control current (Pin 6)	I_C	–	0.8	–	mA	$V_D = 5\text{ V}$, $V_G = -4\text{ V}$, $V_{CON} = 0\text{ V} \dots 3\text{ V}$
Supply current	I_D	–	48	–	mA	$V_D = 5\text{ V}$, $V_G = -4\text{ V}$, $V_{CON} = 3\text{ V}$

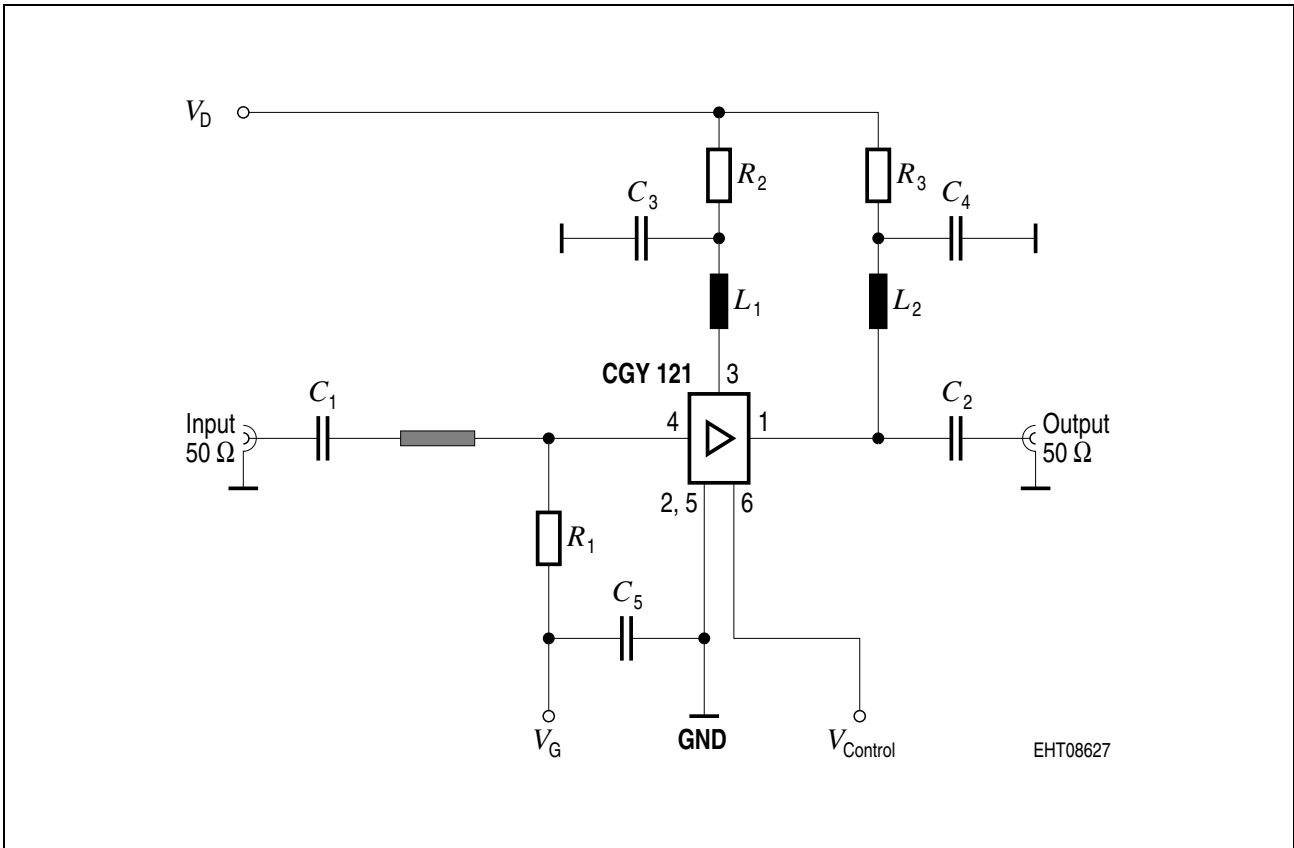


Figure 2 Application Circuit ($f = 900 \text{ MHz}$)

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

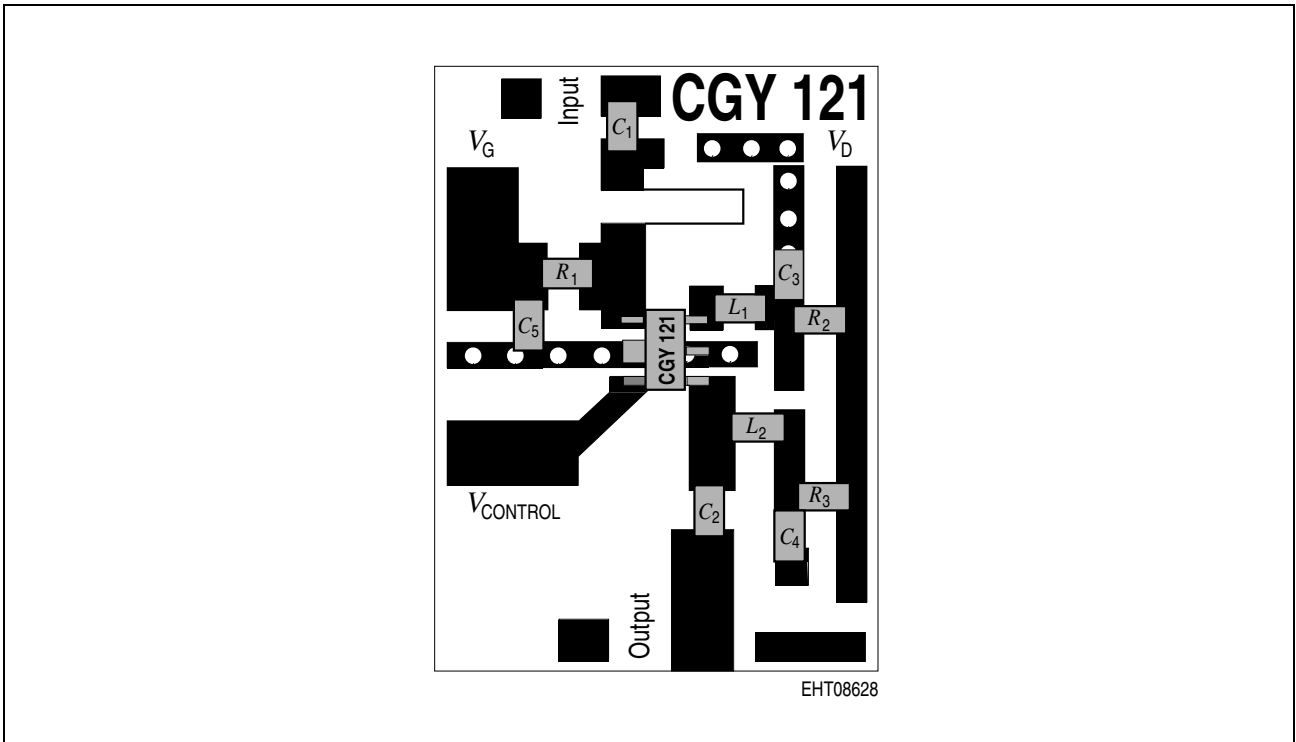


Figure 3

L_1 Coilcraft 0805CS-150XKBC

L_2 Coilcraft 0805CS-270XMBC

R_2 Epcos B 54102-A1120-J60

$C_1 \dots C_5$ Epcos Size 0603

R_1 Epcos B 54102-A1271-J60

R_3 Epcos Size 0805

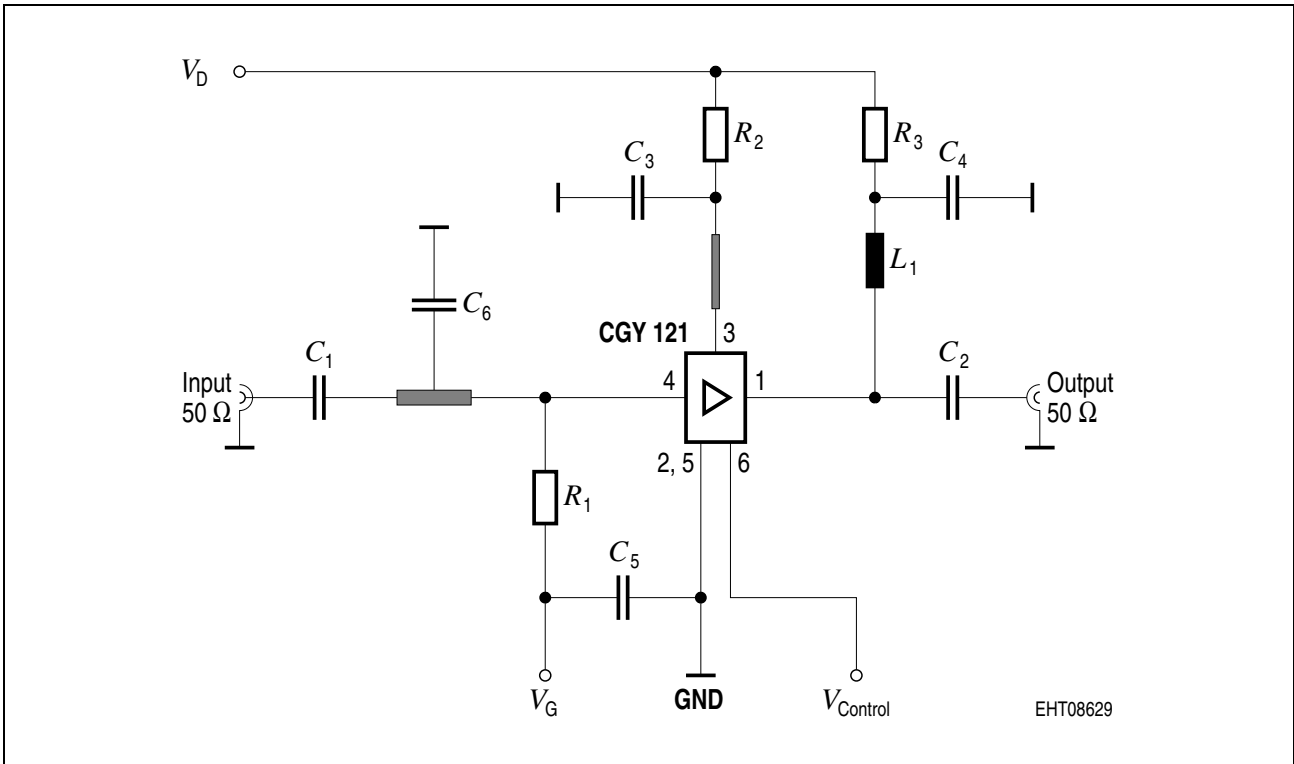


Figure 4 Application Circuit ($f = 1800 \text{ MHz}$)

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

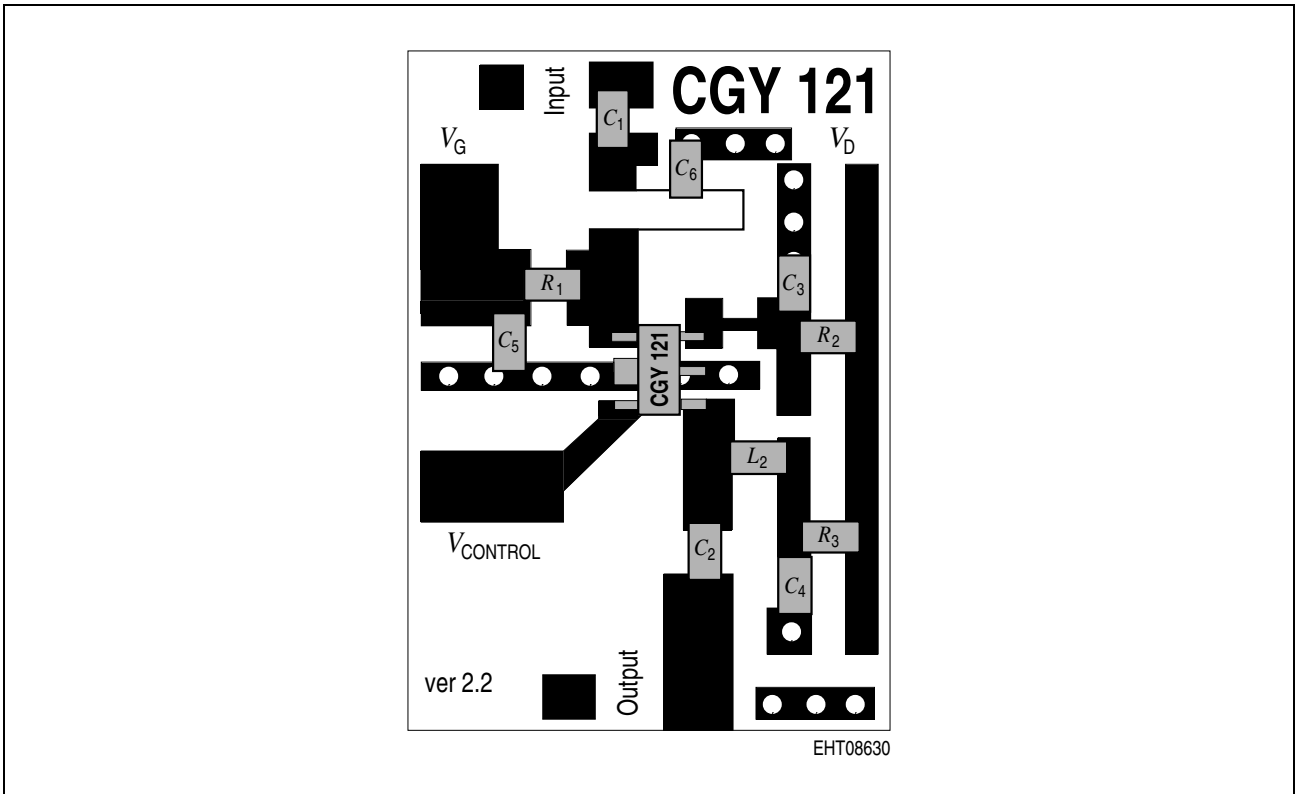


Figure 5

L_1 Coilcraft 0805CS-150XKBC

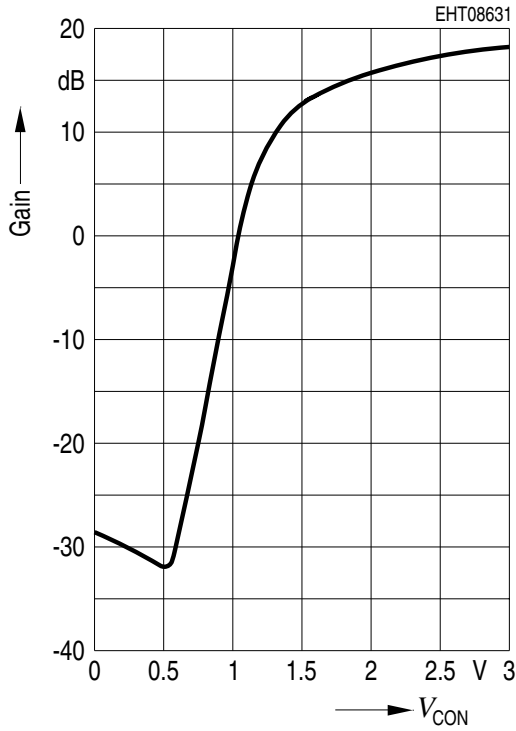
R_2 Epcos B 54102-A1120-J60

$C_1 \dots C_6$ Epcos size 0603

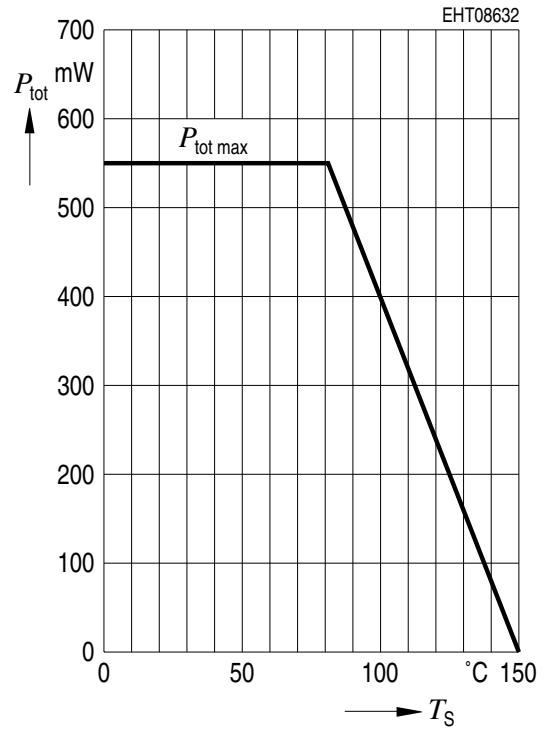
R_3 Epcos Size 0805

R_1 Epcos B 54102-A1271-J60

Gain vs. V_{Control} , Operating Conditions:
 $V_{\text{D}} = 3 \text{ V}$, $V_{\text{G}} = -4 \text{ V}$, $f = 1.9 \text{ GHz}$,
 $P_{\text{IN}} = -10 \text{ dBm}$

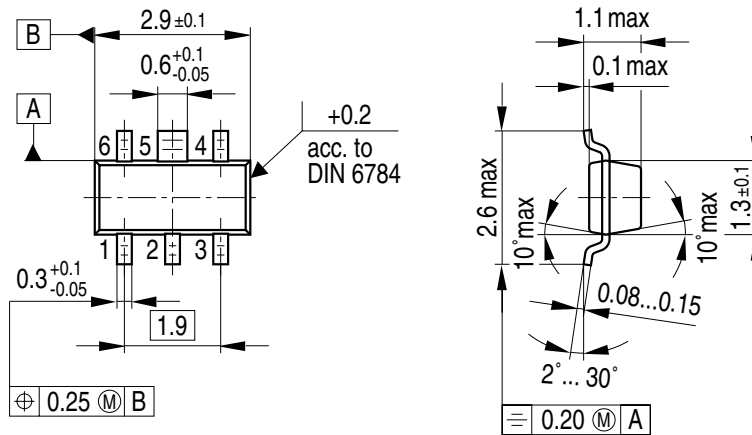


Total Power Dissipation
 $P_{\text{tot}} = f(T_{\text{S}})$



Package Outlines

MW-6
(Special Package)



GPW05794

Sorts of Packing

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

SMD = Surface Mounted Device

Dimensions in mm