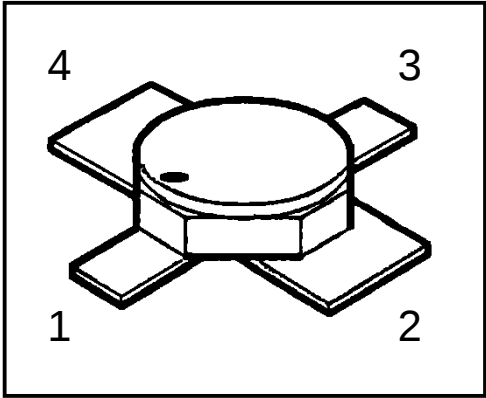


HiRel L- and S-Band GaAs General Purpose Amplifier

- **HiRel Discrete and Microwave Semiconductor**
- Single-stage monolithic microwave IC (MMIC-amplifier)
- Application range: 200 MHz to 3 GHz
- Gain: 9.5 dB typ. @ 1.8 GHz
- Low noise figure: 2.7 dB typ. @ 1.8 GHz
- Bandwidth: 3 GHz typ. @ -3 dB, VSWR < 2 : 1
- Operating voltage range: 3 to 5.5 V
- Input and output matched to 50 Ω
- Individual current control with neg. gate bias
- Hermetically sealed ceramic package micro-x



ESD: **E**lectrostatic **d**ischarge sensitive device,
 observe handling precautions!

Type	Marking	Ordering Code	Circuit Diagram (Pin Configuration)	Package
CGY41 (ql)	-	see below		Micro-X

(ql) Quality Level:	P: Professional Quality,	Ordering Code:	Q62702G95
	H: High Rel Quality,	Ordering Code:	Q62702G94
	S: Space Quality,	Ordering Code:	on request
	ES: ESA Space Quality,	Ordering Code:	on request

(see order instructions for ordering example)

Maximum ratings	Symbol	Value	Unit
Drain-voltage	V_D	5.5	V
Gate-voltage	V_G	-4 ... 0	V
Drain-gate voltage	V_{DG}	9.5	V
RF Input power ¹⁾	P_{RFIN}	16	dBm
Channel temperature	T_{Ch}	175	°C
Storage temperature range	T_{stg}	-55...+175	°C
Total power dissipation ($T_s \leq 107^\circ\text{C}$) ²⁾	P_{tot}	440	mW
Thermal resistance			
Channel-soldering point ²⁾	R_{thChS}	155	K/W

Notes: Exceeding any of the max. ratings may cause permanent damage to the device. Appropriate handling is required to protect the electrostatic sensitive MMIC against degradation due to excess voltage or current spikes. Proper ground connection of leads 2 and 4 (with min. inductance) is required to achieve the guaranteed RF performance, stable operating conditions and adequate cooling.

1) @ $V_D > 4.5\text{ V}$ derating required.

2) T_s is measured on the source lead at the soldering point to the PCB.

Electrical Characteristics

$T_A = 25\text{ }^{\circ}\text{C}$, $V_G = 0\text{ V}$, $V_D = 4.5\text{ V}$, $R_S = R_L = 50\text{ }\Omega$, unless otherwise specified

(for application circuit see next page)

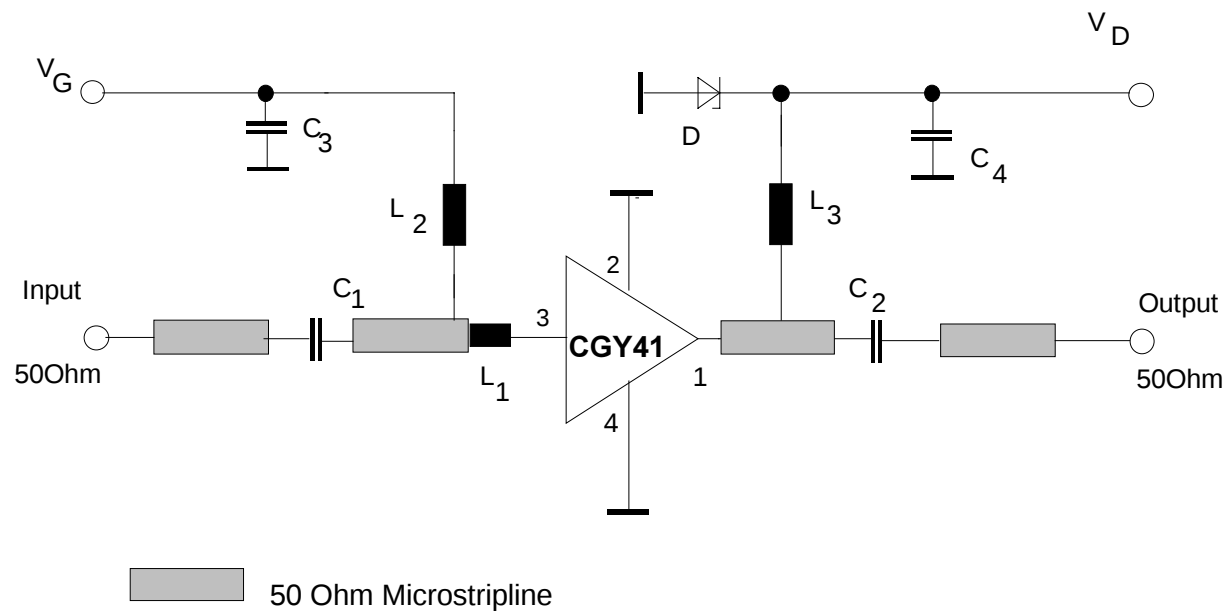
Characteristics	Symbol	min	typ	max	Unit
Drain current	I_D	40	60	80	mA
Power gain f = 200 MHz f = 1800 MHz	G	9.5 8.5	10.5 9.5	12 11	dB
Gain flatness f = 200 to 1000 MHz f = 800 to 1800 MHz	ΔG	- -	0.6 1.1	- 2	dB
Noise figure f = 200 to 1000 MHz f = 800 to 1800 MHz	F	- -	2.5 2.7	- 4.0	dB
Input return loss f = 200 to 1000 MHz f = 800 to 1800 MHz	RL_{IN}	- -	13 12	- 9.5	dB
Output return loss f = 200 to 1000 MHz f = 800 to 1800 MHz	RL_{OUT}	- -	12 12	- 9.5	dB
Third order intercept point Two tone intermodulation test f ₁ = 806 MHz, f ₂ = 810 MHz P ₀ = 10 dBm (both carriers)	$IP3$	31	32	-	dBm
1dB gain compression f = 200 to 1800 MHz	$P_{1\text{ dB}}$	16	18	-	dBm
Gain control dynamic range, (per gate control voltage) f = 200 to 1000 MHz f = 800 to 1800 MHz	ΔG	- -	30 20	- -	dB

Typical Common Source S-Parameters

$$V_G = 0V \quad V_D = 4.5V \quad Z_0 = 50\Omega$$

f	S11		S21		S12		S22	
GHz	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
0.200	0.12	-78.4	3.69	163.8	0.1317	4.4	0.1950	-172.1
0.400	0.10	-85.0	3.57	159.9	0.1306	0.1	0.1916	166.2
0.600	0.10	-95.5	3.46	153.3	0.1299	-2.6	0.1918	151.8
0.800	0.12	-106.9	3.39	146.2	0.1284	-3.9	0.1920	139.1
1.000	0.14	-116.4	3.30	139.4	0.1272	-5.5	0.1902	128.1
1.200	0.16	-125.2	3.22	132.5	0.1243	-6.1	0.1897	117.4
1.400	0.18	-133.3	3.12	125.8	0.1219	-6.9	0.1888	107.5
1.600	0.20	-140.0	3.00	119.6	0.1196	-7.2	0.1859	97.3
1.800	0.22	-145.8	2.90	112.9	0.1167	-6.9	0.1854	89.4
2.000	0.23	-151.0	2.81	106.8	0.1162	-6.9	0.1852	80.9
2.200	0.25	-155.9	2.72	101.2	0.1137	-7.1	0.1807	72.6
2.400	0.26	-160.7	2.64	95.7	0.1124	-6.4	0.1772	64.8
2.600	0.27	-165.8	2.50	89.9	0.1112	-5.2	0.1774	57.4
2.800	0.28	-170.7	2.45	85.2	0.1115	-4.8	0.1759	50.4
3.000	0.29	-175.3	2.40	79.8	0.1103	-4.2	0.1749	43.5
3.200	0.29	-179.4	2.29	74.9	0.1121	-3.5	0.1733	36.8
3.400	0.30	176.2	2.21	70.0	0.1121	-2.2	0.1714	31.0
3.600	0.30	171.7	2.12	65.5	0.1129	-1.9	0.1706	25.6
3.800	0.31	167.7	2.07	60.8	0.1141	-1.2	0.1681	20.3
4.000	0.31	163.4	2.03	56.2	0.1165	-.2	0.1655	15.5
4.200	0.32	159.2	1.97	52.2	0.1187	-0.0	0.1617	10.9
4.400	0.33	154.8	1.91	48.1	0.1210	0.5	0.1583	6.3
4.600	0.33	151.1	1.87	43.4	0.1232	1.1	0.1549	2.5
4.800	0.34	147.0	1.84	39.2	0.1263	1.1	0.1499	-0.9
5.000	0.34	143.8	1.77	35.5	0.1293	1.4	0.1434	-4.6

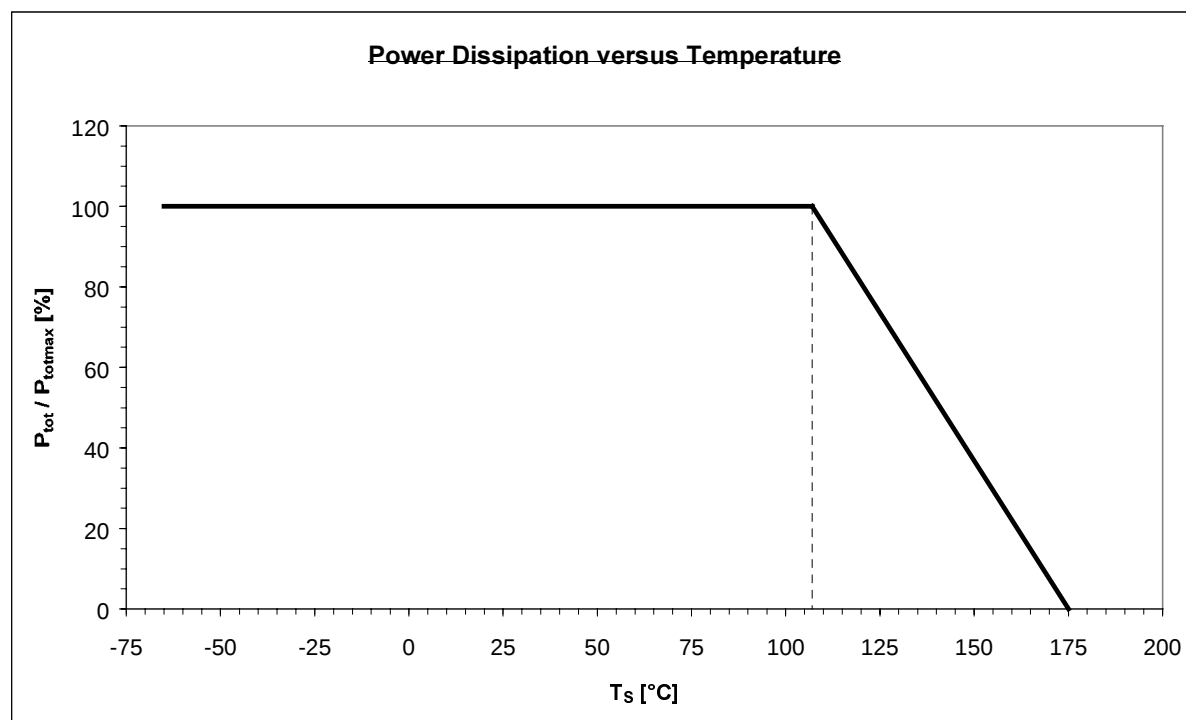
Application Circuit ($f = 500$ to 2000 MHz)



Legend of components

C_1, C_2 C_3, C_4	Chip capacitors 100 pF Chip capacitors 1 nF
L_1	For optimized input matching - discrete inductor: approx. 3nH, or - printed microstripline inductor: Z approx. 100 Ω , l_p approx. 5 mm
L_2, L_3	- discrete inductor: approx. 40 nH, as e.g. 5 turns 0.25 mm copper wire on nylon rod with M3-thread, or - printed microstripline inductor
D	Z diode 5.6 V (type BZW 22 C5 V 6)

Power Dissipation



Order Instructions:

Full type variant including quality level must be specified by the orderer. For *HiRel* Discrete and Microwave Semiconductors the ordering code specifies device family and quality level only.

Ordering Form:

Ordering Code: Q.....

CGY41 (ql)

(ql): Quality Level

Ordering Example: tbd

Further Informations:

See our WWW-Pages:

- Discrete and RF-Semiconductors (Small Signal Semiconductors)

www.siemens.de/semiconductor/products/35/35.htm

- *HiRel* Discrete and Microwave Semiconductors

www.siemens.de/semiconductor/products/35/35.htm

Please contact also our marketing division :

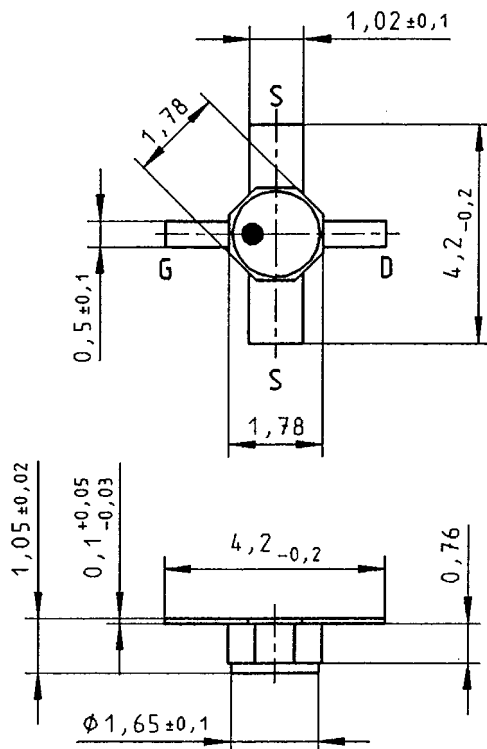
Tel.: ++89 6362 4480

Fax.: ++89 6362 5568

e-mail: martin.wimmers@siemens-scg.com

Address: Siemens Semiconductors,
High Frequency Products Marketing,
P.O.Box 801709,
D-81617 Munich

Micro-X Package



Published by Siemens Semiconductors, High Frequency Products Marketing, P.O.Box 801709, D-81617 Munich.

© Siemens AG 1998. All Rights Reserved.

As far as patents or other rights of third parties are concerned, liability is only assumed for components per se, not for applications, processes and circuits implemented within components or assemblies.

The information describes the type of component and shall not be considered as assured characteristics.

Terms of delivery and rights to change design reserved.

For questions on technology, delivery and prices please contact the Offices of Semiconductor Group in Germany or the Siemens Companies and Representatives worldwide (see address list).

Due to technical requirements components may contain dangerous substances. For information on the type in question please contact your nearest Siemens Office, Semiconductor Group.

Siemens Semiconductors is a certified CECC and QS9000 manufacturer (this includes ISO 9000).