
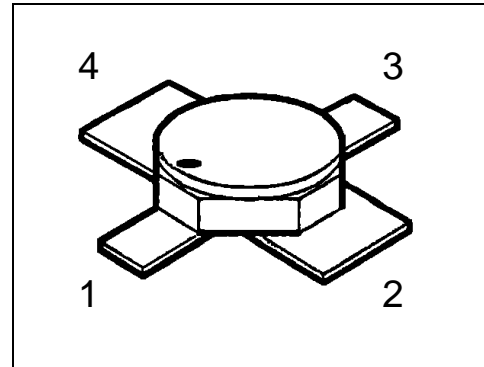


HiRel K-Band GaAs Super Low Noise HEMT

- **HiRel Discrete and Microwave Semiconductor**
- Pseudo-morphic AlGaAs/InGaAs/GaAs HEMT
- For professional super low-noise amplifiers
- For frequencies from 500 MHz to > 20 GHz
- Hermetically sealed microwave package
- Super low noise figure, high associated gain
-  **ESA Space Qualified**
ESA/SCC Detail Spec. No.: 5613/004,
Type Variant No.s 01 to 04, 05 foreseen (tbc.)



ESD: Electrostatic discharge sensitive device, observe handling precautions!

Type	Marking	Ordering Code	Pin Configuration				Package
			1	2	3	4	
CFY67-06 (ql)	-	see below	G	S	D	S	Micro-X
CFY67-08 (ql)							
CFY67-08P (ql)							
CFY67-10 (ql)							
CFY67-10P (ql)							

CFY67-nnl: specifies gain and output power levels (see electrical characteristics)

(ql) Quality Level: P: Professional Quality
 H: High Rel Quality
 S: Space Quality
 ES: ESA Space Quality

(see order instructions for ordering example)

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	3.5	V
Drain-gate voltage	V_{DG}	4.5	V
Gate-source voltage (reverse / forward)	V_{GS}	- 3... + 0.5	V
Drain current	I_D	60	mA
Gate forward current	I_G	2	mA
RF Input Power, C- and X-Band ¹⁾	$P_{RF,in}$	+ 10	dBm
Junction temperature	T_J	150	°C
Storage temperature range	T_{stg}	- 65... + 150	°C
Total power dissipation ²⁾	P_{tot}	200	mW
Soldering temperature ³⁾	T_{sol}	230	°C

Thermal Resistance

Junction-soldering point	$R_{th,JS}$	≤ 515 (tbc.)	K/W
--------------------------	-------------	--------------	-----

Notes.:

- 1) For $V_{DS} \leq 2$ V. For $V_{DS} > 2$ V, derating is required.
- 2) At $T_S = + 47$ °C. For $T_S > + 47$ °C derating is required.
- 3) During 15 sec. maximum. The same terminal shall not be resoldered until 3 minutes have elapsed.

Electrical Characteristics (at $T_A=25^\circ\text{C}$; unless otherwise specified)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source saturation current $V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	15	30	60	mA
Gate threshold voltage $V_{DS} = 2\text{ V}, I_D = 1\text{ mA}$	$-V_{Gth}$	0.2	0.7	2.0	V
Drain current at pinch-off $V_{DS} = 1.5\text{ V}, V_{GS} = -3\text{ V}$	I_{Dp}	-	< 50	-	μA
Gate leakage current at pinch-off $V_{DS} = 1.5\text{ V}, V_{GS} = -3\text{ V}$	$-I_{Gp}$	-	< 50	200	μA
Transconductance $V_{DS} = 2\text{ V}, I_D = 15\text{ mA}$	g_{m15}	50	65	-	mS
Gate leakage current at operation $V_{DS} = 2\text{ V}, I_D = 15\text{ mA}$	$-I_{G15}$	-	< 0.5	2	μA
Thermal resistance junction to soldering point	$R_{th,JS}$	-	450	-	K/W

Electrical Characteristics (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Noise figure ¹⁾ $V_{DS} = 2\text{ V}$, $I_D = 15\text{ mA}$, $f = 12\text{ GHz}$	NF				dB
CFY67-06		-	0.5	0.6	
CFY67-08, -08P		-	0.7	0.8	
CFY67-10, 10P		-	0.9	1.0	
Associated gain. ¹⁾ $V_{DS} = 2\text{ V}$, $I_D = 15\text{ mA}$, $f = 12\text{ GHz}$	G_a				dB
CFY67-06		11.5	12.5	-	
CFY67-08, -08P		11.0	11.5	-	
CFY67-10, 10P		10.5	11.0	-	
Output power at 1 dB gain compression ²⁾ $V_{DS} = 2\text{ V}$, $I_D = 20\text{ mA}$, $f = 12\text{ GHz}$	P_{1dB}				dBm
CFY67-06, -08, -10		-	11.0	-	
CFY67-08P, -10P		10.0	11.0	-	

Notes.:

1) Noise figure / associated gain characteristics given for minimum noise figure matching conditions (fixed generic matching, no fine-tuning).

2) Output power characteristics given for optimum output power matching conditions (fixed generic matching, no fine-tuning).

Typical Common Source S-Parameters

CFY67-08: $V_{DS} = 2\text{ V}$, $I_D = 15\text{ mA}$, $Z_o = 50\ \Omega$											
f	S11	<S11	S21	<S21	S12	<S12	S22	<S22	k-Fact.	S_{21}/S_{12}	MAG
[GHz]	[magn]	[angle]	[magn]	[angle]	[magn]	[angle]	[magn]	[angle]	[magn]	[dB]	[dB]
0,5	0,963	-15	5,315	165	0,0111	74	0,655	-14	0,40	26,8	
1,0	0,938	-23	5,182	159	0,0225	68	0,639	-18	0,39	23,6	
1,5	0,913	-33	5,060	150	0,0317	62	0,625	-23	0,42	22,0	
2,0	0,889	-42	4,940	142	0,0411	57	0,611	-28	0,43	20,8	
2,5	0,865	-52	4,824	133	0,0509	53	0,596	-35	0,43	19,8	
3,0	0,844	-62	4,715	124	0,0585	46	0,582	-41	0,45	19,1	
3,5	0,823	-72	4,591	115	0,0650	41	0,567	-47	0,47	18,5	
4,0	0,800	-81	4,450	107	0,0714	36	0,552	-53	0,50	17,9	
4,5	0,779	-91	4,319	99	0,0768	31	0,534	-60	0,52	17,5	
5,0	0,761	-100	4,183	91	0,0811	25	0,520	-66	0,54	17,1	
5,5	0,743	-109	4,043	83	0,0850	20	0,500	-72	0,58	16,8	
6,0	0,725	-117	3,906	75	0,0885	15	0,490	-77	0,60	16,4	
6,5	0,708	-125	3,769	68	0,0917	11	0,477	-83	0,63	16,1	
7,0	0,690	-132	3,640	61	0,0942	7	0,467	-88	0,67	15,9	
7,5	0,673	-139	3,529	54	0,0962	3	0,455	-93	0,71	15,6	
8,0	0,656	-146	3,427	48	0,0978	-1	0,442	-97	0,76	15,4	
8,5	0,640	-153	3,344	41	0,0998	-5	0,430	-101	0,79	15,3	
9,0	0,625	-160	3,271	34	0,1010	-9	0,417	-104	0,84	15,1	
9,5	0,611	-168	3,202	28	0,1027	-12	0,406	-108	0,87	14,9	
10,0	0,597	-175	3,143	21	0,1033	-16	0,393	-113	0,91	14,8	
10,5	0,586	177	3,089	15	0,1044	-20	0,381	-118	0,94	14,7	
11,0	0,576	169	3,041	8	0,1056	-24	0,370	-123	0,96	14,6	
11,5	0,564	161	3,002	1	0,1068	-28	0,358	-129	0,98	14,5	
12,0	0,554	154	2,960	-5	0,1070	-32	0,351	-134	1,01	14,4	13,8
12,5	0,547	146	2,923	-12	0,1076	-36	0,343	-140	1,03	14,3	13,3
13,0	0,536	139	2,886	-19	0,1076	-41	0,336	-146	1,06	14,3	12,7
13,5	0,529	131	2,848	-26	0,1081	-45	0,330	-151	1,09	14,2	12,4
14,0	0,522	124	2,815	-33	0,1087	-50	0,325	-156	1,11	14,1	12,1
14,5	0,517	116	2,787	-40	0,1087	-55	0,320	-161	1,13	14,1	11,9
15,0	0,510	108	2,765	-46	0,1093	-60	0,315	-167	1,14	14,0	11,7
15,5	0,505	99	2,751	-54	0,1090	-65	0,311	-172	1,16	14,0	11,6
16,0	0,502	91	2,735	-61	0,1090	-71	0,305	-177	1,18	14,0	11,4
16,5	0,499	82	2,719	-68	0,1091	-77	0,301	177	1,19	14,0	11,3
17,0	0,498	74	2,722	-75	0,1097	-82	0,297	172	1,19	13,9	11,3
17,5	0,498	68	2,741	-80	0,1103	-87	0,294	168	1,18	14,0	11,4
18,0	0,498	62	2,760	-84	0,1107	-90	0,290	165	1,17	14,0	11,5

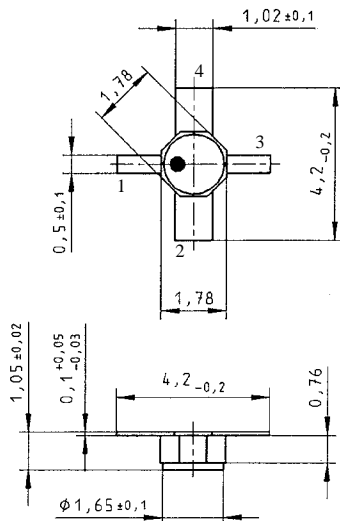
Typical Common Source S-Parameters (continued)

CFY67-06: $V_{DS} = 2\text{ V}$, $I_D = 15\text{ mA}$, $Z_o = 50\ \Omega$											
f	S11	<S11	S21	<S21	S12	<S12	S22	<S22	k-Fact.	S_{21}/S_{12}	MAG
[GHz]	[mag]	[ang]	[mag]	[ang]	[mag]	[ang]	[mag]	[ang]	[mag]	[dB]	[dB]
0,5	0,962	-13	6,112	166	0,0111	76	0,539	-15	0,42	27,4	
1,0	0,937	-22	5,956	159	0,0211	69	0,525	-19	0,42	24,5	
1,5	0,913	-33	5,810	150	0,0302	64	0,511	-24	0,44	22,8	
2,0	0,889	-41	5,690	142	0,0394	58	0,498	-30	0,46	21,6	
2,5	0,860	-51	5,522	133	0,0484	53	0,484	-36	0,48	20,6	
3,0	0,834	-61	5,386	124	0,0567	48	0,469	-43	0,50	19,8	
3,5	0,810	-71	5,236	116	0,0637	43	0,456	-49	0,52	19,1	
4,0	0,784	-80	5,067	107	0,0702	38	0,440	-55	0,55	18,6	
4,5	0,761	-90	4,911	99	0,0760	33	0,423	-61	0,58	18,1	
5,0	0,740	-99	4,752	91	0,0809	28	0,410	-67	0,60	17,7	
5,5	0,720	-107	4,586	84	0,0851	24	0,397	-73	0,63	17,3	
6,0	0,701	-116	4,420	76	0,0889	19	0,385	-79	0,66	17,0	
6,5	0,682	-124	4,260	69	0,0918	15	0,373	-84	0,69	16,7	
7,0	0,663	-131	4,107	62	0,0941	11	0,362	-89	0,73	16,4	
7,5	0,644	-139	3,974	55	0,0962	7	0,351	-93	0,77	16,2	
8,0	0,627	-148	3,852	49	0,0980	3	0,343	-98	0,80	15,9	
8,5	0,611	-157	3,747	42	0,0995	-1	0,333	-102	0,83	15,8	
9,0	0,595	-165	3,659	35	0,1008	-5	0,323	-107	0,86	15,6	
9,5	0,581	-173	3,571	29	0,1022	-9	0,313	-112	0,90	15,4	
10,0	0,567	178	3,497	22	0,1039	-13	0,303	-116	0,92	15,3	
10,5	0,556	170	3,430	16	0,1049	-17	0,293	-121	0,95	15,1	
11,0	0,546	163	3,368	9	0,1064	-21	0,284	-127	0,98	15,0	
11,5	0,537	155	3,317	3	0,1078	-26	0,274	-131	1,00	14,9	
12,0	0,528	149	3,265	-4	0,1093	-30	0,265	-135	1,02	14,8	13,8
12,5	0,520	142	3,216	-10	0,1105	-35	0,255	-139	1,05	14,6	13,3
13,0	0,513	135	3,169	-17	0,1116	-39	0,246	-143	1,07	14,5	12,9
13,5	0,506	128	3,120	-24	0,1126	-44	0,235	-146	1,10	14,4	12,5
14,0	0,498	121	3,080	-30	0,1137	-49	0,225	-150	1,12	14,3	12,2
14,5	0,492	113	3,044	-37	0,1151	-54	0,215	-155	1,14	14,2	12,0
15,0	0,489	106	3,014	-44	0,1160	-59	0,207	-159	1,15	14,1	11,8
15,5	0,484	98	2,990	-51	0,1171	-65	0,200	-163	1,16	14,1	11,6
16,0	0,485	91	2,967	-58	0,1185	-71	0,193	-167	1,17	14,0	11,5
16,5	0,485	83	2,945	-65	0,1197	-77	0,187	-171	1,17	13,9	11,4
17,0	0,485	75	2,947	-71	0,1206	-82	0,182	-175	1,17	13,9	11,4
17,5	0,487	69	2,961	-77	0,1215	-87	0,177	-178	1,16	13,9	11,5
18,0	0,490	64	2,979	-81	0,1230	-90	0,174	179	1,14	13,8	11,6

Typical Common Source Noise-Parameters

CFY67-08: $V_{DS} = 2 \text{ V}$, $I_D = 15 \text{ mA}$, $Z_o = 50 \text{ } \Omega$				
f [GHz]	NF_{min} [dB]	$ \Gamma_{opt} $ [magn]	$\angle \Gamma_{opt}$ [angle]	R_n [Ω]
1	0,29	0,756	14	15,60
2	0,30	0,690	28	14,65
3	0,34	0,643	43	13,56
4	0,38	0,606	58	12,10
5	0,41	0,578	73	10,53
6	0,46	0,553	87	8,86
7	0,50	0,534	102	7,16
8	0,55	0,518	116	5,62
9	0,60	0,505	131	4,29
10	0,64	0,495	145	3,23
11	0,69	0,486	159	2,53
12	0,73	0,476	173	2,22
13	0,78	0,467	-173	2,37
14	0,84	0,455	-160	2,96
15	0,88	0,443	-146	4,01
16	0,93	0,428	-132	5,47
17	0,99	0,412	-118	7,26
18	1,05	0,394	-103	9,61

Micro-X Package



Edition 2011-02

Published by

Infineon Technologies AG

85579 Neubiberg, Germany

© Infineon Technologies AG 2011

All Rights Reserved.

Attention please!

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of a third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.

Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.