

KGF1254B/1254

Medium-Power Amplifier for UHF-Band and PCS Frequencies

GENERAL DESCRIPTION

The KGF1254B is a medium-power amplifier, with frequencies ranging from the UHF-band to the L band, that features high output power, low noise, and low current dissipation. The KGF1254B has the specifications are guaranteed by the fixed matching circuit of 5.2 V and 850 MHz, although external impedance matching circuits are required. Because of the low noise and high output power at the low operating current, the KGF1254B is ideal as a transmitter-driver-stage amplifier for personal handy phones.

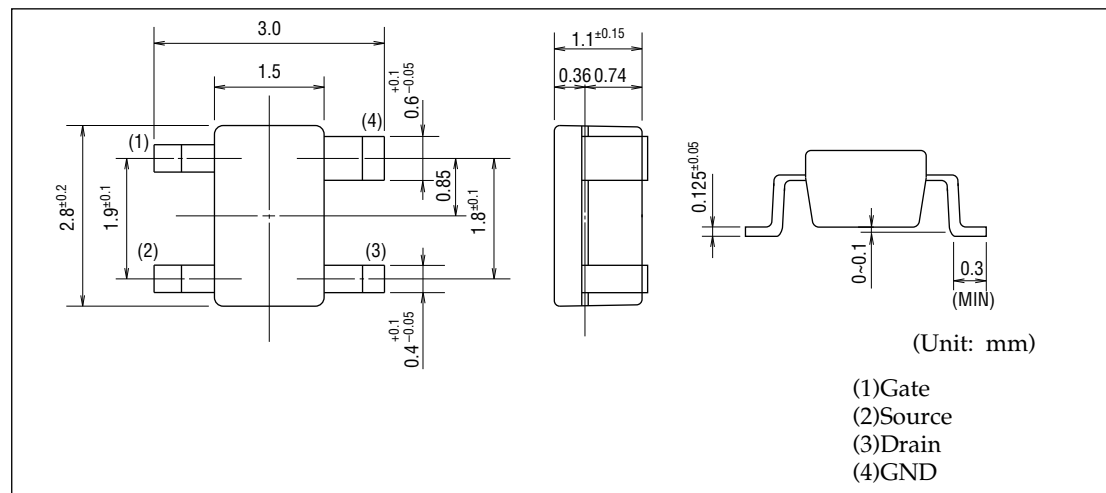
The KGF1254 is an amplifier similar to the KGF1254B in specifications and typical properties. Although having S-Parameters that are slightly different from those of the KGF1254B, the KGF1254 meets the specifications for the KGF1254B, even with the same matching circuits as those of the KGF1254B.

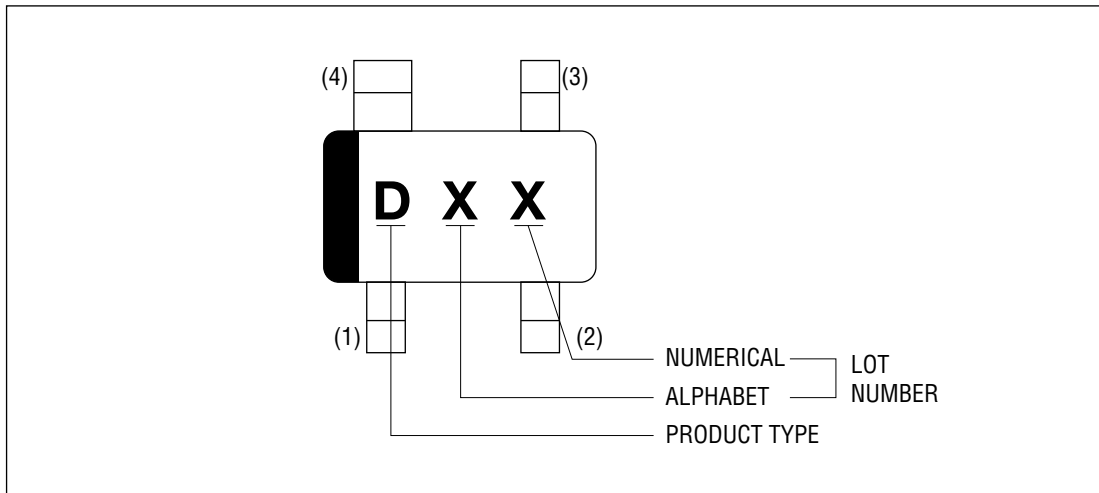
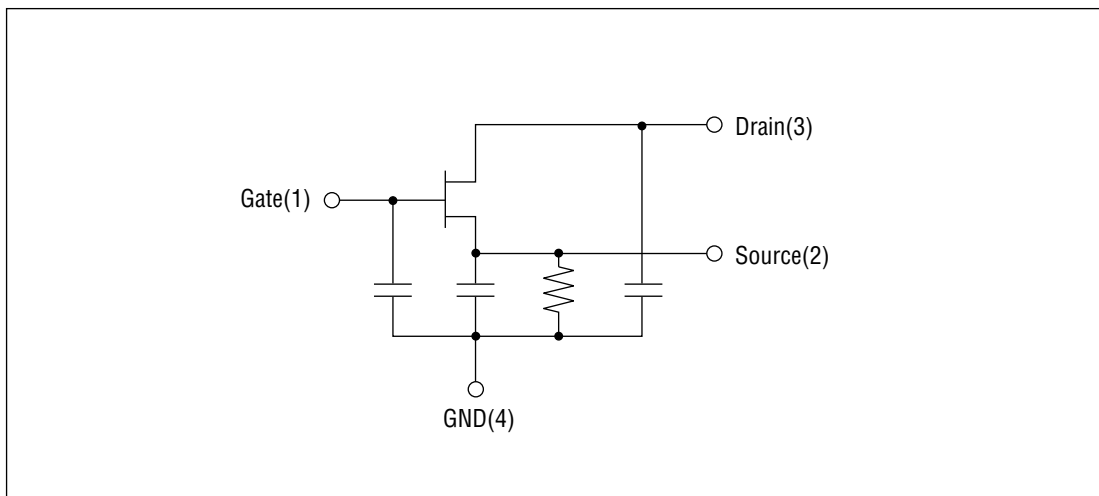
FEATURES

- High output power: 20 dBm (min)
- Low noise: 2.5 dB (max)
- Low current: 80 mA (max)
- Self-bias circuit configuration with built-in source capacitor
- Surface-mount 4-pin SOP plastic package

Note: Ask our sales department for detailed requirements of the KGF1254.

PACKAGE OUTLINE



MARKING OF KGF1254B**CIRCUIT**

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Unit	Min.	Max.
Drain-Source voltage	V_{DS}	$T_a = 25^{\circ}\text{C}$	V	—	10
Gate-Source voltage	V_{GS}	$T_a = 25^{\circ}\text{C}$	V	-5.0	0.4
Drain current	I_{DS}	$T_a = 25^{\circ}\text{C}$	mA	—	360
Total power dissipation	P_{tot}	$T_a = 25^{\circ}\text{C}$	mW	—	300
Channel temperature	T_{ch}	—	$^{\circ}\text{C}$	—	150
Storage temperature	T_{stg}	—	$^{\circ}\text{C}$	-45	125

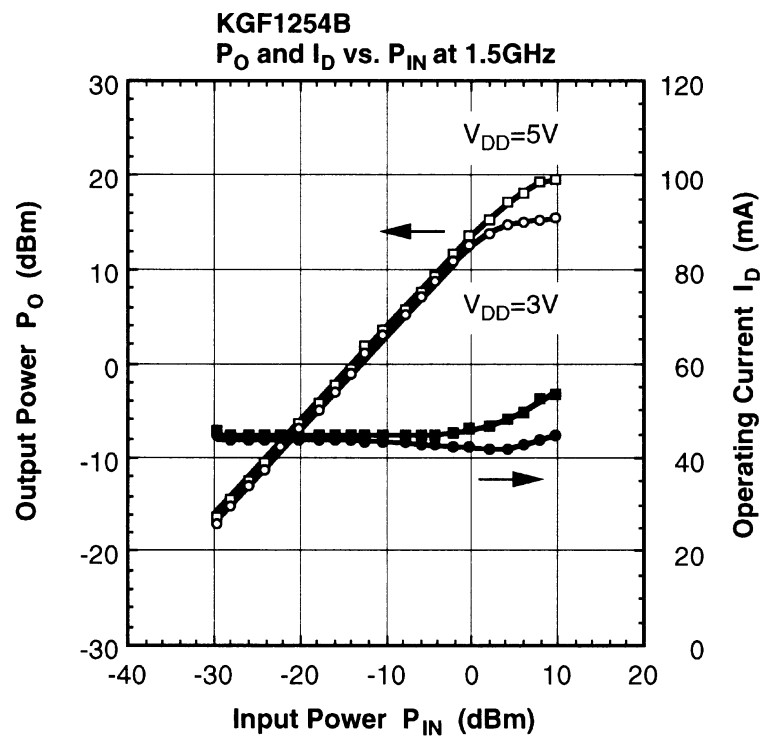
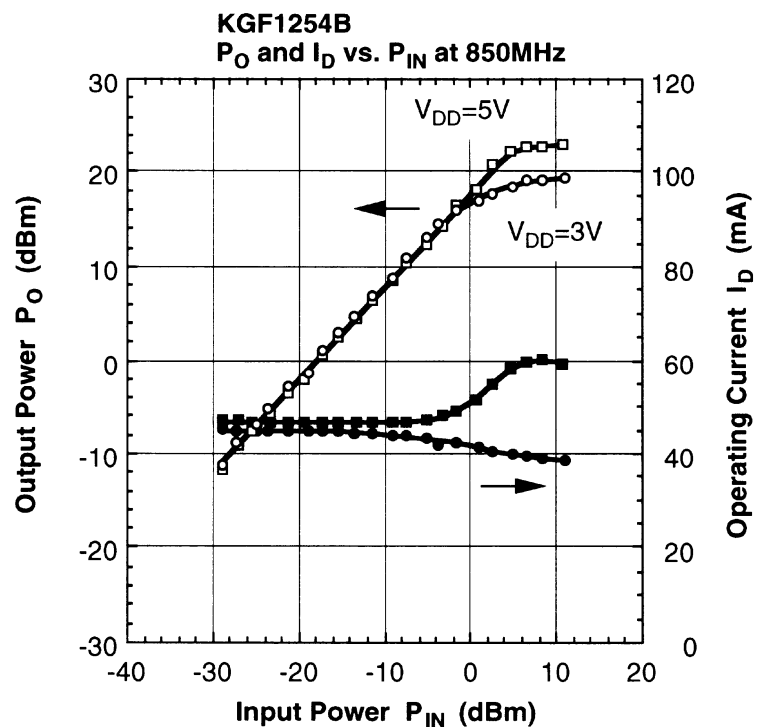
ELECTRICAL CHARACTERISTICS

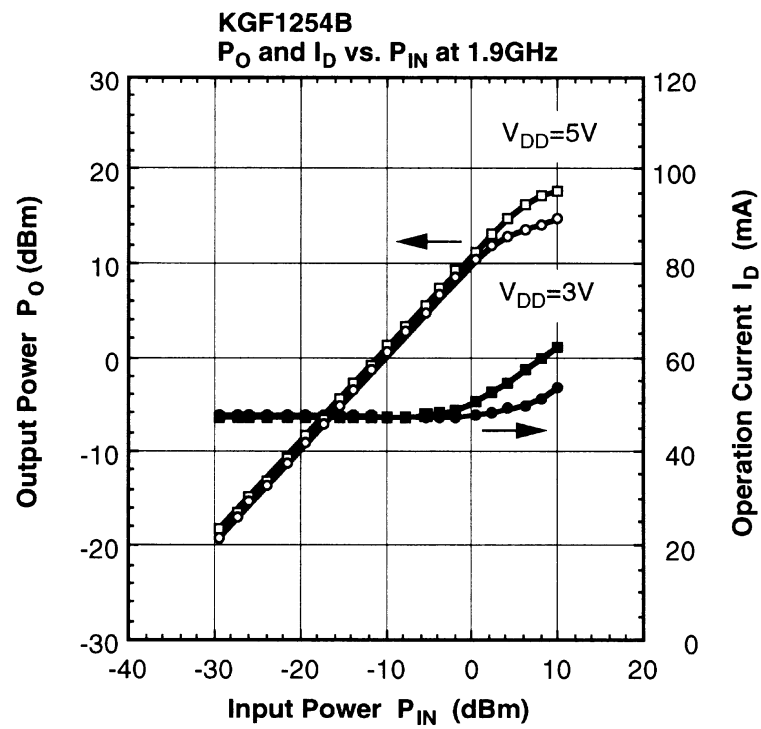
(Ta = 25°C)

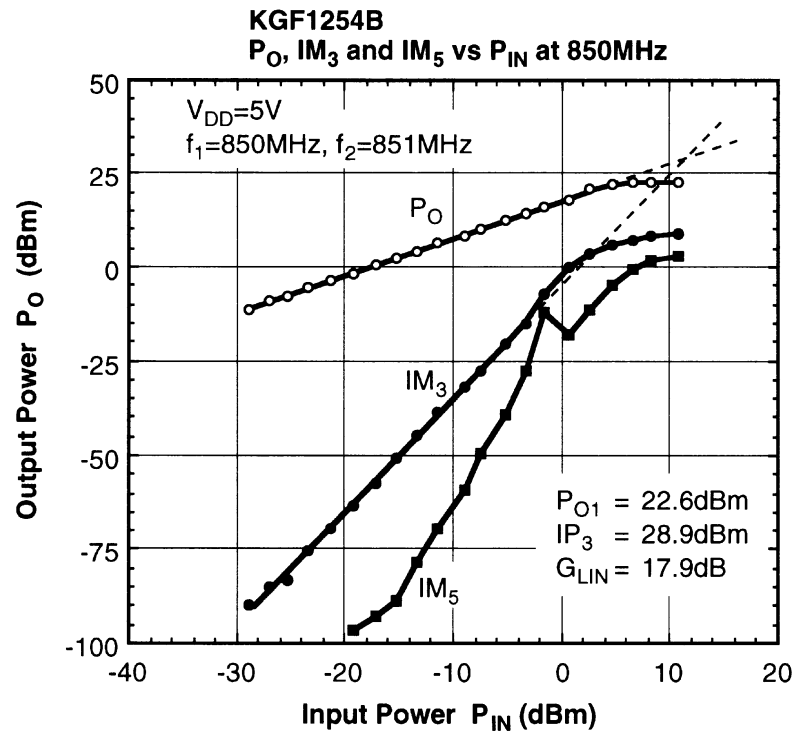
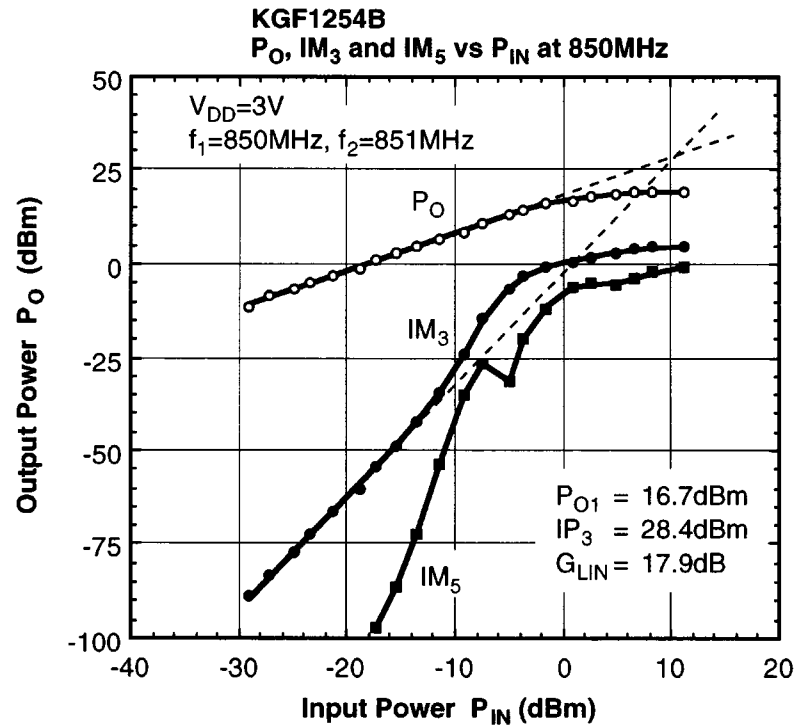
Item	Symbol	Condition		Unit	Min.	Typ.	Max.
Gate-Source leakage current	I_{GSS}	$V_{GS} = -3\text{ V}$		μA	—	—	72
Gate-Drain leakage current	I_{GDO}	$V_{GD} = -15\text{ V}$		μA	—	—	360
Drain-Source leakage current	$I_{DS(off)}$	$V_{DS} = 3\text{ V}, V_{GS} = -2.5\text{ V}$		μA	—	—	720
Drain current	I_{DSS}	$V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}$		mA	130	—	—
Operating current	I_D	(*1), $P_{IN} = 10\text{ dBm}$, $f = 850\text{ MHz}$		mA	—	—	80.0
Gate-Source cut-off voltage	$V_{GS(off)}$	$V_{DS} = 3\text{ V}, I_{DS} = 720\text{ }\mu\text{A}$		V	-2.0	—	-1.0
Transconductance	gm	$V_{DS} = 3\text{ V}, I_{DS} = 60\text{ mA}$		mS	125	—	—
Noise figure	F	(*1), $f = 850\text{ MHz}$		dB	—	—	2.5
Linear gain	G_{LIN}	(*1), $P_{IN} = -10\text{ dBm}$	$f = 850\text{ MHz}$	dB	14.0	17.0	—
			$f = 1.5\text{ GHz}$		—	13.5	—
			$f = 1.9\text{ GHz}$		—	11.0	—
		(*2), $P_{IN} = -10\text{ dBm}$	$f = 850\text{ MHz}$		—	17.0	—
			$f = 1.5\text{ GHz}$		—	13.0	—
			$f = 1.9\text{ GHz}$		—	10.0	—
Output power	P_O	(*1), $P_{IN} = 10\text{ dBm}$	$f = 850\text{ MHz}$	dBm	20.0	22.0	—
			$f = 1.5\text{ GHz}$		—	20.0	—
			$f = 1.9\text{ GHz}$		—	18.0	—
		(*2), $P_{IN} = 10\text{ dBm}$	$f = 850\text{ MHz}$		—	20.0	—
			$f = 1.5\text{ GHz}$		—	16.0	—
			$f = 1.9\text{ GHz}$		—	15.0	—

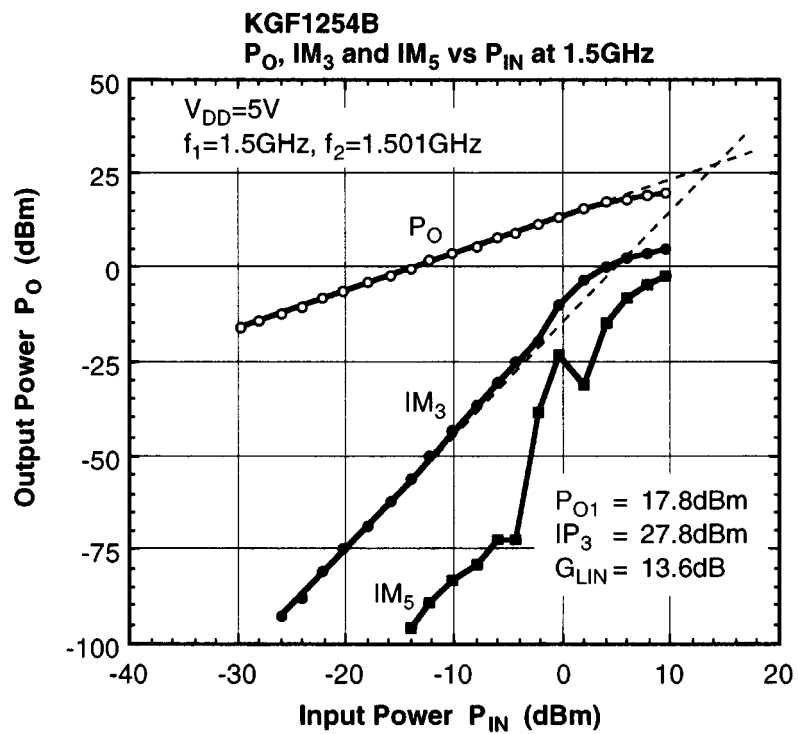
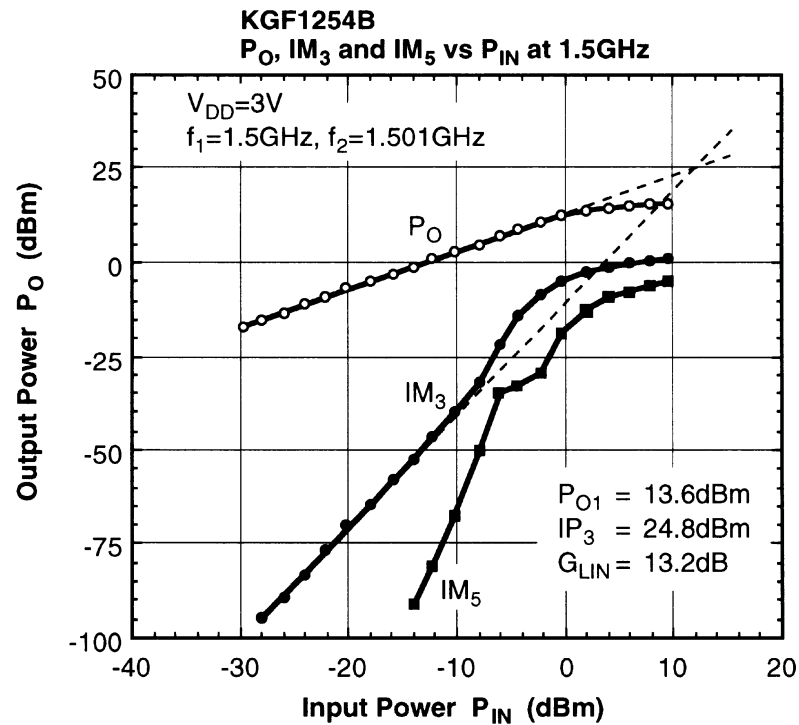
*1 Self-bias condition: $V_{DD} = 5.2\text{ V}, V_G = 0\text{ V}$ *2 Self-bias condition: $V_{DD} = 3\text{ V}, V_G = 0\text{ V}$

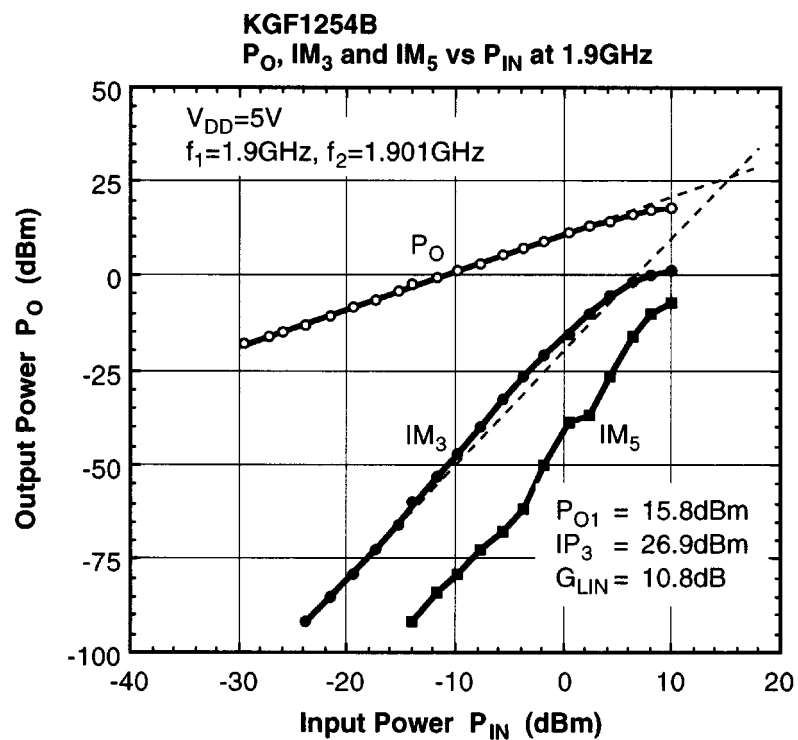
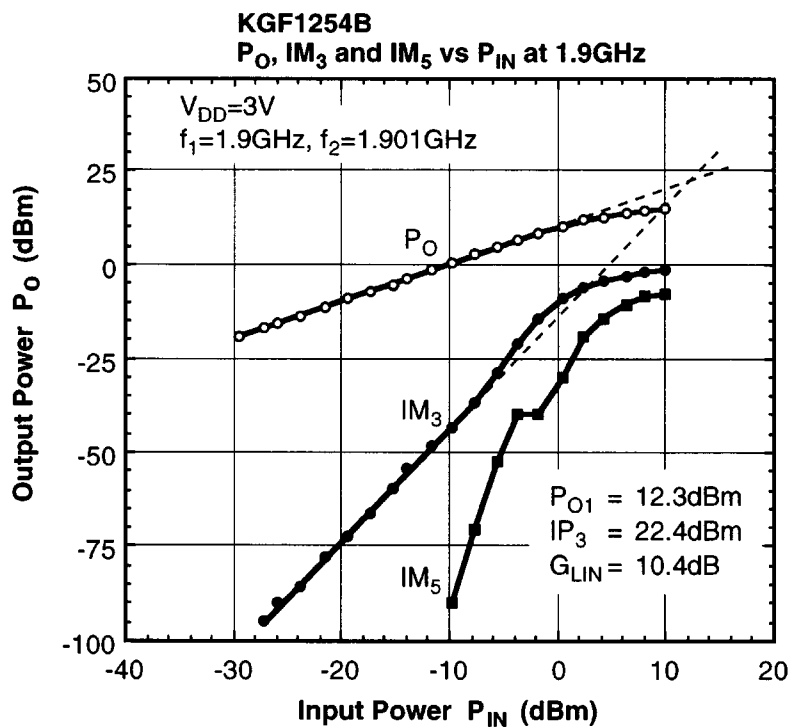
RF CHAR.









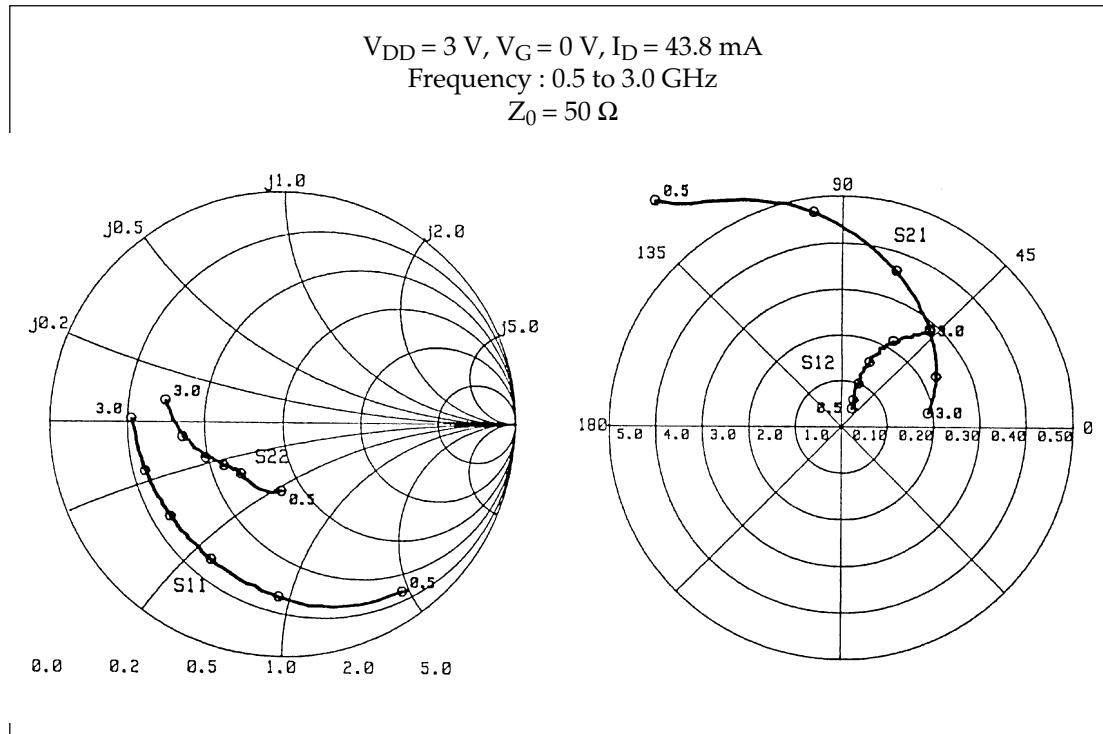


Typical S-Parameters of KGF1254B

 $V_{DD} = 3\text{ V}$, $V_G = 0\text{ V}$, $I_D = 43.8\text{ mA}$

Freq(MHz)	MAG(S ₁₁)	ANG(S ₁₁)	MAG(S ₂₁)	ANG(S ₂₁)	MAG(S ₁₂)	ANG(S ₁₂)	MAG(S ₂₂)	ANG(S ₂₂)
500.0	0.882	-54.29	6.342	129.65	0.044	59.98	0.291	-91.01
600.0	0.858	-61.91	5.839	124.19	0.050	57.96	0.299	-102.52
700.0	0.828	-70.32	5.529	117.60	0.050	59.06	0.296	-112.71
800.0	0.797	-77.65	5.244	110.96	0.055	63.86	0.289	-119.30
900.0	0.770	-84.78	4.984	104.10	0.058	63.60	0.287	-125.16
1000.0	0.741	-91.04	4.689	97.72	0.062	65.29	0.279	-128.77
1100.0	0.720	-97.10	4.430	91.83	0.068	66.39	0.276	-132.96
1200.0	0.700	-102.38	4.176	86.10	0.076	67.73	0.280	-135.93
1300.0	0.681	-107.86	3.958	80.86	0.084	69.74	0.290	-137.58
1400.0	0.666	-113.07	3.747	75.51	0.093	69.37	0.292	-140.07
1500.0	0.656	-117.36	3.590	70.87	0.099	68.47	0.307	-143.39
1600.0	0.648	-122.06	3.402	65.72	0.108	70.21	0.309	-146.87
1700.0	0.636	-126.25	3.263	61.49	0.119	70.91	0.318	-148.45
1800.0	0.629	-130.79	3.095	57.06	0.128	68.98	0.330	-151.18
1900.0	0.629	-135.10	2.973	52.30	0.138	69.75	0.348	-154.04
2000.0	0.623	-139.85	2.851	48.02	0.152	66.93	0.358	-155.23
2100.0	0.620	-144.21	2.717	43.82	0.166	67.20	0.363	-159.28
2200.0	0.616	-147.51	2.619	39.65	0.178	64.35	0.386	-163.29
2300.0	0.621	-152.56	2.498	35.18	0.192	64.22	0.395	-165.34
2400.0	0.623	-156.23	2.408	31.36	0.205	61.50	0.406	-169.53
2500.0	0.623	-160.44	2.304	27.83	0.218	58.91	0.429	-171.79
2600.0	0.625	-164.40	2.217	23.62	0.230	56.57	0.441	-175.67
2700.0	0.632	-168.81	2.128	19.87	0.243	54.01	0.457	-179.59
2800.0	0.635	-172.79	2.047	16.31	0.256	52.28	0.471	177.80
2900.0	0.638	-177.44	1.965	12.51	0.270	49.71	0.486	173.52
3000.0	0.647	178.65	1.895	8.54	0.283	47.52	0.508	169.33

Typical S-Parameters of KGF1254B

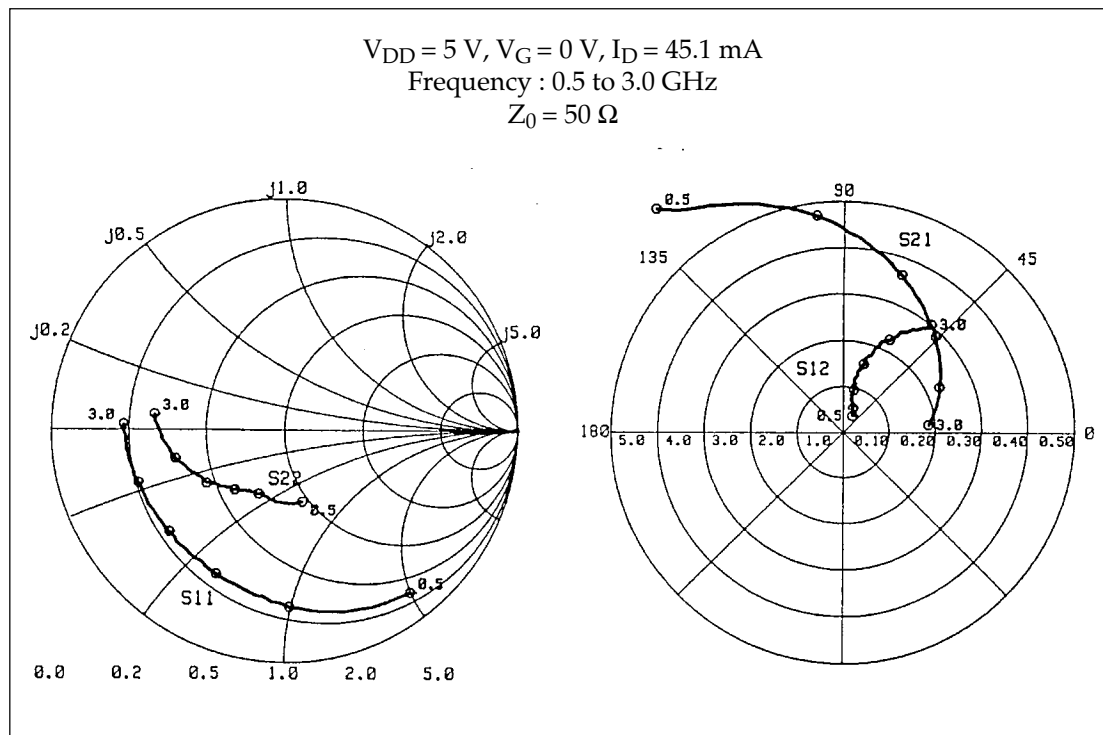


Typical S-Parameters of KGF1254B

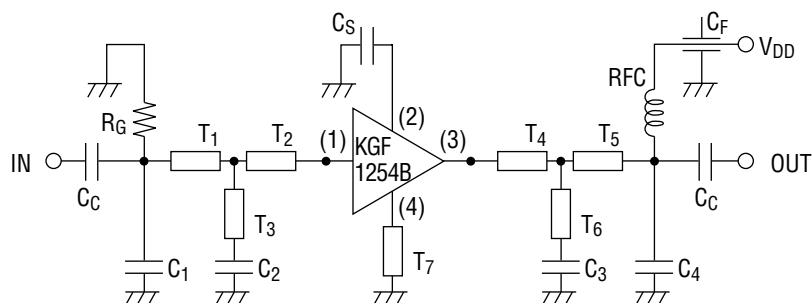
 $V_{DD} = 5\text{ V}$, $V_G = 0\text{ V}$, $I_D = 45.1\text{ mA}$

Freq(MHz)	MAG(S ₁₁)	ANG(S ₁₁)	MAG(S ₂₁)	ANG(S ₂₁)	MAG(S ₁₂)	ANG(S ₁₂)	MAG(S ₂₂)	ANG(S ₂₂)
500.0	0.885	-52.63	6.302	130.04	0.040	61.92	0.322	-76.26
600.0	0.864	-59.83	5.861	124.38	0.043	59.74	0.321	-86.96
700.0	0.836	-67.93	5.553	117.38	0.045	60.36	0.315	-96.63
800.0	0.812	-75.08	5.277	110.70	0.047	62.83	0.307	-102.22
900.0	0.786	-82.06	5.005	103.96	0.051	62.81	0.300	-107.66
1000.0	0.765	-88.22	4.724	97.24	0.056	68.01	0.299	-111.14
1100.0	0.743	-94.20	4.471	91.06	0.062	71.47	0.298	-114.83
1200.0	0.725	-99.50	4.221	85.19	0.068	73.68	0.303	-119.37
1300.0	0.707	-105.20	3.978	79.95	0.079	76.17	0.311	-122.26
1400.0	0.697	-110.17	3.783	74.02	0.084	76.17	0.326	-125.15
1500.0	0.689	-114.84	3.624	69.53	0.094	75.92	0.334	-128.57
1600.0	0.679	-119.36	3.432	64.21	0.105	79.05	0.341	-132.48
1700.0	0.673	-123.74	3.289	59.89	0.115	77.97	0.353	-135.45
1800.0	0.667	-128.52	3.123	55.16	0.127	76.07	0.367	-138.21
1900.0	0.669	-133.13	2.995	50.31	0.139	76.30	0.388	-142.51
2000.0	0.661	-137.70	2.872	45.87	0.154	73.45	0.403	-144.74
2100.0	0.660	-142.35	2.730	41.41	0.166	74.08	0.408	-149.35
2200.0	0.660	-145.82	2.630	37.21	0.180	69.70	0.427	-153.97
2300.0	0.667	-151.02	2.497	32.36	0.199	68.97	0.444	-157.05
2400.0	0.663	-155.34	2.411	28.42	0.215	67.08	0.459	-161.21
2500.0	0.665	-159.71	2.294	24.90	0.225	63.38	0.479	-164.88
2600.0	0.671	-163.88	2.208	20.26	0.241	60.62	0.493	-168.63
2700.0	0.677	-168.72	2.118	16.64	0.259	57.47	0.510	-173.48
2800.0	0.682	-173.12	2.025	12.64	0.272	55.78	0.523	-177.27
2900.0	0.680	-177.75	1.936	8.81	0.284	52.98	0.542	178.12
3000.0	0.688	178.08	1.854	4.75	0.301	50.65	0.557	173.21

Typical S-Parameters of KGF1254B

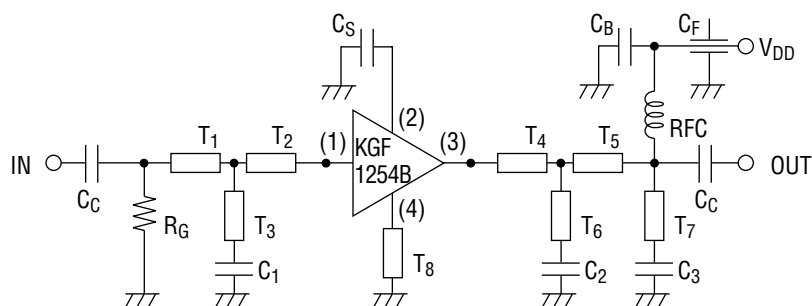


Test Circuit and Bias Configuration for KGF1254B at 850 MHz



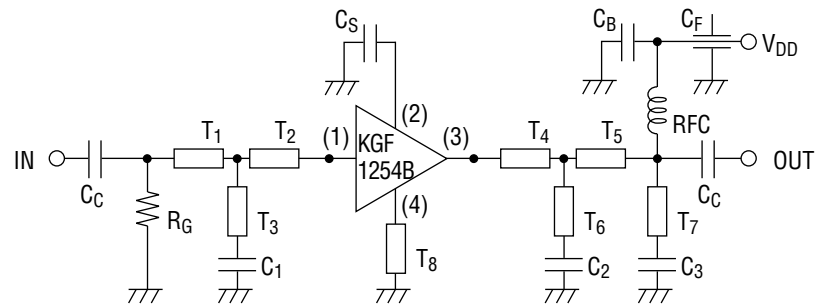
T_1 : $Z_0 = 75 \Omega$, $E = 30 \text{ deg}$ T_5 : $Z_0 = 75 \Omega$, $E = 30 \text{ deg}$
 T_2 : $Z_0 = 75 \Omega$, $E = 28 \text{ deg}$ T_6 : $Z_0 = 75 \Omega$, $E = 30 \text{ deg}$
 $T_3 = T_6$: $Z_0 = 100 \Omega$, $E = 5 \text{ deg}$ T_7 : $Z_0 = 100 \Omega$, $E = 1 \text{ deg}$
 $C_1 = 7.0 \text{ pF}$, $C_2 = 0.8 \text{ pF}$, $C_3 = 5.0 \text{ pF}$, $C_4 = 5.5 \text{ pF}$, $C_S = 100 \text{ pF}$
 $C_C(\text{DC Block}) = 1000 \text{ pF}$, $C_F(\text{Feed Through}) = 1000 \text{ pF}$
 $\text{RFC} = 200 \text{ nH}$, $R_G = 1000 \Omega$

Test Circuit and Bias Configuration for KGF1254B at 1.5 GHz



T_1 : $Z_0 = 75 \Omega$, $E = 65 \text{ deg}$ T_4 : $Z_0 = 75 \Omega$, $E = 50 \text{ deg}$
 T_2 : $Z_0 = 75 \Omega$, $E = 40 \text{ deg}$ T_5 : $Z_0 = 75 \Omega$, $E = 50 \text{ deg}$
 $T_3 = T_6 = T_7$: $Z_0 = 100 \Omega$, $E = 8 \text{ deg}$ T_8 : $Z_0 = 100 \Omega$, $E = 1 \text{ deg}$
 $C_1 = 2.4 \text{ pF}$, $C_2 = 1.2 \text{ pF}$, $C_3 = 0.6 \text{ pF}$, $C_S = 100 \text{ pF}$
 $C_C(\text{DC Block}) = 1000 \text{ pF}$, $C_B(\text{By-pass}) = 1000 \text{ pF}$, $C_F(\text{Feed Through}) = 1000 \text{ pF}$
 $\text{RFC} = 60 \text{ nH}$, $R_G = 1000 \Omega$

Test Circuit and Bias Configuration for KGF1254B at 1.9 GHz



T_1 : $Z_0 = 75 \Omega$, $E = 65 \text{ deg}$

T_4 : $Z_0 = 75 \Omega$, $E = 50 \text{ deg}$

T_2 : $Z_0 = 75 \Omega$, $E = 40 \text{ deg}$

T_5 : $Z_0 = 75 \Omega$, $E = 50 \text{ deg}$

$T_3 = T_6 = T_7$: $Z_0 = 100 \Omega$, $E = 1 \text{ deg}$

T_8 : $Z_0 = 100 \Omega$, $E = 1 \text{ deg}$

$C_1 = 1.7 \text{ pF}$, $C_2 = 1.3 \text{ pF}$, $C_3 = 0.2 \text{ pF}$, $C_S = 100 \text{ pF}$

$C_C(\text{DC Block}) = 1000 \text{ pF}$, $C_B(\text{By-pass}) = 1000 \text{ pF}$, $C_F(\text{Feed Through}) = 1000 \text{ pF}$

$RFC = 60 \text{ nH}$, $R_G = 1000 \Omega$