

OKI electronic components

KGF1191

Small-Signal Amplifier

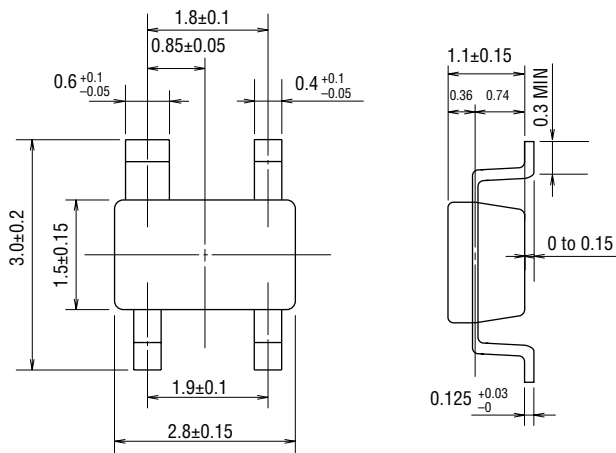
GENERAL DESCRIPTION

The KGF1191 is a two-stage small-signal amplifier, with frequencies ranging from the UHF-band to the L-band, that features low voltage operation, low current operation, high gain, and high isolation. The KGF1191 specifications are guaranteed to a fixed matching circuit for 3 V and 850 MHz; external impedance-matching circuits are also required. Because of the high gain and high isolation at 3 V, the KGF1191 is ideal as an intermediate-stage amplifier for portable phones.

FEATURES

- Low voltage and low current: 3 V, 5 mA (max.)
- Specifications guaranteed to a fixed matching circuit for 3 V and 850 MHz
- High linear gain: 24 dB (typ.)
- High isolation: -35 dB (typ.)
- Self-bias circuit configuration with built-in source capacitor
- Package: 4PSOP

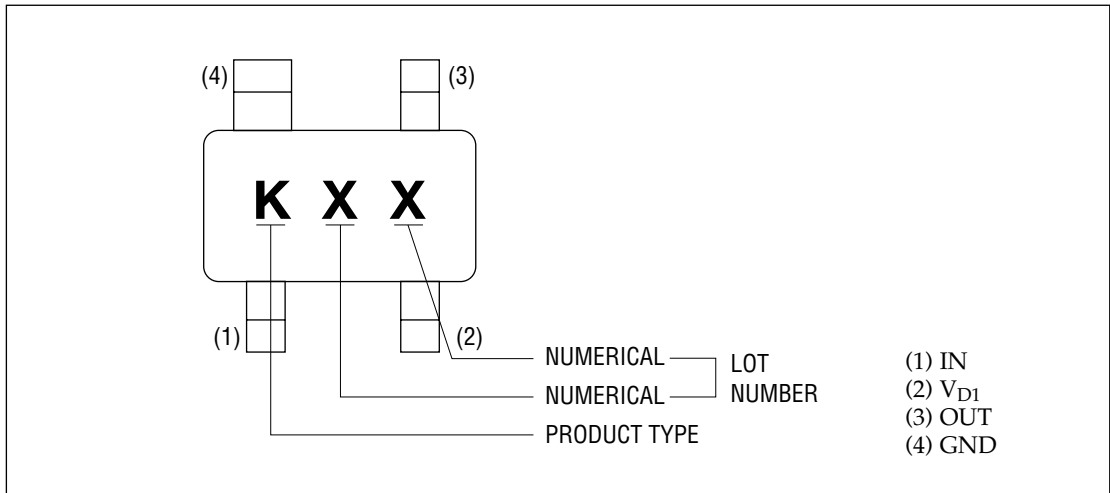
PACKAGE DIMENSIONS



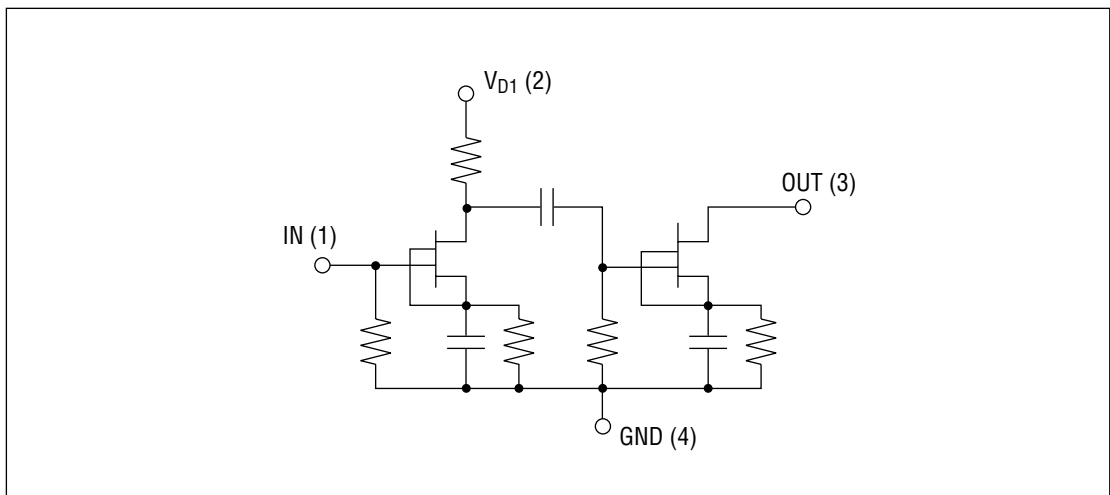
(Unit: mm)

Package material	Epoxy resin
Lead frame material	42 alloy
Pin treatment	Solder plating
Solder plate thickness	5 μm or more

MARKING



CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Unit	Min.	Max.
Supply voltage	V_{DD}	$T_a = 25^\circ\text{C}$	V	—	7
Gate voltage	V_G	$T_a = 25^\circ\text{C}$	V	-3.0	0.4
Total power dissipation	P_{tot}	$T_a = 25^\circ\text{C}$	mW	—	200
Channel temperature	T_{ch}	—	$^\circ\text{C}$	—	150
Storage temperature	T_{stg}	—	$^\circ\text{C}$	-45	125

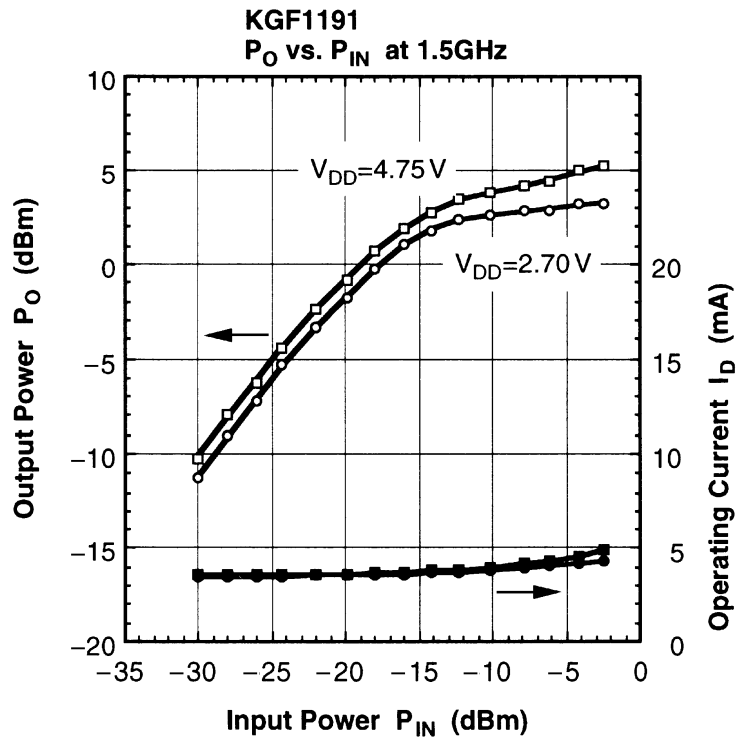
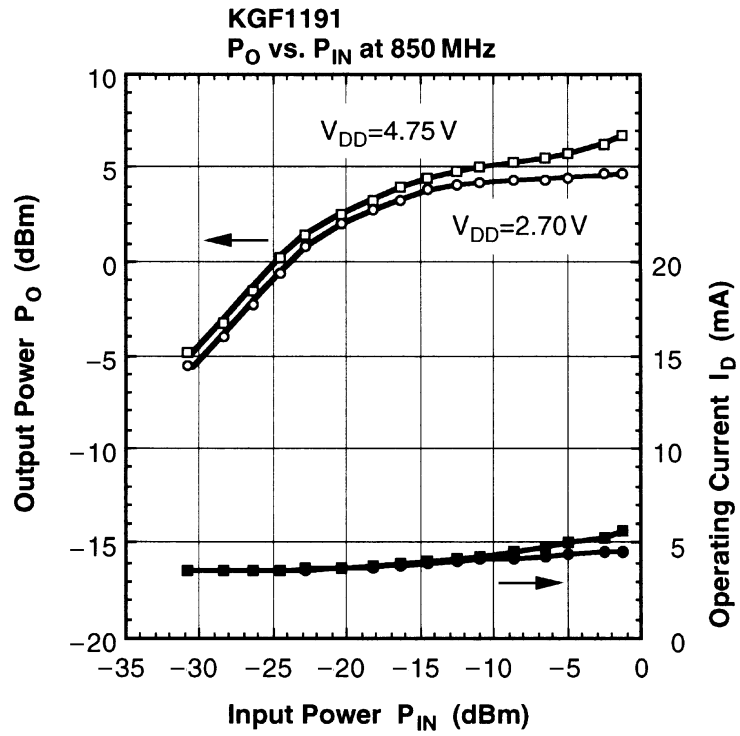
ELECTRICAL CHARACTERISTICS

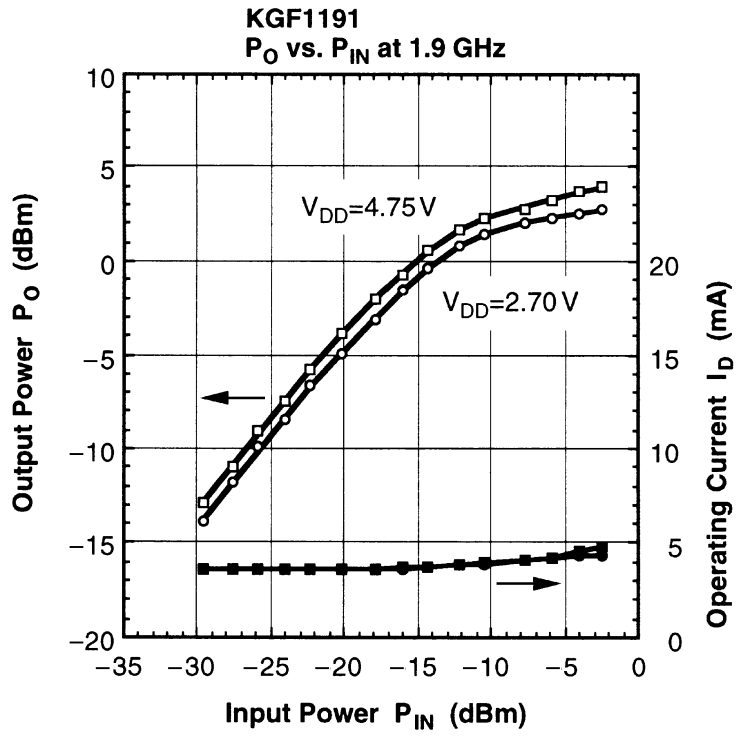
(Ta = 25°C)

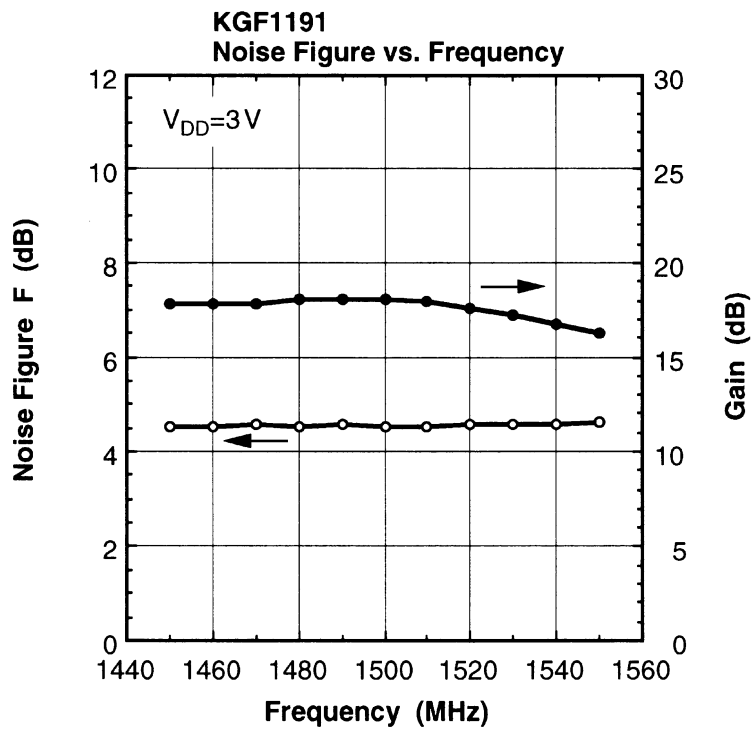
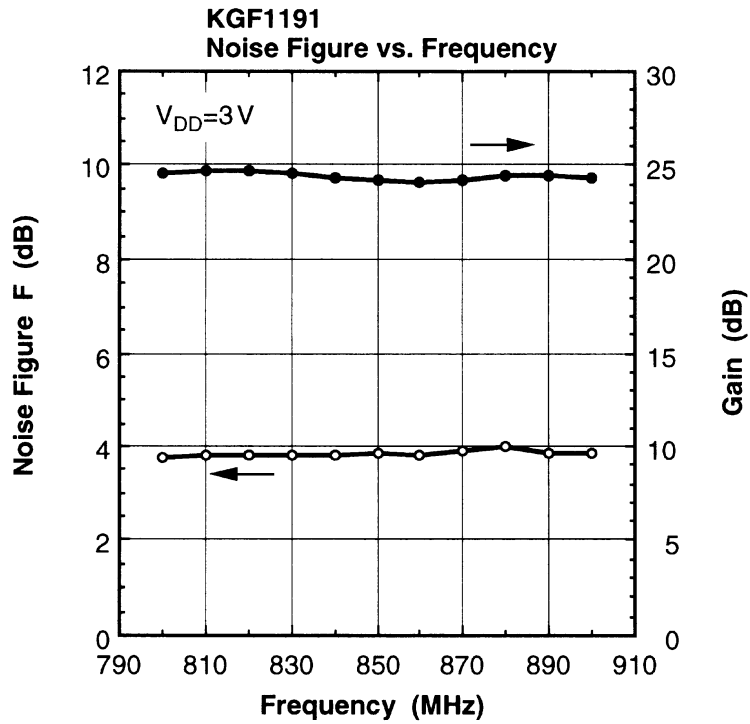
Item	Symbol	Condition	Unit	Min.	Typ.	Max.	
Operating current	I_D	(*1), $P_{IN} = -13 \text{ dBm}$	mA	—	—	5.0	
Noise figure	F	(*1)	f = 850 MHz	dB	—	4.0	5.0
			f = 1.5 GHz		—	4.5	—
			f = 1.9 GHz		—	5.0	—
Linear gain	G_{LIN}	(*1), $P_{IN} = -30 \text{ dBm}$	f = 850 MHz	dB	18.0	24.0	—
			f = 1.5 GHz		—	19.0	—
			f = 1.9 GHz		—	15.0	—
Output power	P_O	(*1), $P_{IN} = -13 \text{ dBm}$	f = 850 MHz	dBm	0	3.0	—
			f = 1.5 GHz		—	1.5	—
			f = 1.9 GHz		—	0	—
Isolation	ISO	(*1), $P_{IN} = -20 \text{ dBm}$	f = 850 MHz	dB	—	-35.0	—
			f = 1.5 GHz		—	-30.0	—
			f = 1.9 GHz		—	-30.0	—

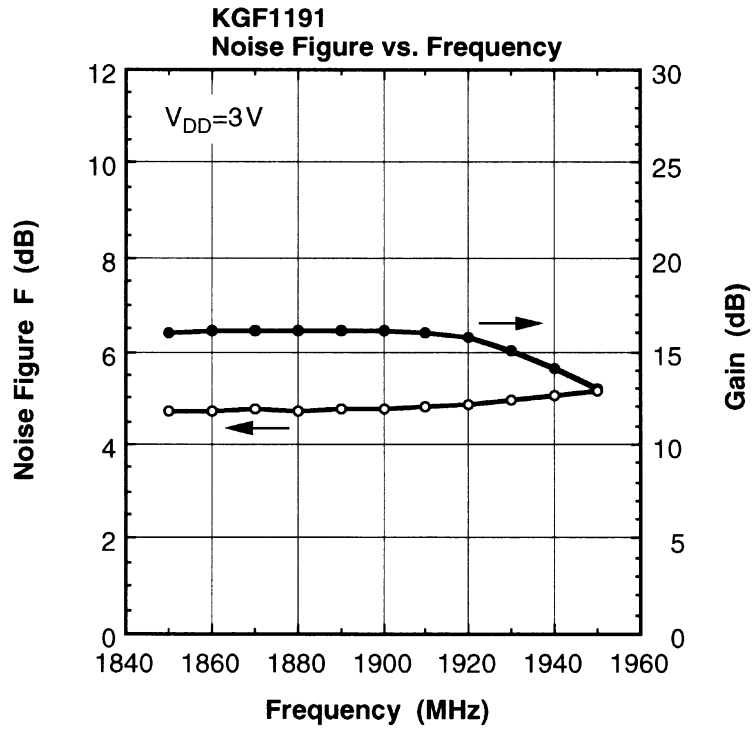
*1 Self-bias condition: $V_{DD} = 3 \pm 0.3 \text{ V}$, $V_G = 0 \text{ V}$

RF CHARACTERISTICS







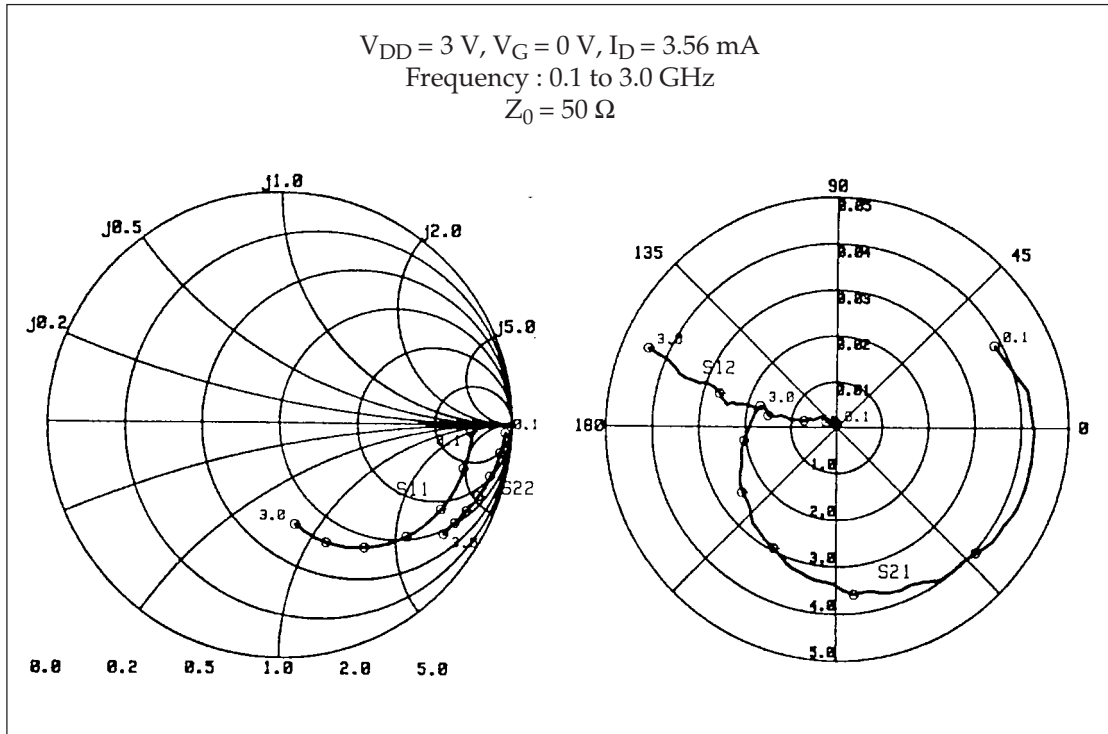


Typical S Parameters

 $V_{DD} = 3\text{ V}$, $V_G = 0\text{ V}$, $I_D = 3.56\text{ mA}$

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)
100.0	0.826	-2.48	3.689	26.33	0.001	102.87	0.969	-2.13
200.0	0.828	-5.42	4.054	-2.68	0.002	178.63	0.965	-3.46
300.0	0.826	-8.25	4.047	-19.24	0.001	85.27	0.960	-4.74
400.0	0.823	-10.98	3.944	-32.66	0.002	81.51	0.957	-6.19
500.0	0.818	-13.69	3.811	-43.77	0.002	96.73	0.954	-7.65
600.0	0.813	-16.49	3.742	-53.51	0.001	139.53	0.950	-8.87
700.0	0.808	-19.25	3.565	-62.73	0.002	122.83	0.945	-10.31
800.0	0.802	-22.02	3.510	-70.82	0.002	119.07	0.941	-11.55
900.0	0.796	-24.75	3.362	-78.70	0.002	132.88	0.937	-12.91
1000.0	0.789	-27.55	3.339	-85.73	0.003	141.62	0.932	-14.08
1100.0	0.781	-30.33	3.105	-93.15	0.004	145.54	0.928	-15.36
1200.0	0.770	-33.16	3.050	-99.64	0.004	148.84	0.922	-16.66
1300.0	0.761	-35.86	2.945	-105.81	0.004	160.42	0.920	-17.82
1400.0	0.750	-38.93	2.877	-111.89	0.005	167.88	0.912	-19.06
1500.0	0.737	-41.28	2.709	-118.68	0.007	167.34	0.909	-19.98
1600.0	0.723	-44.23	2.629	-124.25	0.009	167.54	0.906	-21.15
1700.0	0.713	-47.11	2.547	-129.31	0.010	168.93	0.901	-22.12
1800.0	0.696	-49.54	2.419	-135.82	0.010	171.82	0.898	-23.36
1900.0	0.690	-52.26	2.315	-141.51	0.013	167.51	0.893	-23.98
2000.0	0.663	-55.32	2.285	-145.96	0.016	169.19	0.885	-25.32
2100.0	0.645	-57.91	2.227	-151.50	0.016	170.19	0.882	-26.00
2200.0	0.629	-60.52	2.091	-157.05	0.019	165.87	0.875	-27.26
2300.0	0.610	-62.96	2.006	-162.57	0.022	169.05	0.874	-28.24
2400.0	0.589	-66.12	1.971	-167.19	0.025	165.57	0.867	-28.90
2500.0	0.571	-68.72	1.875	-171.67	0.028	165.24	0.866	-30.12
2600.0	0.551	-70.99	1.801	-176.77	0.031	162.81	0.864	-30.61
2700.0	0.532	-73.75	1.742	178.62	0.034	161.97	0.856	-31.85
2800.0	0.508	-76.47	1.706	173.98	0.038	160.90	0.858	-32.49
2900.0	0.484	-79.35	1.671	169.70	0.041	160.05	0.853	-33.54
3000.0	0.462	-81.93	1.608	164.43	0.046	157.80	0.850	-34.74

Typical S Parameters

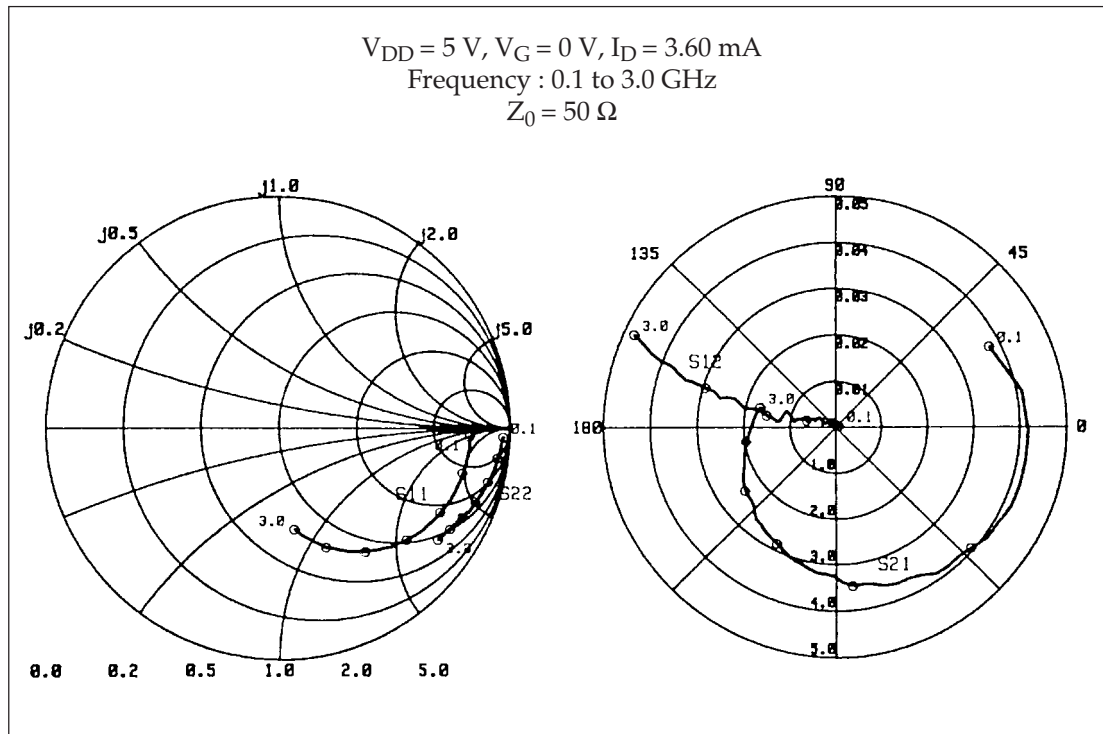


Typical S Parameters

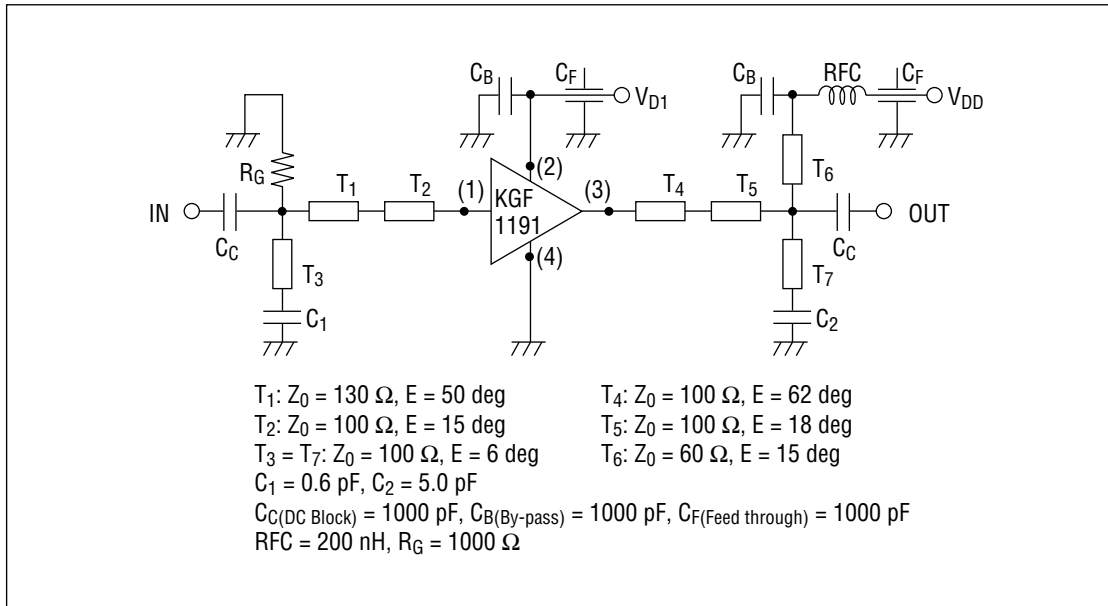
 $V_{DD} = 5\text{ V}$, $V_G = 0\text{ V}$, $I_D = 3.60\text{ mA}$

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)
100.0	0.821	-2.46	3.840	27.87	0.001	106.42	0.970	-2.14
200.0	0.824	-5.35	4.257	-1.07	0.001	14.24	0.966	-3.35
300.0	0.821	-8.20	4.265	-17.53	0.001	111.02	0.963	-4.61
400.0	0.819	-10.93	4.173	-30.85	0.001	102.62	0.960	-5.99
500.0	0.814	-13.64	4.041	-41.88	0.001	107.82	0.957	-7.42
600.0	0.810	-16.52	3.984	-51.44	0.002	104.70	0.952	-8.74
700.0	0.805	-19.23	3.803	-60.76	0.002	119.01	0.948	-10.13
800.0	0.799	-22.06	3.755	-68.89	0.001	118.47	0.946	-11.33
900.0	0.792	-24.80	3.609	-76.94	0.002	142.84	0.940	-12.76
1000.0	0.786	-27.81	3.601	-83.94	0.003	153.34	0.933	-13.87
1100.0	0.775	-30.47	3.355	-91.50	0.003	147.32	0.929	-15.16
1200.0	0.765	-33.34	3.309	-98.33	0.004	148.53	0.925	-16.33
1300.0	0.755	-36.06	3.208	-104.65	0.005	156.44	0.922	-17.45
1400.0	0.743	-39.21	3.128	-110.68	0.006	163.77	0.914	-18.75
1500.0	0.729	-41.61	2.946	-117.74	0.007	168.64	0.909	-19.67
1600.0	0.714	-44.53	2.882	-123.29	0.009	169.40	0.905	-20.74
1700.0	0.700	-47.43	2.792	-128.77	0.010	173.81	0.903	-21.84
1800.0	0.684	-49.85	2.659	-135.06	0.010	170.88	0.896	-22.79
1900.0	0.667	-52.61	2.532	-140.91	0.013	168.32	0.888	-23.52
2000.0	0.646	-55.60	2.502	-145.68	0.015	170.35	0.887	-24.80
2100.0	0.629	-58.35	2.434	-151.11	0.018	168.88	0.880	-25.51
2200.0	0.613	-60.75	2.279	-156.84	0.019	166.36	0.874	-26.69
2300.0	0.593	-63.14	2.192	-162.33	0.023	167.44	0.874	-27.52
2400.0	0.570	-66.00	2.137	-167.16	0.025	168.58	0.865	-28.22
2500.0	0.551	-68.61	2.050	-171.55	0.027	163.96	0.866	-29.33
2600.0	0.530	-70.87	1.959	-176.76	0.030	161.14	0.860	-29.76
2700.0	0.509	-73.62	1.898	178.81	0.033	161.94	0.856	-30.88
2800.0	0.486	-76.19	1.749	173.93	0.036	161.44	0.855	-31.65
2900.0	0.462	-78.64	1.810	169.62	0.040	158.20	0.852	-32.56
3000.0	0.440	-81.11	1.734	164.47	0.044	157.30	0.850	-33.67

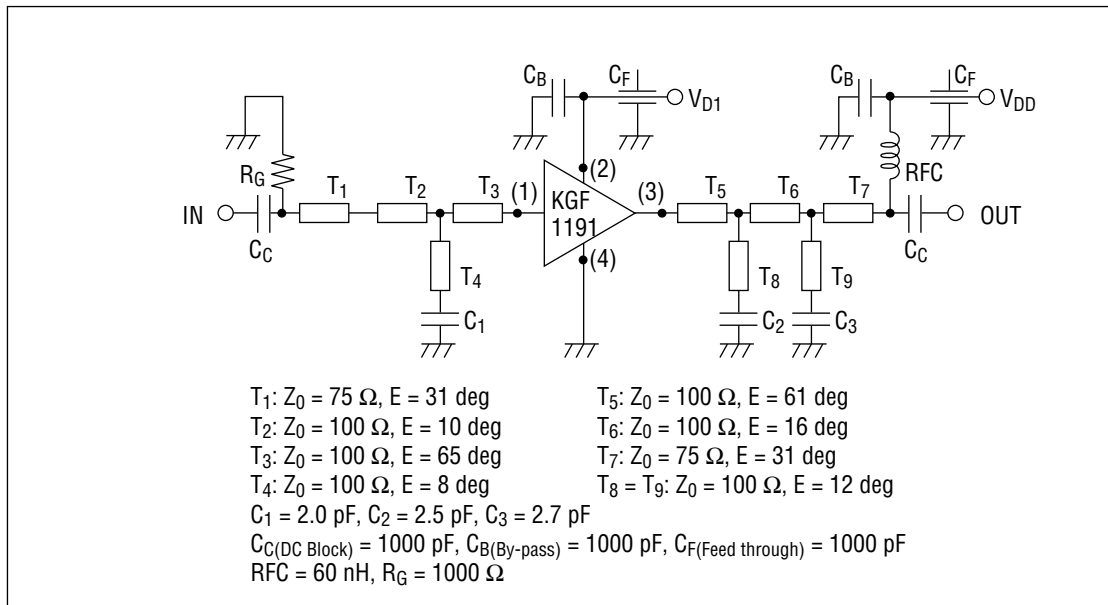
Typical S Parameters



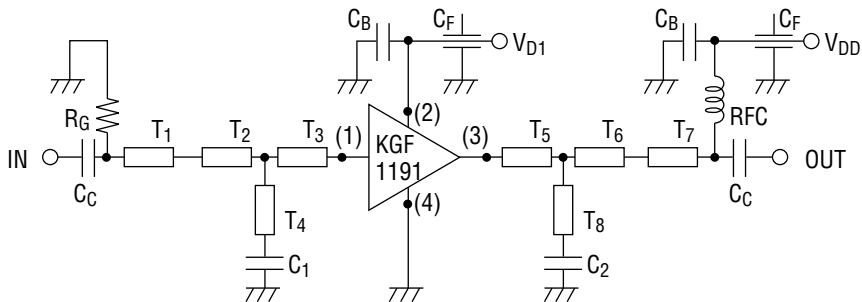
Test Circuit and Bias Configuration for KGF1191 at 850 MHz



Test Circuit and Bias Configuration for KGF1191 at 1.5 GHz



Test Circuit and Bias Configuration for KGF1191 at 1.9 GHz



T_1 : $Z_0 = 75 \Omega$, $E = 40 \text{ deg}$ T_5 : $Z_0 = 100 \Omega$, $E = 88 \text{ deg}$
 T_2 : $Z_0 = 100 \Omega$, $E = 35 \text{ deg}$ T_6 : $Z_0 = 100 \Omega$, $E = 35 \text{ deg}$
 T_3 : $Z_0 = 100 \Omega$, $E = 88 \text{ deg}$ T_7 : $Z_0 = 75 \Omega$, $E = 40 \text{ deg}$
 $T_4 = T_8$: $Z_0 = 100 \Omega$, $E = 12 \text{ deg}$
 $C_1 = 0.7 \text{ pF}$, $C_2 = 1.4 \text{ pF}$
 $C_C(\text{DC Block}) = 1000 \text{ pF}$, $C_B(\text{By-pass}) = 1000 \text{ pF}$, $C_F(\text{Feed through}) = 1000 \text{ pF}$
 $\text{RFC} = 60 \text{ nH}$, $R_G = 1000 \Omega$