

OKI electronic components

KGF1175B/1175

Small-Signal Amplifier

GENERAL DESCRIPTION

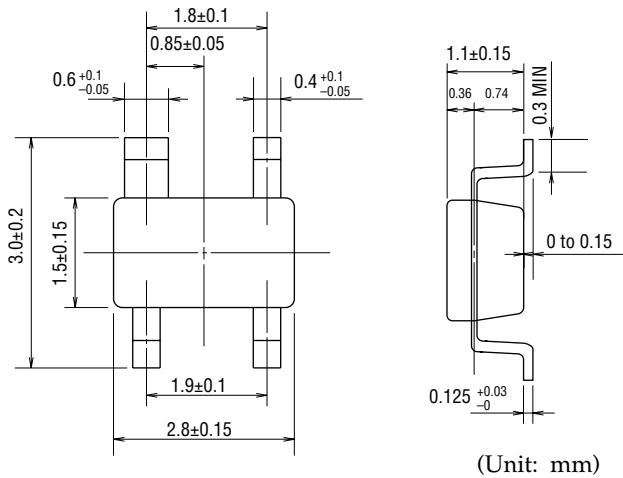
The KGF1175B is a small-signal amplifier, for frequencies ranging from the UHF-band to the L-band, that features low noise and low current operation. The KGF1175B specifications are guaranteed to a fixed matching circuit for 5 V and 850 MHz; external impedance-matching circuits are also required. Because of the one-input dual gate configuration, low noise, and low operating current, the KGF1175B is ideal as a receiving-stage head amplifier for personal handy phones.

The KGF1175 is an amplifier similar to the KGF1175B in specifications and typical properties. Although possessing S Parameters that are slightly different from those of the KGF1175B, the KGF1175 meets the specifications for the KGF1175B, even with the same matching circuits as those of the KGF1175B.

FEATURES

- Low current operation: 2.5 mA (max.)
- High output power: 3 dBm (min.)
- Low noise: 2 dB (max.)
- Self-bias circuit configuration with built-in source capacitor
- Package: 4PSOP

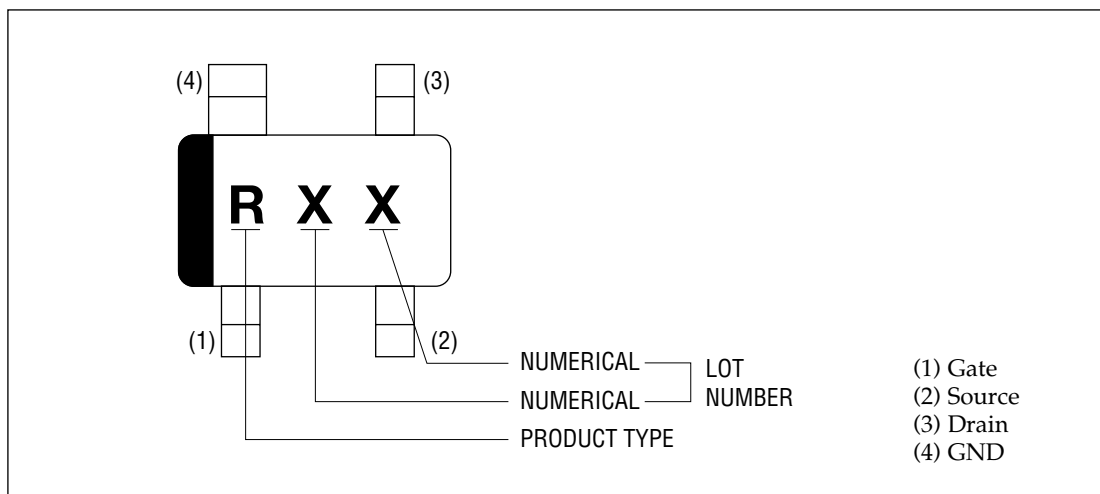
PACKAGE DIMENSIONS



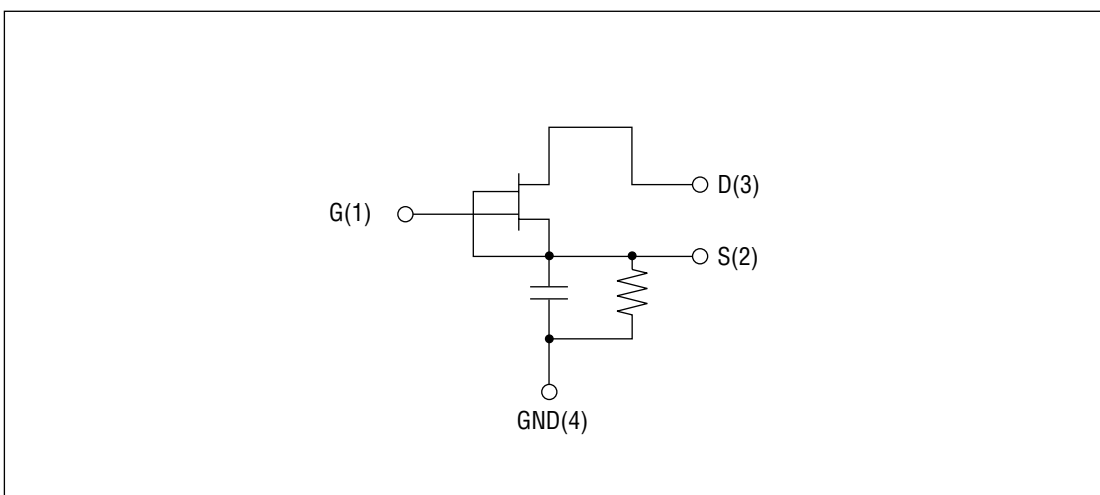
Package material	Epoxy resin
Lead frame material	42 alloy
Pin treatment	Solder plating
Solder plate thickness	5 μm or more

Note: Ask our sales department for detailed requirements of the KGF1175.

MARKING



CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Unit	Min.	Max.
Drain-source voltage	V_{DS}	$T_a = 25^{\circ}\text{C}$	V	—	7.0
Gate-source voltage	V_{GS}	$T_a = 25^{\circ}\text{C}$	V	-3.0	0.4
Drain current	I_{DS}	$T_a = 25^{\circ}\text{C}$	mA	—	60
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

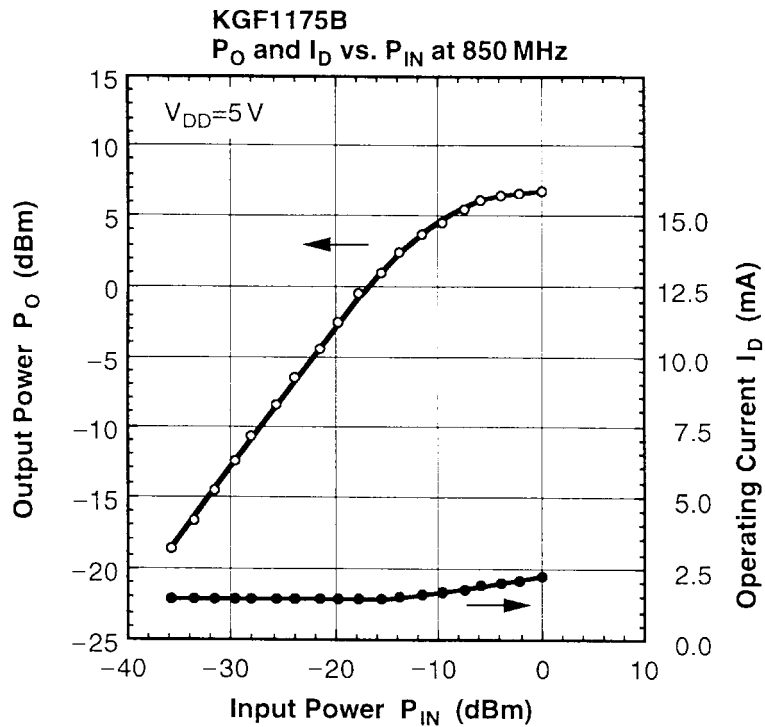
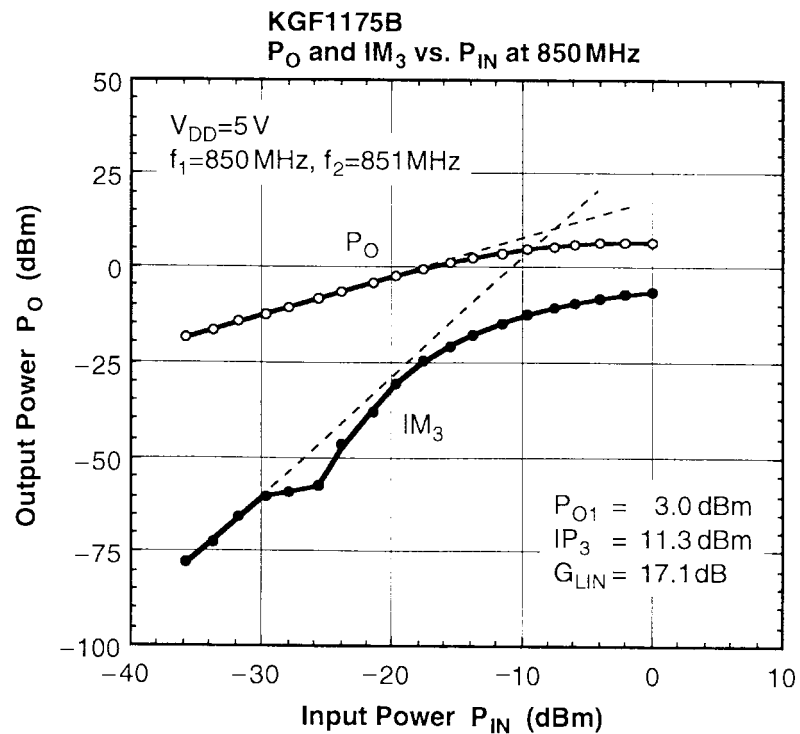
ELECTRICAL CHARACTERISTICS

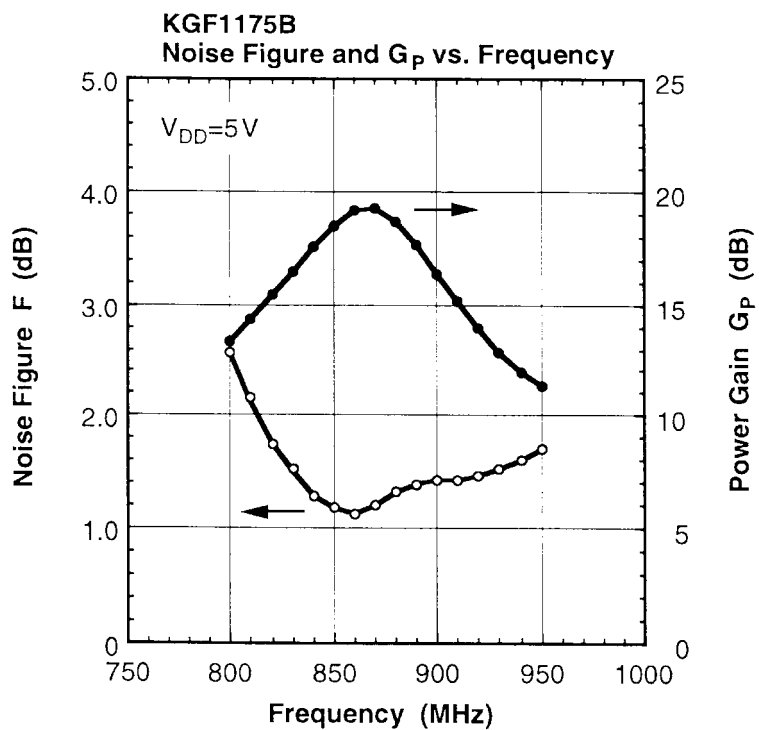
(Ta = 25°C)

Item	Symbol	Condition	Unit	Min.	Typ.	Max.
Gate-source leakage current	I_{GSS}	$V_{GS} = -3\text{ V}$	μA	—	—	12
Gate-drain leakage current	I_{GDO}	$V_{GD} = -8\text{ V}$	μA	—	—	60
Drain-source leakage current	$I_{DS(off)}$	$V_{DS} = 3\text{ V}, V_{GS} = -2.5\text{ V}$	μA	—	—	120
Drain current	I_{DSS}	$V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}$	mA	15	—	—
Operating current	I_D	(*1), $P_{IN} = -20\text{ dBm}$	mA	—	—	2.5
Gate-source cut-off voltage	$V_{GS(off)}$	$V_{DS} = 3\text{ V}, I_{DS} = 120\text{ }\mu\text{A}$	V	-2.0	—	-1.0
Transconductance	g_m	$V_{DS} = 3\text{ V}, I_{DS} = 1.5\text{ mA}$	mS	8	—	—
Noise figure	F	(*1)	dB	—	—	2.0
Linear gain	G_{LIN}	(*1), $P_{IN} = -20\text{ dBm}$	dB	12.0	—	—
Output power	P_O	(*1), $P_{IN} = -3\text{ dBm}$	dBm	3.0	—	—
Third-order intercept point	IP_3	(*1), $f_2 = 851\text{ MHz}$	dBm	—	11	—

*1 Self-bias condition: $V_{DD} = 5.0\text{ V} \pm 0.25\text{ V}$, $V_G = 0\text{ V}$, $f = 850\text{ MHz}$

RF CHARACTERISTICS



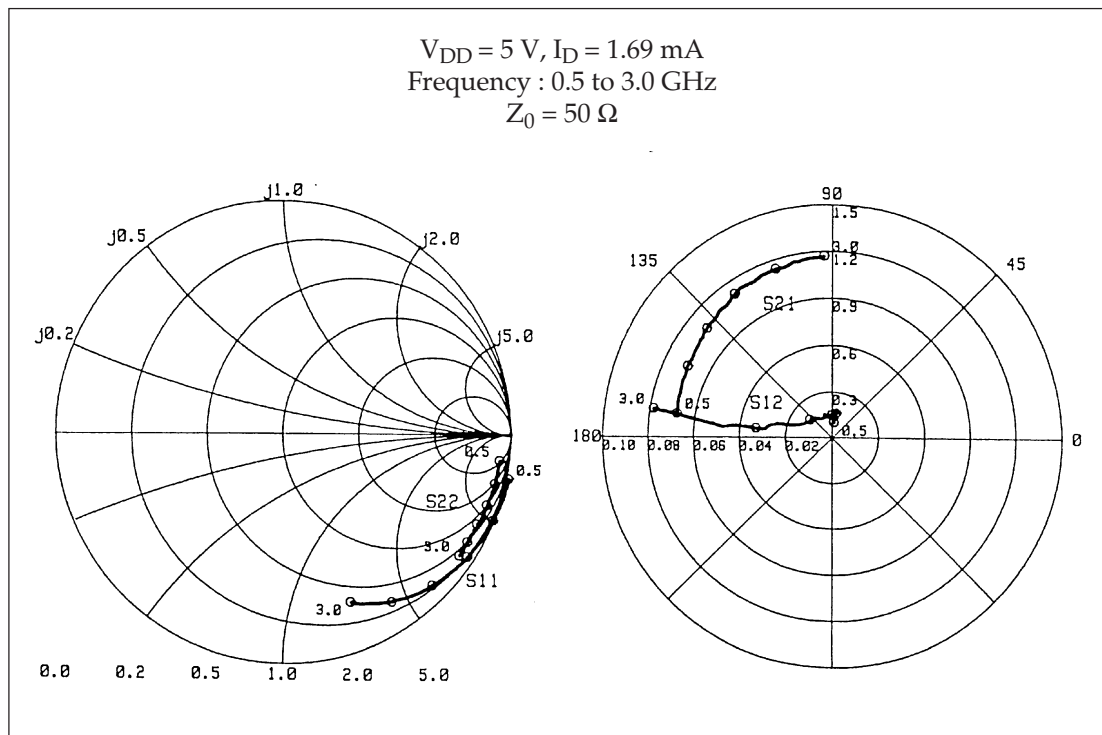


Typical S Parameters of KGF1175B

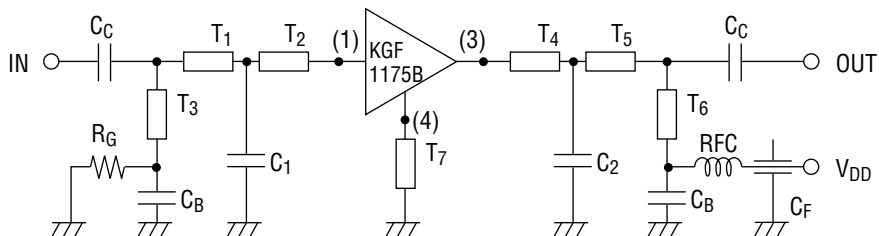
 $V_{DD} = 5\text{ V}$, $I_D = 1.69\text{ mA}$

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	1.008	-11.02	1.019	171.36	0.007	83.61	0.958	-6.74
600.0	1.007	-13.24	1.025	167.48	0.008	83.43	0.957	-7.82
700.0	1.006	-15.37	1.025	164.09	0.009	75.44	0.954	-9.11
800.0	1.001	-17.68	1.034	160.38	0.009	85.48	0.956	-10.38
900.0	0.998	-19.88	1.033	157.50	0.010	82.09	0.953	-11.83
1000.0	0.996	-22.19	1.044	153.96	0.011	80.33	0.955	-12.91
1100.0	0.991	-24.38	1.038	150.84	0.012	75.82	0.953	-14.06
1200.0	0.986	-26.69	1.049	147.93	0.011	81.04	0.951	-15.33
1300.0	0.983	-28.89	1.050	145.49	0.012	83.52	0.951	-16.72
1400.0	0.976	-31.10	1.057	142.31	0.011	77.92	0.946	-17.78
1500.0	0.972	-33.47	1.071	139.27	0.010	91.04	0.947	-18.96
1600.0	0.966	-35.78	1.077	136.44	0.010	91.33	0.947	-20.19
1700.0	0.958	-38.00	1.078	133.75	0.009	103.17	0.946	-21.30
1800.0	0.949	-40.29	1.090	130.07	0.009	108.28	0.945	-22.67
1900.0	0.941	-42.69	1.098	127.08	0.010	126.29	0.946	-23.46
2000.0	0.931	-45.01	1.114	124.55	0.012	141.00	0.938	-24.72
2100.0	0.923	-47.22	1.130	121.79	0.013	152.85	0.941	-25.74
2200.0	0.915	-49.59	1.123	117.89	0.016	161.34	0.937	-26.78
2300.0	0.902	-51.85	1.130	114.85	0.022	164.46	0.937	-27.93
2400.0	0.888	-54.08	1.139	111.93	0.028	169.99	0.937	-28.74
2500.0	0.875	-56.60	1.142	108.72	0.033	173.26	0.936	-30.14
2600.0	0.859	-58.75	1.137	105.39	0.040	172.77	0.938	-30.84
2700.0	0.844	-61.15	1.158	102.27	0.047	174.63	0.936	-31.58
2800.0	0.828	-63.45	1.160	99.38	0.057	172.91	0.939	-32.64
2900.0	0.813	-65.50	1.166	95.89	0.067	171.69	0.938	-33.47
3000.0	0.791	-67.60	1.168	92.62	0.078	170.94	0.938	-34.37

Typical S Parameters of KGF1175B



Test Circuit and Bias Configuration for KGF1175B at 850 MHz



T_1 : $Z_0 = 110 \, \Omega$, $E = 25 \, \text{deg}$

T_2 : $Z_0 = 110 \, \Omega$, $E = 27 \, \text{deg}$

T_3 : $Z_0 = 65 \, \Omega$, $E = 16 \, \text{deg}$

T_7 : $Z_0 = 110 \, \Omega$, $E = 6 \, \text{deg}$

$C_1 = 0.10 \, \text{pF}$, $C_2 = 1.05 \, \text{pF}$

$C_{C(DC \text{ Block})} = 1000 \, \text{pF}$, $C_{B(By-pass)} = 1000 \, \text{pF}$, $C_{F(Feed \text{ through})} = 1000 \, \text{pF}$

$R_{FC} = 200 \, \text{nH}$, $R_G = 1000 \, \Omega$

T_4 : $Z_0 = 110 \, \Omega$, $E = 7 \, \text{deg}$

T_5 : $Z_0 = 110 \, \Omega$, $E = 35 \, \text{deg}$

T_6 : $Z_0 = 65 \, \Omega$, $E = 16 \, \text{deg}$