

# OKI electronic components

## KGF1156

### Small-Signal Amplifier

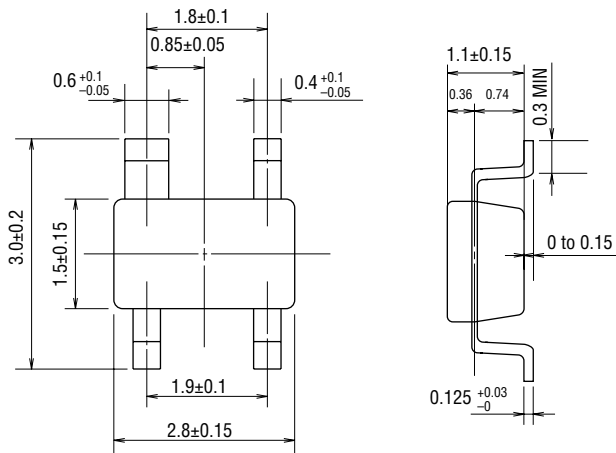
#### GENERAL DESCRIPTION

The KGF1156 is a small-signal UHF-band amplifier that features high output power, high gain, low noise, and low current operation. The KGF1156 specifications are guaranteed to a fixed matching circuit for 5 V and 850 MHz; external impedance-matching circuits are also required. Because of the dual gate configuration, high output, high gain, low noise, and low operating current, the KGF1156 is ideal as a receiver mixer for personal handy phones.

#### FEATURES

- High output power: 6 dBm (min.)
- High linear gain: 15 dB (min.)
- Low current operation: 6 mA (max.)
- Low noise: 3 dB (max.)
- Self-bias circuit configuration with built-in source capacitor
- Package: 4PSOP

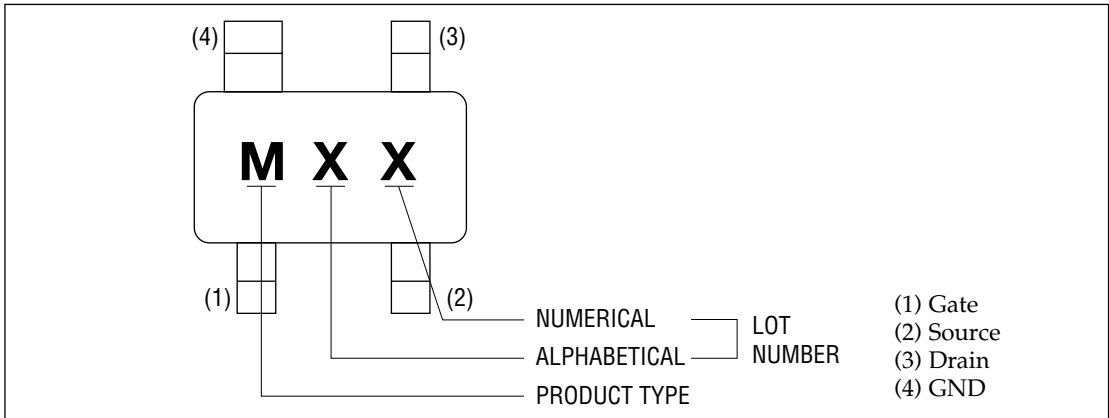
#### PACKAGE DIMENSIONS



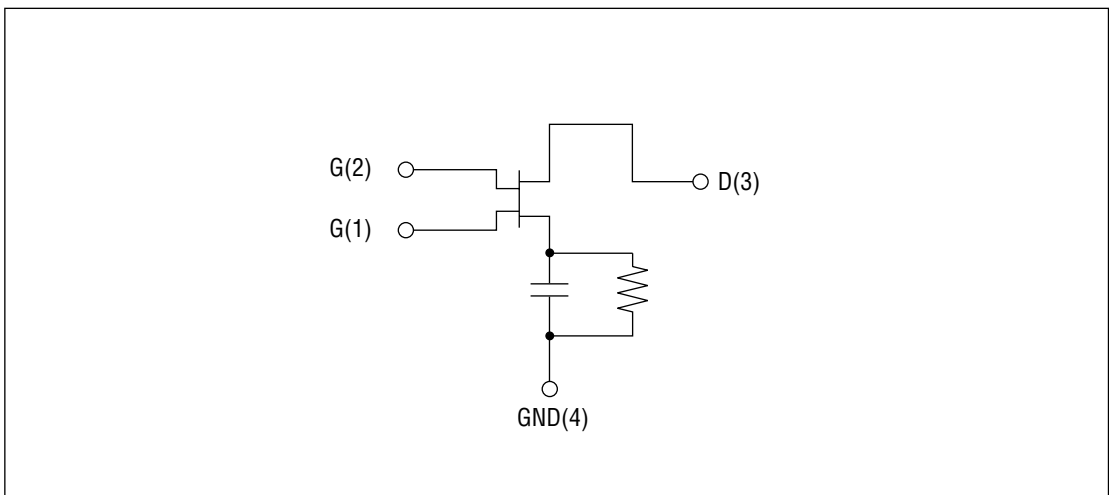
(Unit: mm)

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.
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**

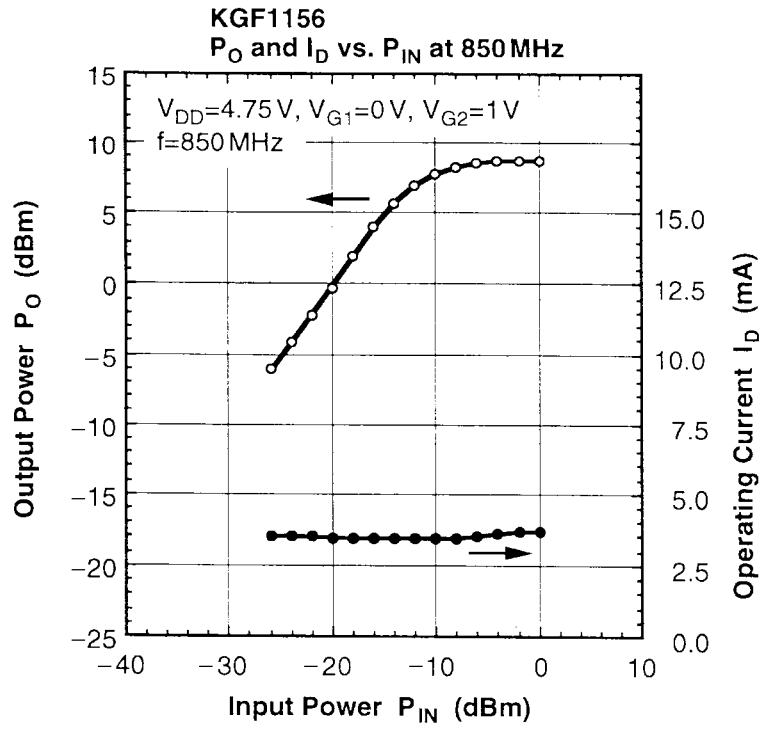
(Ta = 25°C)

Item	Symbol	Condition	Unit	Min.	Typ.	Max.
Gate-source leakage current	$I_{GSS}$	$V_{GS(1,2)} = -3\text{ V}$	$\mu\text{A}$	—	—	12
Gate-drain leakage current	$I_{GDO}$	$V_{GD(1,2)} = -8\text{ V}$	$\mu\text{A}$	—	—	60
Drain-source leakage current	$I_{DS(off)}$	$V_{DS} = 3\text{ V}, V_{GS(1,2)} = -2.5\text{ V}$	$\mu\text{A}$	—	—	120
Operating current	$I_D$	(*1), $P_{IN} = -20\text{ dBm}$	mA	—	—	6.0
Gate-source cut-off voltage	$V_{GS(off)}$	$V_{DS} = 3\text{ V}, I_{DS} = 120\ \mu\text{A}$	V	-2.0	—	-1.0
Noise figure	F	(*1)	dB	—	—	3.0
Linear gain	$G_{LIN}$	(*1), $P_{IN} = -20\text{ dBm}$	dB	15.0	—	—
Output power	$P_O$	(*2), $P_{IN} = -3\text{ dBm}$	dBm	6.0	—	—

\*1 Self-bias condition:  $V_{DD} = 5.0\text{ V} \pm 0.25\text{ V}$ ,  $V_{G1} = 0\text{ V}$ ,  $V_{G2} = 1.0\text{ V}$ ,  $f = 850\text{ MHz}$

\*2 Self-bias condition:  $V_{DD} = 5.0\text{ V} \pm 0.25\text{ V}$ ,  $V_{G1} = 0\text{ V}$ ,  $V_{G2} = 1.5\text{ V}$ ,  $f = 850\text{ MHz}$

RF CHARACTERISTICS

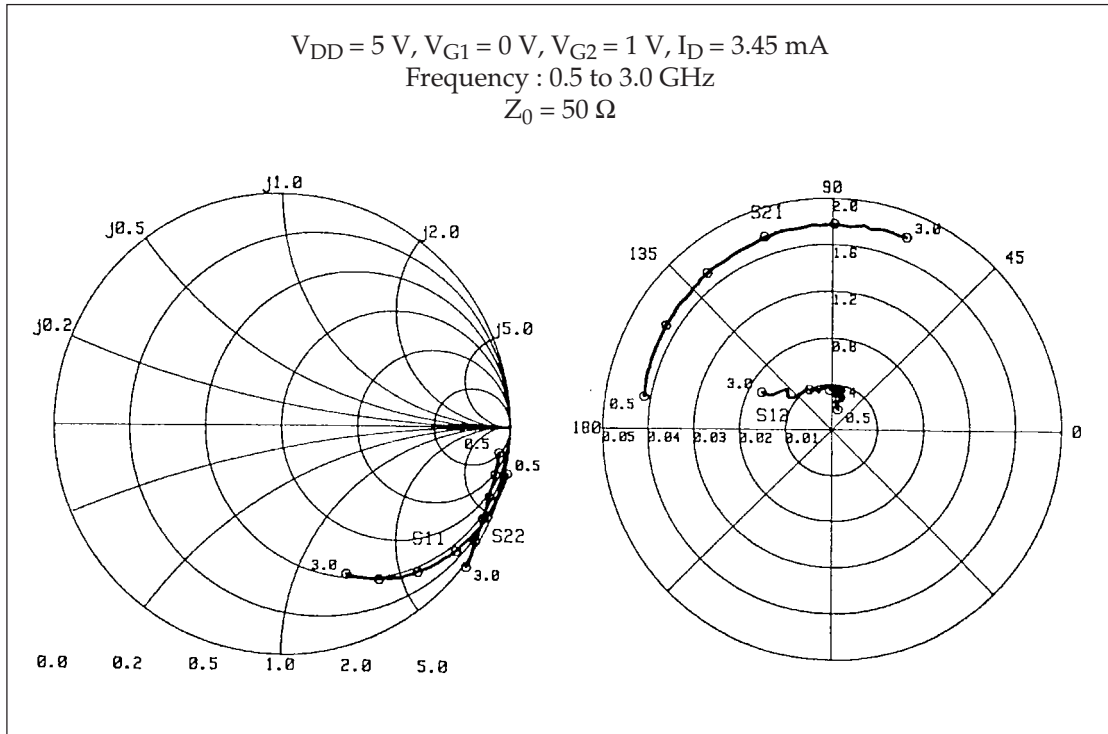


## Typical S Parameters

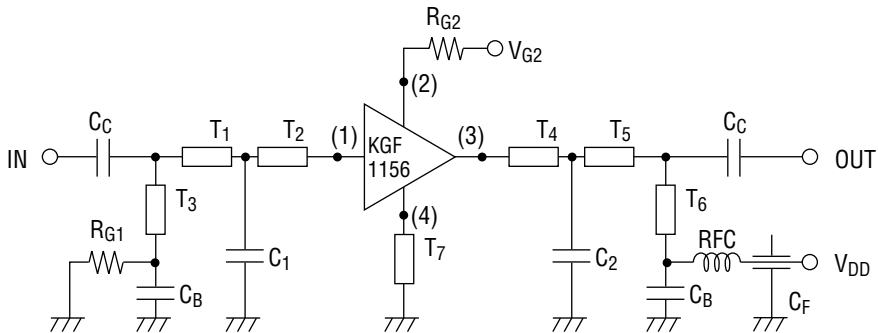
 $V_{DD} = 5\text{ V}$ ,  $V_{G1} = 0\text{ V}$ ,  $V_{G2} = 1\text{ V}$ ,  $I_D = 3.45\text{ mA}$ 

Freq(MHz)	MAG(S <sub>11</sub> )	ANG(S <sub>11</sub> )	MAG(S <sub>21</sub> )	ANG(S <sub>21</sub> )	MAG(S <sub>12</sub> )	ANG(S <sub>12</sub> )	MAG(S <sub>22</sub> )	ANG(S <sub>22</sub> )
500.0	1.006	-11.82	1.659	170.20	0.005	74.34	0.957	-6.73
600.0	1.004	-14.16	1.671	165.31	0.005	75.15	0.956	-7.78
700.0	0.999	-16.46	1.674	160.78	0.006	77.69	0.956	-8.94
800.0	0.993	-18.92	1.684	156.27	0.006	84.33	0.957	-10.16
900.0	0.987	-21.33	1.689	152.35	0.006	75.44	0.955	-11.57
1000.0	0.983	-23.66	1.699	148.07	0.007	76.22	0.957	-12.62
1100.0	0.975	-26.09	1.697	143.94	0.008	77.78	0.957	-13.86
1200.0	0.965	-28.46	1.709	140.23	0.009	76.68	0.957	-15.10
1300.0	0.958	-30.78	1.700	136.62	0.009	73.17	0.957	-16.31
1400.0	0.945	-33.11	1.712	132.59	0.009	79.47	0.956	-17.36
1500.0	0.938	-35.49	1.729	128.78	0.009	78.44	0.958	-18.58
1600.0	0.926	-37.80	1.731	125.12	0.008	82.11	0.960	-19.78
1700.0	0.913	-40.00	1.730	121.32	0.009	79.45	0.963	-20.80
1800.0	0.900	-42.39	1.741	117.25	0.009	84.64	0.964	-22.32
1900.0	0.887	-44.60	1.743	113.22	0.010	87.69	0.965	-23.43
2000.0	0.871	-46.76	1.763	109.51	0.009	92.88	0.966	-24.46
2100.0	0.861	-48.98	1.769	105.94	0.009	93.67	0.969	-25.91
2200.0	0.847	-51.17	1.767	101.30	0.009	98.33	0.975	-26.73
2300.0	0.830	-53.28	1.771	97.56	0.009	110.97	0.977	-28.12
2400.0	0.812	-55.29	1.768	93.63	0.010	110.61	0.984	-29.21
2500.0	0.795	-57.37	1.777	89.55	0.010	118.86	0.982	-30.65
2600.0	0.776	-59.34	1.762	85.37	0.010	125.43	0.993	-31.97
2700.0	0.759	-61.20	1.789	81.01	0.011	141.77	0.994	-33.04
2800.0	0.741	-63.08	1.777	77.33	0.013	137.75	1.004	-34.61
2900.0	0.728	-64.59	1.783	72.83	0.015	149.96	1.010	-35.82
3000.0	0.709	-66.24	1.785	68.76	0.017	151.86	1.012	-37.15

Typical S Parameters



Test Circuit and Bias Configuration for KGF1156 at 850 MHz



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

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

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

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

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

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

$RFC = 200 \text{ nH}$ ,  $R_{G1} = 1000 \Omega$ ,  $R_{G2} = 750 \Omega$

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

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

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