This version: Jul. 1998
Previous version: Jan. 1998

OKI electronic components

KGF1284

Power FET (Plastic Package Type)

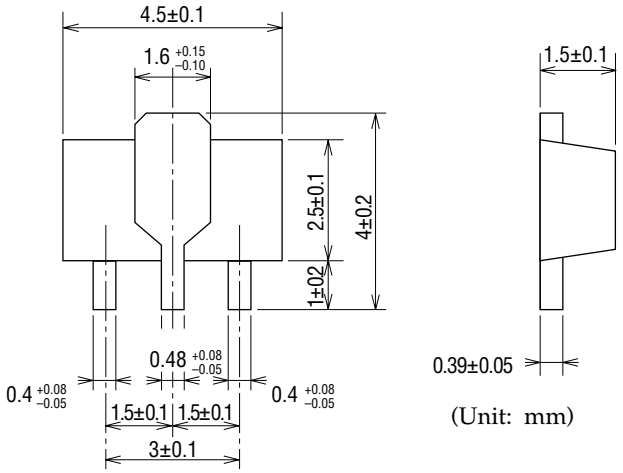
GENERAL DESCRIPTION

The KGF1284, housed in a SOT-89 type plastic-mold package, is a discrete power FET with frequencies ranging from the UHF-to L-band. This device features high efficiency, high output power, and high gain. The KGF1284 specifications are guaranteed to a fixed matching circuit for 3.4 V and 1.9 GHz; external impedance-matching circuits are also required. Because of its high efficiency, high output power (more than 21.5 dBm), high gain, and plastic package, the KGF1284 is ideal as a transmitter-driver amplifier for personal handy phones, such as digital keying cordless phones.

FEATURES

- Specifications guaranteed to a fixed matching circuit for 3.4 V, 1.9 GHz
- High output power: 21.5 dBm (min.) at 1.9 GHz
- High efficiency: 50% (typ.) at 1.9 GHz
- High linear gain: 12 dB (typ.) at 1.9 GHz
- Package: 3PMMP (SOT-89 type)

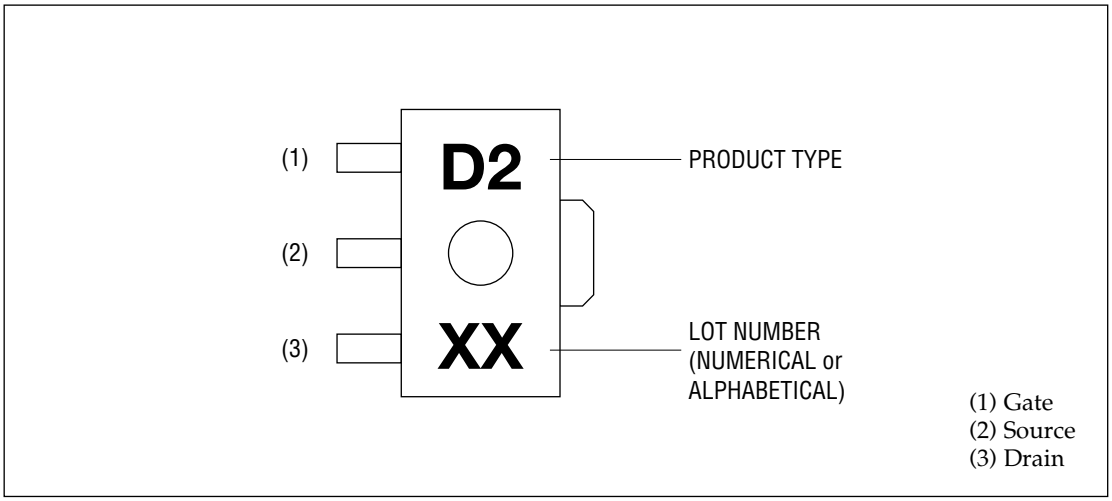
PACKAGE DIMENSIONS



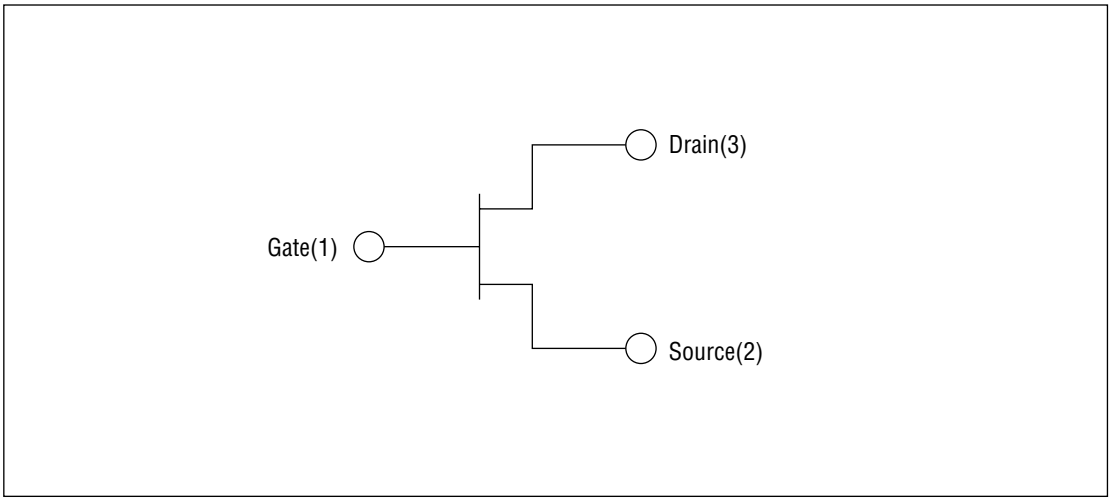
(Unit: mm)

Package material	Epoxy resin
Lead frame material	Cu
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}	Ta = 25°C	V	—	7.0
Gate-source voltage	V_{GS}	Ta = 25°C	V	–5.0	0.4
Drain current	I_{DS}	Ta = 25°C	A	—	0.8
Total power dissipation	P_{tot}	Ta = Tc = 25°C	W	—	2.5
Channel temperature	T_{ch}	—	°C	—	150
Storage temperature	T_{stg}	—	°C	–45	125

ELECTRICAL CHARACTERISTICS

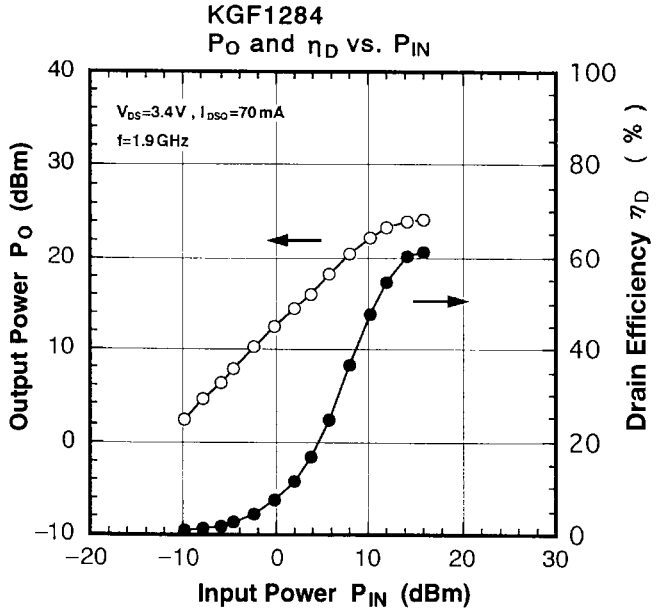
(Ta = 25°C)

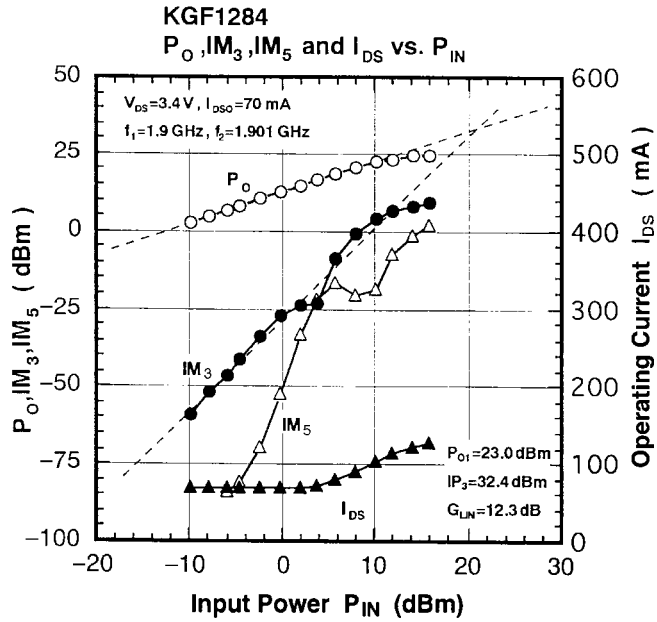
Item	Symbol	Condition	Unit	Min.	Typ.	Max.
Gate-source leakage current	I_{GSS}	V_{GS} = –5 V	µA	—	—	50
Gate-drain leakage current	I_{GDO}	V_{GD} = –12 V	µA	—	—	150
Drain-source leakage current	$I_{DS(off)}$	V_{DS} = 7 V, V_{GS} = –5 V	µA	—	—	500
Drain current	I_{DSS}	V_{DS} = 1.5 V, V_{GS} = 0 V	mA	450	—	—
Gate-source cut-off voltage	$V_{GS(off)}$	V_{DS} = 3 V, I_{DS} = 1.4 mA	V	–3.0	—	–2.0
Output power	P_O	(*1), P_{IN} = 12 dBm	dBm	21.5	22.5	—
Drain efficiency	η_D	(*1), P_{IN} = 12 dBm	%	45	50	—
Linear gain	G_{LIN}	(*1), P_{IN} = –5 dBm	dB	—	12.0	—
Thermal resistance	R_{th}	Channel to case	°C/W	—	35	—

*1 Condition: f = 1.9 GHz, V_{DS} = 3.4 V, I_{DSQ} = 70 mA

RF CHARACTERISTICS

Matching conditions
Gamma S (Source impedance) : 4.94 + j8.41 (Ω)
Gamma L (Load impedance) : 16.28 + j2.61 (Ω)
Bias conditions
V_{DS}=3.4 V, I_{DSQ}=70 mA, f=1.9 Hz





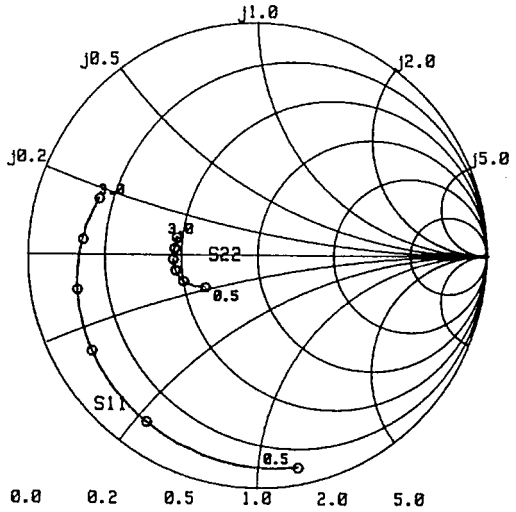
Typical S Parameters

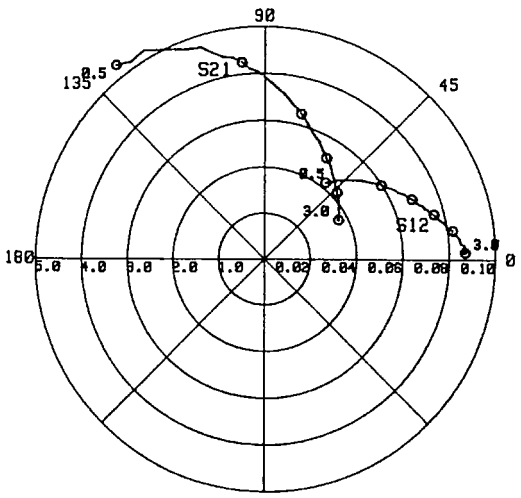
V_{DS} = 3.4 V, V_{GS} = –1.50 V, I_{DS} = 70 mA

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	0.929	–78.89	5.276	128.00	0.042	51.45	0.267	–148.33
600.0	0.912	–90.54	5.192	120.39	0.047	46.56	0.290	–151.44
700.0	0.898	–100.54	4.906	113.48	0.051	42.16	0.309	–153.97
800.0	0.883	–109.32	4.758	107.25	0.055	38.55	0.323	–156.56
900.0	0.876	–117.13	4.432	102.09	0.057	35.18	0.335	–158.61
1000.0	0.866	–123.86	4.255	96.87	0.060	32.38	0.343	–160.77
1100.0	0.859	–130.11	4.020	92.12	0.062	30.00	0.350	–162.66
1200.0	0.851	–135.65	3.790	87.84	0.064	27.73	0.355	–164.65
1300.0	0.844	–140.78	3.588	83.54	0.065	25.74	0.360	–166.30
1400.0	0.838	–145.60	3.381	79.70	0.067	23.56	0.363	–168.00
1500.0	0.832	–149.99	3.226	75.89	0.069	22.15	0.364	–169.53
1600.0	0.825	–154.26	3.066	72.32	0.070	20.26	0.366	–171.09
1700.0	0.819	–158.20	2.908	68.85	0.072	18.89	0.366	–172.68
1800.0	0.812	–161.99	2.809	65.26	0.073	17.33	0.369	–174.12
1900.0	0.806	–165.60	2.666	61.68	0.074	16.01	0.366	–175.62
2000.0	0.799	–169.02	2.570	58.72	0.076	14.72	0.369	–177.03
2100.0	0.793	–172.66	2.470	54.67	0.077	13.41	0.366	–178.53
2200.0	0.785	–175.81	2.367	52.14	0.078	12.04	0.367	179.93
2300.0	0.778	–178.99	2.285	48.53	0.080	10.71	0.365	178.65
2400.0	0.771	177.76	2.194	45.78	0.080	9.42	0.365	177.06
2500.0	0.764	174.95	2.129	42.86	0.082	8.56	0.364	175.54
2600.0	0.758	171.70	2.067	39.50	0.082	7.12	0.361	174.11
2700.0	0.750	168.79	1.991	36.47	0.085	5.91	0.360	172.44
2800.0	0.742	165.98	1.932	33.51	0.085	4.43	0.359	171.33
2900.0	0.736	163.16	1.854	30.44	0.087	2.92	0.358	169.80
3000.0	0.733	160.53	1.808	27.91	0.087	1.82	0.360	168.19

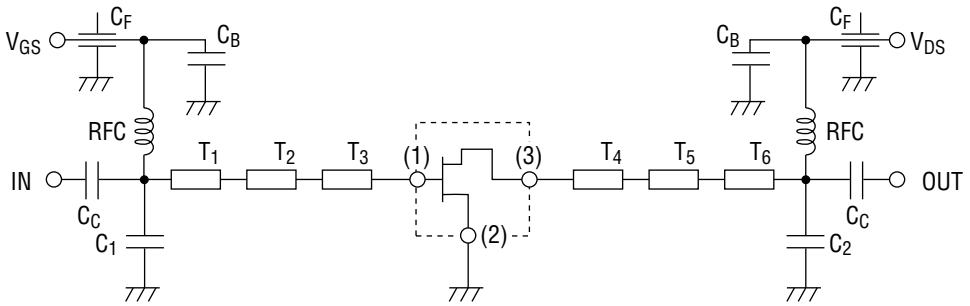
Typical S Parameters

V_{DS} = 3.4 V, V_{GS} = –1.50 V, I_{DS} = 70 mA
Frequency : 0.5 to 3.0 GHz
Z_0 = 50 Ω





Test Circuit and Bias Configuration for KGF1284 at 1.9 GHz



f = 1.9 GHz

T_1: Z_0 = 80 Ω, E = 53 deg

T_2: Z_0 = 10 Ω, E = 32 deg

T_3: Z_0 = 30 Ω, E = 53 deg

T_4: Z_0 = 30 Ω, E = 53 deg

T_5: Z_0 = 12 Ω, E = 32 deg

T_6: Z_0 = 50 Ω, E = 54 deg

C_1 = 1.0 pF, C_2 = 2.0 pF

C_C = 1000 pF, C_F = 1000 pF, C_B = 1000 pF, RFC = 60 nH