

OKI electronic components

KGF1312

Power FET (Plastic Package Type)

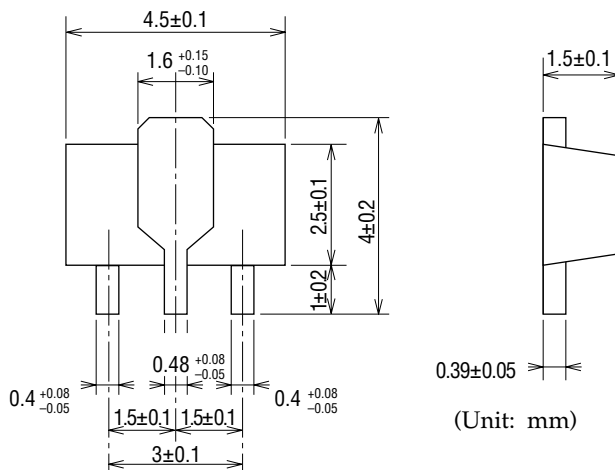
GENERAL DESCRIPTION

The KGF1312, housed in a SOT-89 type plastic-mold package, is a discrete UHF-band power FET that features high efficiency and high output power. The KGF1312 specifications are guaranteed to a fixed matching circuit for 5.8 V and 850 MHz; external impedance-matching circuits are also required. Because of its high efficiency, high output power (more than 31.5 dBm), and plastic package, the KGF1312 is ideal as a transmitter-final-stage amplifier for personal handy phones, such as analog cellular phones.

FEATURES

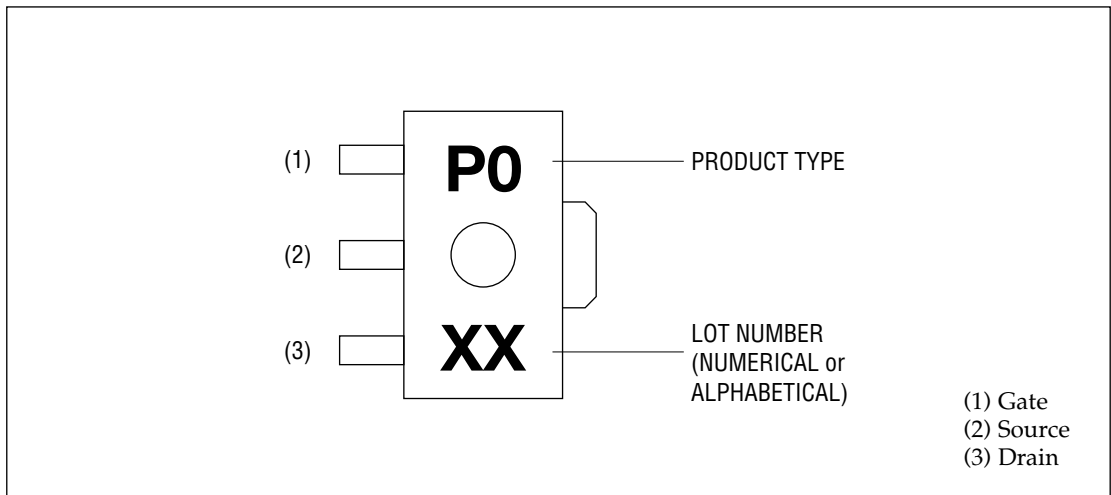
- High output power: 31.5 dBm (min.)
- High efficiency: 70% (typ.)
- Low thermal resistance: 23°C/W (typ.)
- Package: 3PMMP (SOT-89 type)

PACKAGE DIMENSIONS

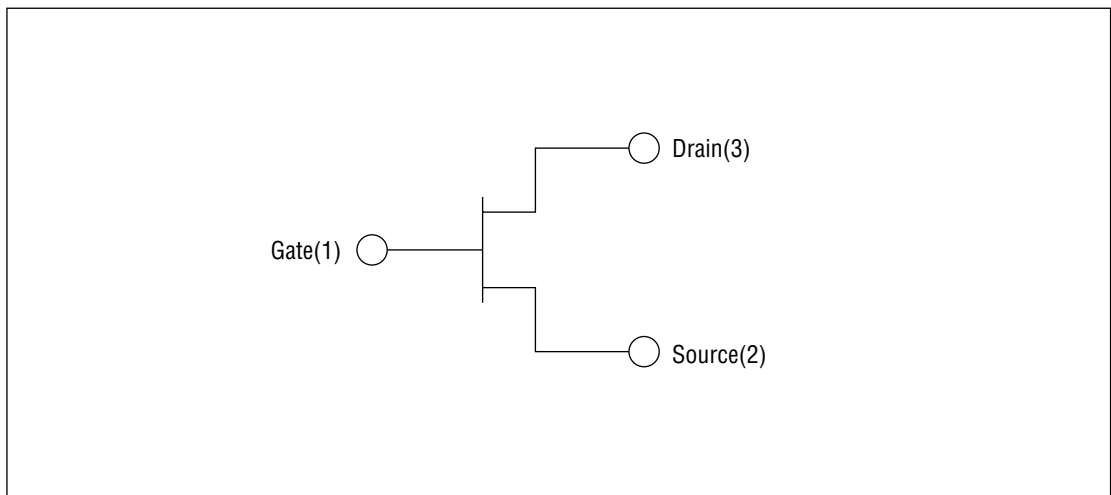


Package material	Epoxy resin
Lead frame material	Cu
Pin treatment	Solder plating
Solder plate thickness	5 μm or more

MARKING



CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Unit	Min.	Max.
Drain-source voltage	V_{DS}	$T_a = 25^\circ\text{C}$	V	—	10
Gate-source voltage	V_{GS}	$T_a = 25^\circ\text{C}$	V	-6.0	0.4
Drain current	I_{DS}	$T_a = 25^\circ\text{C}$	A	—	2.0
Total power dissipation	P_{tot}	$T_a = T_c = 25^\circ\text{C}$	W	—	4.5
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}	$V_{GS} = -6\text{ V}$	μA	—	—	100
Gate-drain leakage current	I_{GDO}	$V_{GD} = -16\text{ V}$	μA	—	—	500
Drain-source leakage current	$I_{DS(off)}$	$V_{DS} = 10\text{ V}, V_{GS} = -6\text{ V}$	μA	—	—	1500
Drain current	I_{DSS}	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}$	A	1.3	—	—
Gate-source cut-off voltage	$V_{GS(off)}$	$V_{DS} = 3\text{ V}, I_{DS} = 4.0\text{ mA}$	V	-3.0	—	-2.0
Output power	P_O	(*1), $P_{IN} = 20\text{ dBm}$	dBm	31.5	32.5	—
Drain efficiency	η_D	(*1), $P_{IN} = 20\text{ dBm}$	%	60	70	—
Linear gain	G_{LIN}	(*1), $P_{IN} = 0\text{ dBm}$	dB	—	16.0	—
Thermal resistance	R_{th}	Channel to case	$^\circ\text{C/W}$	—	15	—

*1 Condition: $f = 850\text{ MHz}$, $V_{DS} = 5.8\text{ V}$, $I_{DSQ} = 150\text{ mA}$

RF CHARACTERISTICS

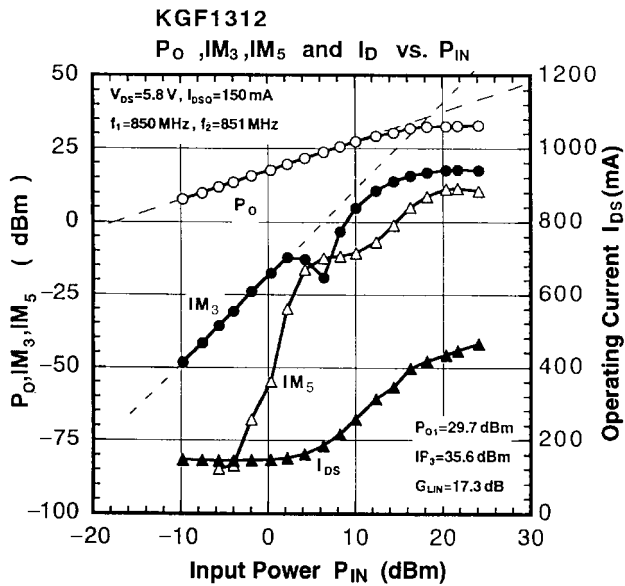
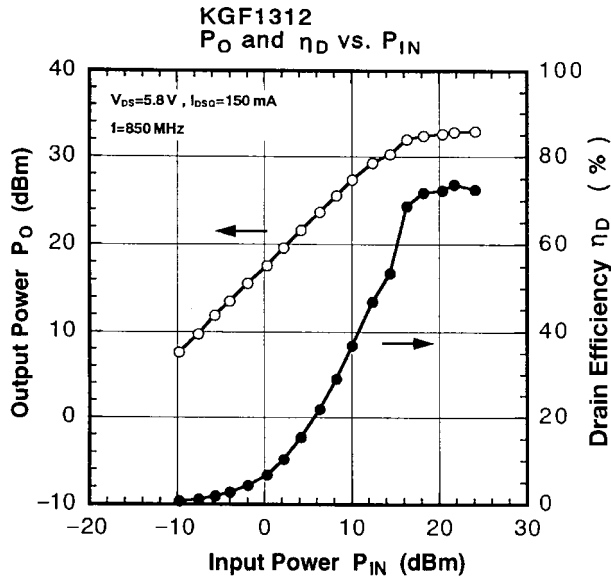
Matching conditions

Gamma S (Source impedance) : $5.98 + j12.62 \ (\Omega)$

Gamma L (Load impedance) : $12.80 + j1.65 \ (\Omega)$

Bias conditions

$V_{DS}=5.8\text{ V}$, $I_{DSQ}=150\text{ mA}$, $f=850\text{ MHz}$

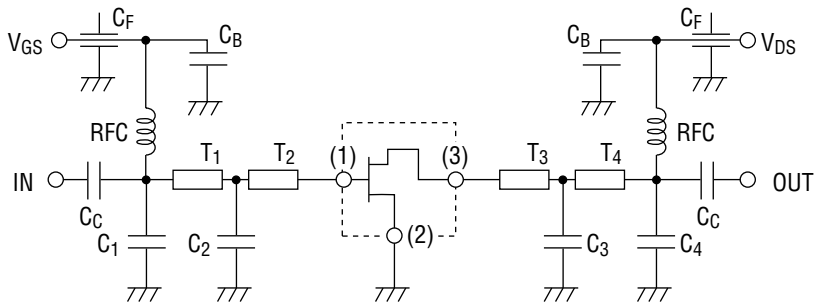


Typical S Parameters

 $V_{DS} = 5.8 \text{ V}$, $V_{GS} = -1.71 \text{ V}$, $I_{DS} = 150 \text{ mA}$

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	0.924	-139.66	4.272	99.14	0.035	27.24	0.646	-176.25
600.0	0.922	-147.41	3.642	93.91	0.036	24.98	0.651	-177.83
700.0	0.921	-153.36	3.172	89.24	0.037	23.36	0.654	-178.86
800.0	0.919	-158.06	2.807	85.09	0.038	22.06	0.657	179.87
900.0	0.917	-162.15	2.527	81.68	0.039	21.30	0.659	179.20
1000.0	0.916	-165.42	2.287	78.11	0.039	20.60	0.658	178.10
1100.0	0.914	-168.40	2.097	74.73	0.040	20.21	0.658	177.39
1200.0	0.913	-171.17	1.937	71.66	0.041	19.73	0.659	176.24
1300.0	0.909	-173.58	1.807	68.85	0.042	19.77	0.659	175.50
1400.0	0.909	-175.84	1.678	65.85	0.043	18.98	0.660	174.67
1500.0	0.907	-178.03	1.581	62.88	0.043	19.17	0.657	173.68
1600.0	0.903	179.87	1.492	60.17	0.044	18.67	0.657	172.96
1700.0	0.898	177.75	1.397	57.22	0.045	18.52	0.655	171.87
1800.0	0.896	176.17	1.347	54.70	0.046	18.21	0.657	171.11
1900.0	0.894	174.09	1.269	51.77	0.047	17.93	0.653	170.24
2000.0	0.889	172.45	1.216	49.30	0.048	17.78	0.654	169.18
2100.0	0.889	170.47	1.161	46.25	0.049	17.58	0.650	168.49
2200.0	0.881	168.80	1.109	43.98	0.050	17.02	0.652	167.27
2300.0	0.880	167.20	1.067	41.18	0.051	16.63	0.650	166.58
2400.0	0.875	165.32	1.022	39.08	0.051	16.22	0.650	165.39
2500.0	0.869	163.90	0.988	36.31	0.053	15.93	0.649	164.21
2600.0	0.868	162.02	0.952	33.96	0.053	15.60	0.647	163.41
2700.0	0.863	160.42	0.918	31.08	0.055	14.65	0.647	162.14
2800.0	0.860	158.82	0.888	29.16	0.055	14.24	0.646	161.38
2900.0	0.857	157.12	0.852	26.39	0.057	13.71	0.646	160.14
3000.0	0.855	155.55	0.833	24.25	0.057	13.45	0.643	159.01

Test Circuit and Bias Configuration for KGF1312 at 850 MHz



$f = 850 \text{ MHz}$

$T_1: Z_0 = 50 \Omega, E = 18.0 \text{ deg}$

$T_3: Z_0 = 50 \Omega, E = 18.0 \text{ deg}$

$T_2: Z_0 = 50 \Omega, E = 18.0 \text{ deg}$

$T_4: Z_0 = 50 \Omega, E = 9.0 \text{ deg}$

$C_1 = 3.0 \text{ pF}, C_2 = 8.0 \text{ pF}, C_3 = 1.0 \text{ pF}, C_4 = 4.0 \text{ pF}$

$C_C = 1000 \text{ pF}, C_F = 1000 \text{ pF}, C_B = 1000 \text{ pF}, \text{RFC} = 200 \text{ nH}$