

# OKI electronic components

## KGF1658

This version: Jan. 1998  
Previous version: Jun. 1996

### Power FET (Ceramic Package Type)

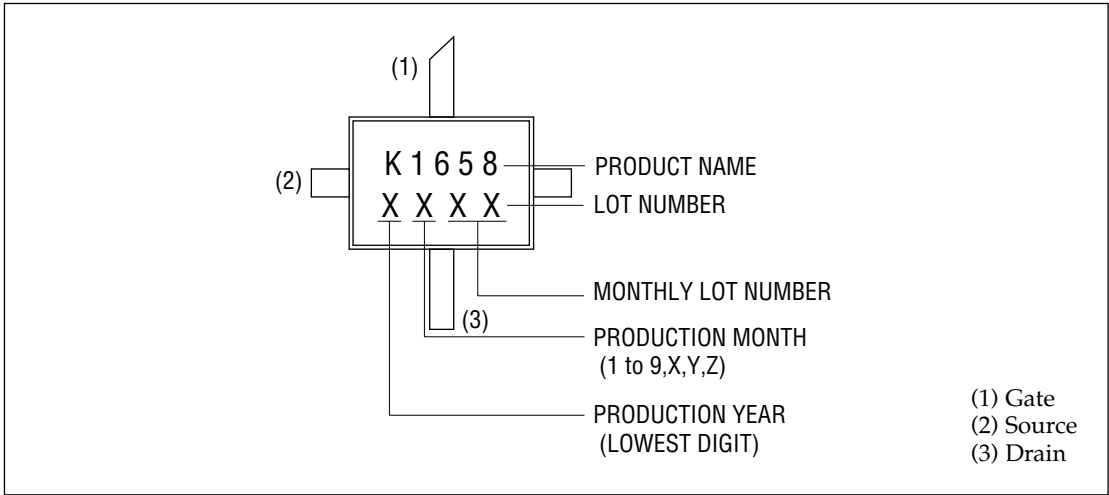
#### GENERAL DESCRIPTION

The KGF1658, housed in a SMD-type ceramic package, is a discrete GaAs power FET that features high efficiency and low distortion at 3 V. The KGF1658 specifications are guaranteed to a fixed matching circuit of 3.4 V and 850 MHz; external impedance-matching circuits are also required. The KGF1658 provides high efficiency (55% typical) and very low adjacent channel leakage power with a 31 dBm output at 3.4 V. The device is optimized for transmitter-final-stage amplifiers in Portable Handy Phones (PHPs) and other 3-V digital cellular phones that require low distortion.

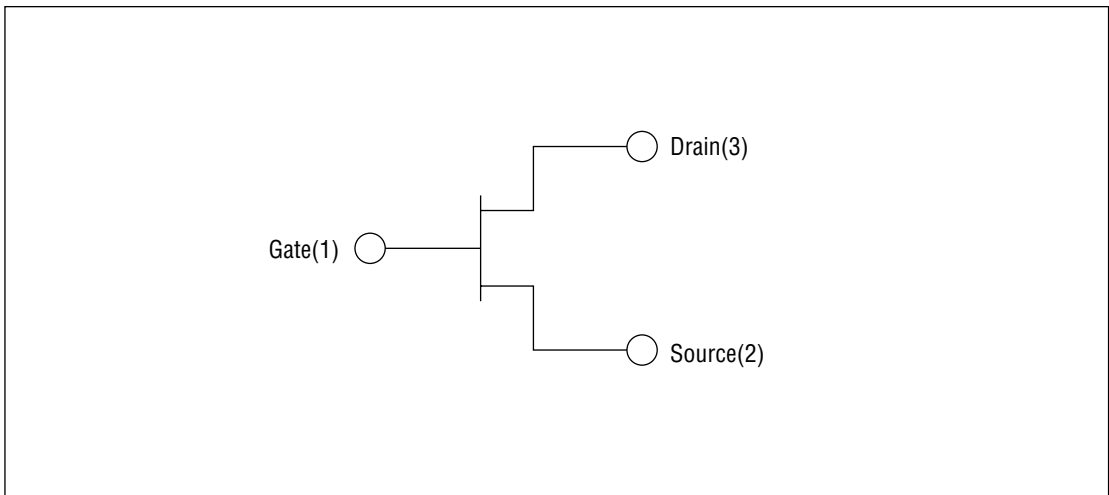
#### FEATURES

- Low distortion: – 28 dBc typical (adjacent channel leakage power)  
– 48 dBc typical (channel leakage power adjacent to the adjacent channel)
- High efficiency: 50% (typ.)
- Specifications guaranteed to a fixed matching circuit at 3.4 V, 850 MHz
- Low thermal resistance: 18°C/W (typ.)
- Package: 3PFP

**MARKING**



**CIRCUIT**



## ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	Unit	Min.	Max.
Drain-source voltage	$V_{DS}$	$T_a = 25^\circ\text{C}$	V	—	7
Gate-source voltage	$V_{GS}$	$T_a = 25^\circ\text{C}$	V	-5	0.4
Drain current	$I_{DS}$	$T_a = 25^\circ\text{C}$	A	—	5.5
Total power dissipation	$P_{tot}$	$T_a = T_c = 25^\circ\text{C}$	W	—	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	$I_{GSS}$	$V_{GS} = -5\text{ V}$	$\mu\text{A}$	—	—	100
Gate-drain leakage current	$I_{GDO}$	$V_{GD} = -12\text{ V}$	mA	—	—	1
Drain-source leakage current	$I_{DS(off)}$	$V_{DS} = 7\text{ V}, V_{GS} = -5\text{ V}$	mA	—	—	1.5
Drain current	$I_{DSS}$	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}$	A	4.0	—	—
Gate-source cut-off voltage	$V_{GS(off)}$	$V_{DS} = 3\text{ V}, I_{DS} = 11.2\text{ mA}$	V	-3.0	—	-2.0
Adjacent channel leakage power	ACP <sub>30</sub>	(*1),(*2) $P_0 = 31\text{ dBm}$	dBc	—	-28	—
	ACP <sub>60</sub>	(*1),(*3) $P_0 = 31\text{ dBm}$	dBc	—	-48	—
Drain efficiency	$\eta_D$	(*1), $P_0 = 31\text{ dBm}$	%	—	50	—
Linear gain	$G_{LIN}$	(*1), $P_{IN} = 12\text{ dBm}$	dB	—	13	—
Thermal resistance	$R_{th}$	Channel to case	$^\circ\text{C/W}$	—	18	—

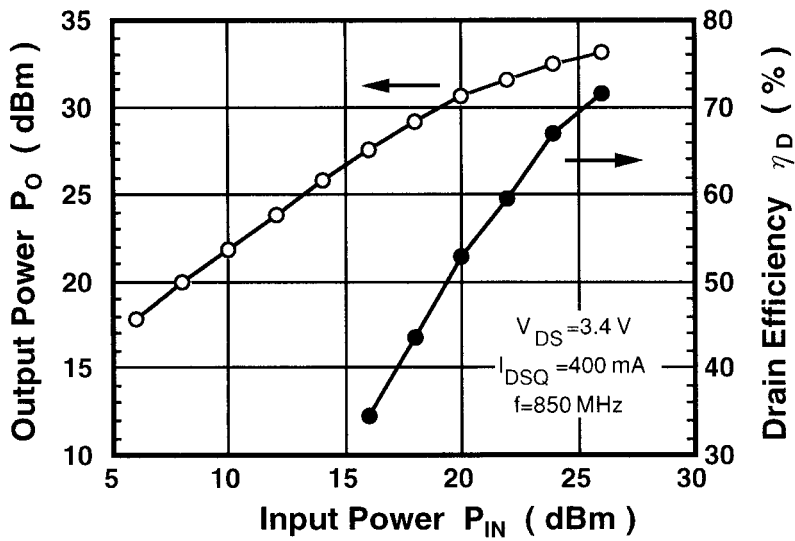
\*1 Condition:  $f = 850\text{ MHz}, V_{DS} = 3.4\text{ V}, I_{DSQ} = 400\text{ mA}$ ,\*2 IS-54 condition,  $\pm 30\text{ kHz}$ \*3 IS-54 condition,  $\pm 60\text{ kHz}$

RF CHARACTERISTICS

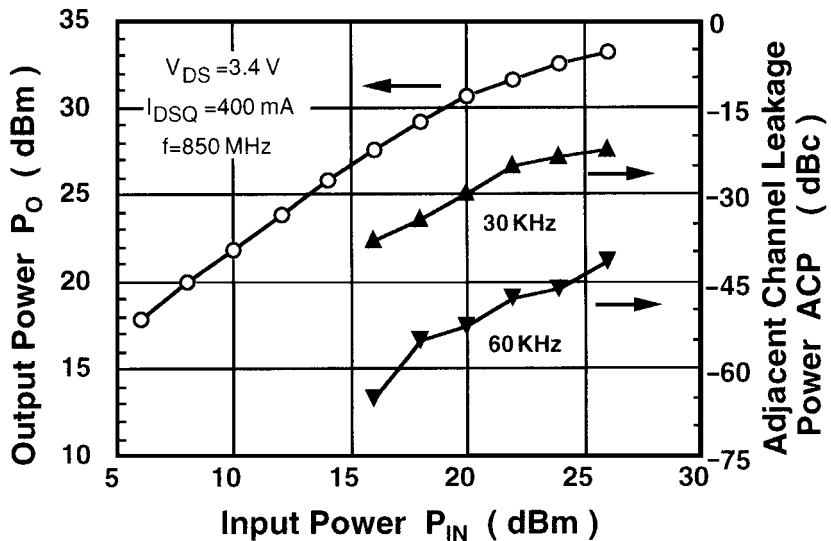
Bias conditions

$V_{DS}=3.4\text{ V}$ ,  $I_{DSQ}=400\text{ mA}$ ,  $f=850\text{ MHz}$

KGF1658  
 $P_O$  and  $\eta_D$  vs.  $P_{IN}$



KGF1658  
 $P_O$  and ACP vs.  $P_{IN}$

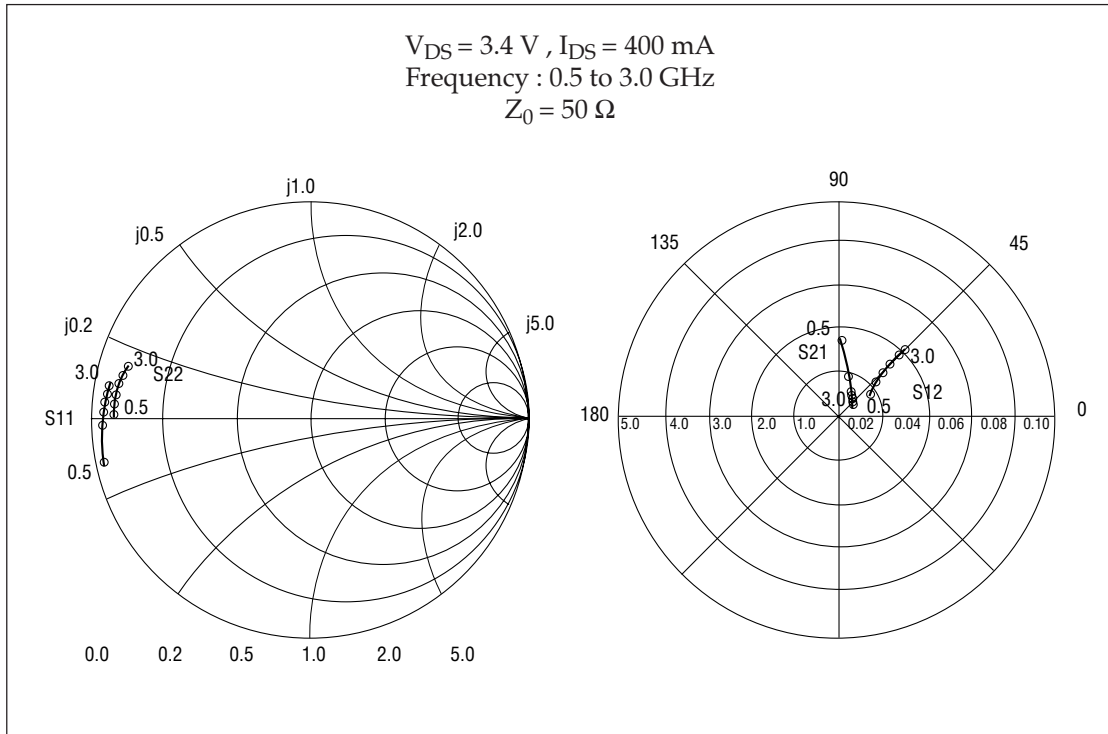


## Typical S Parameters

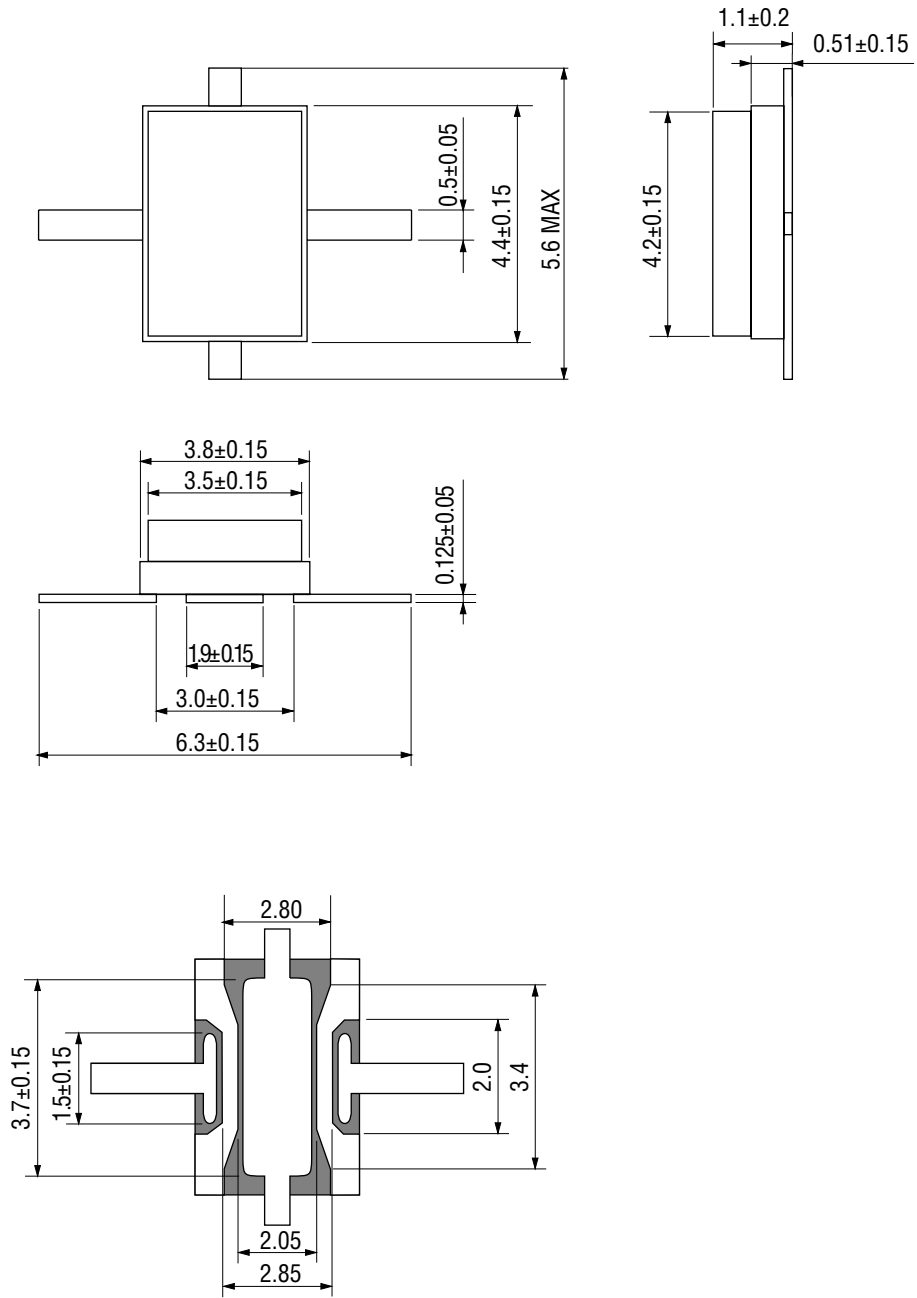
 $V_{DS} = 3.4 \text{ V}$ ,  $I_{DS} = 400 \text{ mA}$ 

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	0.950	-171.77	2.177	87.12	0.015	25.83	0.886	179.02
600.0	0.949	-174.15	1.816	84.97	0.016	28.04	0.887	177.84
700.0	0.950	-175.99	1.563	82.42	0.017	29.96	0.889	177.77
800.0	0.950	-177.56	1.370	80.39	0.018	32.12	0.891	176.80
900.0	0.948	-178.82	1.215	78.54	0.018	34.28	0.889	176.49
1000.0	0.948	179.93	1.094	76.61	0.019	35.25	0.887	175.54
1100.0	0.947	178.82	0.996	74.89	0.020	37.90	0.886	175.39
1200.0	0.948	178.01	0.912	72.84	0.021	38.39	0.888	174.68
1300.0	0.946	177.16	0.847	71.16	0.022	40.12	0.887	174.44
1400.0	0.945	176.19	0.785	69.41	0.023	40.54	0.889	173.77
1500.0	0.945	175.38	0.736	67.43	0.024	41.61	0.886	173.13
1600.0	0.944	174.47	0.690	65.76	0.024	42.27	0.892	172.75
1700.0	0.943	173.89	0.648	64.10	0.025	43.52	0.884	172.11
1800.0	0.940	172.99	0.617	62.12	0.026	43.26	0.890	171.70
1900.0	0.941	172.30	0.578	60.53	0.027	43.81	0.886	171.16
2000.0	0.938	171.54	0.559	59.22	0.029	44.37	0.894	170.65
2100.0	0.939	170.82	0.531	56.76	0.030	44.14	0.890	170.07
2200.0	0.936	170.16	0.509	55.48	0.030	44.51	0.896	169.26
2300.0	0.932	169.47	0.490	53.22	0.032	43.88	0.892	168.48
2400.0	0.931	168.60	0.469	51.70	0.032	44.19	0.890	167.70
2500.0	0.929	168.00	0.454	49.24	0.034	44.46	0.885	167.17
2600.0	0.929	167.35	0.435	47.76	0.034	44.26	0.892	166.86
2700.0	0.923	166.67	0.419	45.75	0.036	43.83	0.886	165.64
2800.0	0.921	165.99	0.409	44.10	0.037	43.82	0.887	165.14
2900.0	0.917	165.22	0.390	42.05	0.038	43.15	0.882	163.94
3000.0	0.915	164.77	0.382	40.00	0.039	43.40	0.874	163.54

Typical S Parameters



PACKAGE DIMENSIONS



 METALIZATION

(Unit: mm)

Package material	Al <sub>2</sub> O <sub>3</sub>
Lead frame material	Fe-Ni-Co alloy
Pin treatment	Ni/Au plating
plate thickness	Au:1.0 μm or more