

OKI electronic components

KGF1607

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

Power FET (Ceramic Package Type)

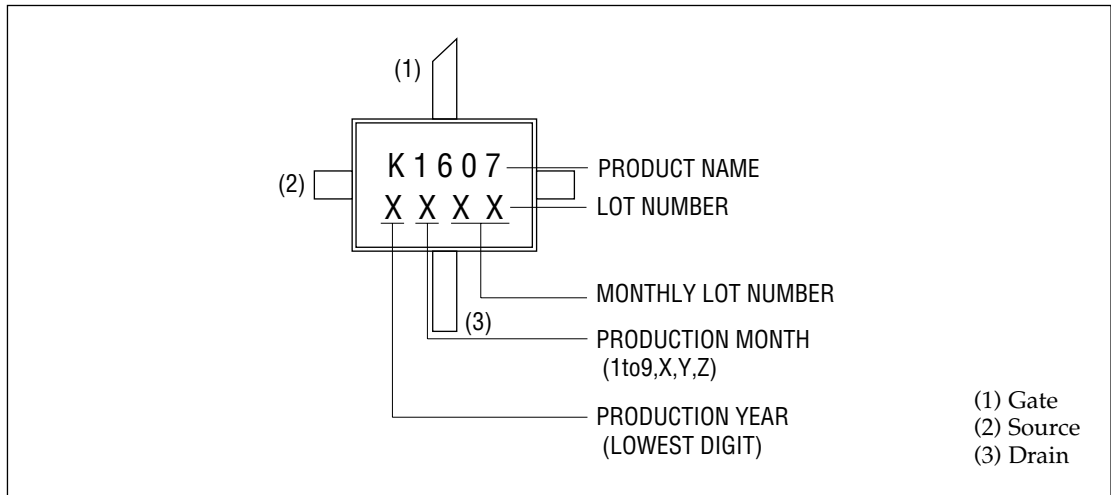
GENERAL DESCRIPTION

The KGF1607, housed in a SMD type ceramic package, is a discrete GaAs power FET that features high efficiency and high output power. The KGF1607 specifications are guaranteed to a fixed matching circuit for 3.4 V and 850 MHz; external impedance-matching circuits are also required. Because of its high efficiency (70% min.), high output power (more than 31.5 dBm), and plastic package, the KGF1607 is ideal as a transmitter-final-stage amplifier for personal handy phones, such as 3-V type analog cellular phones.

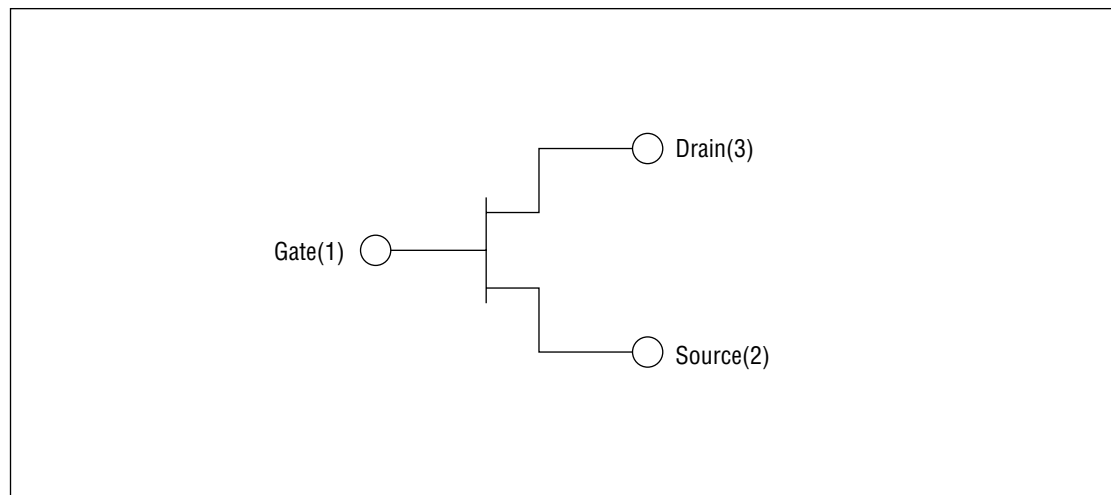
FEATURES

- High output power: 31.5 dBm (min.)
- High efficiency: 70% (min.)
- Specifications guaranteed to a fixed matching circuit for 3.4 V and 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 | — | 8 |
| 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 | — | 4.5 |
| 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} | $V_{GS} = -5\text{ V}$ | μA | — | — | 100 |
| Gate-drain leakage current | I_{GDO} | $V_{GD} = -13\text{ V}$ | mA | — | — | 3 |
| Drain-source cut-off current | $I_{DS(off)}$ | $V_{DS} = 8\text{ V}, V_{GS} = -5\text{ V}$ | mA | — | — | 3 |
| Drain current | I_{DSS} | $V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}$ | A | 3.5 | — | — |
| Gate-source cut-off voltage | $V_{GS(off)}$ | $V_{DS} = 3\text{ V}, I_{DS} = 8.4\text{ mA}$ | V | -3.0 | — | -2.0 |
| Output power | P_O | (*1) $P_{IN} = 22\text{ dBm}$ | dBm | 31.5 | — | — |
| Drain efficiency | η_D | (*1) $P_{IN} = 22\text{ dBm}$ | % | 70 | — | — |
| Thermal resistance | R_{th} | Channel to case | $^\circ\text{C/W}$ | — | 18 | — |

*1 Condition: $f = 850\text{ MHz}$, $V_{DS} = 3.4\text{ V}$, $I_{DSQ} = 300\text{ mA}$,

RF CHARACTERISTICS

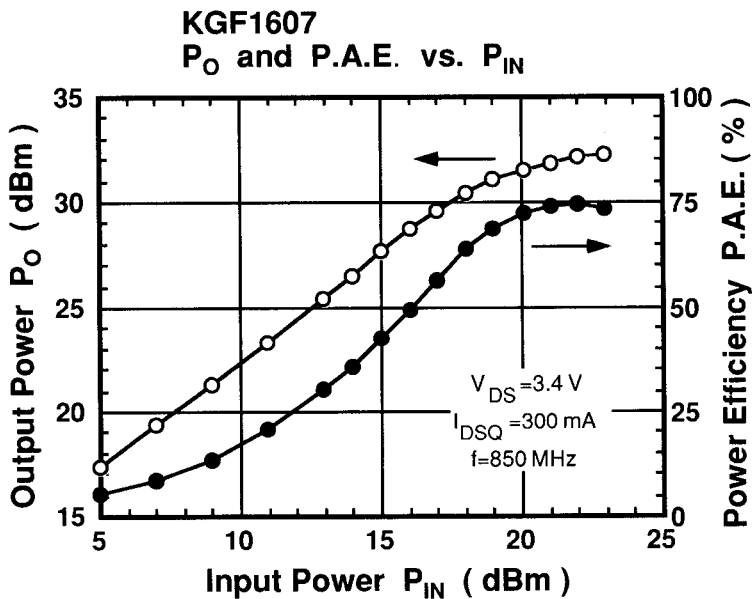
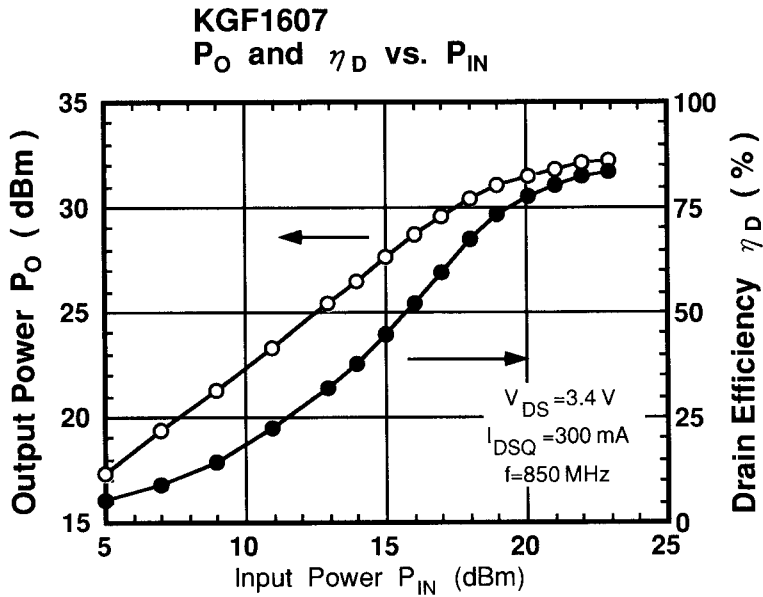
Matching conditions

Gamma S (Source impedance) : $2.03 + j6.71 (\Omega)$

Gamma L (Load impedance) : $4.62 + j1.04 (\Omega)$

Bias conditions

$V_{DS}=3.4\text{ V}$, $I_{DSQ}=300\text{ mA}$, $f=850\text{ MHz}$



Matching conditions

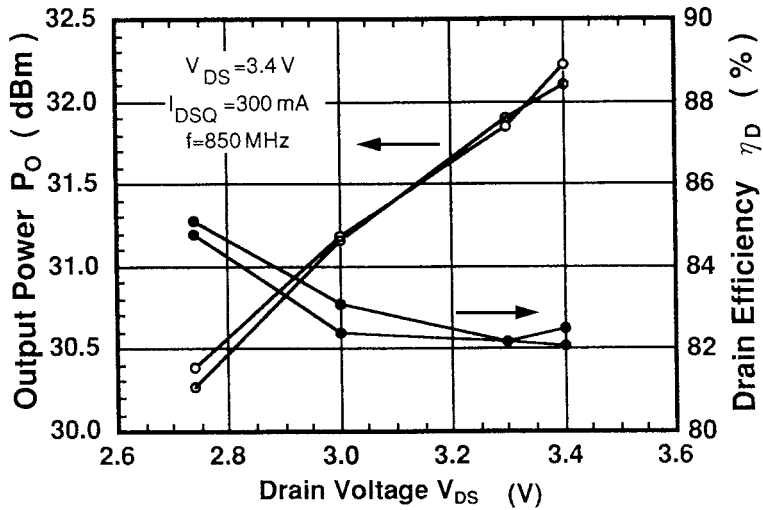
Gamma S (Source impedance) : $2.03 + j6.71 (\Omega)$

Gamma L (Load impedance) : $4.62 + j1.04 (\Omega)$

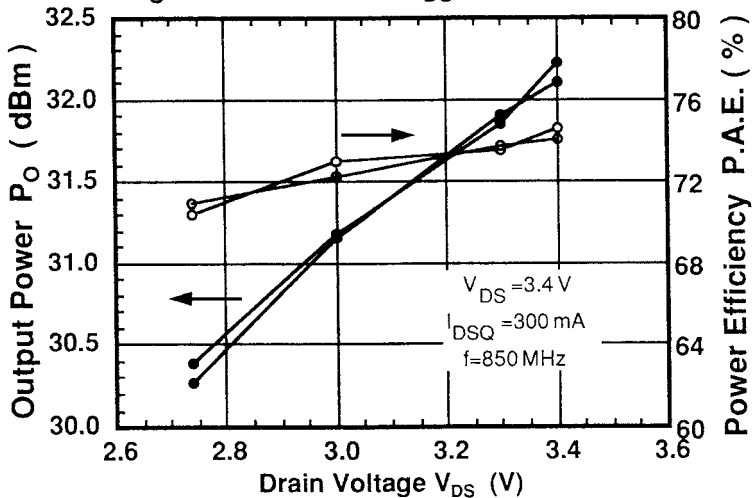
Bias conditions

$V_{DS}=3.4V$, $I_{DSQ}=300mA$, $P_{IN}=22dBm$, $f=850MHz$

KGF1607
 P_O and η_D vs. V_{DS}



KGF1607
 P_O and P.A.E. vs. V_{DS}

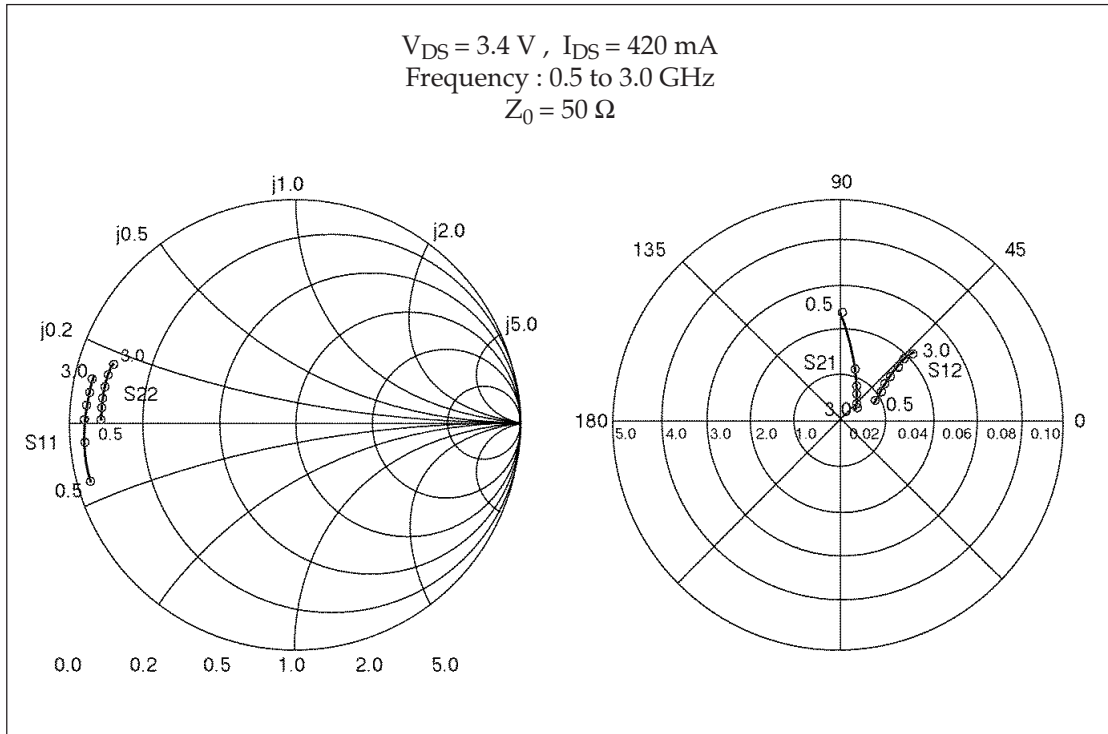


Typical S Parameters

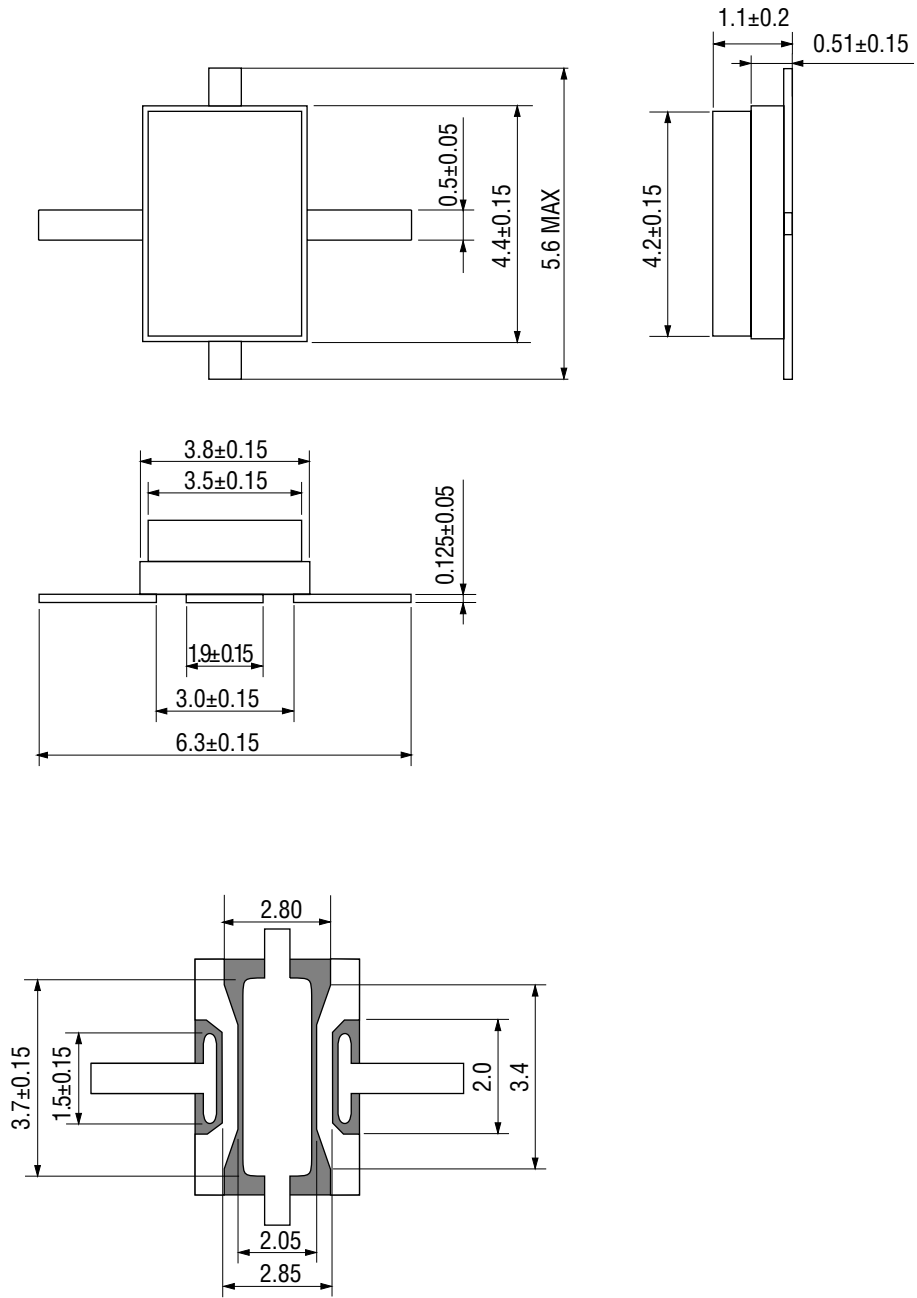
 $V_{DS} = 3.4 \text{ V}$, $I_{DS} = 420 \text{ mA}$

| 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 | 0.948 | -164.16 | 2.401 | 89.58 | 0.018 | 28.34 | 0.862 | 178.70 |
| 600.0 | 0.949 | -167.70 | 2.004 | 86.64 | 0.019 | 29.90 | 0.863 | 177.78 |
| 700.0 | 0.947 | -170.31 | 1.724 | 83.87 | 0.019 | 31.37 | 0.861 | 177.41 |
| 800.0 | 0.945 | -172.49 | 1.512 | 81.08 | 0.020 | 32.88 | 0.868 | 176.26 |
| 900.0 | 0.945 | -174.31 | 1.344 | 78.99 | 0.021 | 34.56 | 0.863 | 175.65 |
| 1000.0 | 0.944 | -175.70 | 1.210 | 76.50 | 0.022 | 35.27 | 0.865 | 174.80 |
| 1100.0 | 0.944 | -176.99 | 1.107 | 74.70 | 0.023 | 36.97 | 0.864 | 174.53 |
| 1200.0 | 0.943 | -178.21 | 1.013 | 72.44 | 0.024 | 37.73 | 0.863 | 173.64 |
| 1300.0 | 0.943 | -179.20 | 0.944 | 70.68 | 0.025 | 39.72 | 0.862 | 173.19 |
| 1400.0 | 0.941 | 179.70 | 0.871 | 68.92 | 0.026 | 39.48 | 0.864 | 172.42 |
| 1500.0 | 0.938 | 178.76 | 0.822 | 66.82 | 0.027 | 40.67 | 0.859 | 171.75 |
| 1600.0 | 0.940 | 177.86 | 0.769 | 65.23 | 0.028 | 41.09 | 0.866 | 171.30 |
| 1700.0 | 0.939 | 177.34 | 0.729 | 62.93 | 0.029 | 41.66 | 0.857 | 170.63 |
| 1800.0 | 0.936 | 176.11 | 0.692 | 62.04 | 0.030 | 41.93 | 0.865 | 170.07 |
| 1900.0 | 0.935 | 175.58 | 0.660 | 59.93 | 0.031 | 42.32 | 0.856 | 169.05 |
| 2000.0 | 0.935 | 174.63 | 0.629 | 58.39 | 0.032 | 42.64 | 0.864 | 168.83 |
| 2100.0 | 0.932 | 173.95 | 0.602 | 56.99 | 0.033 | 43.35 | 0.857 | 167.69 |
| 2200.0 | 0.933 | 173.26 | 0.578 | 55.14 | 0.034 | 42.99 | 0.862 | 167.40 |
| 2300.0 | 0.929 | 172.39 | 0.555 | 53.65 | 0.036 | 43.23 | 0.861 | 166.37 |
| 2400.0 | 0.929 | 171.83 | 0.538 | 52.58 | 0.036 | 43.21 | 0.858 | 165.60 |
| 2500.0 | 0.929 | 170.92 | 0.516 | 50.22 | 0.038 | 43.51 | 0.856 | 164.86 |
| 2600.0 | 0.926 | 170.30 | 0.504 | 49.61 | 0.038 | 43.16 | 0.853 | 164.29 |
| 2700.0 | 0.925 | 169.54 | 0.485 | 47.26 | 0.040 | 43.10 | 0.854 | 163.33 |
| 2800.0 | 0.924 | 168.85 | 0.475 | 46.57 | 0.041 | 43.01 | 0.852 | 162.91 |
| 2900.0 | 0.922 | 168.14 | 0.458 | 44.61 | 0.043 | 42.65 | 0.853 | 161.67 |
| 3000.0 | 0.920 | 167.38 | 0.450 | 43.44 | 0.043 | 42.65 | 0.850 | 161.18 |

Typical S Parameters



PACKAGE DIMENSIONS



 METALIZATION

(Unit: mm)

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