

# OKI electronic components

## KGF1631

### Power FET (Plastic Package Type)

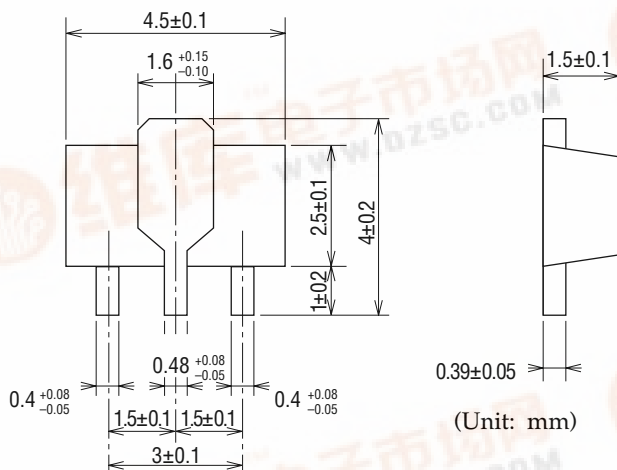
#### GENERAL DESCRIPTION

The KGF1631, housed in a SOT-89 type plastic-mold package, is a discrete GaAs power FET that features high efficiency and high output power. The KGF1631 specifications are guaranteed to a fixed matching circuit for 3.4 V and 850 MHz; external impedance-matching circuits are also required. The KGF1631 provides an output power of more than 24dBm at 3.4V, with high efficiency (50% typ.) and high gain (21dB typ.). The device is optimized for transmitter driver amplifier applications for Portable Handy Phones (PHPs) and other 3-V cellular phones.

#### FEATURES

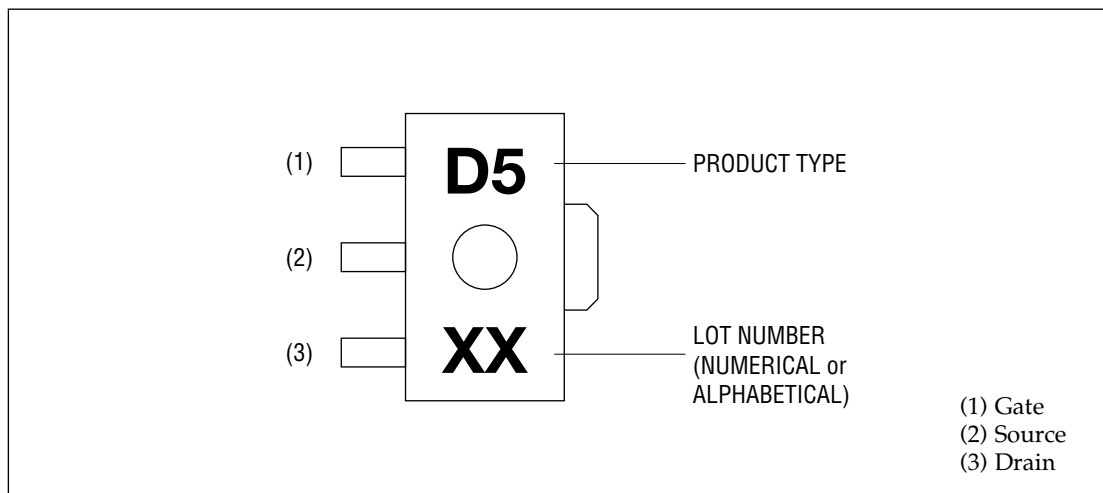
- High output power: 24 dBm (min.)
- High gain: 21dB (typ.)
- High efficiency: 50% (typ.)
- Specifications guaranteed to a fixed matching circuits for 3.4 V, 850 MHz
- Package: 3PMMP (SOT-89 type)

#### PACKAGE DIMENSIONS

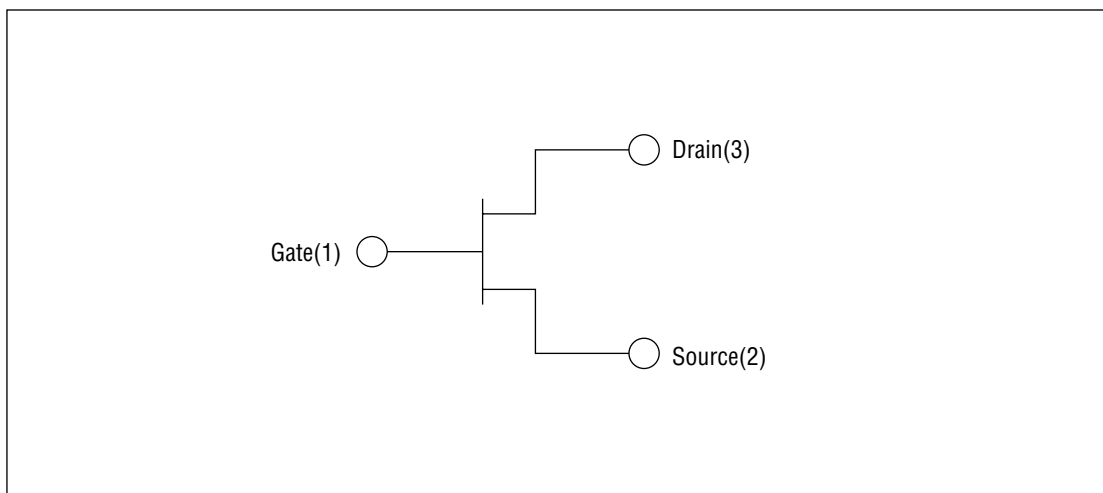


|                        |                |
|------------------------|----------------|
| Package material       | Epoxy resin    |
| Lead frame material    | Cu             |
| Pin treatment          | Solder plating |
| Solder plate thickness | 5 μm or more   |

## MARKING



## CIRCUIT



**ABSOLUTE MAXIMUM RATINGS**

| Item                    | Symbol    | Condition                        | Unit               | Min. | Max. |
|-------------------------|-----------|----------------------------------|--------------------|------|------|
| Drain-source voltage    | $V_{DS}$  | $T_a = 25^{\circ}\text{C}$       | V                  | —    | 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                  | —    | 0.8  |
| Total power dissipation | $P_{tot}$ | $T_a = T_c = 25^{\circ}\text{C}$ | W                  | —    | 2    |
| Channel temperature     | $T_{ch}$  | —                                | $^{\circ}\text{C}$ | —    | 150  |
| Storage temperature     | $T_{stg}$ | —                                | $^{\circ}\text{C}$ | -45  | 125  |

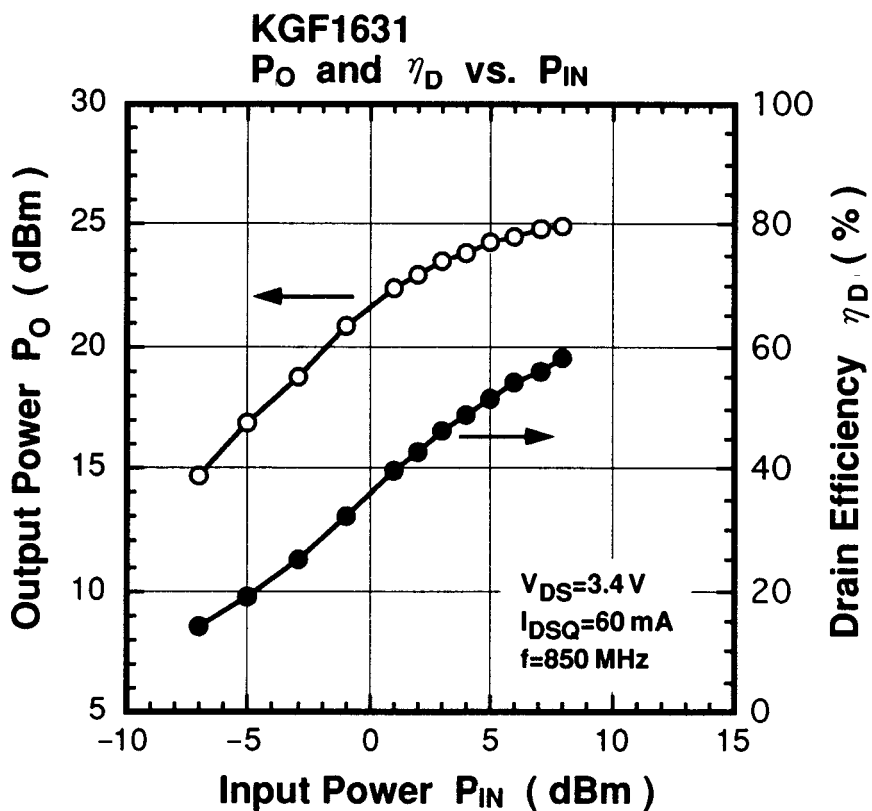
**ELECTRICAL CHARACTERISTICS**

(Ta = 25°C)

| Item                         | Symbol        | Condition                                       | Unit                 | Min. | Typ. | Max. |
|------------------------------|---------------|---|----------------------|------|------|------|
| Gate-source leakage current  | $I_{GSS}$     | $V_{GS} = -5\text{ V}$                          | $\mu\text{A}$        | —    | —    | 50   |
| Gate-drain leakage current   | $I_{GDO}$     | $V_{GD} = -13\text{ V}$                         | $\mu\text{A}$        | —    | —    | 500  |
| Drain-source leakage current | $I_{DS(off)}$ | $V_{DS} = 8\text{ V}, V_{GS} = -5\text{ V}$     | $\mu\text{A}$        | —    | —    | 500  |
| Drain current                | $I_{DSS}$     | $V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}$    | mA                   | 500  | —    | —    |
| Gate bias Q point            | $V_{GSQ}$     | $V_{DS} = 3.4\text{ V}, I_{DSQ} = 70\text{ mA}$ | V                    | -3.0 | —    | -2.0 |
| Output power                 | $P_O$         | (*1), $P_{IN} = 7\text{ dBm}$                   | dBm                  | 24   | 24.5 | —    |
| Drain efficiency             | $\eta_D$      | (*1), $P_{IN} = 7\text{ dBm}$                   | %                    | 45   | 50   | —    |
| Linear gain                  | $G_{LIN}$     | (*1), $P_{IN} = 0\text{ dBm}$                   | dB                   | —    | 21   | —    |
| Thermal resistance           | $R_{th}$      | Channel to case                                 | $^{\circ}\text{C/W}$ | —    | 40   | —    |

\*1 Condition:  $f = 850\text{ MHz}$ ,  $V_{DS} = 3.4\text{ V}$ ,  $I_{DSQ} = 70\text{ mA}$

## RF CHARACTERISTICS

**Matching conditions** $\Gamma_S$  (Source impedance) :  $11.87 + j39.22 \ (\Omega)$  $\Gamma_L$  (Load impedance) :  $11.89 + j7.41 \ (\Omega)$ **Bias conditions** $V_{DS}=3.4\text{ V}$ ,  $I_{DSQ}=60\text{ mA}$ ,  $f=850\text{ MHz}$ 

## Typical S Parameters

 $V_{DS} = 3.4V$ ,  $I_{DS} = 60mA$ 

| 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     | 0.912                 | -82.96                | 5.291                 | 125.03                | 0.051                 | 45.92                 | 0.293                 | -139.69               |
| 600.0     | 0.890                 | -95.50                | 5.203                 | 117.02                | 0.055                 | 40.96                 | 0.318                 | -145.24               |
| 700.0     | 0.877                 | -105.77               | 4.901                 | 109.97                | 0.059                 | 36.59                 | 0.339                 | -149.01               |
| 800.0     | 0.862                 | -114.69               | 4.748                 | 103.99                | 0.062                 | 33.33                 | 0.350                 | -152.49               |
| 900.0     | 0.852                 | -122.49               | 4.402                 | 98.78                 | 0.064                 | 30.12                 | 0.363                 | -155.70               |
| 1000.0    | 0.844                 | -129.11               | 4.185                 | 93.87                 | 0.067                 | 27.58                 | 0.368                 | -158.02               |
| 1100.0    | 0.836                 | -135.35               | 3.952                 | 89.28                 | 0.069                 | 25.41                 | 0.375                 | -160.24               |
| 1200.0    | 0.829                 | -140.56               | 3.727                 | 85.04                 | 0.071                 | 23.21                 | 0.378                 | -162.50               |
| 1300.0    | 0.820                 | -145.56               | 3.526                 | 81.18                 | 0.072                 | 21.66                 | 0.383                 | -164.25               |
| 1400.0    | 0.818                 | -150.19               | 3.325                 | 77.31                 | 0.074                 | 19.64                 | 0.385                 | -166.00               |
| 1500.0    | 0.811                 | -154.29               | 3.162                 | 73.59                 | 0.075                 | 18.31                 | 0.385                 | -167.91               |
| 1600.0    | 0.806                 | -158.37               | 3.008                 | 70.23                 | 0.077                 | 16.52                 | 0.387                 | -169.46               |
| 1700.0    | 0.803                 | -162.27               | 2.860                 | 66.68                 | 0.078                 | 15.41                 | 0.387                 | -171.06               |
| 1800.0    | 0.794                 | -165.60               | 2.727                 | 63.99                 | 0.079                 | 13.93                 | 0.388                 | -172.92               |
| 1900.0    | 0.792                 | -169.02               | 2.626                 | 60.15                 | 0.081                 | 12.77                 | 0.386                 | -174.22               |
| 2000.0    | 0.783                 | -172.51               | 2.499                 | 57.37                 | 0.082                 | 11.31                 | 0.386                 | -175.82               |
| 2100.0    | 0.781                 | -175.43               | 2.420                 | 54.00                 | 0.083                 | 10.49                 | 0.386                 | -177.63               |
| 2200.0    | 0.774                 | -178.78               | 2.316                 | 50.98                 | 0.084                 | 8.76                  | 0.385                 | -178.86               |
| 2300.0    | 0.769                 | 178.27                | 2.242                 | 47.99                 | 0.086                 | 7.84                  | 0.383                 | 179.19                |
| 2400.0    | 0.764                 | 175.35                | 2.159                 | 44.96                 | 0.087                 | 6.58                  | 0.383                 | 177.94                |
| 2500.0    | 0.757                 | 172.17                | 2.083                 | 42.18                 | 0.089                 | 5.47                  | 0.381                 | 176.06                |
| 2600.0    | 0.753                 | 169.62                | 2.024                 | 39.18                 | 0.089                 | 4.46                  | 0.379                 | 174.75                |
| 2700.0    | 0.746                 | 166.72                | 1.951                 | 36.14                 | 0.091                 | 3.18                  | 0.377                 | 173.09                |
| 2800.0    | 0.741                 | 164.19                | 1.897                 | 33.39                 | 0.092                 | 1.83                  | 0.377                 | 171.74                |
| 2900.0    | 0.736                 | 161.65                | 1.827                 | 30.30                 | 0.094                 | 0.39                  | 0.376                 | 169.90                |
| 3000.0    | 0.734                 | 159.07                | 1.778                 | 28.02                 | 0.093                 | -0.72                 | 0.377                 | 168.25                |

## Typical S Parameters

