PRELIMINARY DATA SHEET

NEC

# SILICON POWER MOS FIELD EFFECT TRANSISTOR

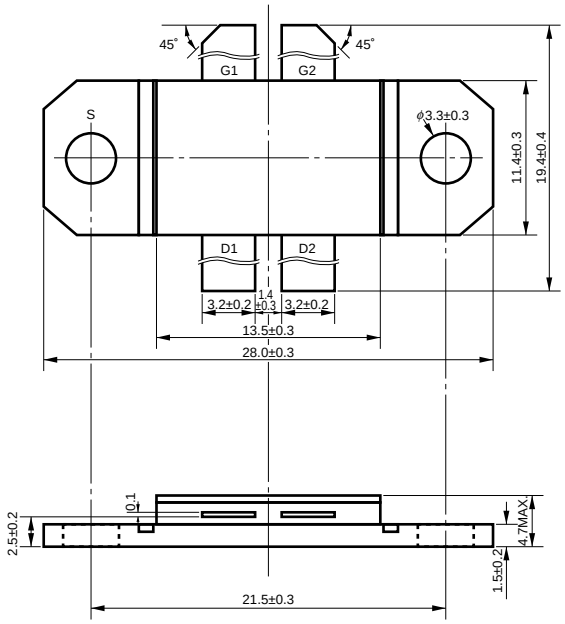
# 2SK2597

## N-CHANNEL SILICON POWER MOSFET FOR BASE STATION OF 900 MHz BAND CELLULAR PHONE POWER AMPLIFICATION

### FEATURES

- High output, high gain
  $P_O$ = 100 W, $G_L$ = 13 dB (TYP.) (f = 900 MHz)
  $P_O$ = 90 W, $G_L$ = 12 dB (TYP.) (f = 960 MHz)
- Low intermodulation distortion
- Covers all base station frequencies such as 800-MHz PDC and GSM
- High-reliability gold electrodes
- Hermetic sealed package
- Internal matching circuit
- Push-pull structure

### PACKAGE DRAWING (Unit: mm)




$G_1$, $G_2$: gate
$D_1$, $D_2$: drain
S : source
Flange is connected to the source.

### ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 60 | V |
| Gate-source voltage | $V_{GS}$ | 7 | V |
| Drain current (D.C.) | $I_D$ | 15 **Note** | A |
| Total power dissipation | $P_T$ | 290 | W |
| Thermal resistance | $R_{th}$ | 0.6 | °C/W |
| Channel temperature | $T_{ch}$ | 200 | °C |
| Storage temperature | $T_{stg}$ | –65 to +150 | °C |

**Note** Per side

### ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C)

| Parameter | Symbol | Condition | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Gate leakage current | $I_{GSS}$ | $V_{GS}$ = 7 V | | | 1 | μA |
| Cut-off voltage | $V_{GS(off)}$ | $V_{DS}$ = 5 V, $I_D$ = 50 mA | 1.5 | | 4 | V |
| Drain current | $I_{DSS}$ | $V_{DS}$ = 60 V | | | 2 | mA |
| Mutual conductance | $g_m$ | $V_{DS}$ = 5 V, $I_D$ = 3 A, $\Delta I_D$ = 100 mA | 2.0 | | | S |
| Output power | $P_O$ | f = 960 MHz, $V_{DD}$ = 30 V | 80 | 90 | | W |
| Drain efficiency | $\eta_D$ | $I_{DQ}$ = 200 mA × 2, $P_{in}$ = 40 dBm | 35 | 40 | | % |
| Linear gain | $G_L$ | f = 960 MHz, $V_{DD}$ = 30 V<br>$I_{DQ}$ = 200 mA × 2, $P_{in}$ = 30 dBm | 11 | 12 | | dB |
| Third intermodulation distortion | $IM_3$ | f = 900 MHz, $\Delta f$ = 0.1 MHz, $V_{DD}$ = 30 V<br>$I_{DQ}$ = 200 mA × 2, $P_O$ = 42 dBm | | –38 | | dBc |

**The information in this document is subject to change without notice.**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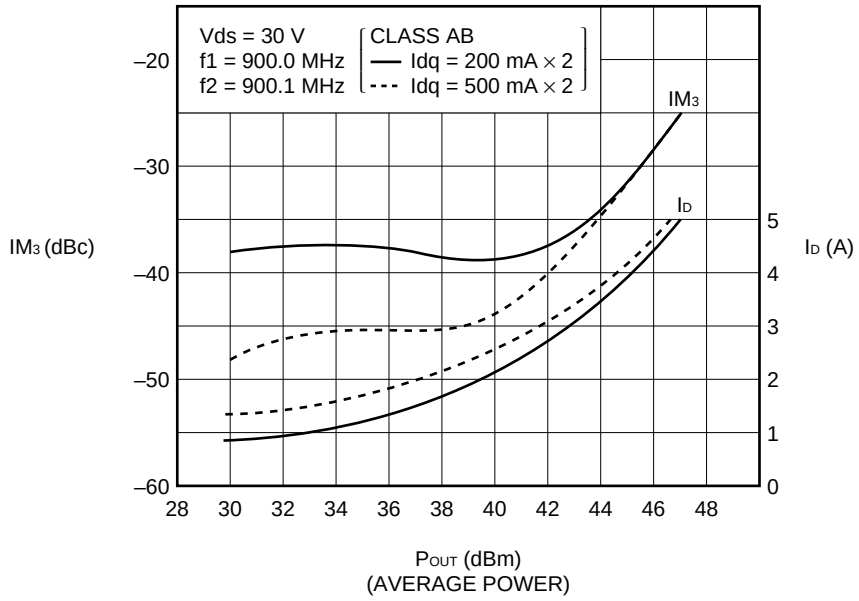
## OUTPUT v.s. $IM_3$, $I_D$ CHARACTERISTICS

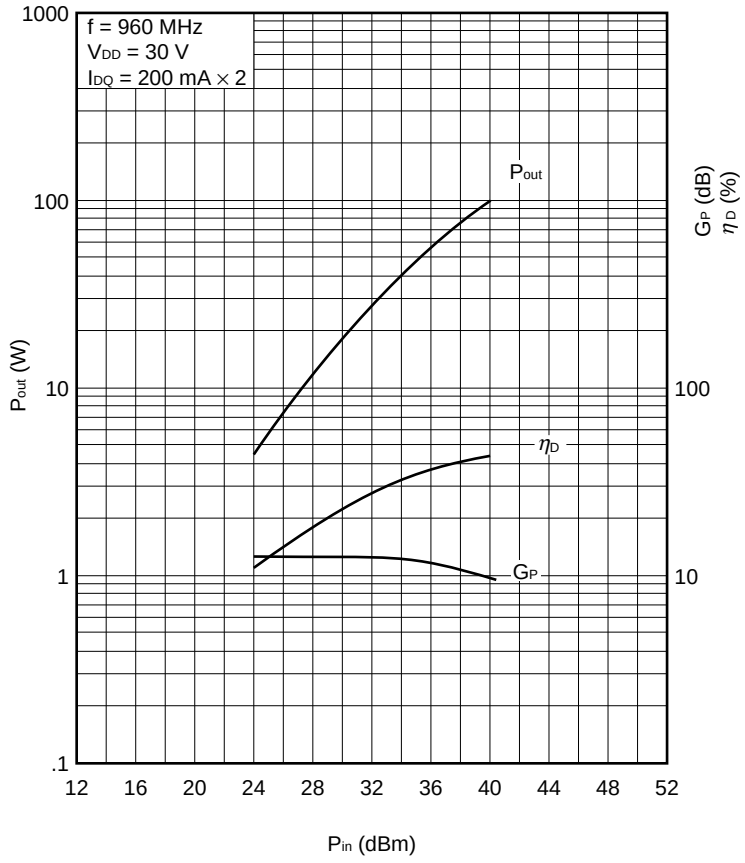
**THIRD ORDER INTERMODULATION DISTORTION / DRAIN CURRENT v.s. OUTPUT POWER**




## INPUT v.s. OUTPUT, POWER GAIN, EFFICIENCY

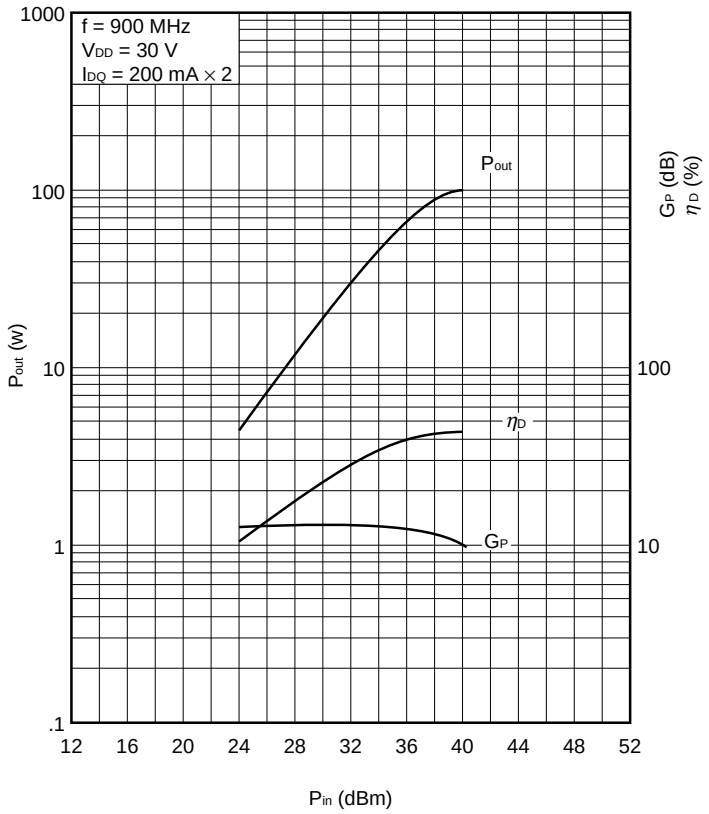
**(1) f = 960 MHz**

**OUTPUT POWER / DRAIN EFFICIENCY / POWER GAIN vs. INPUT POWER**



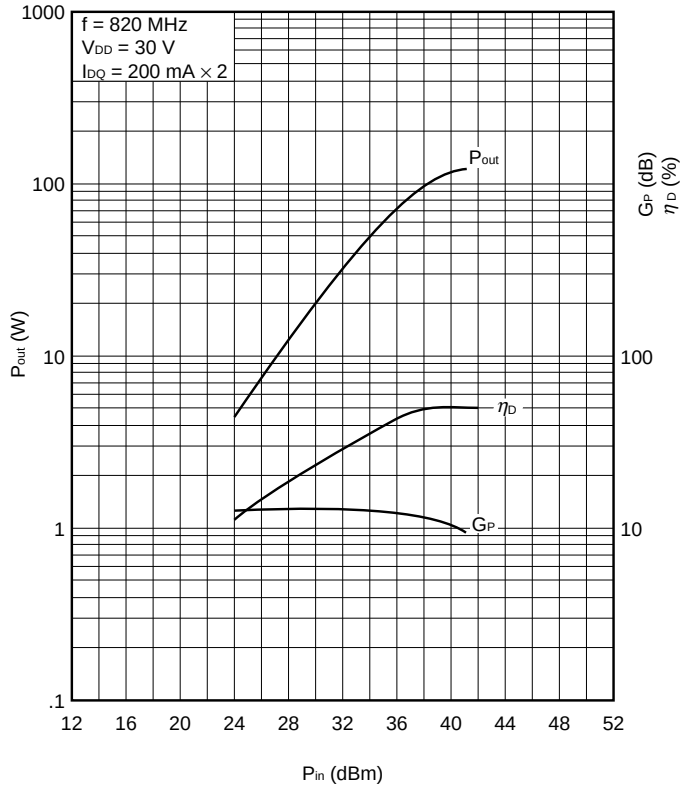
**(2) f = 900 MHz**

**OUTPUT POWER / DRAIN EFFICIENCY / POWER GAIN vs. INPUT POWER**

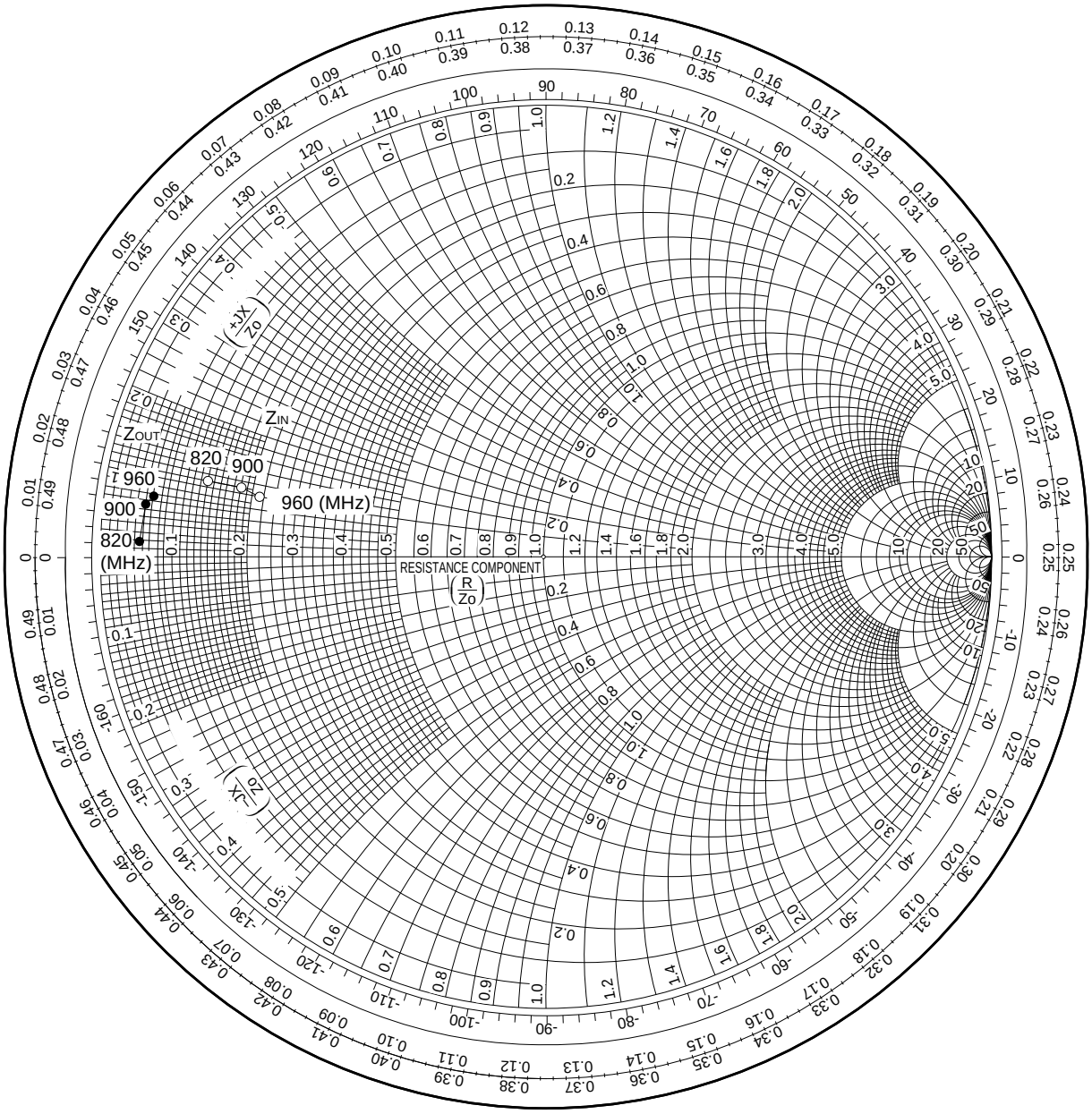



**(3) f = 820 MHz**

**OUTPUT POWER / DRAIN EFFICIENCY / POWER GAIN vs. INPUT POWER**



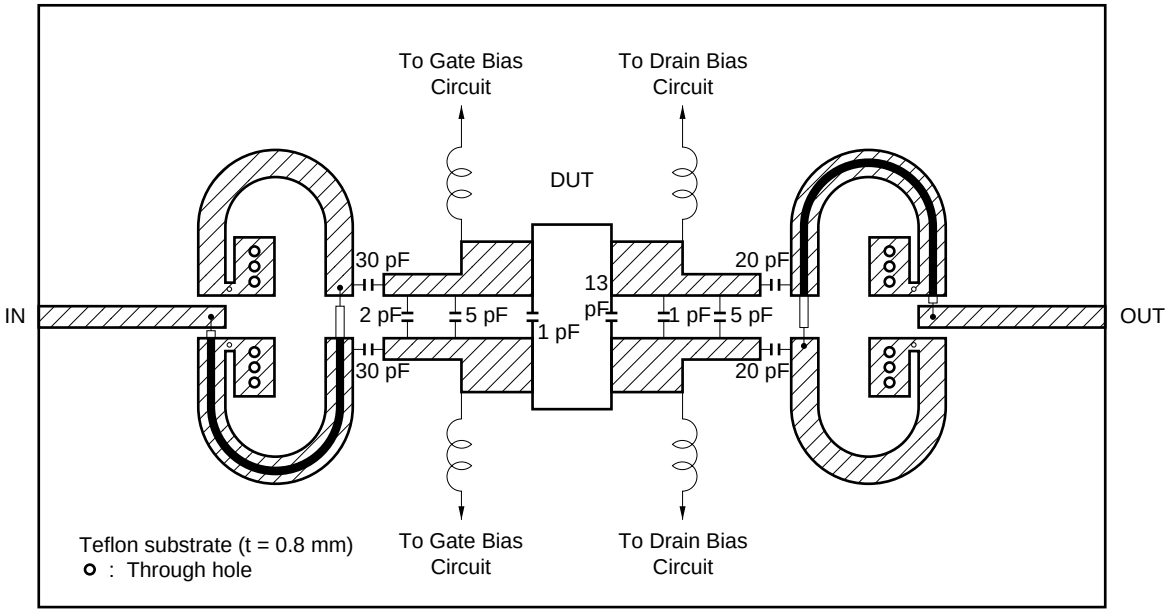
**ZIN, ZOUT**




**VDD = 30 V, IDQ = 200 mA × 2, Pin = 40 dBm**

| f (MHz) | ZIN (Ω) | ZOUT (Ω) |
|---|---|---|
| 820 | 6.52 + j5.52 | 2.34 + j0.91 |
| 900 | 8.86 + j5.49 | 2.78 + j3.23 |
| 960 | 10.36 + j4.79 | 2.95 + j3.37 |

**APPLICATION CIRCUIT EXAMPLE (f = 960 MHz)**




**Notes on Handling**

This product internally uses beryllie porcelain (beryllium oxide). If powder or vapor of beryllium oxide enters your respiratory organs, you will have a difficulty in breathing, which is dangerous. Therefore, do no disassemble or chemically process the product.

Be sure to abolish the product separately from general industrial wastes or garbage.

**[MEMO]**