# 2SK1610

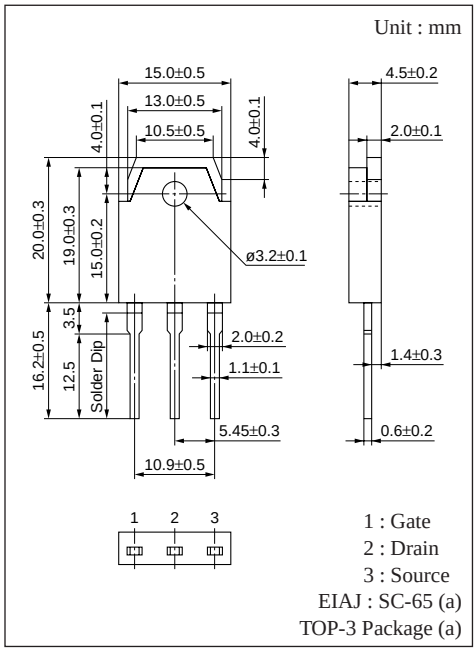
## Silicon N-Channel Power F-MOS

### ■ Features

- High avalanche energy capability
- $V_{GSS}$ : 30V guaranteed
- Low $R_{DS(on)}$, high-speed switching characteristic

### ■ Applications

- High-speed switching (switching mode regulator)
- For high-frequency power amplification




### ■ Absolute Maximum Ratings (Tc = 25˚C)

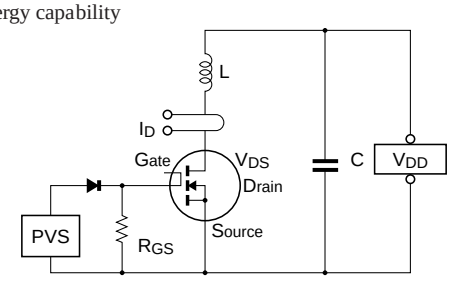
| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source breakdown voltage | | $V_{DSS}$ | 500 | V |
| Gate-Source voltage | | $V_{GSS}$ | ±30 | V |
| Drain current | DC | $I_D$ | ±13 | A |
| | Pulse | $I_{DP}$ | ±26 | A |
| Avalanche energy capability | | EAS * | 170 | mJ |
| Allowable power dissipation | $T_C$ = 25˚C | $P_D$ | 120 | W |
| | Ta = 25˚C | | 2.5 | |
| Channel temperature | | $T_{ch}$ | 150 | ˚C |
| Storage temperature | | $T_{stg}$ | –55 to +150 | ˚C |

* Single pulse

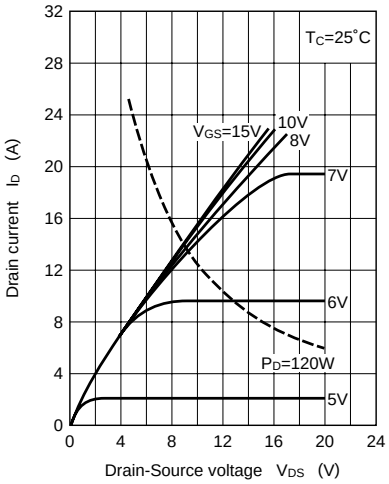
### ■ Electrical Characteristics (Tc = 25˚C)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source cut-off current | $I_{DSS}$ | $V_{DS}$= 400V, $V_{GS}$= 0 | | | 0.1 | mA |
| Gate-Source leakage current | $I_{GSS}$ | $V_{GS}$=±30V, $V_{DS}$= 0 | | | ±1 | μ A |
| Drain-Source breakdown voltage | $V_{DSS}$ | $I_D$=1mA, $V_{GS}$= 0 | 500 | | | V |
| Avalanche energy capability | EAS* | L= 2mH, $I_D$=13A, $V_{DD}$= 50V | 170 | | | mJ |
| Gate threshold voltage | $V_{th}$ | $V_{DS}$= 25V, $I_D$=1mA | 1 | | 5 | V |
| Drain-Source ON-resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$= 7A | | 0.45 | 0.6 | Ω |
| Forward transadmittance | \| $Y_{fs}$ \| | $V_{DS}$= 25V, $I_D$= 7A | 5 | 8 | | S |
| Input capacitance | $C_{iss}$ | $V_{DS}$= 20V, $V_{GS}$= 0, f=1MHz | | 1700 | | pF |
| Output capacitance | $C_{oss}$ | | | 300 | | pF |
| Feedback capacitance | $C_{rss}$ | | | 120 | | pF |
| Turn-on time | $t_{on}$ | $V_{GS}$=10V, $I_D$=7A<br>$V_{DD}$=150V, $R_L$= 21.4Ω | | 100 | | ns |
| Fall time | $t_f$ | | | 90 | | ns |
| Turn-off time (delay time) | $t_{d(off)}$ | | | 210 | | ns |

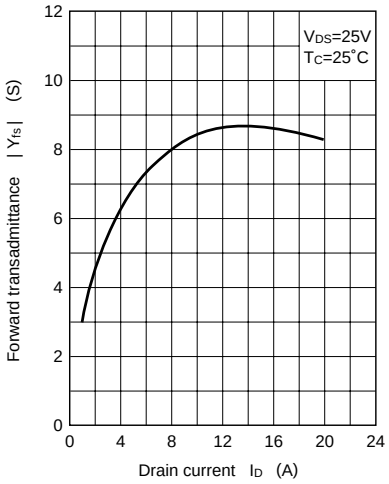
* Avalanche energy capability
Test circuit



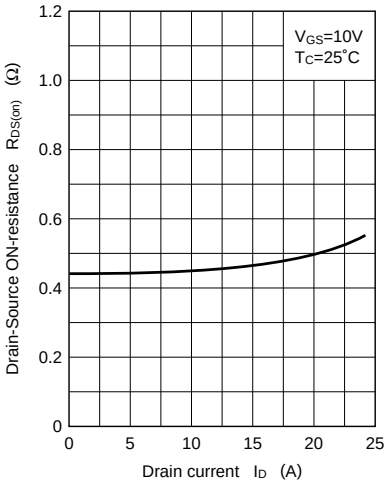
$I_D - V_{DS}$



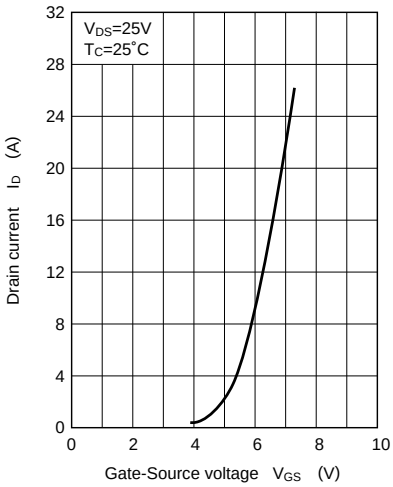

$|Y_{fs}| - I_D$



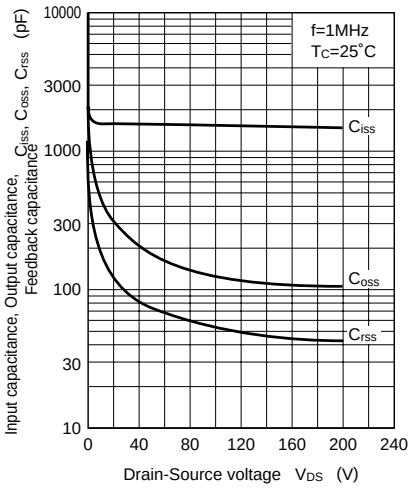

$R_{DS\,(on)} - I_D$



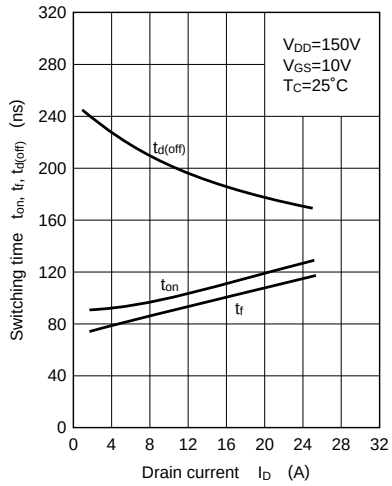

$I_D - V_{GS}$



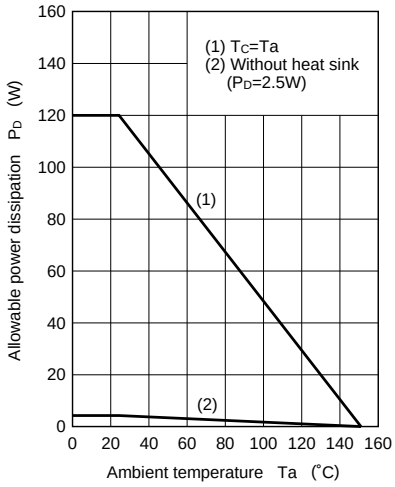

$C_{iss}, C_{oss}, C_{rss} - V_{DS}$



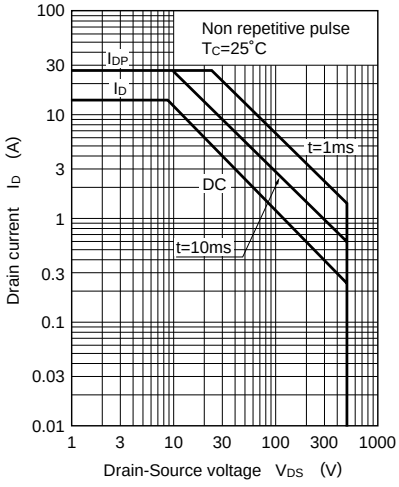

$t_{on}, t_f, t_{d\,(off)} - I_D$




$P_D - Ta$




Area of safe operation (ASO)




$EAS - T_j$