# 2SK3046

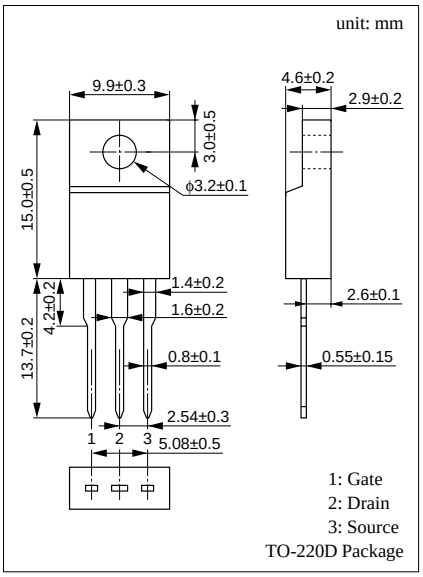
## Silicon N-Channel Power F-MOS FET

### ■ Features

- Avalanche energy capacity guaranteed: EAS > 130mJ
- $V_{GSS}$ = ±30V guaranteed
- High-speed switching: $t_f$ = 60ns
- No secondary breakdown

### ■ Applications

- Contactless relay
- Diving circuit for a solenoid
- Driving circuit for a motor
- Control equipment
- Switching power supply




### ■ Absolute Maximum Ratings ($T_C$ = 25°C)

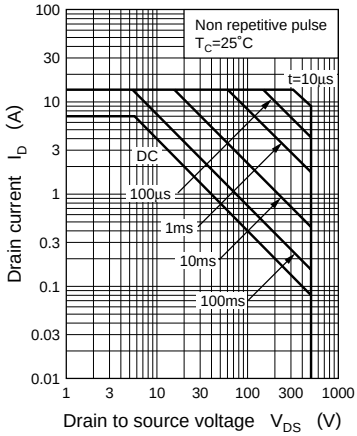
| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain to Source breakdown voltage | | $V_{DSS}$ | 500 | V |
| Gate to Source voltage | | $V_{GSS}$ | ±30 | V |
| Drain current | DC | $I_D$ | ±7 | A |
| | Pulse | $I_{DP}$ | ±14 | A |
| Avalanche energy capacity | | EAS* | 130 | mJ |
| Allowable power dissipation | $T_C$ = 25°C | $P_D$ | 40 | W |
| | Ta = 25°C | | 2 | |
| Channel temperature | | $T_{ch}$ | 150 | °C |
| Storage temperature | | $T_{stg}$ | –55 to +150 | °C |

* L = 5.4mH, $I_L$ = 7A, 1 pulse

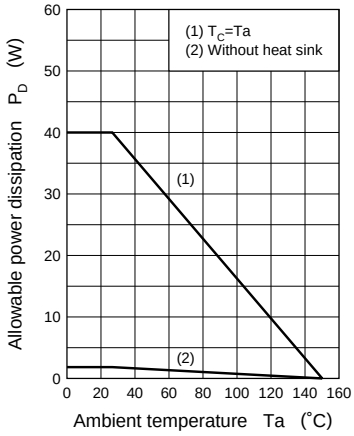
### ■ Electrical Characteristics ($T_C$ = 25°C)

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|
| Drain to Source cut-off current | $I_{DSS}$ | $V_{DS}$ = 400V, $V_{GS}$ = 0 | | | 0.1 | mA |
| Gate to Source leakage current | $I_{GSS}$ | $V_{GS}$ = ±30V, $V_{DS}$ = 0 | | | ±1 | µA |
| Drain to Source breakdown voltage | $V_{DSS}$ | $I_D$ = 1mA, $V_{GS}$ = 0 | 500 | | | V |
| Gate threshold voltage | $V_{th}$ | $V_{DS}$ = 25V, $I_D$ = 1mA | 2 | | 5 | V |
| Drain to Source ON-resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 4A | | 0.7 | 1 | Ω |
| Forward transfer admittance | $\|Y_{fs}\|$ | $V_{DS}$ = 25V, $I_D$ = 4A | 3 | 5 | | S |
| Diode forward voltage | $V_{DSF}$ | $I_{DR}$ = 7A, $V_{GS}$ = 0 | | | –1.6 | V |
| Input capacitance (Common Source) | $C_{iss}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0, f = 1MHz | | 1200 | | pF |
| Output capacitance (Common Source) | $C_{oss}$ | | | 160 | | pF |
| Reverse transfer capacitance (Common Source) | $C_{rss}$ | | | 70 | | pF |
| Turn-on time (delay time) | $t_{d(on)}$ | $V_{GS}$ = 10V, $I_D$ = 5A, $V_{DD}$ = 150V, $R_L$ = 30Ω | | 30 | | ns |
| Rise time | $t_r$ | | | 70 | | ns |
| Turn-off time (delay time) | $t_{d(off)}$ | | | 140 | | ns |
| Fall time | $t_f$ | | | 60 | | ns |

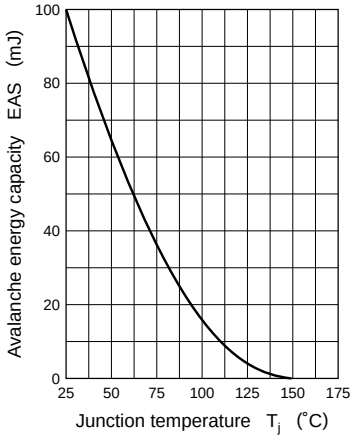
Area of safe operation (ASO)



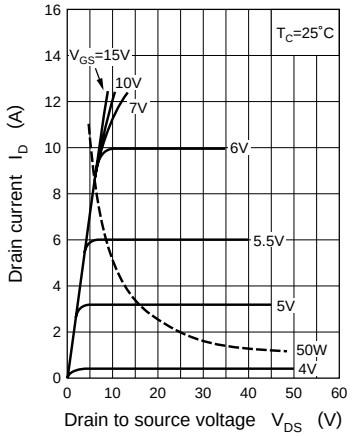

$P_D$ — Ta



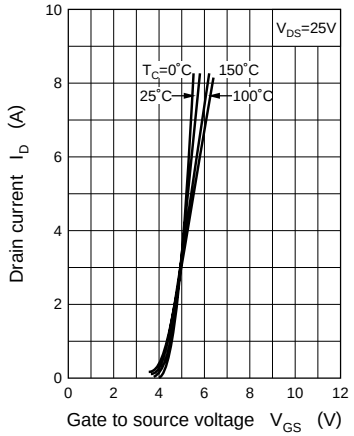

EAS — $T_j$



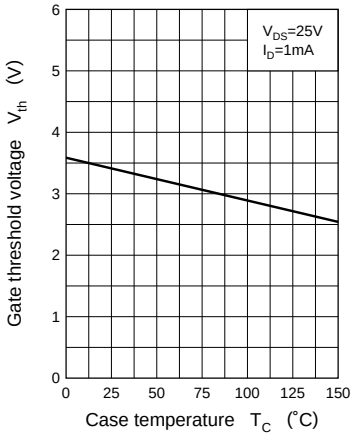

$I_D$ — $V_{DS}$



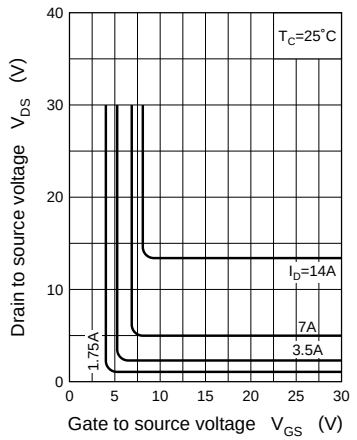

$I_D$ — $V_{GS}$



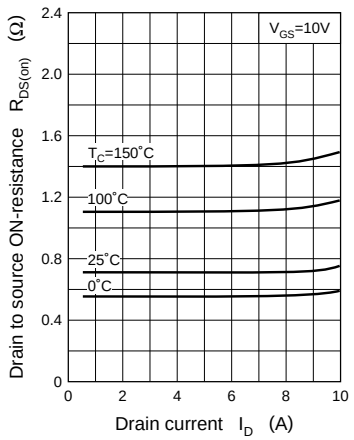

$V_{th}$ — $T_C$



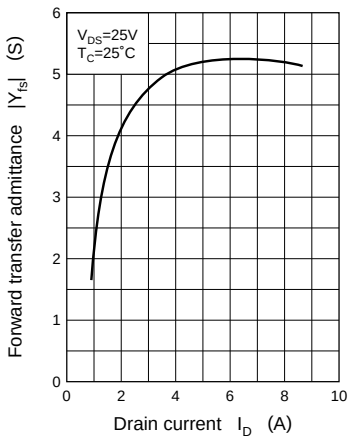

$V_{DS}$ — $V_{GS}$



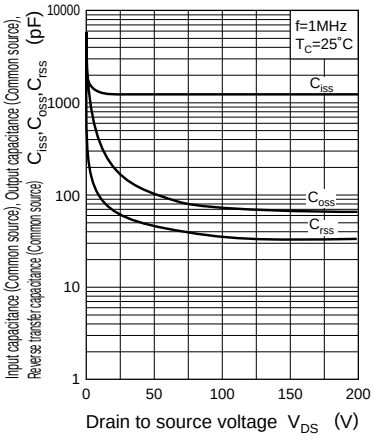

$R_{DS(on)}$ — $I_D$



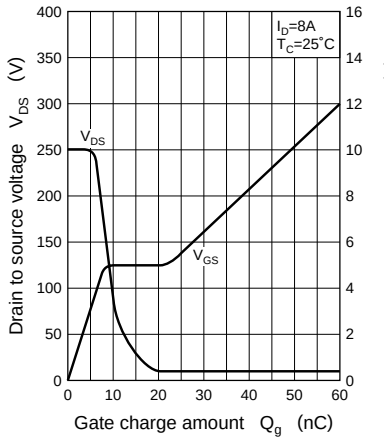

$|Y_{fs}|$ — $I_D$



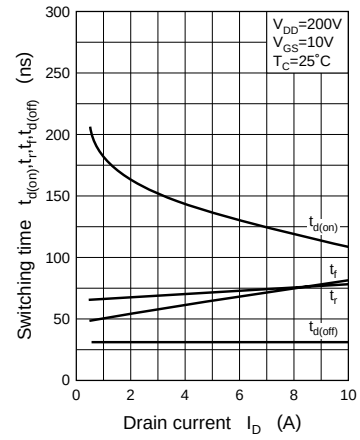
$C_{iss}$, $C_{oss}$, $C_{rss}$ — $V_{DS}$



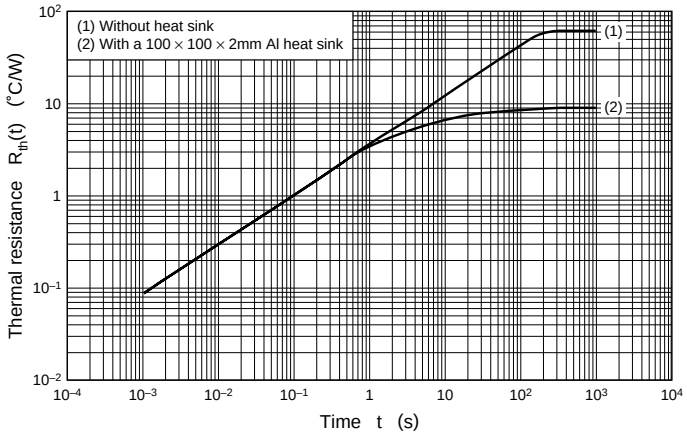

$V_{DS}$, $V_{GS}$ — $Q_g$




$t_{d(on)}$, $t_r$, $t_f$, $t_{d(off)}$ — $I_D$




$R_{th(t)}$ — t



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