

# 2SK2538

## Silicon N-Channel Power F-MOS

### ■ Features

- Avalanche energy capability guaranteed
- High-speed switching
- No secondary breakdown

### ■ Applications

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

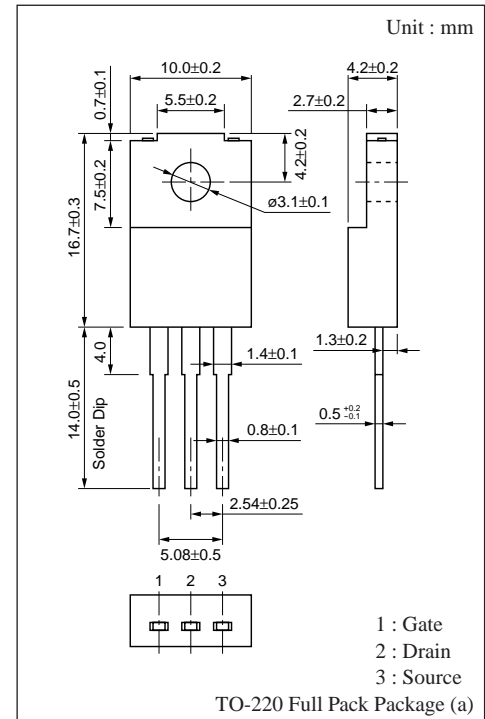
### ■ Absolute Maximum Ratings (T<sub>c</sub> = 25°C)

| Parameter                      | Symbol                | Rating          | Unit |   |
|--------------------------------|-----------------------|-----------------|------|---|
| Drain-Source breakdown voltage | V <sub>DSS</sub>      | 250             | V    |   |
| Gate-Source voltage            | V <sub>GS</sub>       | ±30             | V    |   |
| Drain current                  | DC                    | I <sub>D</sub>  | ±2   | A |
|                                | Pulse                 | I <sub>DP</sub> | ±4   | A |
| Avalanche energy capability    | EAS*                  | 10              | mJ   |   |
| Allowable power dissipation    | T <sub>C</sub> = 25°C | P <sub>D</sub>  | 30   | W |
|                                | T <sub>a</sub> = 25°C |                 | 2    |   |
| Channel temperature            | T <sub>ch</sub>       | 150             | °C   |   |
| Storage temperature            | T <sub>stg</sub>      | -55 to +150     | °C   |   |

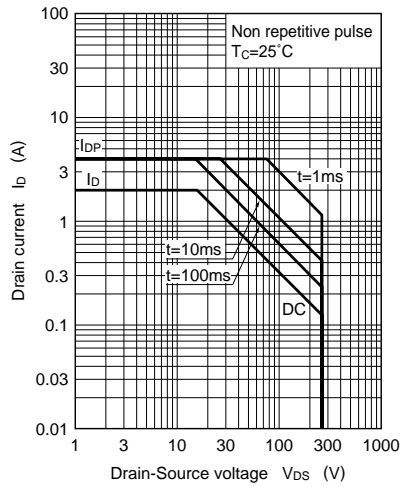
\* L= 5mH, I<sub>L</sub>= 2A, V<sub>DD</sub>= 30V, 1 pulse

### ■ Electrical Characteristics (T<sub>c</sub> = 25°C)

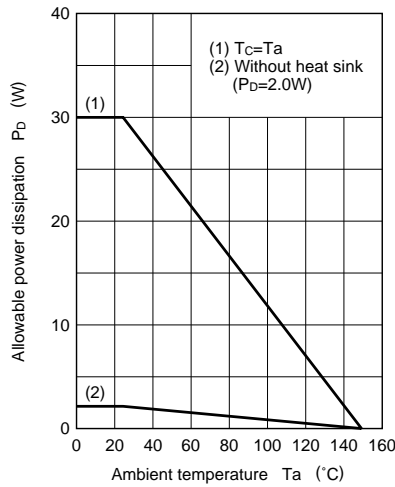
| Parameter                          | Symbol                | Condition   | Min | Typ | Max  | Unit |
|------------------------------------|-----------------------|---|-----|-----|------|------|
| Drain-Source cut-off current       | I <sub>DSS</sub>      | V <sub>DS</sub> = 200V, V <sub>GS</sub> = 0   |     |     | 100  | μA   |
| Gate-Source leakage current        | I <sub>GS</sub>       | V <sub>GS</sub> =±30V, V <sub>DS</sub> = 0  |     |     | ±1   | μA   |
| Drain-Source breakdown voltage     | V <sub>DSS</sub>      | I <sub>D</sub> =1mA, V <sub>GS</sub> = 0  | 250 |     |      | V    |
| Gate threshold voltage             | V <sub>th</sub>       | V <sub>DS</sub> =10V, I <sub>D</sub> =1mA   | 1   |     | 5    | V    |
| Drain-Source ON-resistance         | R <sub>DS(on)</sub>   | V <sub>GS</sub> =10V, I <sub>D</sub> =1A  |     | 1.2 | 2    | Ω    |
| Forward transadmittance            | Y <sub>fs</sub>       | V <sub>DS</sub> = 25V, I <sub>D</sub> =1A   | 0.5 | 1   |      | S    |
| Diode forward voltage              | V <sub>DSF</sub>      | I <sub>DR</sub> = 2A, V <sub>GS</sub> = 0   |     |     | -1.6 | V    |
| Input capacitance                  | C <sub>iss</sub>      | V <sub>DS</sub> =10V, V <sub>GS</sub> = 0, f=1MHz   |     | 220 |      | pF   |
| Output capacitance                 | C <sub>oss</sub>      |   |     | 60  |      | pF   |
| Feedback capacitance               | C <sub>rss</sub>      |   |     | 20  |      | pF   |
| Turn-on time (delay time)          | t <sub>d(on)</sub>    | V <sub>DD</sub> = 200V, I <sub>D</sub> = 2A<br>V <sub>GS</sub> =10V, R <sub>L</sub> =100Ω |     | 10  |      | ns   |
| Rise time                          | t <sub>r</sub>        |   |     | 20  |      | ns   |
| Fall time                          | t <sub>f</sub>        |   |     | 45  |      | ns   |
| Turn-off time (delay time)         | t <sub>d(off)</sub>   |   |     | 90  |      | ns   |
| Channel-Case heat resistance       | R <sub>th(ch-c)</sub> |   |     |     | 4.17 | °C/W |
| Channel-Atmosphere heat resistance | R <sub>th(ch-a)</sub> |   |     |     | 62.5 | °C/W |



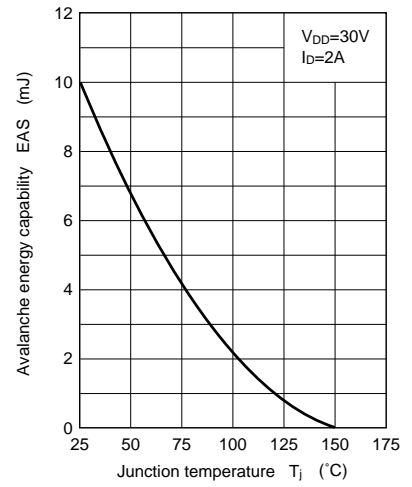
Area of safe operation (ASO)



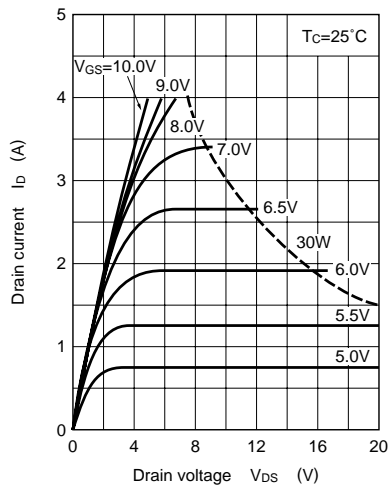
$P_D - T_a$



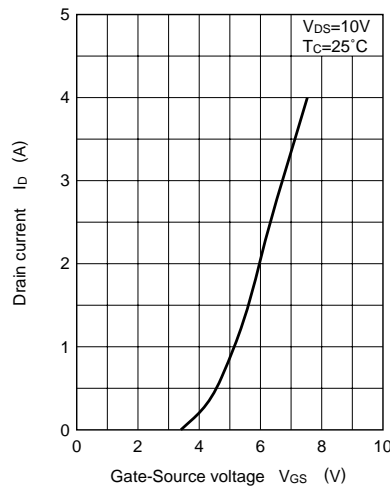
$EAS - T_j$



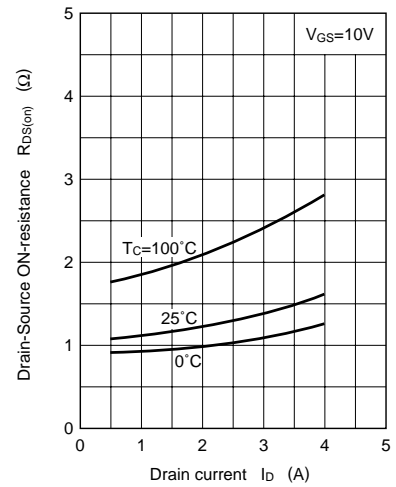
$I_D - V_{DS}$



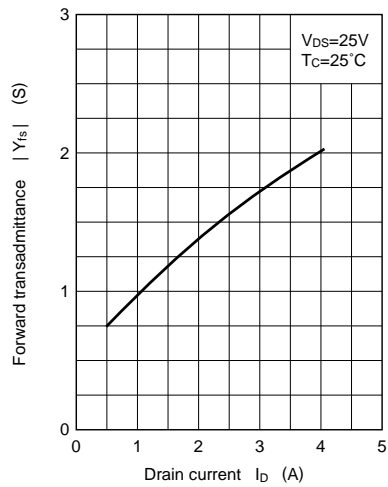
$I_D - V_{GS}$



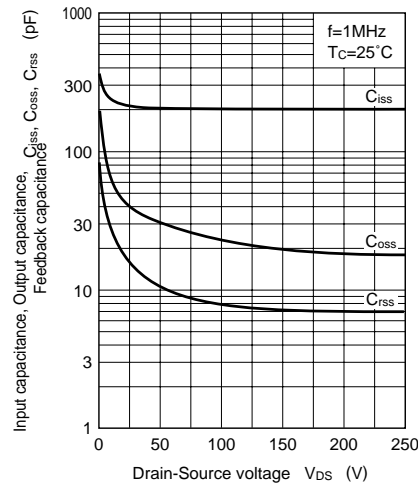
$R_{DS(on)} - I_D$



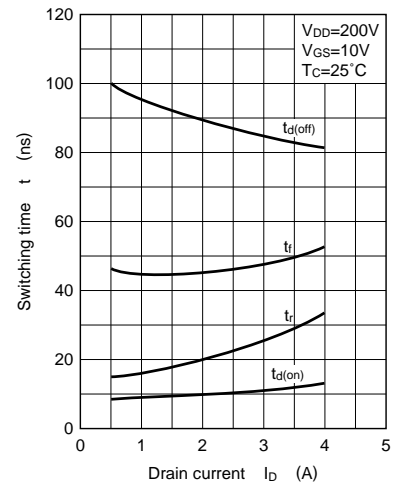
$|Y_{fs}| - I_D$



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



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



$R_{th} - t_p$

