

# 2SK3049

## Silicon N-Channel Power F-MOS FET

### ■ Features

- Avalanche energy capacity guaranteed
- High-speed switching
- Low ON-resistance
- No secondary breakdown

### ■ Applications

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

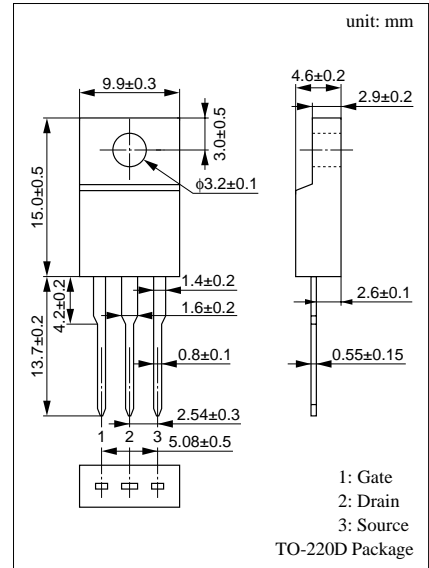
### ■ Absolute Maximum Ratings ( $T_C = 25^\circ\text{C}$ )

| Parameter                         | Symbol                   | Rated Values | Unit             |
|-----------------------------------|--------------------------|--------------|------------------|
| Drain to Source breakdown voltage | $V_{DSS}$                | 600          | V                |
| Gate to Source voltage            | $V_{GSS}$                | $\pm 30$     | V                |
| Drain current                     | DC                       | $I_D$        | $\pm 5$ A        |
|                                   | Pulse                    | $I_{DP}$     | $\pm 10$ A       |
| Avalanche energy capacity         | EAS*                     | 62.5         | mJ               |
| Allowable power dissipation       | $T_C = 25^\circ\text{C}$ | $P_D$        | 40               |
|                                   | $T_a = 25^\circ\text{C}$ |              | 2                |
| Channel temperature               | $T_{ch}$                 | 150          | $^\circ\text{C}$ |
| Storage temperature               | $T_{stg}$                | -55 to +150  | $^\circ\text{C}$ |

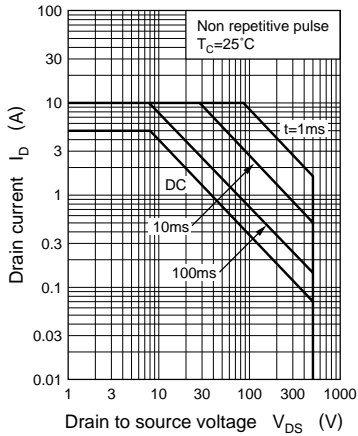
\*  $L = 5\text{mH}$ ,  $I_L = 5\text{A}$ , 1 pulse

### ■ Electrical Characteristics ( $T_C = 25^\circ\text{C}$ )

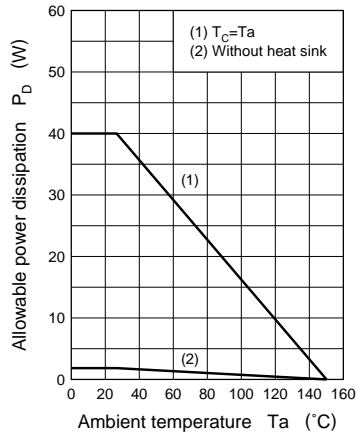
| Parameter                                    | Symbol       | Conditions   | min | typ  | max     | Unit          |    |
|--|--------------|--|-----|------|---------|---------------|----|
| Drain to Source cut-off current              | $I_{DSS}$    | $V_{DS} = 480\text{V}$ , $V_{GS} = 0$  |     |      | 100     | $\mu\text{A}$ |    |
| Gate to Source leakage current               | $I_{GSS}$    | $V_{GS} = \pm 30\text{V}$ , $V_{DS} = 0$   |     |      | $\pm 1$ | $\mu\text{A}$ |    |
| Drain to Source breakdown voltage            | $V_{DSS}$    | $I_D = 1\text{mA}$ , $V_{GS} = 0$  | 600 |      |         | V             |    |
| Gate threshold voltage                       | $V_{th}$     | $V_{DS} = 25\text{V}$ , $I_D = 1\text{mA}$   | 2   |      | 5       | V             |    |
| Drain to Source ON-resistance                | $R_{DS(on)}$ | $V_{GS} = 10\text{V}$ , $I_D = 3\text{A}$  |     | 0.85 | 1.5     | $\Omega$      |    |
| Forward transfer admittance                  | $ Y_{fs} $   | $V_{DS} = 25\text{V}$ , $I_D = 3\text{A}$  | 1.7 | 3.4  |         | S             |    |
| Diode forward voltage                        | $V_{DSF}$    | $I_{DR} = 5\text{A}$ , $V_{GS} = 0$  |     |      | -1.6    | V             |    |
| Input capacitance (Common Source)            | $C_{iss}$    | $V_{DS} = 20\text{V}$ , $V_{GS} = 0$ , $f = 1\text{MHz}$                                 |     | 1200 |         | pF            |    |
| Output capacitance (Common Source)           | $C_{oss}$    |  |     |      | 140     |               | pF |
| Reverse transfer capacitance (Common Source) | $C_{rss}$    |  |     |      | 40      |               | pF |
| Turn-on time (delay time)                    | $t_{d(on)}$  | $V_{DD} = 200\text{V}$ , $I_D = 3\text{A}$<br>$V_{GS} = 10\text{V}$ , $R_L = 66.6\Omega$ |     | 20   |         | ns            |    |
| Rise time                                    | $t_r$        |  |     |      | 30      |               | ns |
| Turn-off time (delay time)                   | $t_{d(off)}$ |  |     |      | 150     |               | ns |
| Fall time                                    | $t_f$        |  |     |      | 50      |               | ns |



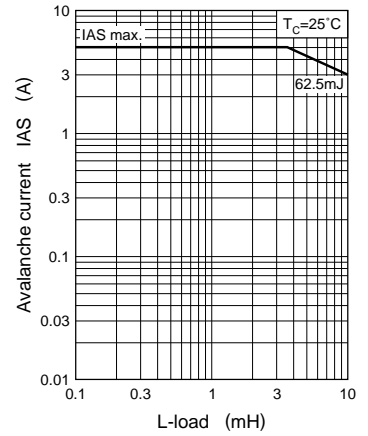
Area of safe operation (ASO)



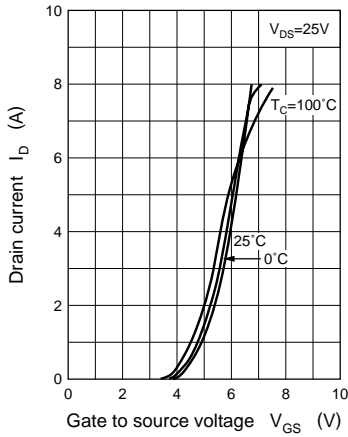
P<sub>D</sub> — T<sub>a</sub>



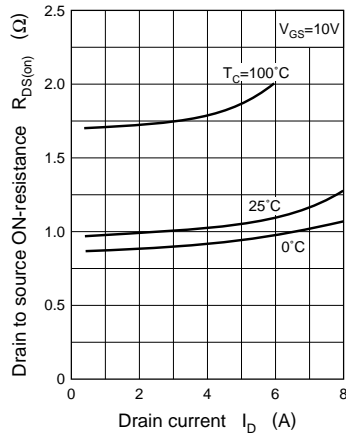
IAS — L-load



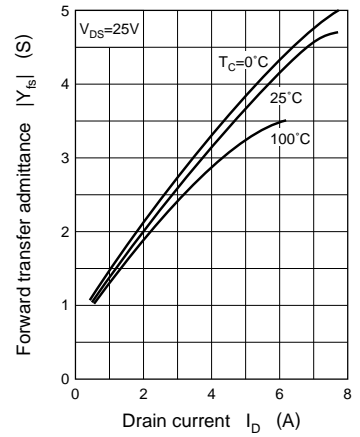
I<sub>D</sub> — V<sub>GS</sub>



R<sub>DS(on)</sub> — I<sub>D</sub>



|Y<sub>fs</sub>| — I<sub>D</sub>



R<sub>th(t)</sub> — t

