

# 2SK3023 (Tentative)

## Silicon N-Channel Power F-MOS FET

### ■ Features

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

### ■ Applications

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

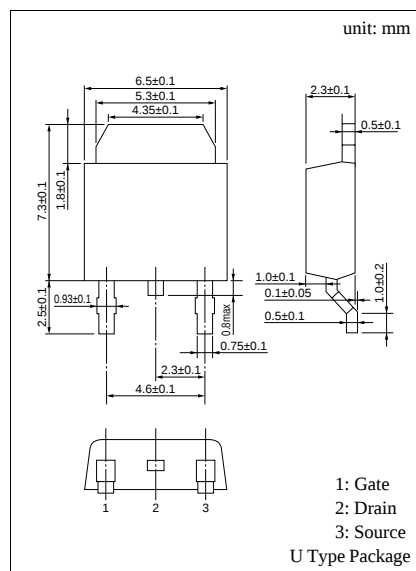
### ■ Absolute Maximum Ratings ( $T_C = 25^\circ\text{C}$ )

| Parameter                         | Symbol                   | Ratings         | Unit             |
|-----------------------------------|--------------------------|-----------------|------------------|
| Drain to Source breakdown voltage | $V_{DS}$                 | 60              | V                |
| Gate to Source voltage            | $V_{GS}$                 | $\pm 20$        | V                |
| Drain current                     | DC                       | $I_D$           | A                |
|                                   | Pulse                    | $I_{DP}$        | A                |
| Avalanche energy capacity         | EAS*                     | 5               | mJ               |
| Allowable power dissipation       | $T_C = 25^\circ\text{C}$ | $P_D$           | W                |
|                                   | $T_a = 25^\circ\text{C}$ | 1               |                  |
| Channel temperature               | $T_{ch}$                 | 150             | $^\circ\text{C}$ |
| Storage temperature               | $T_{stg}$                | $-55$ to $+150$ | $^\circ\text{C}$ |

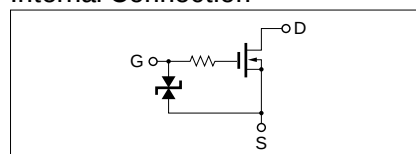
\*  $L = 0.1\text{mH}$ ,  $I_L = 10\text{A}$ , 1 pulse

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

| Parameter                                         | Symbol         | Conditions                                                                           | min | typ | max      | Unit               |
|---------------------------------------------------|----------------|--------------------------------------------------------------------------------------|-----|-----|----------|--------------------|
| Drain to Source cut-off current                   | $I_{DSS}$      | $V_{DS} = 50\text{V}$ , $V_{GS} = 0$                                                 |     |     | 10       | $\mu\text{A}$      |
| Gate to Source leakage current                    | $I_{GSS}$      | $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0$                                             |     |     | $\pm 10$ | $\mu\text{A}$      |
| Drain to Source breakdown voltage                 | $V_{DSS}$      | $I_D = 1\text{mA}$ , $V_{GS} = 0$                                                    | 60  |     |          | V                  |
| Gate threshold voltage                            | $V_{th}$       | $V_{DS} = 10\text{V}$ , $I_D = 1\text{mA}$                                           | 1   |     | 2.5      | V                  |
| Drain to Source ON-resistance                     | $R_{DS(on)1}$  | $V_{GS} = 10\text{V}$ , $I_D = 5\text{A}$                                            |     | 50  | 80       | $\text{m}\Omega$   |
|                                                   | $R_{DS(on)2}$  | $V_{GS} = 4\text{V}$ , $I_D = 5\text{A}$                                             |     | 70  | 110      | $\text{m}\Omega$   |
| Forward transfer admittance                       | $ Y_{fs} $     | $V_{DS} = 10\text{V}$ , $I_D = 5\text{A}$                                            | 3   | 5   |          | S                  |
| Diode forward voltage                             | $V_{DSF}$      | $I_{DR} = 10\text{A}$ , $V_{GS} = 0$                                                 |     |     | $-1.4$   | V                  |
| Input capacitance (Common Source)                 | $C_{iss}$      | $V_{DS} = 10\text{V}$ , $V_{GS} = 0$ , $f = 1\text{MHz}$                             |     | 300 |          | pF                 |
| Output capacitance (Common Source)                | $C_{oss}$      |                                                                                      |     | 165 |          | pF                 |
| Reverse transfer capacitance (Common Source)      | $C_{rss}$      |                                                                                      |     | 65  |          | pF                 |
| Turn-on time (delay time)                         | $t_{d(on)}$    | $V_{DD} = 30\text{V}$ , $I_D = 5\text{A}$<br>$V_{GS} = 10\text{V}$ , $R_L = 6\Omega$ |     | 15  |          | ns                 |
| Rise time                                         | $t_r$          |                                                                                      |     | 70  |          | ns                 |
| Fall time                                         | $t_f$          |                                                                                      |     | 290 |          | ns                 |
| Turn-off time (delay time)                        | $t_{d(off)}$   |                                                                                      |     | 860 |          | ns                 |
| Thermal resistance between channel and case       | $R_{th(ch-c)}$ |                                                                                      |     |     | 12.5     | $^\circ\text{C/W}$ |
| Thermal resistance between channel and atmosphere | $R_{th(ch-a)}$ |                                                                                      |     |     | 125      | $^\circ\text{C/W}$ |



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