

# 2SK3607-01MR

## FUJI POWER MOSFET Super FAP-G Series

### N-CHANNEL SILICON POWER MOSFET

#### Features

High speed switching  
Low on-resistance  
No secondary breakdown  
Low driving power  
Avalanche-proof

#### Applications

Switching regulators  
UPS (Uninterruptible Power Supply)  
DC-DC converters

#### Maximum ratings and characteristic Absolute maximum ratings

( $T_c=25^\circ\text{C}$  unless otherwise specified)

| Item                                    | Symbol             | Ratings                | Unit              |
|-----------------------------------------|--------------------|------------------------|-------------------|
| Drain-source voltage                    | $V_{DS}$           | 200                    | V                 |
|                                         | $V_{DSX}^*5$       | 170                    | V                 |
| Continuous drain current                | $I_D$              | $\pm 13$               | A                 |
| Pulsed drain current                    | $I_D(\text{puls})$ | $\pm 52$               | A                 |
| Gate-source voltage                     | $V_{GS}$           | $\pm 30$               | V                 |
| Non-repetitive Avalanche current        | $I_{AS}^*2$        | 13                     | A                 |
| Maximum Avalanche Energy                | $E_{AS}^*1$        | 175                    | mJ                |
| Maximum Drain-Source dV/dt              | $dV_{DS}/dt^*4$    | 20                     | kV/ $\mu\text{s}$ |
| Peak Diode Recovery dV/dt               | $dV/dt^*3$         | 5                      | kV/ $\mu\text{s}$ |
| Max. power dissipation                  | $P_D$              | $T_a=25^\circ\text{C}$ | 2.16              |
|                                         |                    | $T_c=25^\circ\text{C}$ | 25                |
| Operating and storage temperature range | $T_{ch}$           | $+150$                 | $^\circ\text{C}$  |
|                                         | $T_{stg}$          | -55 to +150            | $^\circ\text{C}$  |
| Isolation voltage                       | $V_{ISO}^*6$       | 2                      | kVrms             |

\*1  $L=1.65\text{mH}$ ,  $V_{CC}=48\text{V}$  \*2  $T_{ch}\leq 150^\circ\text{C}$  \*3  $I_F=-I_D$ ,  $-di/dt=50\text{A}/\mu\text{s}$ ,  $V_{CC}\leq BV_{DS}$ ,  $T_{ch}\leq 150^\circ\text{C}$

\*4  $V_{DS}\leq 200\text{V}$  \*5  $V_{GS}=-30\text{V}$  \*6  $t=60\text{sec}$   $f=60\text{Hz}$

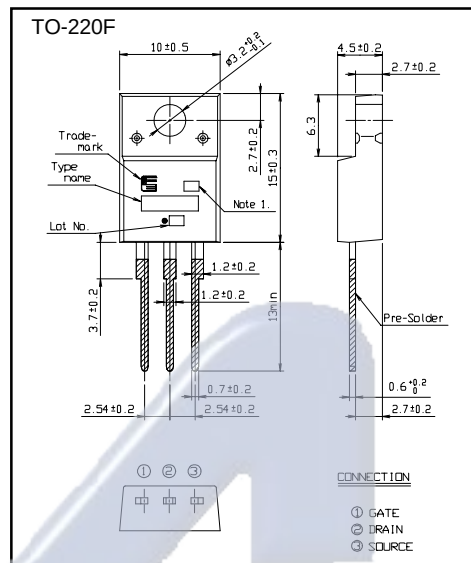
#### Electrical characteristics ( $T_c=25^\circ\text{C}$ unless otherwise specified)

| Item                             | Symbol       | Test Conditions                                               | Min. | Typ. | Max. | Units         |
|----------------------------------|--------------|---------------------------------------------------------------|------|------|------|---------------|
| Drain-source breakdown voltage   | $V_{(BR)DS}$ | $I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$                       | 200  |      |      | V             |
| Gate threshold voltage           | $V_{GS(th)}$ | $I_D=250\mu\text{A}$ $V_{DS}=V_{GS}$                          | 3.0  |      | 5.0  | V             |
| Zero gate voltage drain current  | $I_{DSS}$    | $V_{DS}=200\text{V}$ $V_{GS}=0\text{V}$                       |      |      | 25   | $\mu\text{A}$ |
|                                  |              | $V_{DS}=160\text{V}$ $V_{GS}=0\text{V}$                       |      |      | 250  |               |
| Gate-source leakage current      | $I_{GSS}$    | $V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$                    |      | 10   | 100  | nA            |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D=6.5\text{A}$ $V_{GS}=10\text{V}$                         |      | 131  | 170  | m $\Omega$    |
| Forward transconductance         | $g_{fs}$     | $I_D=6.5\text{A}$ $V_{DS}=25\text{V}$                         | 5.5  | 11   |      | S             |
| Input capacitance                | $C_{iss}$    | $V_{DS}=75\text{V}$                                           |      | 770  | 1155 | pF            |
| Output capacitance               | $C_{oss}$    | $V_{GS}=0\text{V}$                                            |      | 110  | 165  |               |
| Reverse transfer capacitance     | $C_{rss}$    | $f=1\text{MHz}$                                               |      | 5    | 7.5  |               |
| Turn-on time $t_{on}$            | $t_{d(on)}$  | $V_{CC}=48\text{V}$ $I_D=6.5\text{A}$                         |      | 12   | 18   | ns            |
|                                  | $t_r$        | $V_{GS}=10\text{V}$                                           |      | 2.6  | 3.9  |               |
| Turn-off time $t_{off}$          | $t_{d(off)}$ | $R_{GS}=10\Omega$                                             |      | 22   | 33   |               |
|                                  | $t_f$        |                                                               |      | 6.1  | 9.2  |               |
| Total Gate Charge                | $Q_G$        | $V_{CC}=100\text{V}$                                          |      | 21   | 31.5 | nC            |
| Gate-Source Charge               | $Q_{GS}$     | $I_D=13\text{A}$                                              |      | 8    | 12   |               |
| Gate-Drain Charge                | $Q_{GD}$     | $V_{GS}=10\text{V}$                                           |      | 5    | 7.5  |               |
| Avalanche capability             | $I_{AV}$     | $L=100\mu\text{H}$ $T_{ch}=25^\circ\text{C}$                  | 13   |      |      | A             |
| Diode forward on-voltage         | $V_{SD}$     | $I_F=13\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$ |      | 1.10 | 1.65 | V             |
| Reverse recovery time            | $t_{rr}$     | $I_F=13\text{A}$ $V_{GS}=0\text{V}$                           |      | 0.15 |      | $\mu\text{s}$ |
| Reverse recovery charge          | $Q_{rr}$     | $-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$    |      | 0.88 |      | $\mu\text{C}$ |

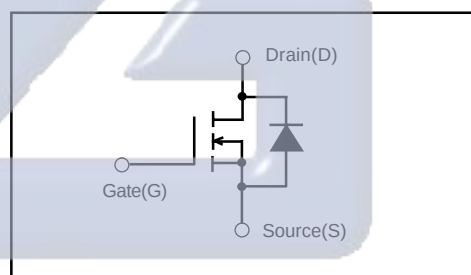
#### Thermal characteristics

| Item               | Symbol         | Test Conditions    | Min. | Typ. | Max. | Units                     |
|--------------------|----------------|--------------------|------|------|------|---------------------------|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case    |      |      | 5.0  | $^\circ\text{C}/\text{W}$ |
|                    | $R_{th(ch-a)}$ | channel to ambient |      |      | 58.0 | $^\circ\text{C}/\text{W}$ |

#### Outline Drawings (mm)



#### Equivalent circuit schematic



## Characteristics

