

## 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                    | $V_{DS}$        | 700                    | V                 |
|   | $V_{DSX}^*5$    | 700                    | V                 |
| Continuous drain current                | $I_D$           | $\pm 12$               | A                 |
| Pulsed drain current                    | $I_{D(puls)}$   | $\pm 48$               | A                 |
| Gate-source voltage                     | $V_{GS}$        | $\pm 30$               | V                 |
| Repetitive or non-repetitive            | $I_{AR}^*2$     | 12                     | A                 |
| Maximum Avalanche Energy                | $E_{AS}^*1$     | 276.7                  | mJ                |
| Maximum Drain-Source dV/dt              | $dV_{DS}/dt^*4$ | 40                     | 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              |
|   |                 | $T_c=25^\circ\text{C}$ | 95                |
| 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  $L=3.53\text{mH}$ ,  $V_{CC}=70\text{V}$ ,  $T_{ch}=25^\circ\text{C}$ , See to Avalanche Energy Graph \*2  $T_{ch}\leq 150^\circ\text{C}$

\*3  $I_F\leq I_D$ ,  $-di/dt=50\text{A}/\mu\text{s}$ ,  $V_{CC}\leq BV_{DSS}$ ,  $T_{ch}\leq 150^\circ\text{C}$  \*4  $V_{DS}\leq 700\text{V}$  \*5  $V_{GS}=-30\text{V}$  \*6  $t=60\text{sec}$ ,  $f=60\text{Hz}$

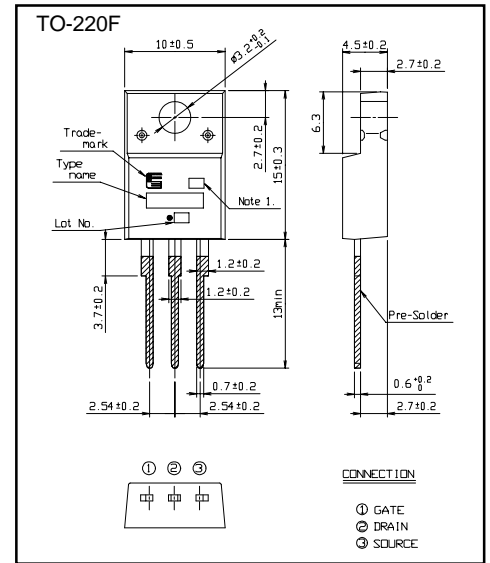
#### Electrical characteristics ( $T_c=25^\circ\text{C}$ unless otherwise specified)

| Item                             | Symbol        | Test Conditions   | Min. | Typ. | Max. | Units         |
|----------------------------------|---------------|---|------|------|------|---------------|
| Drain-source breakdown voltage   | $V_{(BR)DSS}$ | $I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$                       | 700  |      |      | 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  | $I_{DSS}$     | $V_{DS}=700\text{V}$ $V_{GS}=0\text{V}$                       |      |      | 25   | $\mu\text{A}$ |
|                                  |               | $V_{DS}=560\text{V}$ $V_{GS}=0\text{V}$                       |      |      | 250  |               |
| Gate-source leakage current      | $I_{GSS}$     | $V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$                    |      |      | 100  | nA            |
| Drain-source on-state resistance | $R_{DS(on)}$  | $I_D=6\text{A}$ $V_{GS}=10\text{V}$                           |      | 0.72 | 0.93 | $\Omega$      |
| Forward transconductance         | $g_{fs}$      | $I_D=6\text{A}$ $V_{DS}=25\text{V}$                           | 6    | 12   |      | S             |
| Input capacitance                | $C_{iss}$     | $V_{DS}=25\text{V}$   |      | 1100 | 1650 | pF            |
| Output capacitance               | $C_{oss}$     | $V_{GS}=0\text{V}$  |      | 170  | 255  |               |
| Reverse transfer capacitance     | $C_{rss}$     | $f=1\text{MHz}$   |      | 11   | 17   |               |
| Turn-on time $t_{on}$            | $t_{d(on)}$   | $V_{CC}=300\text{V}$ $I_D=6\text{A}$                          |      | 24.5 | 36   | ns            |
|                                  | $t_r$         | $V_{GS}=10\text{V}$   |      | 7.5  | 12   |               |
| Turn-off time $t_{off}$          | $t_{d(off)}$  | $R_{GS}=10\Omega$   |      | 47.5 | 72   |               |
|                                  | $t_f$         |   |      | 10   | 17   |               |
| Total Gate Charge                | $Q_G$         | $V_{CC}=350\text{V}$  |      | 31   | 46.5 | nC            |
| Gate-Source Charge               | $Q_{GS}$      | $I_D=12\text{A}$  |      | 4.5  | 8    |               |
| Gate-Drain Charge                | $Q_{GD}$      | $V_{GS}=10\text{V}$   |      | 11   | 16.5 |               |
| Avalanche capability             | $I_{AV}$      | $L=3.53\text{mH}$ $T_{ch}=25^\circ\text{C}$                   | 12   |      |      | A             |
| Diode forward on-voltage         | $V_{SD}$      | $I_F=12\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$ |      | 0.90 | 1.50 | V             |
| Reverse recovery time            | $t_{rr}$      | $I_F=12\text{A}$ $V_{GS}=0\text{V}$                           |      | 2.6  |      | $\mu\text{s}$ |
| Reverse recovery charge          | $Q_{rr}$      | $-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$    |      | 16.0 |      | $\mu\text{C}$ |

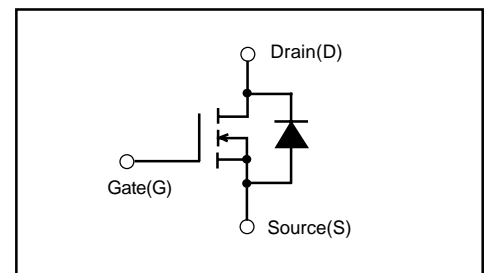
#### Thermal characteristics

| Item               | Symbol         | Test Conditions    | Min. | Typ. | Max.  | Units                     |
|--------------------|----------------|--------------------|------|------|-------|---------------------------|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case    |      |      | 1.316 | $^\circ\text{C}/\text{W}$ |
|                    | $R_{th(ch-a)}$ | channel to ambient |      |      | 58.0  | $^\circ\text{C}/\text{W}$ |

#### Outline Drawings [mm]



#### Equivalent circuit schematic



Characteristics

