

## FUJI POWER MOSFET Super FAP-G Series

### N-CANNEL 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<sub>c</sub>=25°C unless otherwise specified)

| Item                                    | Symbol                  | Ratings              | Unit  |
|---|-------------------------|----------------------|-------|
| Drain-source voltage                    | V <sub>DS</sub>         | 500                  | V     |
| Continuous drain current                | I <sub>D</sub>          | ±12                  | A     |
| Pulsed drain current                    | I <sub>D(puls)</sub>    | ±48                  | A     |
| Gate-source voltage                     | V <sub>GS</sub>         | ±30                  | V     |
| Repetitive or non-repetitive            | IAR *2                  | 12                   | A     |
| Maximum Avalanche Energy                | EAS *1                  | 217                  | mJ    |
| Maximum Drain-Source dV/dt              | dV <sub>DS</sub> /dt *4 | 20                   | kV/μs |
| Peak Diode Recovery dV/dt               | dV/dt *3                | 5                    | kV/μs |
| Max. power dissipation                  | P <sub>D</sub>          | T <sub>a</sub> =25°C | 1.67  |
|   |                         | T <sub>c</sub> =25°C | 95    |
| Operating and storage temperature range | T <sub>ch</sub>         | +150                 | °C    |
|   | T <sub>stg</sub>        | -55 to +150          | °C    |

\*1 L=2.77mH, V<sub>CC</sub>=50V \*2 T<sub>ch</sub>≤150°C \*3 I<sub>F</sub>≤-I<sub>D</sub>, -di/dt=50A/μs, V<sub>CC</sub>≤BV<sub>DSS</sub>, T<sub>ch</sub>≤150°C

\*4V<sub>DS</sub>≤500V

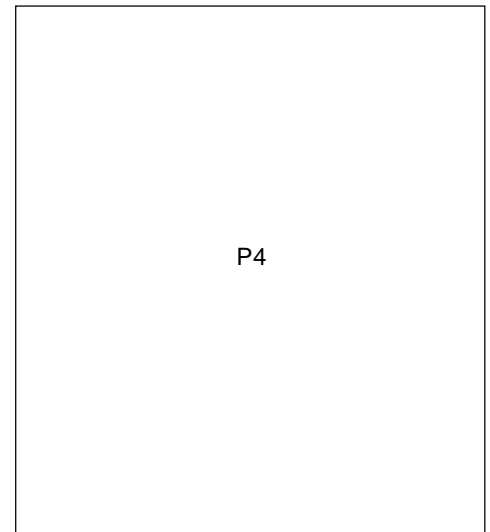
#### ● Electrical characteristics (T<sub>c</sub> =25°C unless otherwise specified)

| Item                             | Symbol               | Test Conditions   | Min. | Typ. | Max. | Units |
|----------------------------------|----------------------|---|------|------|------|-------|
| Drain-source breakdown voltage   | V <sub>(BR)DSS</sub> | I <sub>D</sub> =250μA V <sub>GS</sub> =0V                     | 500  |      |      | V     |
| Gate threshold voltage           | V <sub>GS(th)</sub>  | I <sub>D</sub> = 250μA V <sub>DS</sub> =V <sub>GS</sub>       | 3.0  |      | 5.0  | V     |
| Zero gate voltage drain current  | I <sub>DSS</sub>     | V <sub>DS</sub> =500V V <sub>GS</sub> =0V                     |      |      | 25   | μA    |
|                                  |                      | V <sub>DS</sub> =400V V <sub>GS</sub> =0V                     |      |      | 250  |       |
| Gate-source leakage current      | I <sub>GSS</sub>     | V <sub>GS</sub> =±30V V <sub>DS</sub> =0V                     |      | 10   | 100  | nA    |
| Drain-source on-state resistance | R <sub>DS(on)</sub>  | I <sub>D</sub> =6A V <sub>GS</sub> =10V                       |      | 0.40 | 0.52 | Ω     |
| Forward transconductance         | g <sub>fs</sub>      | I <sub>D</sub> =6A V <sub>DS</sub> =25V                       | 5.5  | 11   |      | S     |
| Input capacitance                | C <sub>iss</sub>     | V <sub>DS</sub> =25V  |      | 1200 | 1800 | pF    |
| Output capacitance               | C <sub>oss</sub>     | V <sub>GS</sub> =0V   |      | 140  | 210  |       |
| Reverse transfer capacitance     | C <sub>rss</sub>     | f=1MHz  |      | 6.0  | 9.0  |       |
| Turn-on time t <sub>on</sub>     | td(on)               | V <sub>CC</sub> =300V I <sub>D</sub> =6A                      |      | 17   | 26   | ns    |
|                                  | t <sub>r</sub>       | V <sub>GS</sub> =10V  |      | 15   | 23   |       |
| Turn-off time t <sub>off</sub>   | td(off)              | R <sub>GS</sub> =10 Ω   |      | 34   | 51   |       |
|                                  | t <sub>f</sub>       |   |      | 7    | 11   |       |
| Total Gate Charge                | Q <sub>G</sub>       | V <sub>CC</sub> =250V   |      | 30   | 45   | nC    |
| Gate-Source Charge               | Q <sub>GS</sub>      | I <sub>D</sub> =12A   |      | 11   | 16.5 |       |
| Gate-Drain Charge                | Q <sub>GD</sub>      | V <sub>GS</sub> =10V  |      | 10   | 15   |       |
| Avalanche capability             | I <sub>AV</sub>      | L=2.77mH T <sub>ch</sub> =25°C                                | 12   |      |      | A     |
| Diode forward on-voltage         | V <sub>SD</sub>      | I <sub>F</sub> =12A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C |      | 1.00 | 1.50 | V     |
| Reverse recovery time            | t <sub>rr</sub>      | I <sub>F</sub> =12A V <sub>GS</sub> =0V                       |      | 0.7  |      | μs    |
| Reverse recovery charge          | Q <sub>rr</sub>      | -di/dt=100A/μs T <sub>ch</sub> =25°C                          |      | 4.5  |      | μC    |

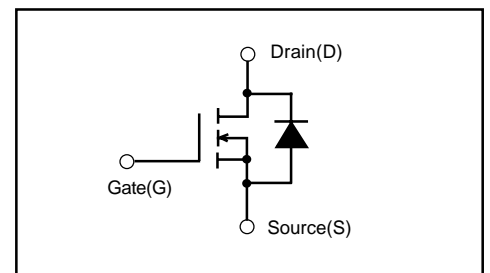
#### ● Thermal characteristics

| Item               | Symbol                | Test Conditions    | Min. | Typ. | Max. | Units |
|--------------------|-----------------------|--------------------|------|------|------|-------|
| Thermal resistance | R <sub>th(ch-c)</sub> | channel to case    |      |      | 1.32 | °C/W  |
|                    | R <sub>th(ch-a)</sub> | channel to ambient |      |      | 75.0 | °C/W  |

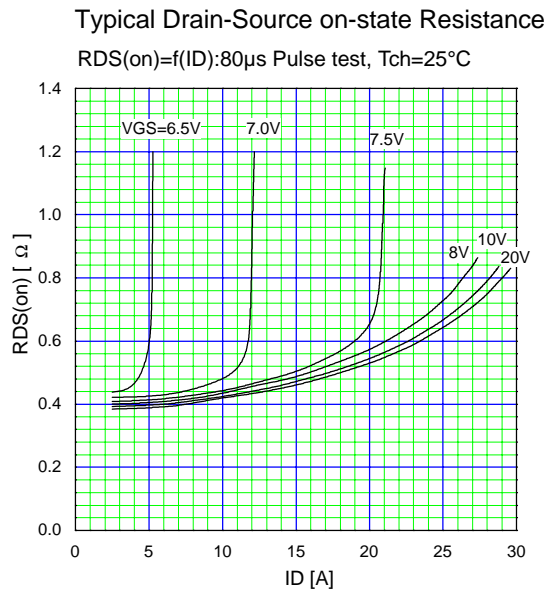
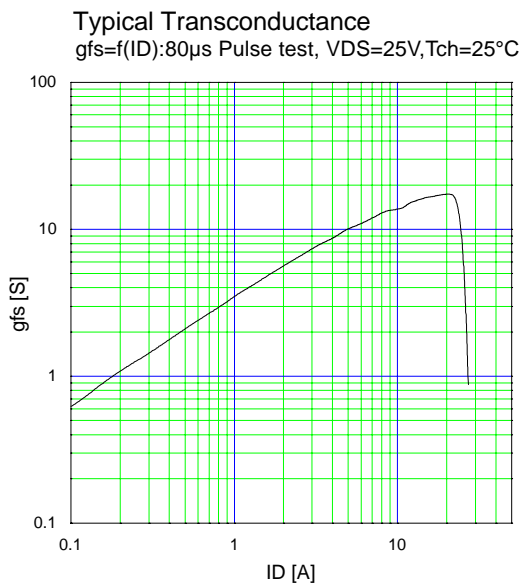
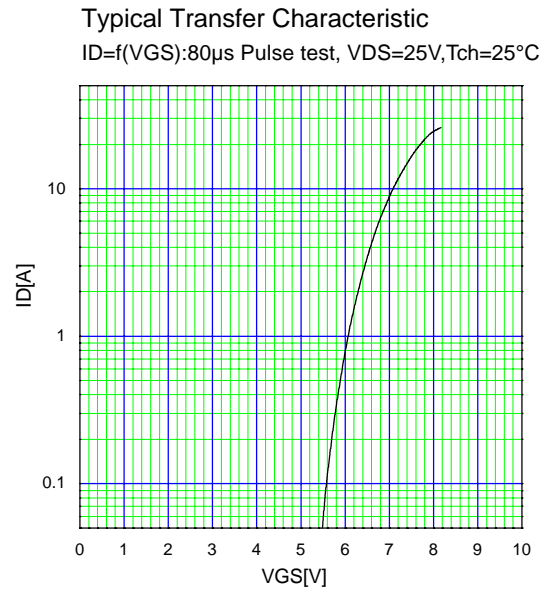
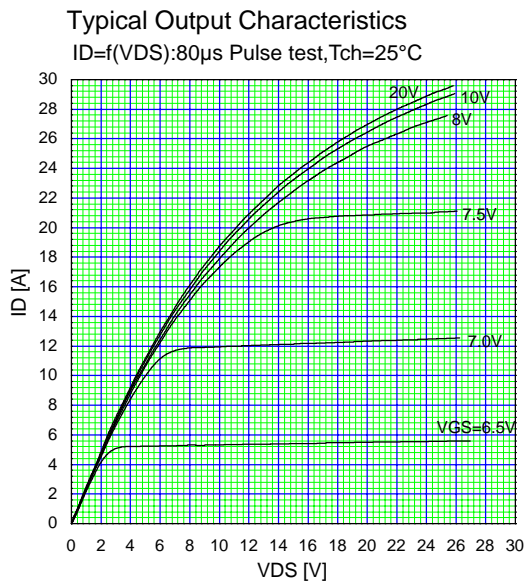
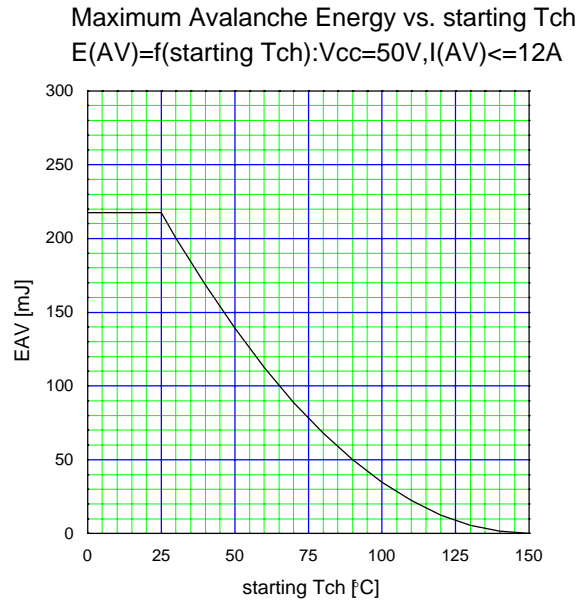
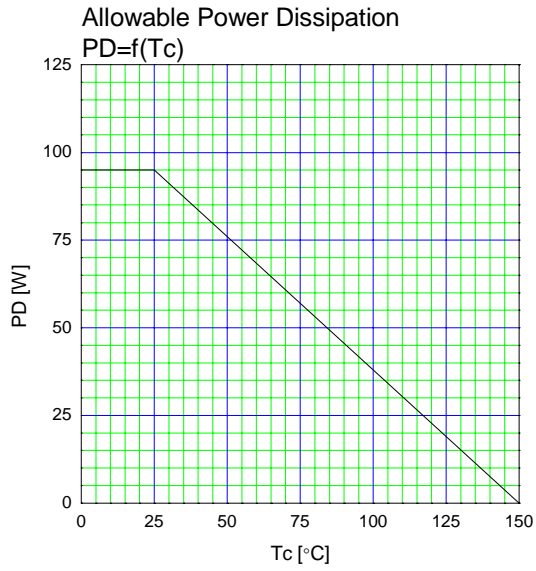
#### ■ Outline Drawings



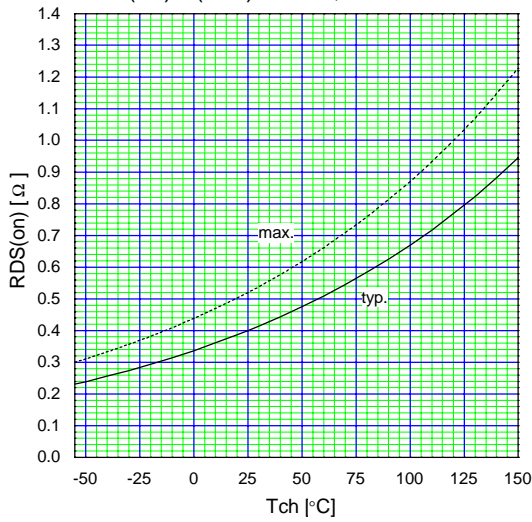
#### ■ Equivalent circuit schematic



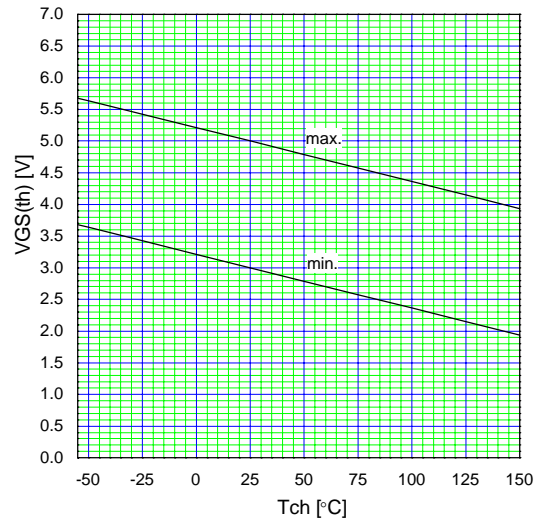
Characteristics



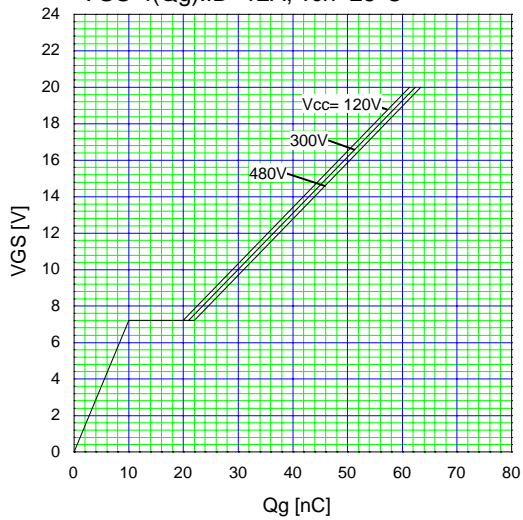
Drain-Source On-state Resistance  
 $R_{DS(on)}=f(T_{ch}):I_D=6A, V_{GS}=10V$



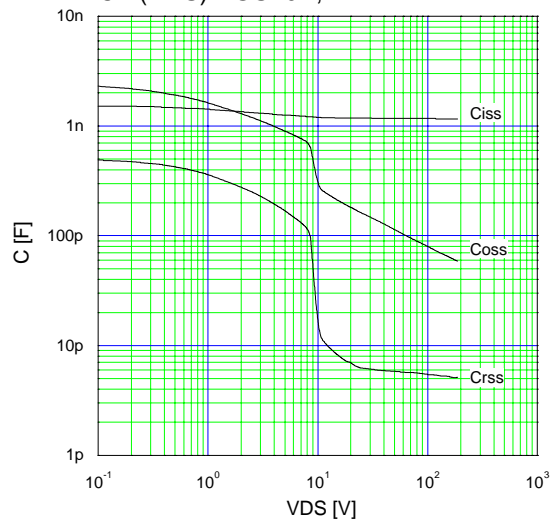
Gate Threshold Voltage vs.  $T_{ch}$   
 $V_{GS(th)}=f(T_{ch}):V_{DS}=V_{GS}, I_D=250\mu A$



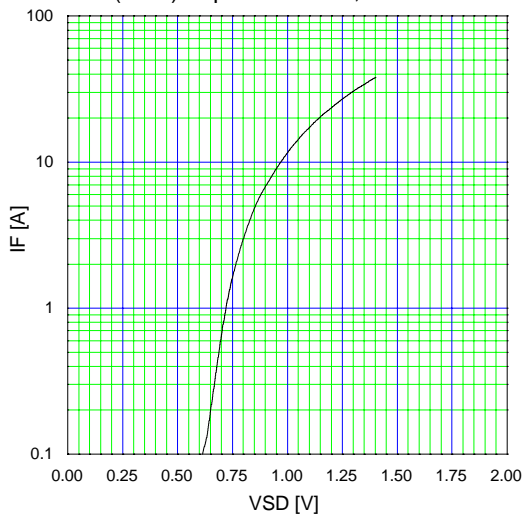
Typical Gate Charge Characteristics  
 $V_{GS}=f(Q_g):I_D=12A, T_{ch}=25^{\circ}C$



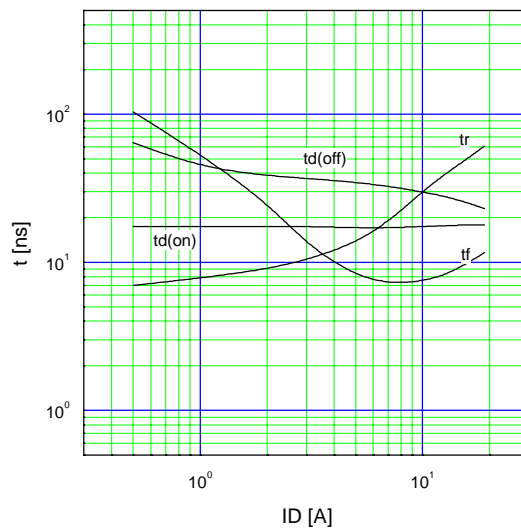
Typical Capacitance  
 $C=f(V_{DS}):V_{GS}=0V, f=1MHz$

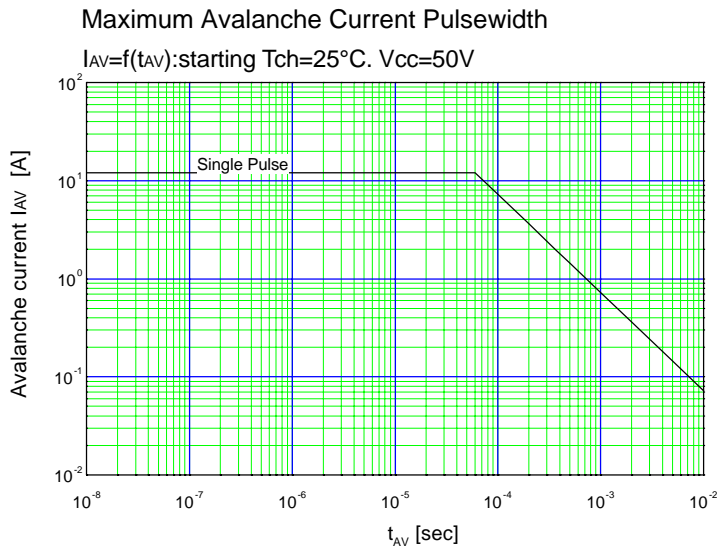
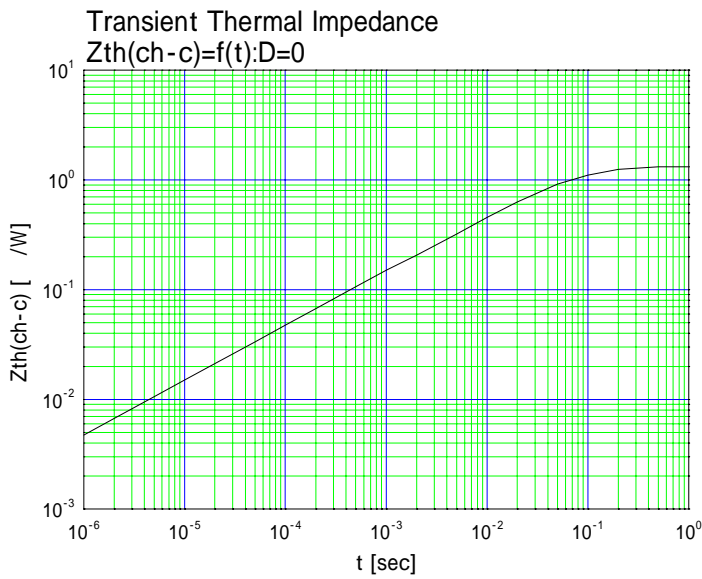


Typical Forward Characteristics of Reverse Diode  
 $I_F=f(V_{SD}):80\mu s$  Pulse test,  $T_{ch}=25^{\circ}C$

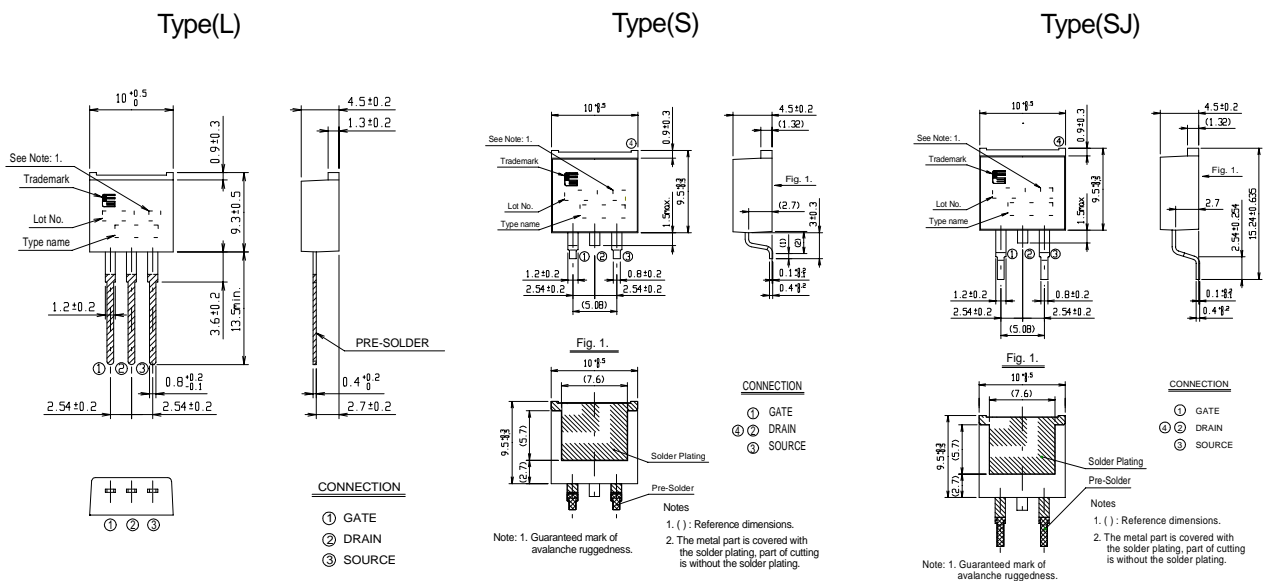


Typical Switching Characteristics vs.  $I_D$   
 $t=f(I_D):V_{CC}=300V, V_{GS}=10V, R_G=10\Omega$





■ Outline Drawings (mm)



Note: 1. Guaranteed mark of avalanche ruggedness.