

# 2SK3788-01

**FUJI**  
ELECTRIC

NE CHANNEL SILICON POWER MOSFET

## FUJI POWER MOSFET Super FAP-G Series

### Features

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

### 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  | Remarks               |
|-----------------------------------------|-----------------------|-------------|-------|-----------------------|
| Drain-source voltage                    | V <sub>DS</sub>       | 150         | V     |                       |
|                                         | V <sub>DSX</sub>      | 150         | V     | V <sub>GS</sub> =-30V |
| Continuous Drain Current                | I <sub>D</sub>        | 92          | A     |                       |
| Pulsed Drain Current                    | I <sub>D</sub> (puls) | ±368        | A     |                       |
| Gate-Source Voltage                     | V <sub>GS</sub>       | ±30         | V     |                       |
| Maximum Avalanche current               | I <sub>AS</sub>       | 92          | A     | Note *1               |
| Non-Repetitive Maximum Avalanche Energy | E <sub>AS</sub>       | 1205.7      | mJ    | Note *2               |
| Repetitive Maximum Avalanche Energy     | E <sub>AR</sub>       | 41          | mJ    | Note *3               |
| Maximum Drain-Source dV/dt              | dV <sub>DS</sub> /dt  | 20          | kV/μs | V <sub>DS</sub> ≤150V |
| Peak Diode Recovery dV/dt               | dV/dt                 | 5           | kV/μs | Note *4               |
| Max. Power Dissipation                  | P <sub>D</sub>        | 410         | W     | T <sub>c</sub> =25°C  |
|                                         |                       | 2.50        |       | T <sub>a</sub> =25°C  |
| Operating and Storage Temperature range | T <sub>ch</sub>       | +150        | °C    |                       |
|                                         | T <sub>stg</sub>      | -55 to +150 | °C    |                       |

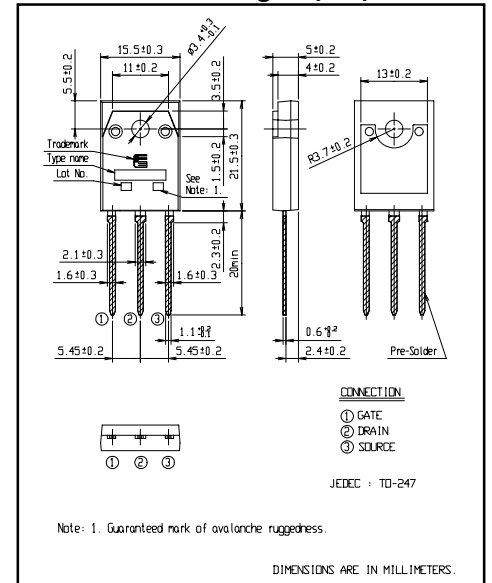
#### Electrical characteristics (T<sub>c</sub>=25°C unless otherwise specified)

| Item                             | Symbol              | Test Conditions                                               | Min. | Typ. | Max. | Units |
|----------------------------------|---------------------|---------------------------------------------------------------|------|------|------|-------|
| Drain-Source Breakdown Voltage   | BV <sub>DSS</sub>   | I <sub>D</sub> =250μA V <sub>GS</sub> =0V                     | 150  |      |      | 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> =150V V <sub>GS</sub> =0V                     |      |      | 25   | μA    |
|                                  |                     | V <sub>DS</sub> =120V V <sub>GS</sub> =0V                     |      |      | 250  |       |
| Gate-Source Leakage Current      | I <sub>GSS</sub>    | V <sub>GS</sub> =±30V V <sub>DS</sub> =0V                     |      |      | 100  | nA    |
| Drain-Source On-State Resistance | R <sub>DS(on)</sub> | I <sub>D</sub> =46A V <sub>GS</sub> =10V                      |      | 21   | 26   | mΩ    |
| Forward Transconductance         | g <sub>fs</sub>     | I <sub>D</sub> =46A V <sub>DS</sub> =25V                      | 12   | 24   |      | S     |
| Input Capacitance                | C <sub>iss</sub>    | V <sub>DS</sub> =75V                                          |      | 3800 | 5400 | pF    |
| Output Capacitance               | C <sub>oss</sub>    | V <sub>GS</sub> =0V                                           |      | 530  | 795  |       |
| Reverse Transfer Capacitance     | C <sub>rss</sub>    | f=1MHz                                                        |      | 35   | 52.5 |       |
| Turn-On Time t <sub>on</sub>     | td(on)              | V <sub>CC</sub> =48V I <sub>D</sub> =46A                      |      | 40   | 60   | ns    |
|                                  | t <sub>r</sub>      | V <sub>GS</sub> =10V                                          |      | 112  | 168  |       |
| Turn-Off Time t <sub>off</sub>   | td(off)             | R <sub>GS</sub> =10 Ω                                         |      | 56   | 84   |       |
|                                  | t <sub>f</sub>      |                                                               |      | 30   | 45   |       |
| Total Gate Charge                | Q <sub>G</sub>      | V <sub>CC</sub> =75V                                          |      | 80   | 120  | nC    |
| Gate-Source Charge               | Q <sub>GS</sub>     | I <sub>D</sub> =92A                                           |      | 30   | 45   |       |
| Gate-Drain Charge                | Q <sub>GD</sub>     | V <sub>GS</sub> =10V                                          |      | 25   | 38   |       |
| Diode forward on-voltage         | V <sub>SD</sub>     | I <sub>F</sub> =92A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C |      | 1.20 | 1.50 | V     |
| Reverse recovery time            | t <sub>rr</sub>     | I <sub>F</sub> =92A V <sub>GS</sub> =0V                       |      | 250  |      | ns    |
| Reverse recovery charge          | Q <sub>rr</sub>     | -di/dt=100A/μs T <sub>ch</sub> =25°C                          |      | 2.0  |      | μC    |

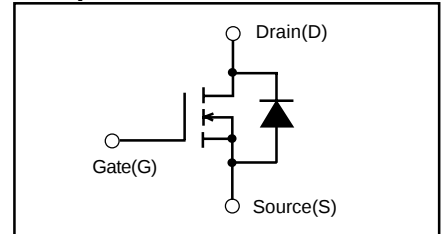
#### Thermal characteristics

| Item               | Symbol                | Test Conditions    | Min. | Typ. | Max.  | Units |
|--------------------|-----------------------|--------------------|------|------|-------|-------|
| Thermal resistance | R <sub>th(ch-c)</sub> | channel to case    |      |      | 0.305 | °C/W  |
|                    | R <sub>th(ch-a)</sub> | channel to ambient |      |      | 50.0  | °C/W  |

### Outline Drawings (mm) 200406



### Equivalent circuit schematic



Note \*1: T<sub>ch</sub>≤150°C, Repetitive and Non-repetitive

Note \*2: Starting T<sub>ch</sub>=25°C, I<sub>AS</sub>=37A, L=1.29mH,

V<sub>CC</sub>=48V, R<sub>G</sub>=50Ω

EAS limited by maximum channel temperature and avalanche current.

See to the 'Avalanche Energy' graph

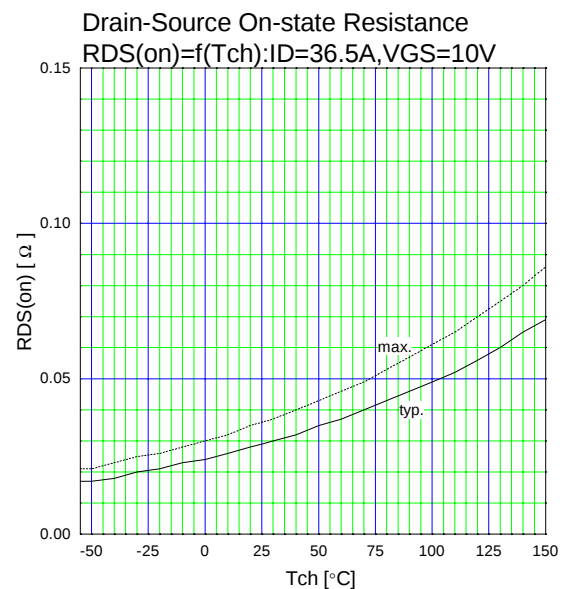
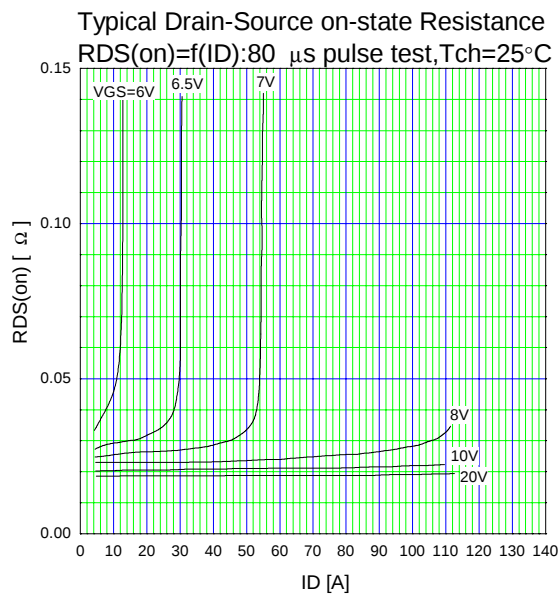
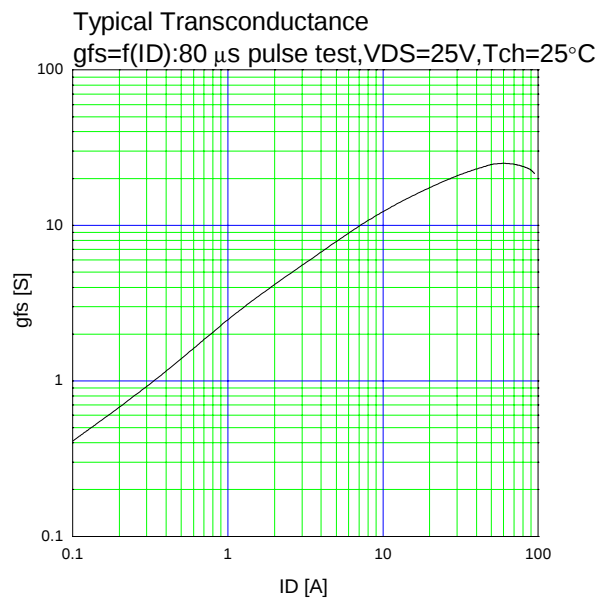
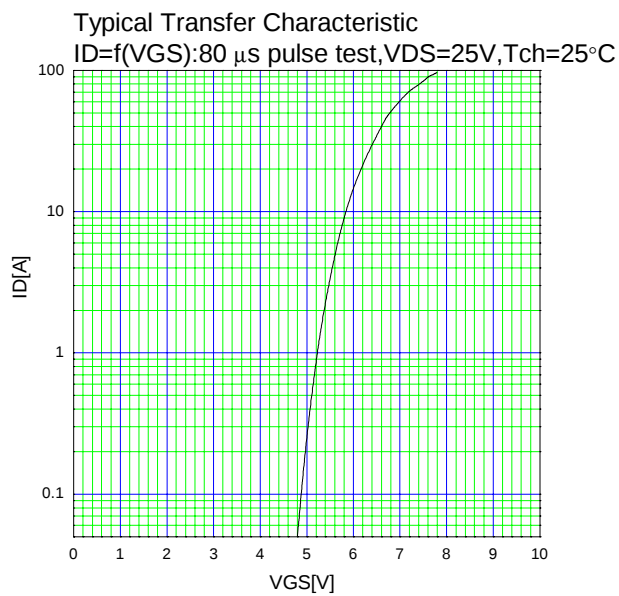
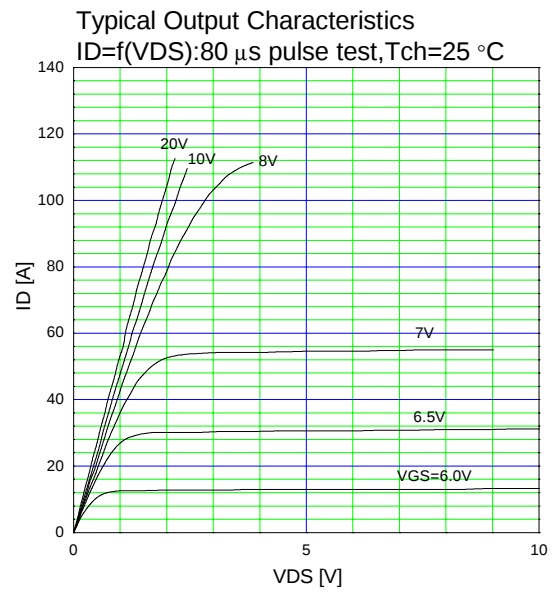
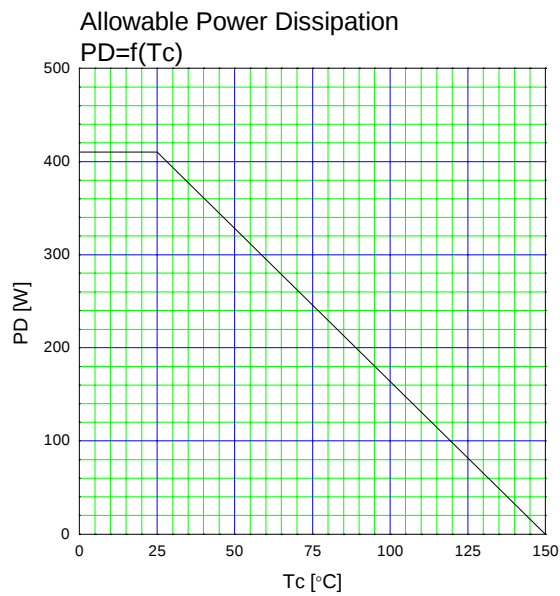
Note \*3: Repetitive rating: Pulse width limited by maximum channel temperature.

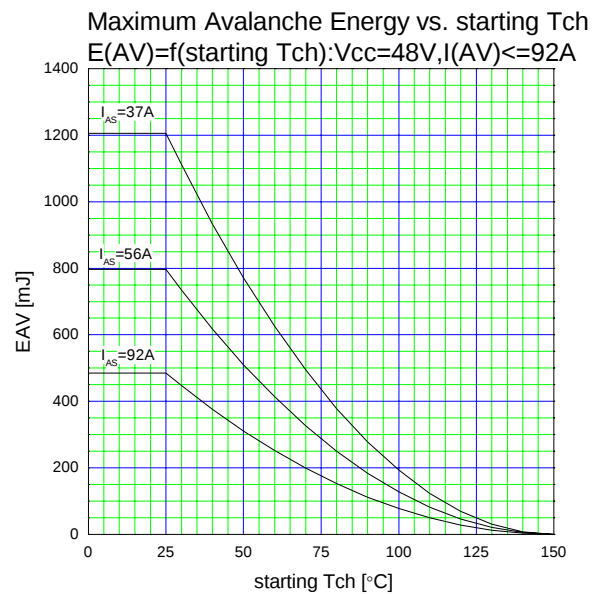
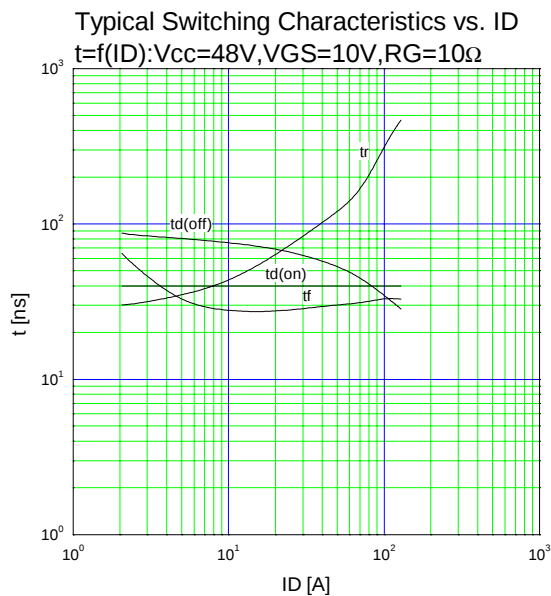
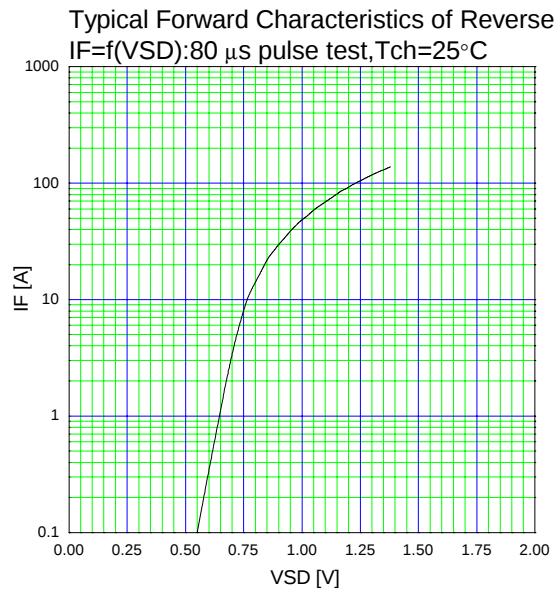
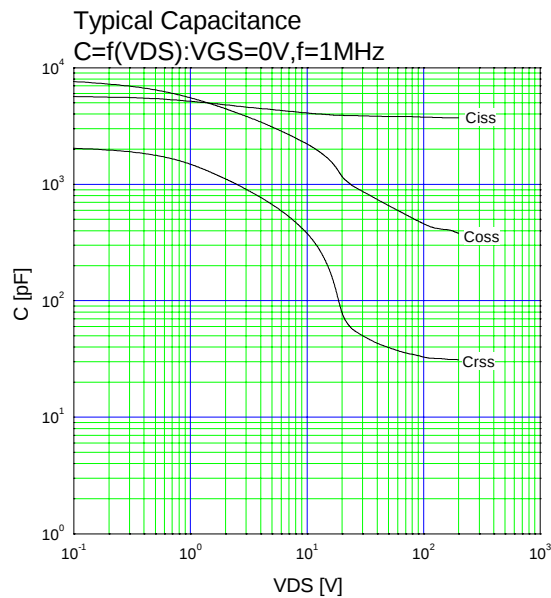
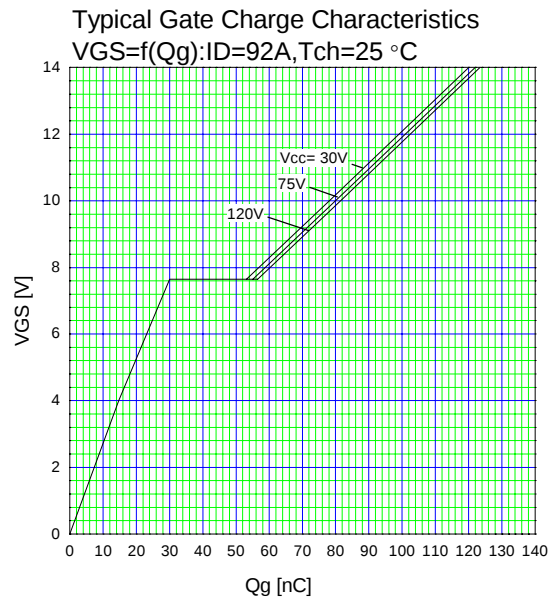
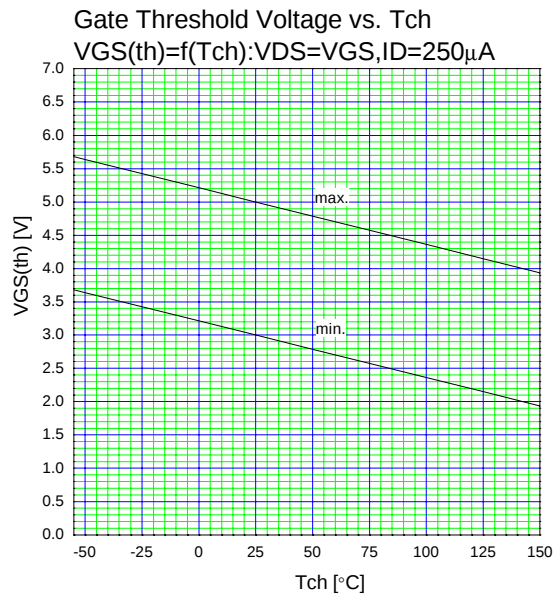
See to the 'Transient Thermal impedance' graph

Note \*4: 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

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## ■ Characteristics





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