

# 2SK3556-01L,S,SJ

**FUJI**  
ELECTRIC

## 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

● (Tc=25°C unless otherwise specified)

| Item                                    | Symbol                  | Ratings              | Unit  |
|-----------------------------------------|-------------------------|----------------------|-------|
| Drain-source voltage                    | V <sub>DS</sub>         | 250                  | V     |
|                                         | V <sub>DSX</sub> *5     | 220                  | V     |
| Continuous drain current                | I <sub>D</sub>          | ±25                  | A     |
| Pulsed drain current                    | I <sub>D</sub> (puls)   | ±100                 | A     |
| Gate-source voltage                     | V <sub>GS</sub>         | ±30                  | V     |
| Repetitive or non-repetitive            | I <sub>AR</sub> *2      | 25                   | A     |
| Maximum Avalanche Energy                | E <sub>AS</sub> *1      | 372                  | 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 | 2.02  |
|                                         |                         | T <sub>c</sub> =25°C | 135   |
| Operating and storage temperature range | T <sub>ch</sub>         | +150                 | °C    |
|                                         | T <sub>stg</sub>        | -55 to +150          | °C    |

\*1 L=0.67mH, V<sub>CC</sub>=48V \*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

\*4 V<sub>DS</sub>≤250V \*5 V<sub>GS</sub>=-30V \*6 t=60sec f=60Hz

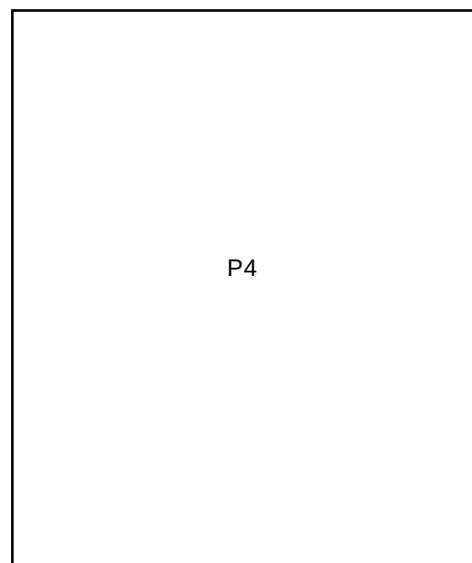
#### ● Electrical characteristics (T<sub>c</sub> =25°C unless otherwise specified)

| Item                             | Symbol               | Test Conditions                                                  | Min. | Typ. | Max. | Units |
|----------------------------------|----------------------|------------------------------------------------------------------|------|------|------|-------|
| Drain-source breakdown voltage   | V(BR) <sub>DSS</sub> | I <sub>D</sub> =250μA V <sub>GS</sub> =0V                        | 250  |      |      | 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> =250V V <sub>GS</sub> =0V T <sub>ch</sub> =25°C  |      |      | 25   | μA    |
|                                  |                      | V <sub>DS</sub> =200V V <sub>GS</sub> =0V T <sub>ch</sub> =125°C |      |      | 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> =12.5A V <sub>GS</sub> =10V                       |      | 75   | 100  | mΩ    |
| Forward transconductance         | g <sub>fs</sub>      | I <sub>D</sub> =12.5A V <sub>DS</sub> =25V                       | 8    | 16   |      | S     |
| Input capacitance                | C <sub>iss</sub>     | V <sub>DS</sub> =75V                                             |      | 2000 | 3000 | pF    |
| Output capacitance               | C <sub>oss</sub>     | V <sub>GS</sub> =0V                                              |      | 220  | 330  |       |
| Reverse transfer capacitance     | C <sub>rss</sub>     | f=1MHz                                                           |      | 15   | 30   |       |
| Turn-on time t <sub>on</sub>     | td(on)               | V <sub>CC</sub> =72V I <sub>D</sub> =12.5A                       |      | 20   | 30   | ns    |
|                                  | t <sub>r</sub>       | V <sub>GS</sub> =10V                                             |      | 30   | 45   |       |
| Turn-off time t <sub>off</sub>   | td(off)              | R <sub>GS</sub> =10Ω                                             |      | 60   | 90   |       |
|                                  | t <sub>f</sub>       |                                                                  |      | 20   | 30   |       |
| Total Gate Charge                | Q <sub>G</sub>       | V <sub>CC</sub> =72V                                             |      | 44   | 66   | nC    |
| Gate-Source Charge               | Q <sub>GS</sub>      | I <sub>D</sub> =12A                                              |      | 14   | 21   |       |
| Gate-Drain Charge                | Q <sub>GD</sub>      | V <sub>GS</sub> =10V                                             |      | 16   | 24   |       |
| Avalanche capability             | I <sub>AV</sub>      | L=100μH T <sub>ch</sub> =25°C                                    | 25   |      |      | A     |
| Diode forward on-voltage         | V <sub>SD</sub>      | I <sub>F</sub> =25A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C    |      | 1.10 | 1.65 | V     |
| Reverse recovery time            | t <sub>rr</sub>      | I <sub>F</sub> =25A V <sub>GS</sub> =0V                          |      | 0.45 |      | μs    |
| Reverse recovery charge          | Q <sub>rr</sub>      | -di/dt=100A/μs T <sub>ch</sub> =25°C                             |      | 1.5  |      | μC    |

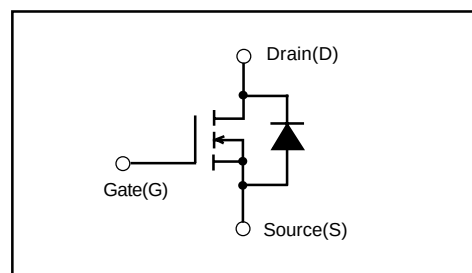
#### ● Thermal characteristics

| Item               | Symbol                | Test Conditions    | Min. | Typ. | Max.  | Units |
|--------------------|-----------------------|--------------------|------|------|-------|-------|
| Thermal resistance | R <sub>th(ch-c)</sub> | channel to case    |      |      | 0.926 | °C/W  |
|                    | R <sub>th(ch-a)</sub> | channel to ambient |      |      | 62.0  | °C/W  |

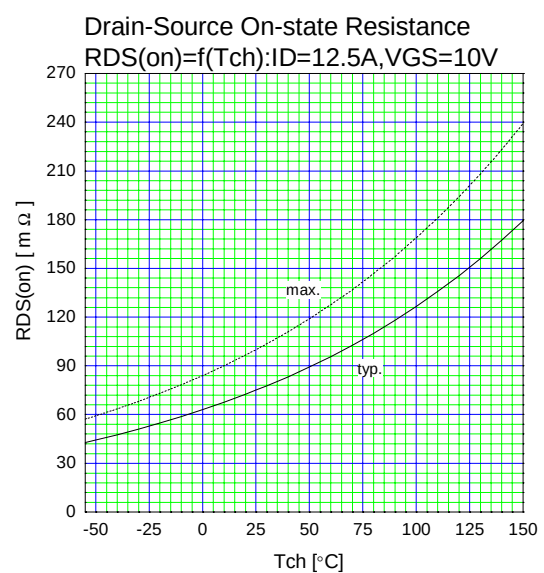
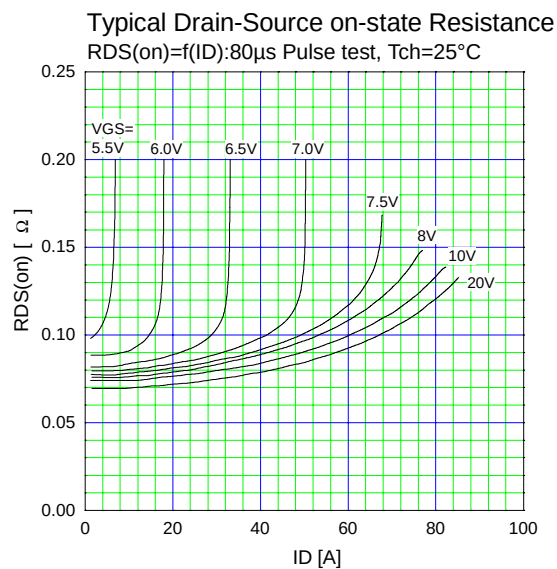
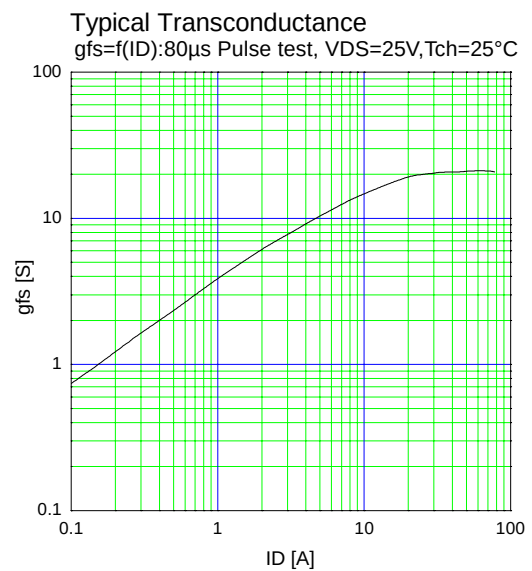
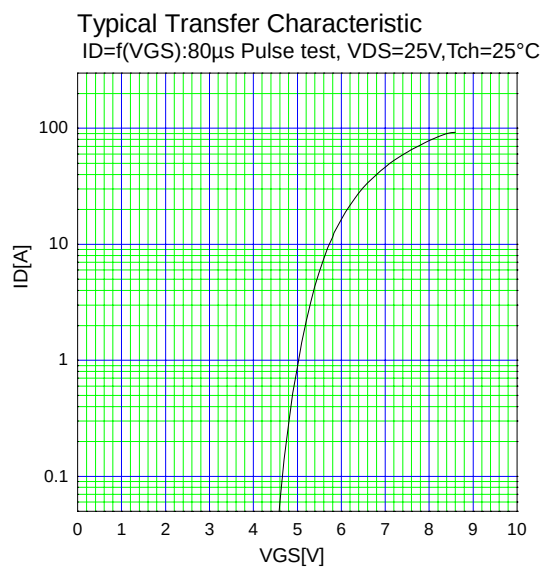
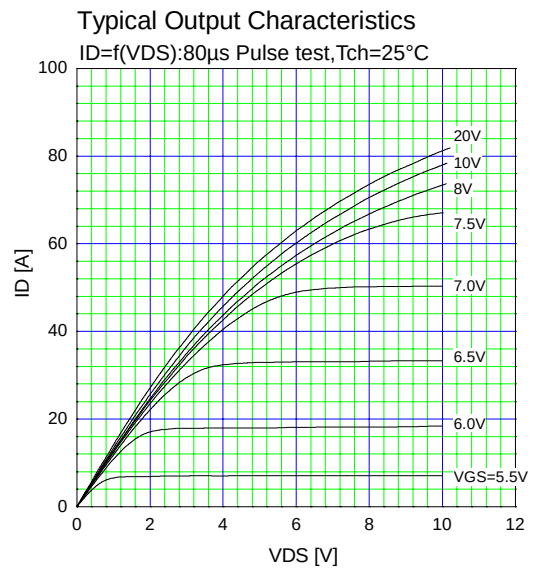
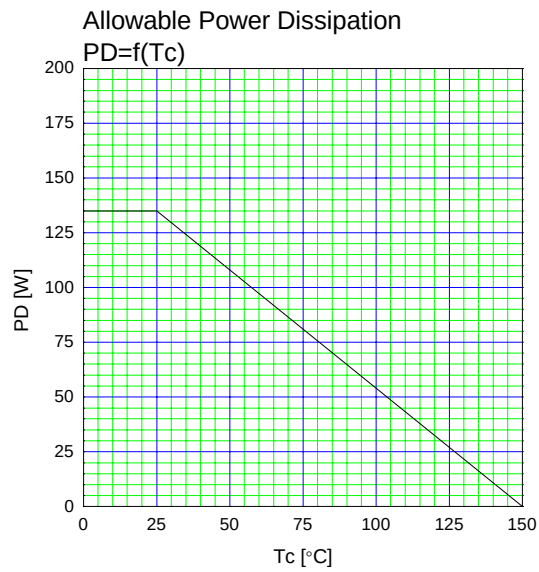
#### ■ Outline Drawings



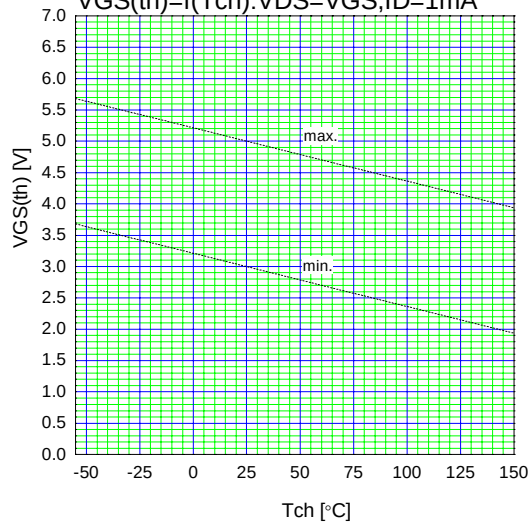
#### ■ Equivalent circuit schematic



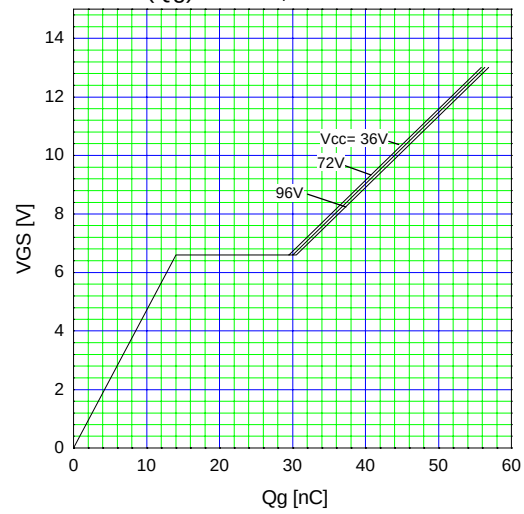
## Characteristics



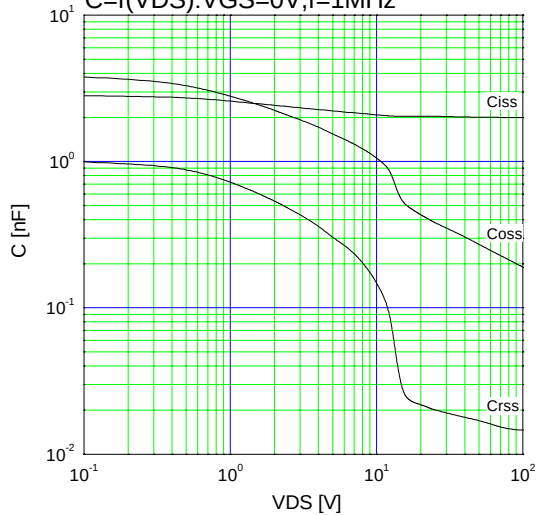
Gate Threshold Voltage vs. T<sub>ch</sub>  
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 1\text{mA}$



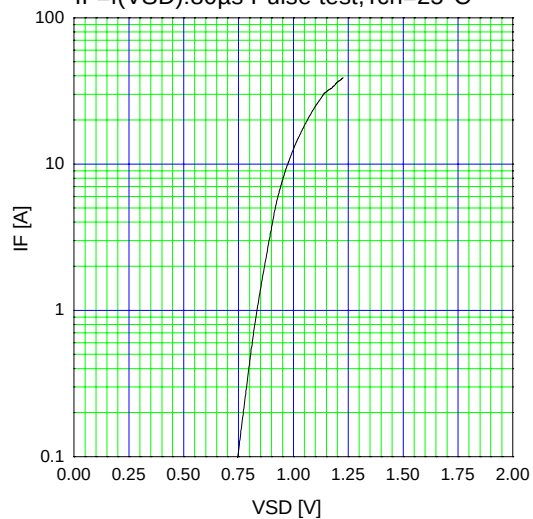
Typical Gate Charge Characteristics  
 $V_{GS} = f(Q_g): I_D = 25\text{A}, T_{ch} = 25^\circ\text{C}$



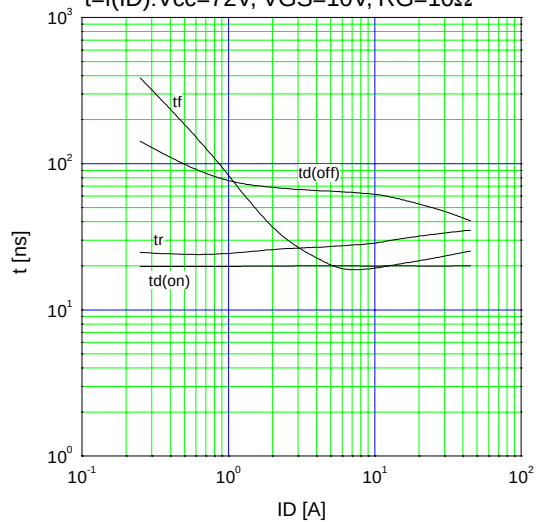
Typical Capacitance  
 $C = f(V_{DS}): V_{GS} = 0\text{V}, f = 1\text{MHz}$

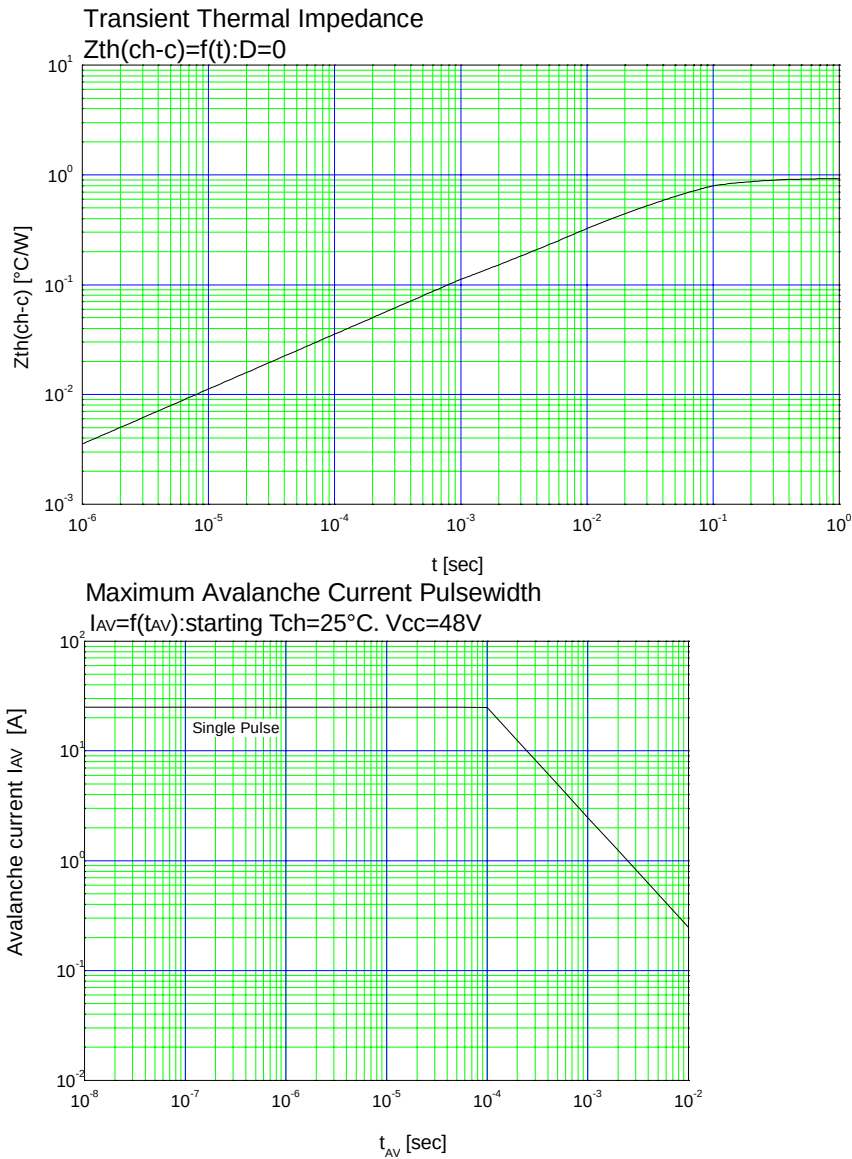


Typical Forward Characteristics of Reverse Diode  
 $I_F = f(V_{SD}): 80\mu\text{s Pulse test}, T_{ch} = 25^\circ\text{C}$



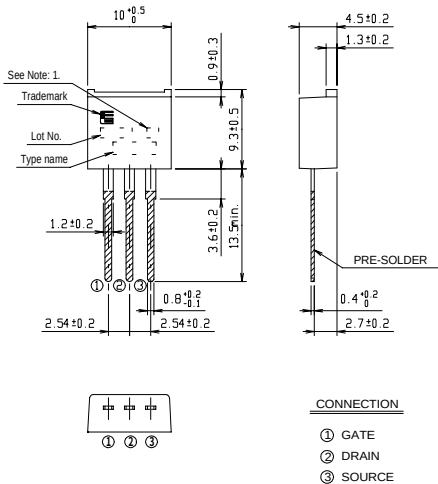
Typical Switching Characteristics vs.  $I_D$   
 $t = f(I_D): V_{CC} = 72\text{V}, V_{GS} = 10\text{V}, R_G = 10\Omega$



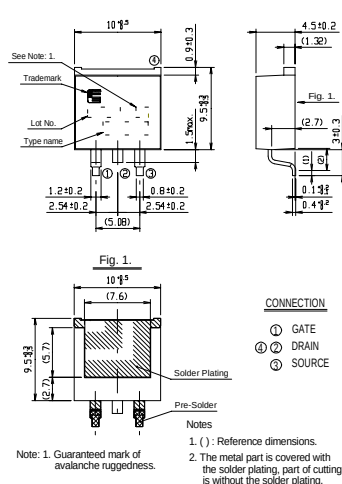


## Outline Drawings (mm)

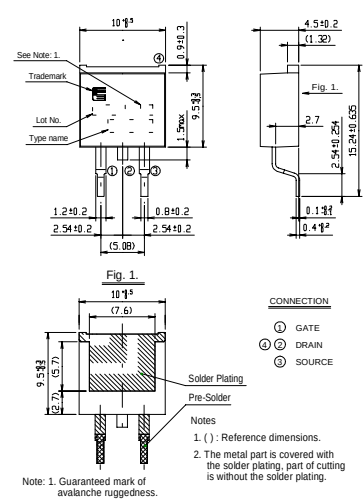
Type(L)



Type(S)



Type(SJ)



Note: 1. Guaranteed mark of avalanche ruggedness.