# 2SK3523-01R

200304

## FUJI POWER MOSFET

## N-CHANNEL SILICON POWER MOSFET

# Super FAP-G Series

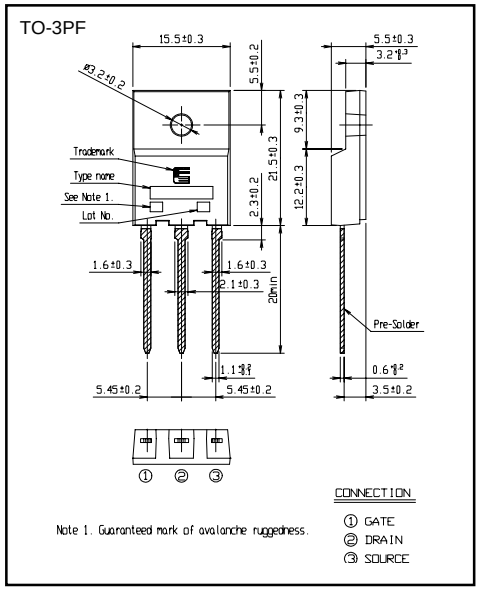
## ■ Features

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

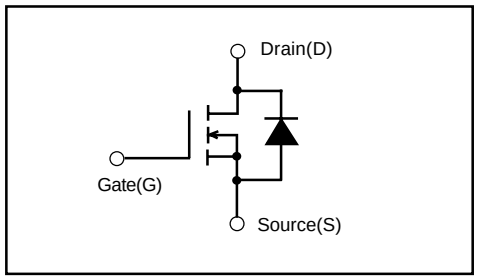
## ■ Applications

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

## ■ Outline Drawings [mm]




## ■ Equivalent circuit schematic




## ■ Maximum ratings and characteristicAbsolute maximum ratings

● **(Tc=25°C unless otherwise specified)**

| Item | Symbol | | Ratings | Unit |
|---|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | | 500 | V |
| | $V_{DSX}$ *5 | | 500 | V |
| Continuous drain current | $I_D$ | | ±25 | A |
| Pulsed drain current | $I_{D(puls)}$ | | ±100 | A |
| Gate-source voltage | $V_{GS}$ | | ±30 | V |
| Repetitive or non-repetitive | $I_{AR}$ *2 | | 25 | A |
| Maximum Avalanche Energy | $E_{AS}$ *1 | | 336.5 | mJ |
| Maximum Drain-Source dV/dt | $dV_{DS}/dt$ *4 | | 20 | kV/µs |
| Peak Diode Recovery dV/dt | dV/dt *3 | | 5 | kV/µs |
| Max. power dissipation | $P_D$ | Ta=25°C | 3.125 | W |
| | | Tc=25°C | 160 | |
| Operating and storage temperature range | $T_{ch}$ | | +150 | °C |
| | $T_{stg}$ | | -55 to +150 | °C |
| Isolation Voltage | $V_{ISO}$ *6 | | 2 | kVrms |

*1 L=987µH, Vcc=50V, See to Avalanche Energy Graph *2 Tch≦150°C
*3 IF≦-ID, -di/dt=50A/µs, Vcc≦BVDSS, Tch≦150°C *4 VDS≦ 500V *5 VGS=-30V *6 t=60sec f=60Hz

● **Electrical characteristics ($T_C$ =25°C unless otherwise specified)**

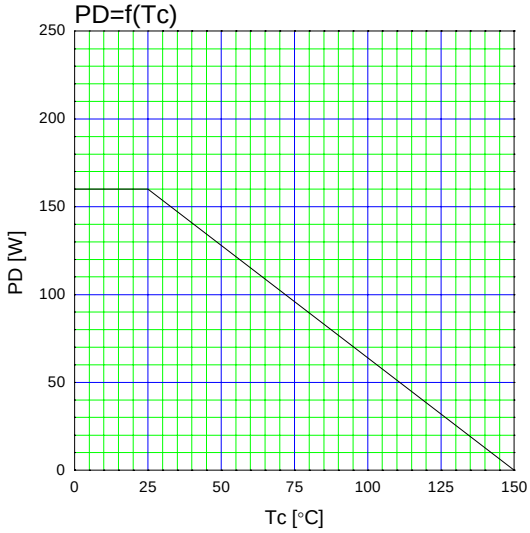
| Item | Symbol | Test Conditions | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Drain-source breakdown voltaget | $V_{(BR)DSS}$ | $I_D$= 250µA $V_{GS}$=0V | | 500 | | | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D$= 250µA $V_{DS}$=$V_{GS}$ | | 3.0 | | 5.0 | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=500V $V_{GS}$=0V | Tch=25°C | | | 25 | µA |
| | | $V_{DS}$=400V $V_{GS}$=0V | Tch=125°C | | | 250 | |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=±30V $V_{DS}$=0V | | | 10 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D$=10.5A $V_{GS}$=10V | | | 0.20 | 0.26 | Ω |
| Forward transcondutance | $g_{fs}$ | $I_D$=10.5A $V_{DS}$=25V | | 11 | 22 | | S |
| Input capacitance | $C_{iss}$ | $V_{DS}$=25V | | | 2280 | 3420 | pF |
| Output capacitance | $C_{oss}$ | $V_{GS}$=0V | | | 320 | 480 | |
| Reverse transfer capacitance | $C_{rss}$ | f=1MHz | | | 16 | 24 | |
| Turn-on time $t_{on}$ | $t_{d(on)}$ | $V_{CC}$=300V $I_D$=10.5A | | | 27 | 41 | ns |
| | $t_r$ | $V_{GS}$=10V | | | 37 | 56 | |
| Turn-off time $t_{off}$ | $t_{d(off)}$ | $R_{GS}$=10 Ω | | | 75 | 113 | |
| | $t_f$ | | | | 11 | 17 | |
| Total Gate Charge | $Q_G$ | $V_{CC}$=300V | | | 54 | 81 | nC |
| Gate-Source Charge | $Q_{GS}$ | $I_D$=21A | | | 16 | 24 | |
| Gate-Drain Charge | $Q_{GD}$ | $V_{GS}$=10V | | | 20 | 30 | |
| Avalanche capability | $I_{AV}$ | L=987µH Tch=25°C | | 25 | | | A |
| Diode forward on-voltage | $V_{SD}$ | $I_F$=21A $V_{GS}$=0V Tch=25°C | | | 0.98 | 1.50 | V |
| Reverse recovery time | $t_{rr}$ | $I_F$=21A $V_{GS}$=0V | | | 0.7 | | µs |
| Reverse recovery charge | $Q_{rr}$ | -di/dt=100A/µs Tch=25°C | | | 10.0 | | µC |

● **Thermalcharacteristics**

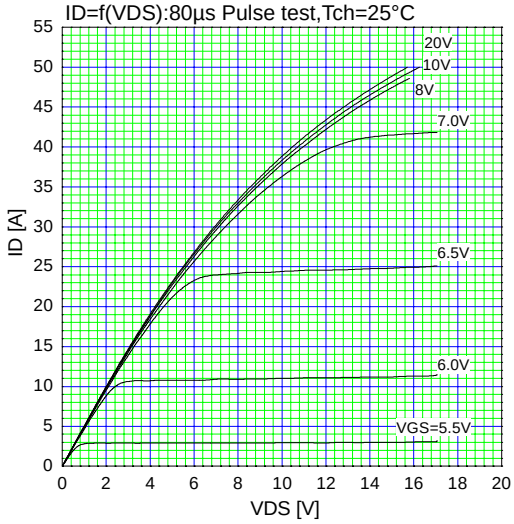
| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case | | | 0.781 | °C/W |
| | $R_{th(ch-a)}$ | channel to ambient | | | 40.0 | °C/W |

## Characteristics

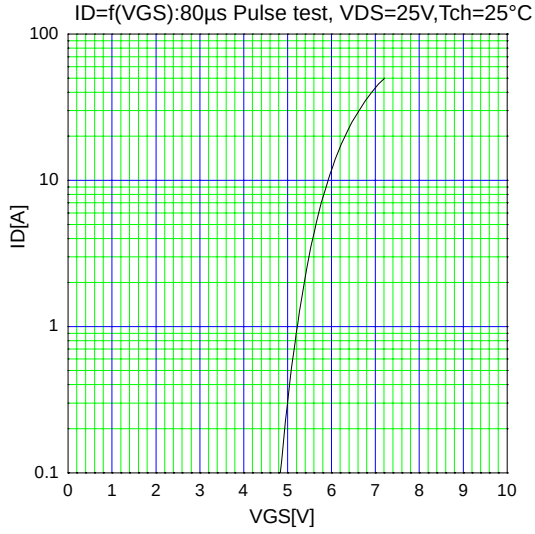
Allowable Power Dissipation
PD=f(Tc)



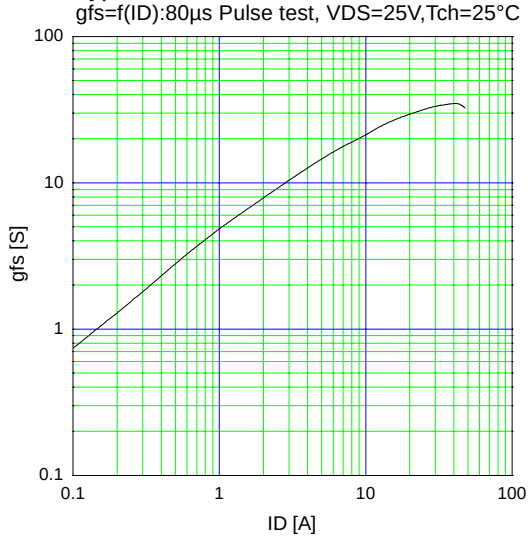

Typical Output Characteristics
ID=f(VDS):80µs Pulse test,Tch=25°C



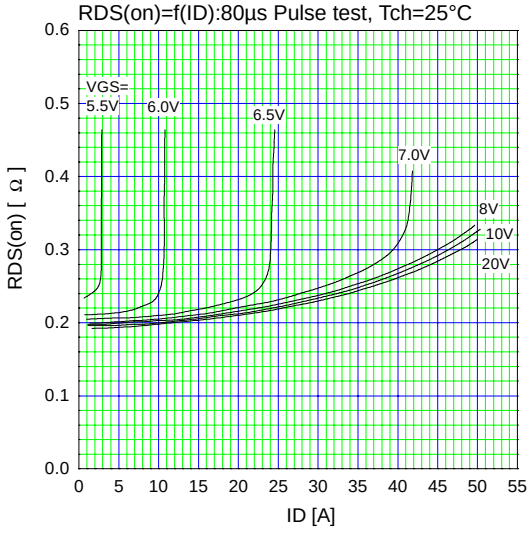

Typical Transfer Characteristic
ID=f(VGS):80µs Pulse test, VDS=25V,Tch=25°C



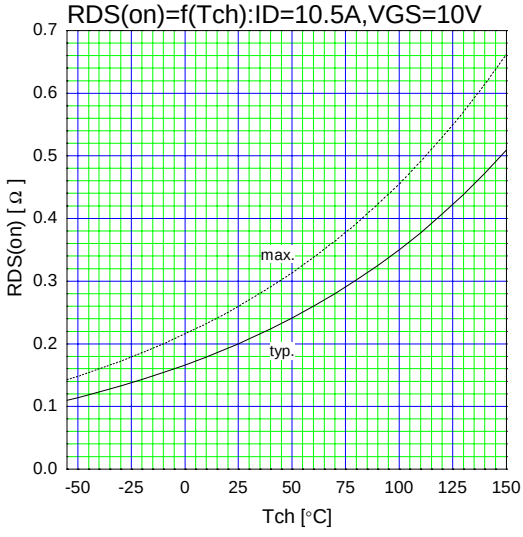

Typical Transconductance
gfs=f(ID):80µs Pulse test, VDS=25V,Tch=25°C



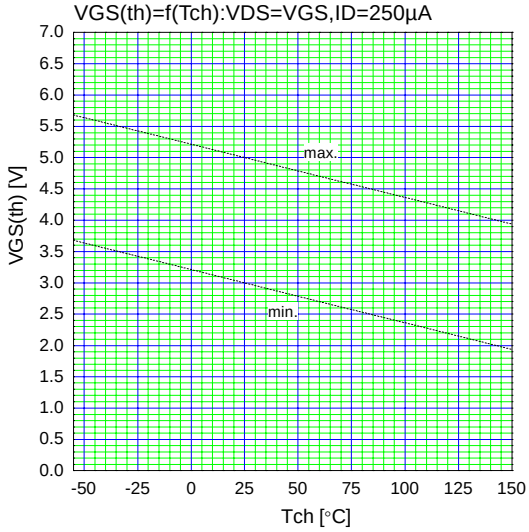

Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80µs Pulse test, Tch=25°C



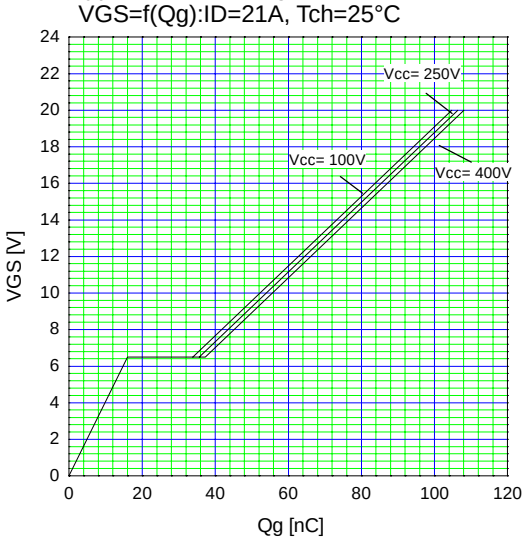

Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=10.5A,VGS=10V



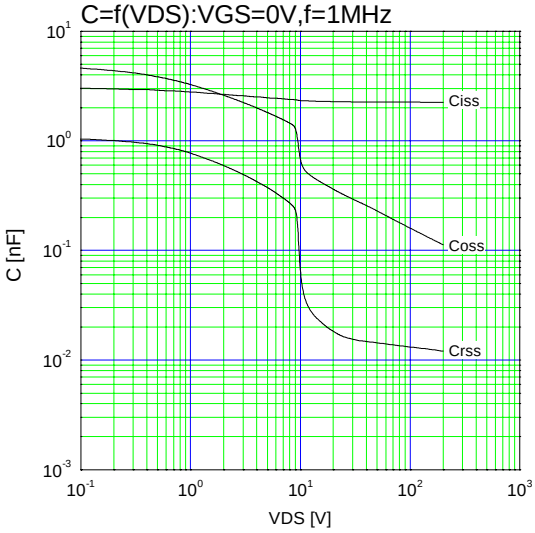
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=250μA



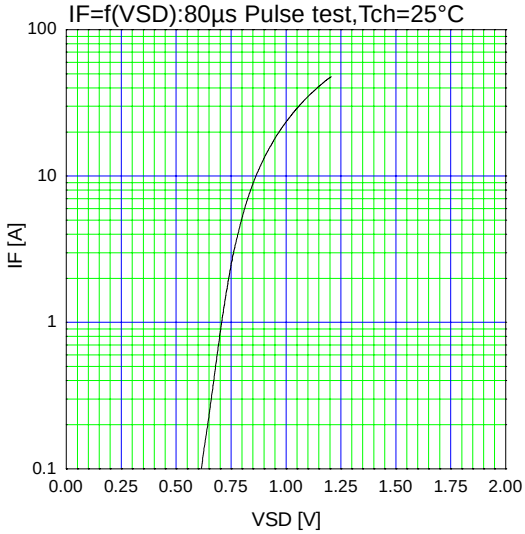

Typical Gate Charge Characteristics
VGS=f(Qg):ID=21A, Tch=25°C



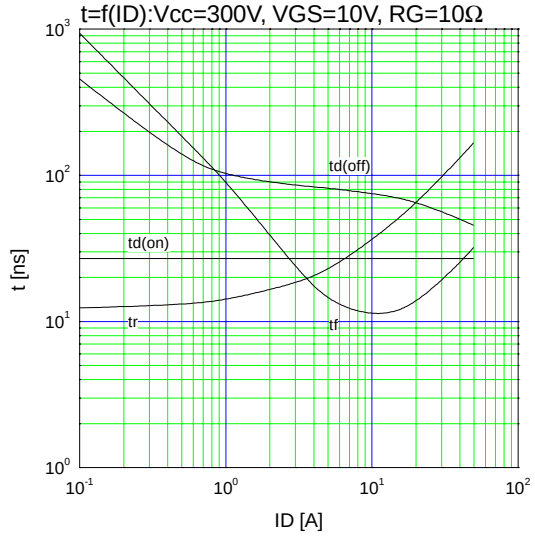

Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



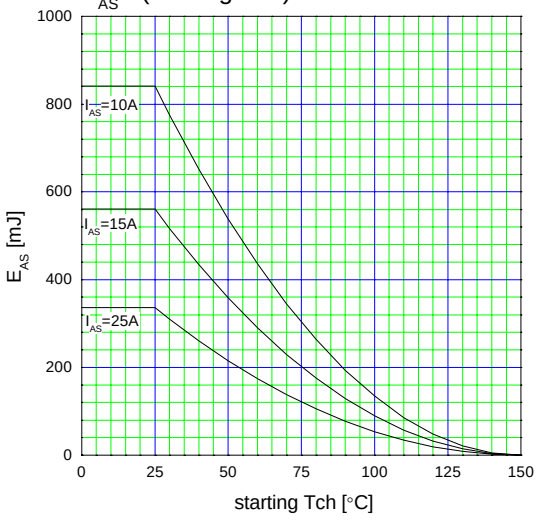

Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80μs Pulse test,Tch=25°C



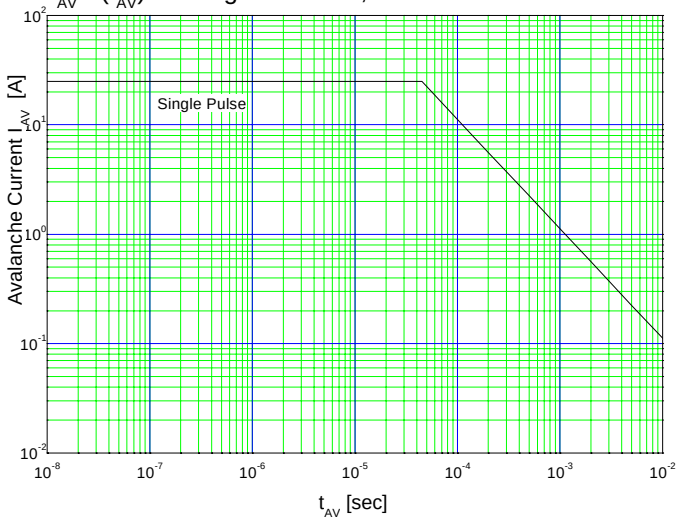

Typical Switching Characteristics vs. ID
t=f(ID):Vcc=300V, VGS=10V, RG=10Ω




Maximum Avalanche Energy vs. starting Tch
$E_{AS}$=f(starting Tch):Vcc=50V



Maximum Avalanche Current Pulsewidth
$I_{AV}=f(t_{AV})$:starting Tch=25°C,Vcc=50V




Maximum Transient Thermal Impedance
Zth(ch-c)=f(t):D=0