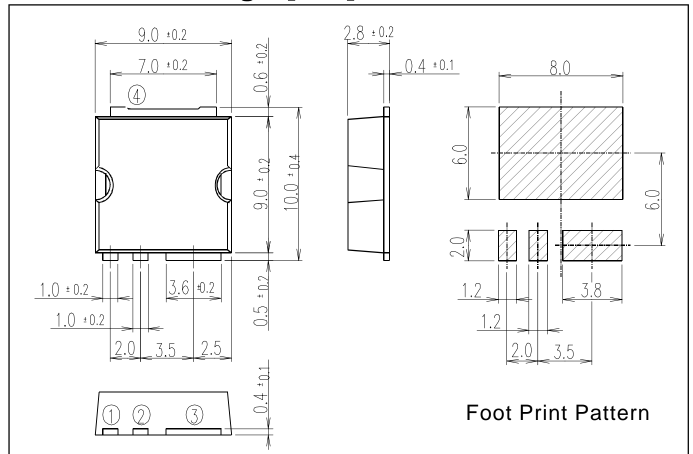
# 2SK3474-01

FUJI POWER MOSFET 200303

## *Super FAP-G Series*

## N-CHANNEL SILICON POWER MOSFET

### ■ Outline Drawings [mm]




### ■ Features

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

### ■ Applications

for Switching

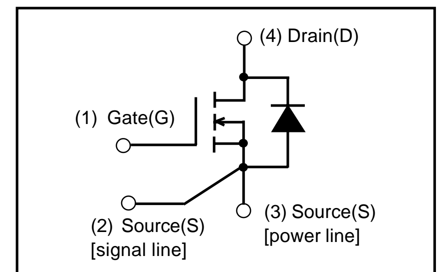
### ■ Absolute Maximum Ratings at Tc=25°C

( unless otherwise specified)

| Item | Symbol | Ratings | Unit | Remarks |
|---|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 150 | V | |
| | $V_{DSX}$ | 120 | V | $V_{GS}$=30V |
| Continuous drain current | $I_D$ | ±33 | A | |
| | | ±4.1 *4 | A | Ta=25°C |
| Pulsed drain current | $I_{D(puls)}$ | ±132 | A | |
| Gate-source voltage | $V_{GS}$ | ±30 | V | |
| Repetitive or non-repetitive | $I_{AR}$ *2 | 33 | A | |
| Maximum Avalanche Energy | $E_{AS}$ *1 | 169 | mJ | |
| Maximum Drain-Source dV/dt | $dV_{DS}/dt$ | 20 | kV/μs | $V_{DS}$≦150V |
| Peak Diode Recovery dV/dt | dV/dt *3 | 5 | kV/μs | |
| Max. power dissipation | $P_D$ | 2.4 *4 | W | Ta=25°C |
| | | 150 | W | |
| Operating and storage | $T_{ch}$ | +150 | ℃ | |
| temperature range | $T_{stg}$ | -55 to +150 | ℃ | |

*1 L=0.228mH, Vcc=48V, See to Avalanche Energy Graph *2 Tch≦150°C *3 $I_F$≦-$I_D$, -di/dt=50A/μs, Vcc≦$BV_{DSS}$, Tch≦150°C
*4 Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area:500mm²)

### ■ Equivalent circuit schematic



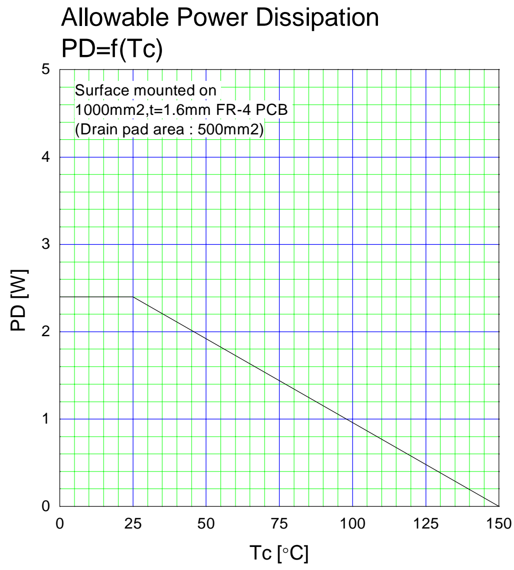

### ● Electrical characteristics atTc =25°C ( unless otherwise specified)

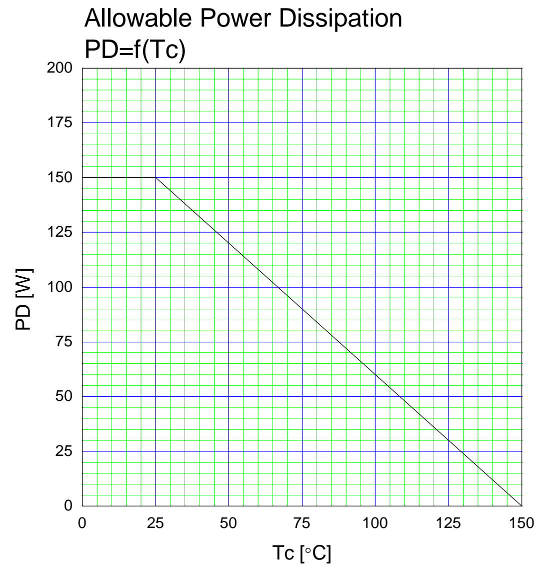
| Item | Symbol | Test Conditions | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Drain-source breakdown voltaget | $V_{(BR)DSS}$ | $I_D$=250μA $V_{GS}$=0V | | 150 | | | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D$= 250μA $V_{DS}$=$V_{GS}$ | | 3.0 | | 5.0 | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=150V $V_{GS}$=0V | $T_{ch}$=25°C | | | 25 | μA |
| | | $V_{DS}$=120V $V_{GS}$=0V | $T_{ch}$=125°C | | | 250 | |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=±30V $V_{DS}$=0V | | | 10 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D$=11.5A $V_{GS}$=10V | | | 54 | 70 | mΩ |
| Forward transconductance | $g_{fs}$ | $I_D$=11.5A $V_{DS}$=25V | | 8 | 16 | | S |
| Input capacitance | $C_{iss}$ | $V_{DS}$=75V | | | 1500 | 1730 | pF |
| Output capacitance | $C_{oss}$ | $V_{GS}$=0V | | | 200 | 300 | |
| Reverse transfer capacitance | $C_{rss}$ | f=1MHz | | | 17 | 26 | |
| Turn-on time $t_{on}$ | $t_{d(on)}$ | $V_{CC}$=48V $I_D$=11.5A | | | 13 | 20 | ns |
| | $t_r$ | $V_{GS}$=10V | | | 15 | 23 | |
| Turn-off time $t_{off}$ | $t_{d(off)}$ | $R_{GS}$=10 Ω | | | 34 | 51 | |
| | $t_f$ | | | | 15 | 23 | |
| Total Gate Charge | $Q_G$ | $V_{CC}$=48V | | | 34 | 51 | nC |
| Gate-Source Charge | $Q_{GS}$ | $I_D$=23A | | | 9 | 13.5 | |
| Gate-Drain Charge | $Q_{GD}$ | $V_{GS}$=10V | | | 12.5 | 19 | |
| Avalanche capability | $I_{AV}$ | L=228 μH $T_{ch}$=25°C | | 33 | | | A |
| Diode forward on-voltage | $V_{SD}$ | $I_F$=23A $V_{GS}$=0V $T_{ch}$=25°C | | | 1.10 | 1.60 | V |
| Reverse recovery time | $t_{rr}$ | $I_F$=23A $V_{GS}$=0V | | | 0.13 | | μs |
| Reverse recovery charge | $Q_{rr}$ | -di/dt=100A/μs $T_{ch}$=25°C | | | 0.6 | | μC |

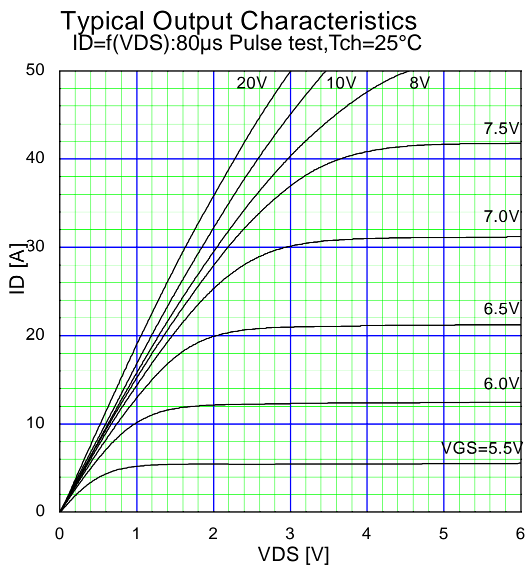
### ● Thermalcharacteristics

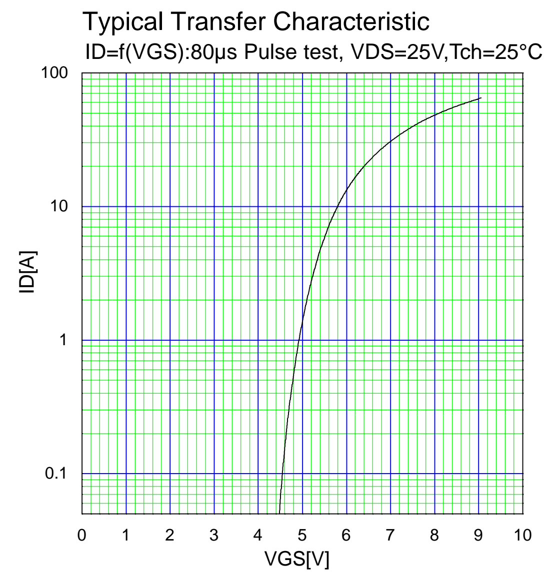
| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case | | | 0.833 | °C/W |
| | $R_{th(ch-a)}$ | channel to ambient | | | 87.0 | °C/W |
| | $R_{th(ch-a)}$ *4 | channel to ambient | | | 52.0 | °C/W |

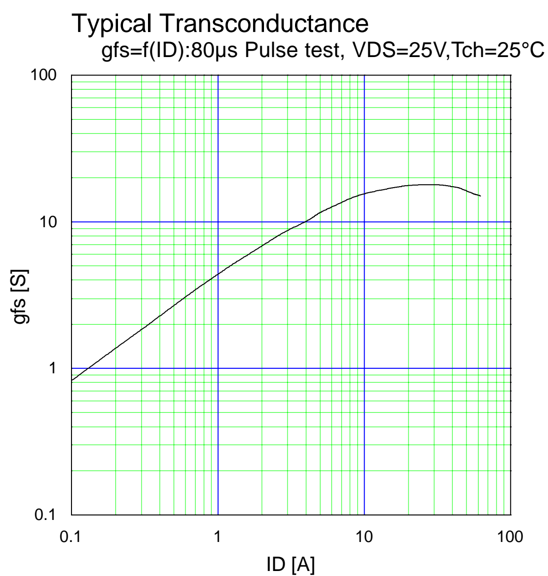
## Characteristics

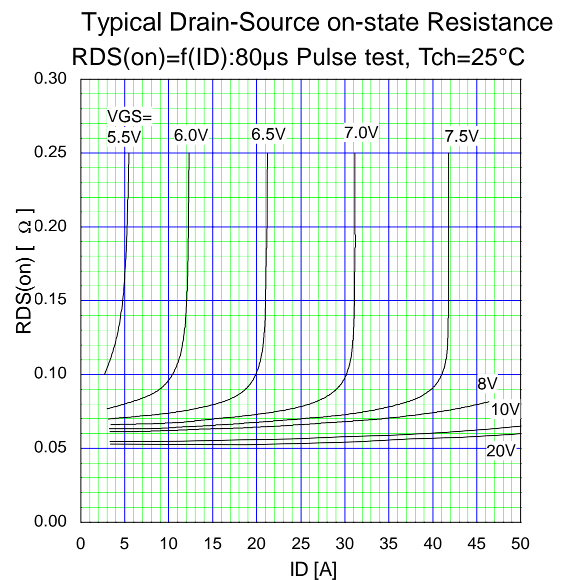


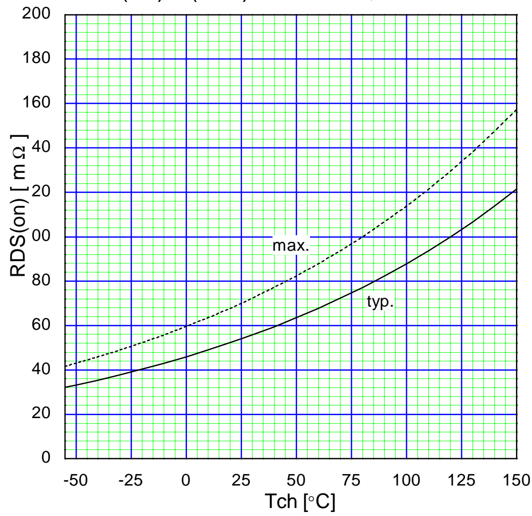



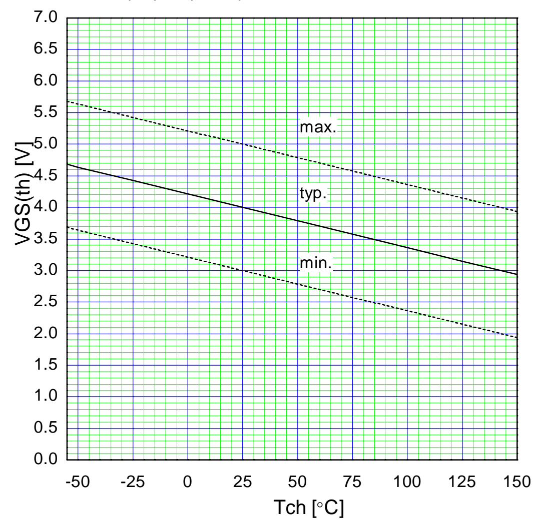



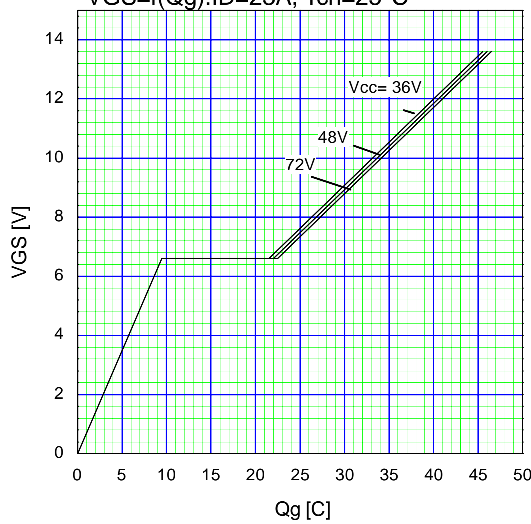



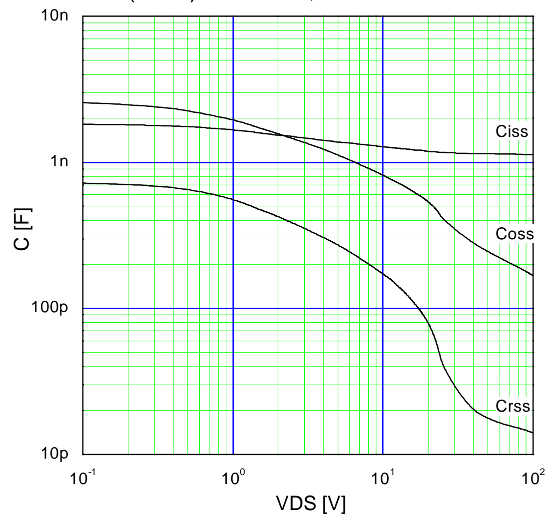



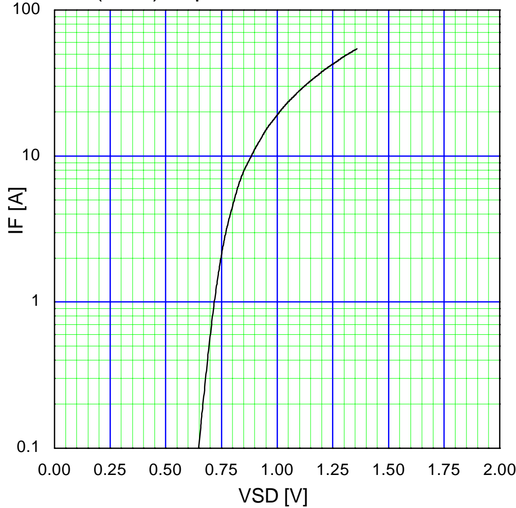



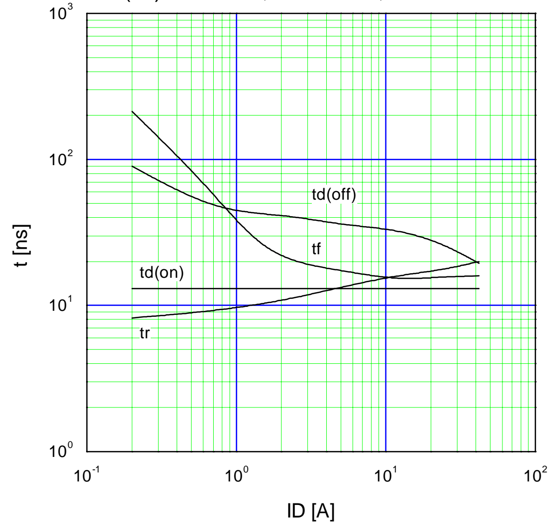

Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=11.5A,VGS=10V
max.
typ.
RDS(on) [ mΩ ]
Tch [°C]


Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA
max.
typ.
min.
VGS(th) [V]
Tch [°C]

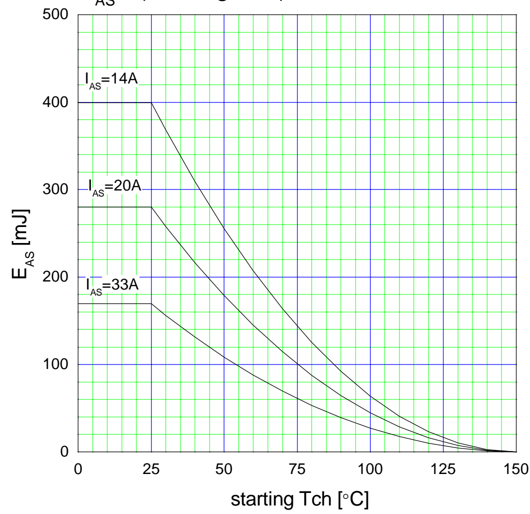

Typical Gate Charge Characteristics
VGS=f(Qg):ID=23A, Tch=25°C
Vcc= 36V
48V
72V
VGS [V]
Qg [C]


Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz
Ciss
Coss
Crss
C [F]
VDS [V]

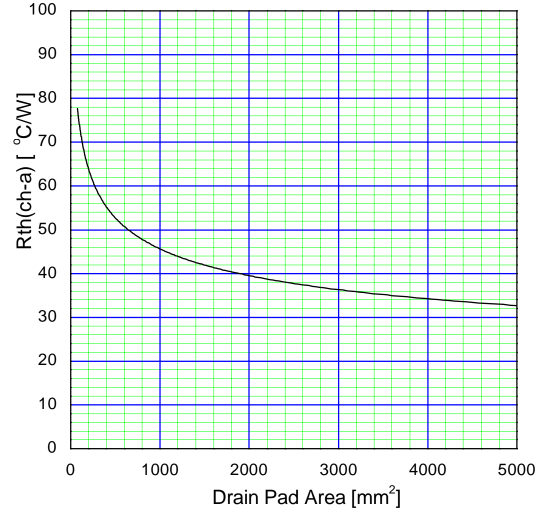

Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80μs Pulse test,Tch=25°C
IF [A]
VSD [V]


Typical Switching Characteristics vs. ID
t=f(ID):Vcc=48V, VGS=10V, RG=10Ω
td(off)
tf
td(on)
tr
t [ns]
ID [A]

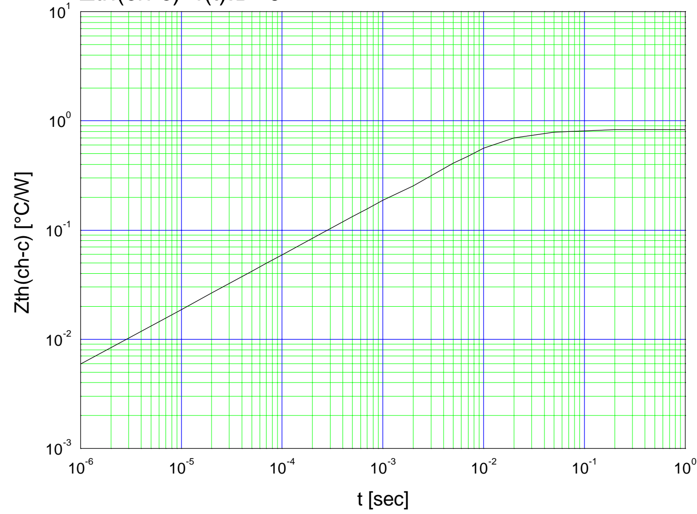
Maximum Avalanche Energy vs. starting Tch
$E_{AS}$=f(starting Tch):Vcc=48V




Thermal Resistance vs. Drain Pad area
t=1.6mm FR-4 PCB




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




Maximum Avalanche Current Pulsewidth
$I_{AV}$=f($t_{AV}$):starting Tch=25°C,Vcc=48V