# 2SK3216-01

FUJI POWER MOS-FET

## N-CHANNEL SILICON POWER MOS-FET

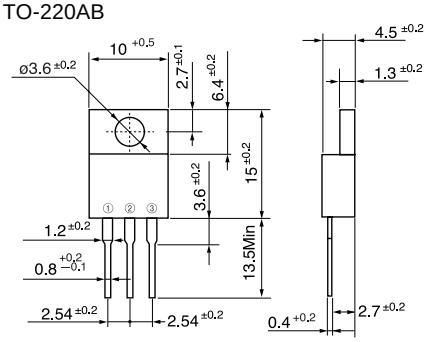
### ■ Features

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

### ■ Applications

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

TO-220AB




1. Gate
2. Drain
3. Source

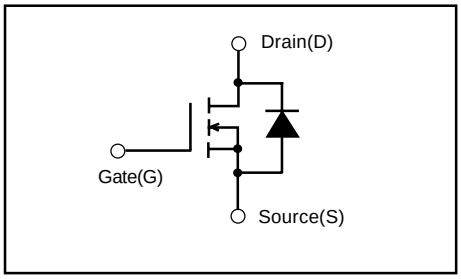
### ■ Maximum ratings and characteristic Absolute maximum ratings

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

| Item | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | 100 | V |
| Continuous drain current | | $I_D$ | ±50 | A |
| Pulsed drain current | | $I_{D(puls)}$ | ±200 | A |
| Gate-source voltage | | $V_{GS}$ | ±30 | V |
| Maximum Avalanche Energy | | $E_{AV}$*1 | 464 | mJ |
| Max. power dissipation | Ta=25°C | $P_D$ | 1.67 | W |
| | Tc=25°C | $P_D$ | 135 | W |
| Operating and storage temperature range | | $T_{ch}$ | +150 | ℃ |
| | | $T_{stg}$ | -55 to +150 | ℃ |

*1 L=298μH, Vcc=24V

### ■ Equivalent circuit schematic




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

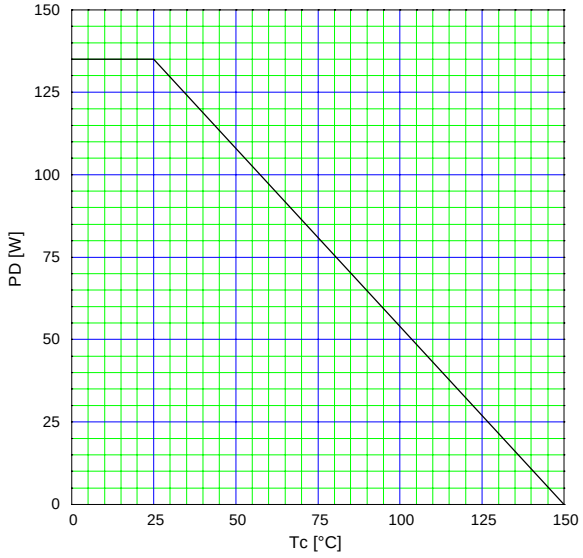
| Item | Symbol | Test Conditions | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Drain-source breakdown voltaget | $V_{(BR)DSS}$ | $I_D$=1mA $V_{GS}$=0V | | 100 | | | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D$=1mA $V_{DS}$=$V_{GS}$ | | 2.5 | 3.0 | 3.5 | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=100V | Tch=25°C | | 1 | 100 | μA |
| | | $V_{GS}$=0V | Tch=125°C | | 0.1 | 0.5 | mA |
| Gate-source leakage current | $I_{GSS}$ | $V_{GS}$=±30V $V_{DS}$=0V | | | 10 | 100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $I_D$=25A $V_{GS}$=10V | | | 20 | 25 | mΩ |
| Forward transcondutance | $g_{fs}$ | $I_D$=25A $V_{DS}$=25V | | 16.0 | 32.0 | | S |
| Input capacitance | $C_{iss}$ | $V_{DS}$=25V | | | 3200 | 4800 | pF |
| Output capacitance | $C_{oss}$ | $V_{GS}$=0V | | | 760 | 1140 | |
| Reverse transfer capacitance | $C_{rss}$ | f=1MHz | | | 230 | 345 | |
| Turn-on time $t_{on}$ | $t_{d(on)}$ | $V_{CC}$=48V $I_D$=50A | | | 23 | 35 | ns |
| | $t_r$ | $V_{GS}$=10V | | | 130 | 195 | |
| Turn-off time $t_{off}$ | $t_{d(off)}$ | $R_{GS}$=10Ω | | | 110 | 165 | |
| | $t_f$ | | | | 65 | 100 | |
| Avalanche capability | $I_{AV}$ | L=100μH Tch=25°C | | 50 | | | A |
| Diode forward on-voltage | $V_{SD}$ | $I_F$=50A $V_{GS}$=0V Tch=25°C | | | 0.97 | 1.46 | V |
| Reverse recovery time | $t_{rr}$ | $I_F$=50A $V_{GS}$=0V | | | 150 | | ns |
| Reverse recovery charge | $Q_{rr}$ | -di/dt=100A/μs Tch=25°C | | | 0.80 | | μC |

● **Thermalcharacteristics**

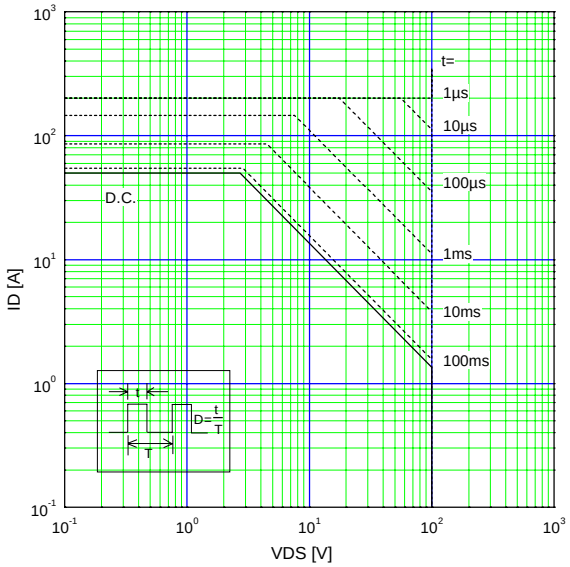
| Item | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Thermal resistance | $R_{th(ch-c)}$ | channel to case | | | 0.93 | °C/W |
| | $R_{th(ch-a)}$ | channel to ambient | | | 75.0 | °C/W |

## Characteristics

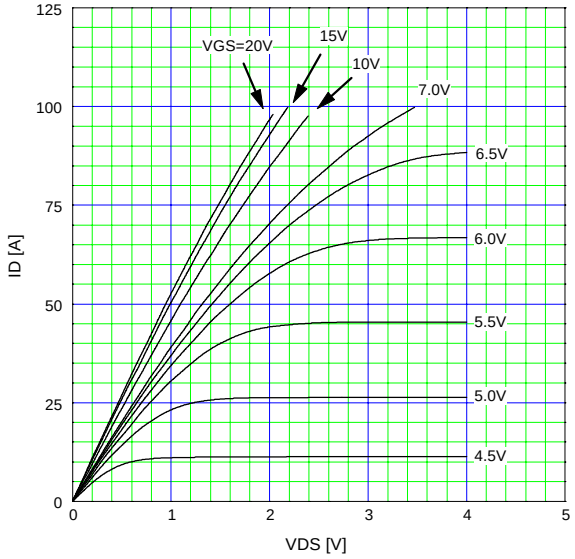
Power Dissipation
PD=f(Tc)



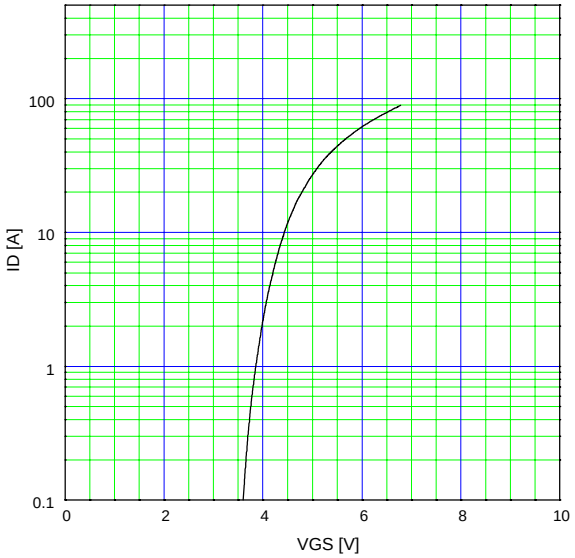

Safe operating area
ID=f(VDS):Single Pulse(D=0),Tc=25°C



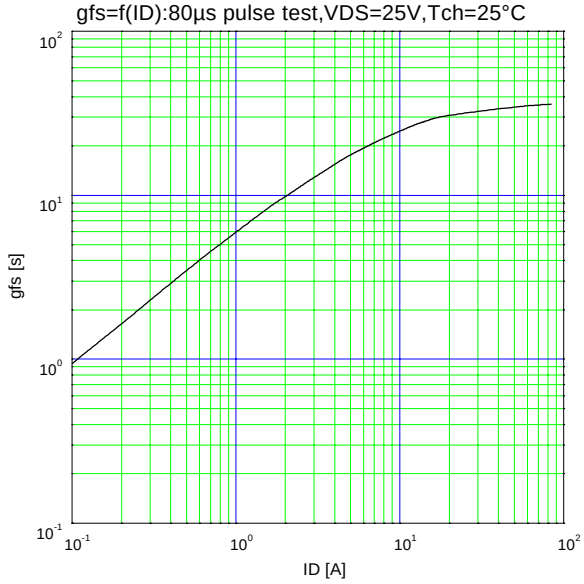

Typical output characteristics
ID=f(VDS):80µs pulse test,Tc=25°C



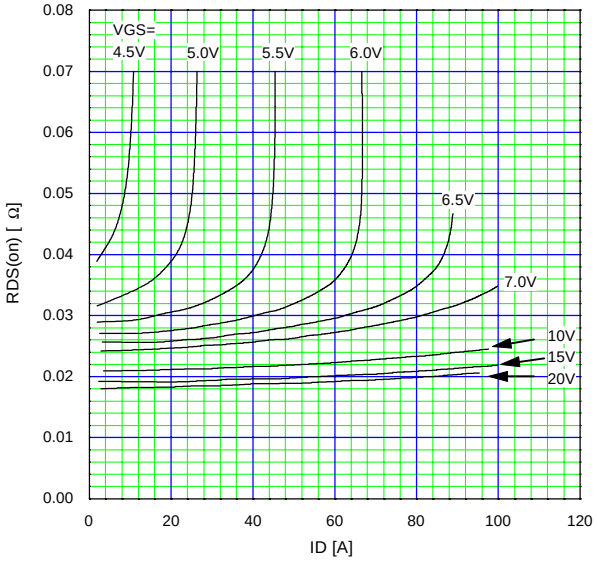

Typical transfer characteristics
ID=f(VGS):80µs pulse test,VDS=25V,Tch=25°C



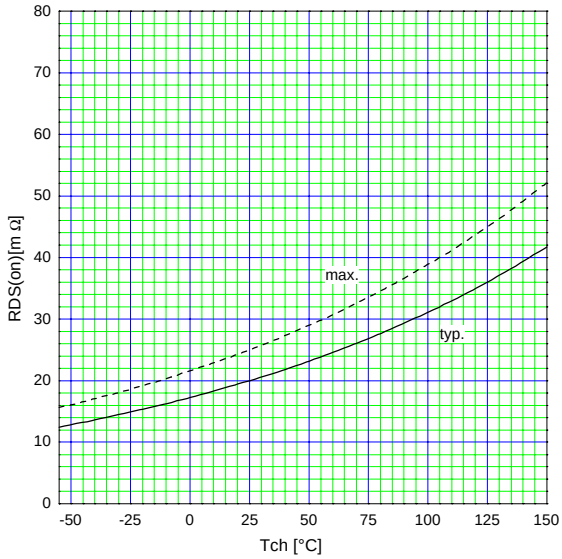

Typical forward transconductance
gfs=f(ID):80µs pulse test,VDS=25V,Tch=25°C



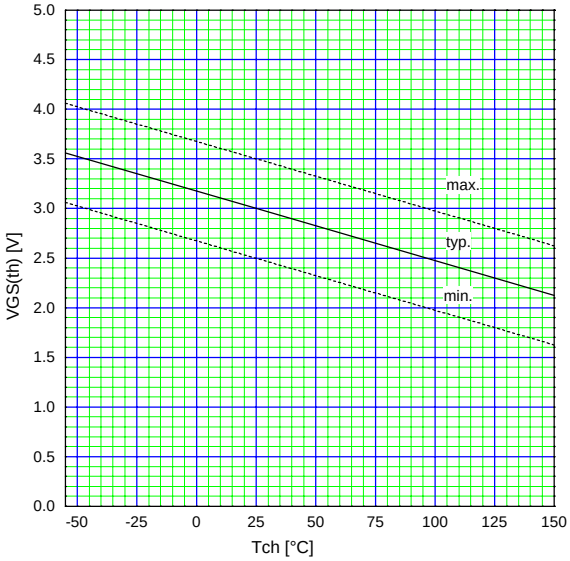

Typical Drain-Source on-State Resistance
RDS(on)=f(ID):80µs pulse test,Tch=25°C



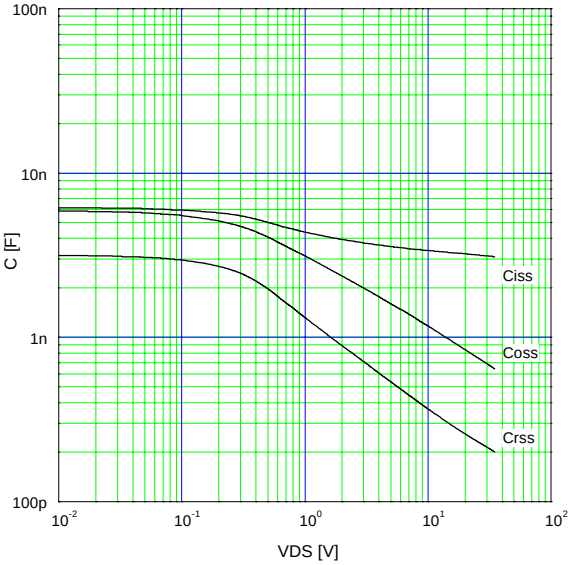
Drain-source on-state resistance
RDS(on)=f(Tch):ID=25A,VGS=10V



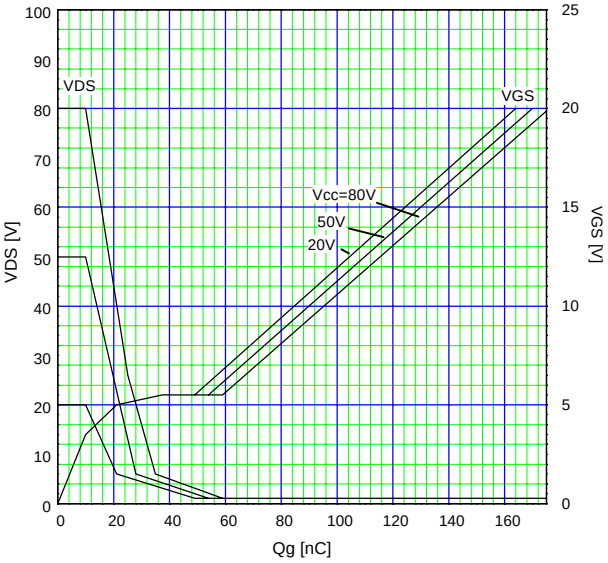

Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA



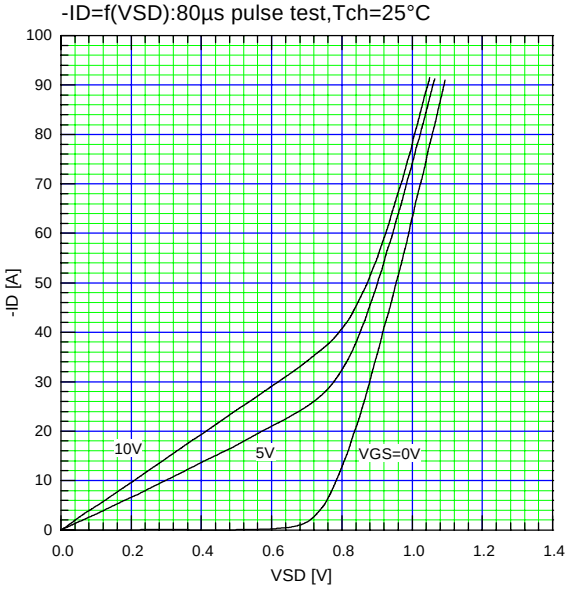

Typical capacitances
C=f(VDS):VGS=0V,f=1MHz



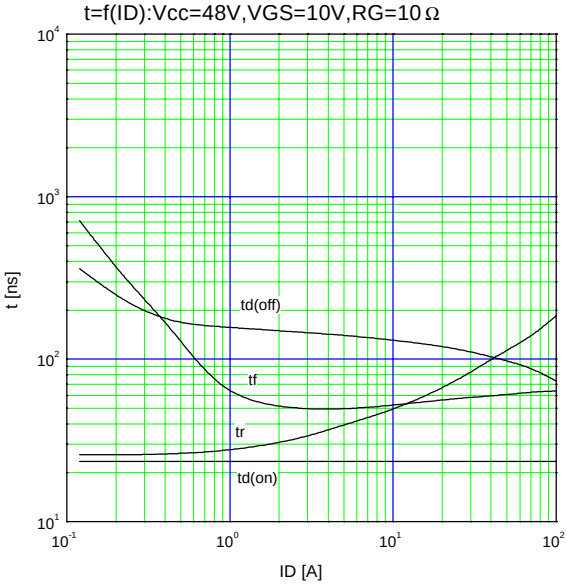

Typical Gate Charge Characteristics
VGS=f(Qg):ID=50A,Tch=25°C



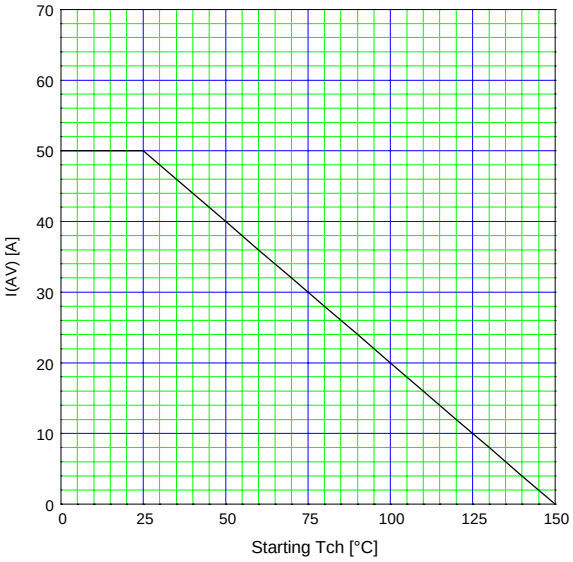

Typical Forward Characteristics of Reverse Diode
-ID=f(VSD):80µs pulse test,Tch=25°C



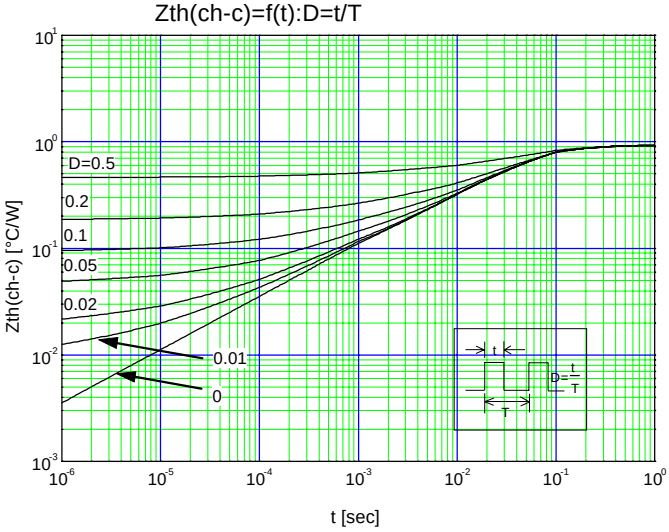

Typical Switching Characteristics vs. ID
t=f(ID):Vcc=48V,VGS=10V,RG=10Ω



Maximum Avalanche Current vs. starting Tch
I(AV)=f(starting Tch),Non Repetitive




Transient Thermal Impedance
Zth(ch-c)=f(t):D=t/T




Maximum Avalanche energy vs. starting Tch
Eas=f(starting Tch):Vcc=24V,$I_{AV}$<=50A,Non-Repetitive