2SK3696-01MR

200309

FUJI POWER MOSFET
Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

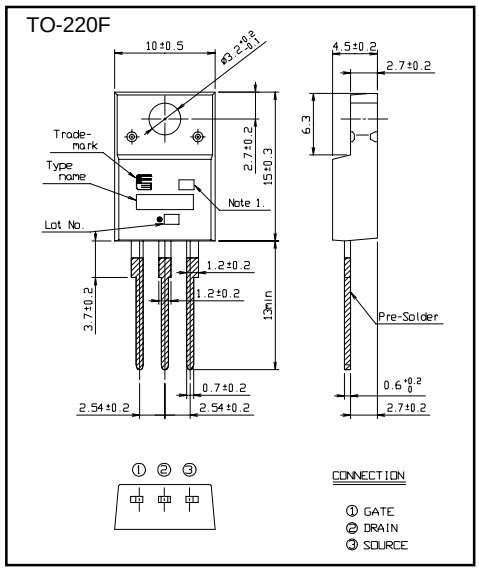
■ Features

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

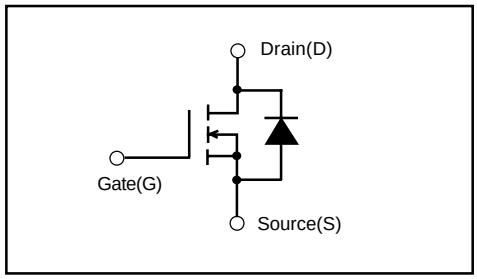
■ Applications

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

■ Outline Drawings [mm]



■ Equivalent circuit schematic



■ Maximum ratings and characteristic Absolute maximum ratings

● (Tc=25°C unless otherwise specified)

Item	Symbol	Ratings	Unit	Remarks
Drain-source voltage	V_{DS}	500	V	
Continuous drain current	I_D	±13	A	
Pulsed drain current	$I_{D(puls)}$	±52	A	
Gate-source voltage	V_{GS}	±30	V	
Non-Repetitive Maximum avalanche current	I_{AS}	13	A	Tch ≦150°C
Non-Repetitive Maximum avalanche energy	E_{AS}	202	mJ	*1
Maximum Drain-Source dV/dt	dV_{DS}/dt	20	kV/s	VDS ≦500V
Peak diode recovery dV/dt	dV/dt	5	kV/µs	*2
Peak diode recovery -di/dt	-di/dt	100	A/µs	*3
Max. power dissipation	P_D	2.16	W	Ta=25°C
		70		Tc=25°C
Operating and storage temperature range	T_{ch}	+150	°C	
	T_{stg}	-55 to +150	°C	
Isolation voltage	V_{ISO}	2	kVrms	t=60sec f=60Hz

*1 L=2.20mH, Vcc=50V, Starting Tch=25°C,See to Avalanche Energy Graph
*2 $I_F \leqq -I_D$, -di/dt=100A/µs, $V_{CC} < BV_{DSS}$, Tch ≦150°C
*3 $I_F \leqq -I_D$, dV/dt=5kV/µs, $V_{CC} \leqq BV_{DSS}$, Tch ≦150°C

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

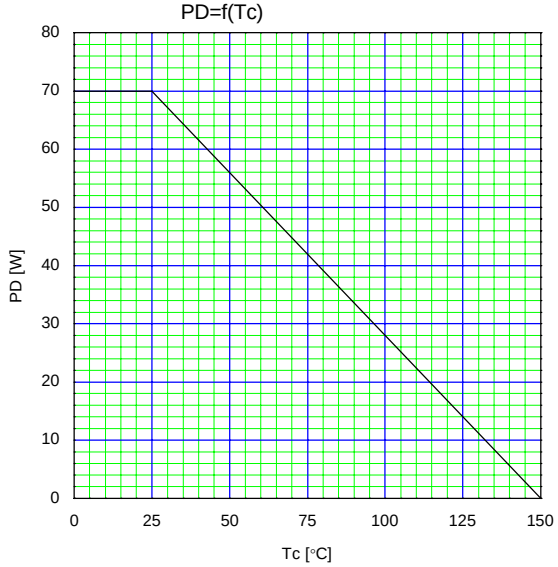
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D= 250µA V_{GS}=0V	500			V
Gate threshold voltage	$V_{GS(th)}$	I_D= 250µA V_{DS}=V_{GS}	3.0		5.0	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=500V V_{GS}=0V Tch=25°C		10	25	µA
		V_{DS}=400V V_{GS}=0V Tch=125°C		1.0	2	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=6.5A V_{GS}=10V		0.42	0.55	Ω
Forward transcondutance	g_{fs}	I_D=6.5A V_{DS}=25V	5.5	11		S
Input capacitance	C_{iss}	V_{DS}=25V		1100	1650	pF
Output capacitance	C_{oss}	V_{GS}=0V		165	250	
Reverse transfer capacitance	C_{rss}	f=1MHz		9	13.5	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=300V I_D=6.5A		23	35	ns
	t_r	V_{GS}=10V		6.5	11	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω		47	71	
	t_f			7.5	12	
Total Gate Charge	Q_G	V_{CC}=250V		28	42	nC
Gate-Source Charge	Q_{GS}	I_D=13A		10	15	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V		9	14	
Avalanche capability	I_{AV}	L=2.20mH Tch=25°C	13			A
Diode forward on-voltage	V_{SD}	I_F=13A V_{GS}=0V Tch=25°C		1.05	1.60	V
Reverse recovery time	t_{rr}	I_F=13A V_{GS}=0V		120	250	ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/µs Tch=25°C		0.5	1.2	µC

● Thermalcharacteristics

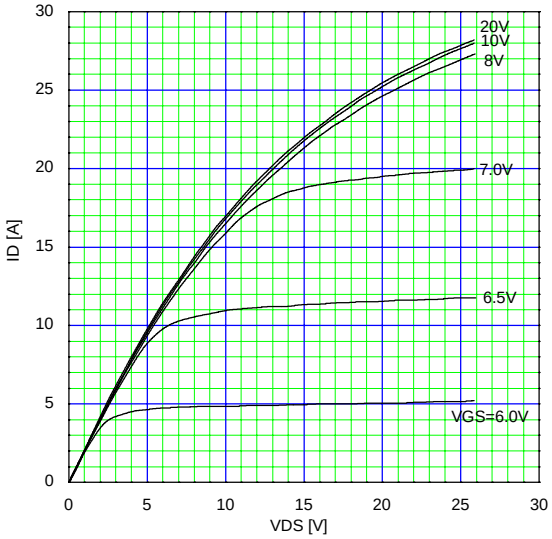
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.79	°C/W
	$R_{th(ch-a)}$	channel to ambient			58.0	°C/W

Characteristics

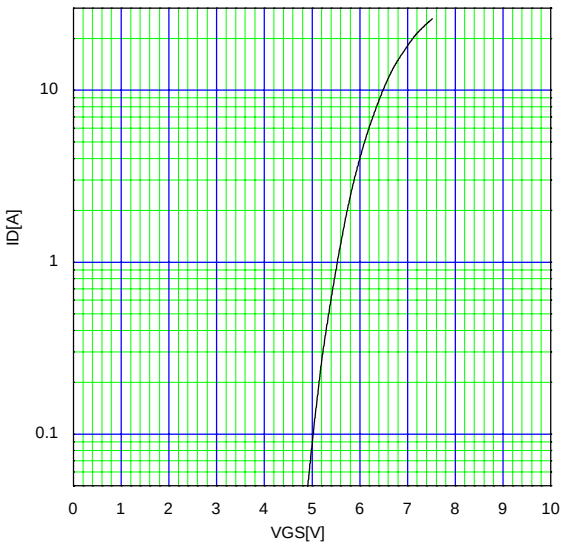
Allowable Power Dissipation
PD=f(Tc)



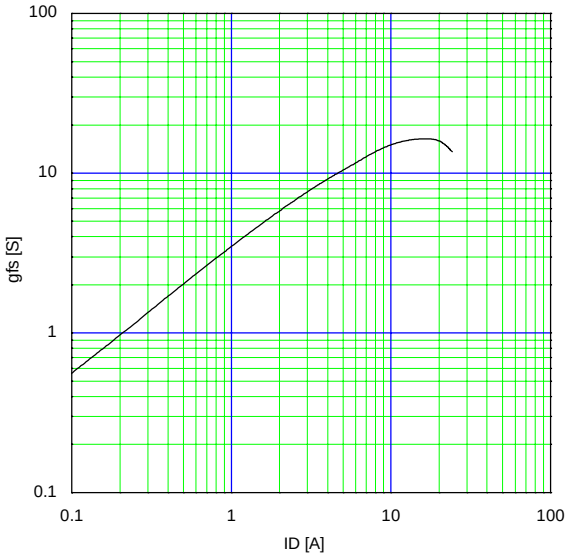
Typical Output Characteristics
ID=f(VDS):80 μs pulse test,Tch=25 °C



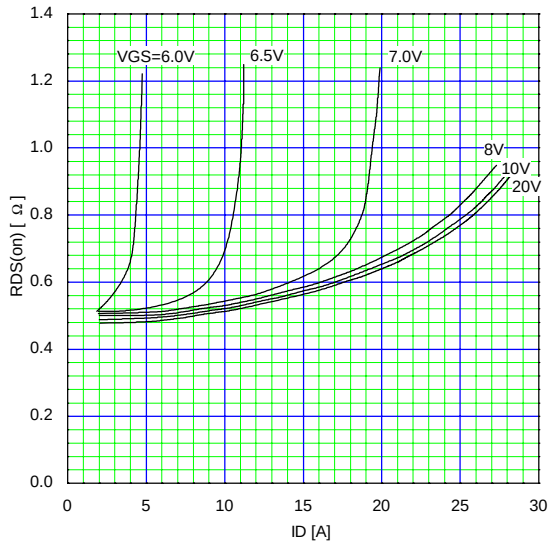
Typical Transfer Characteristic
ID=f(VGS):80 μs pulse test,VDS=25V,Tch=25 °C



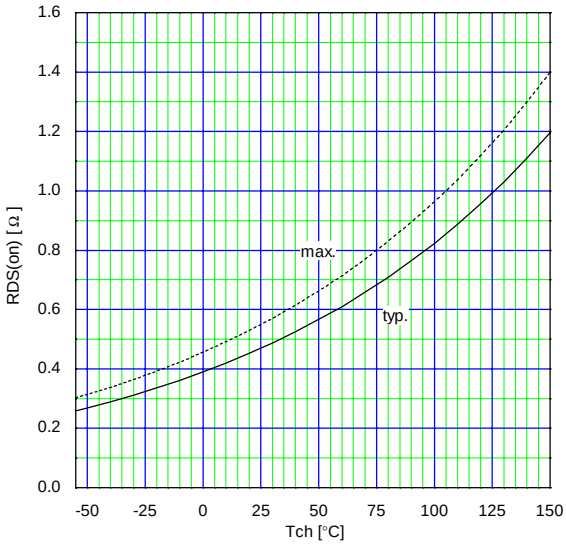
Typical Transconductance
gfs=f(ID):80 μs pulse test,VDS=25V,Tch=25 °C



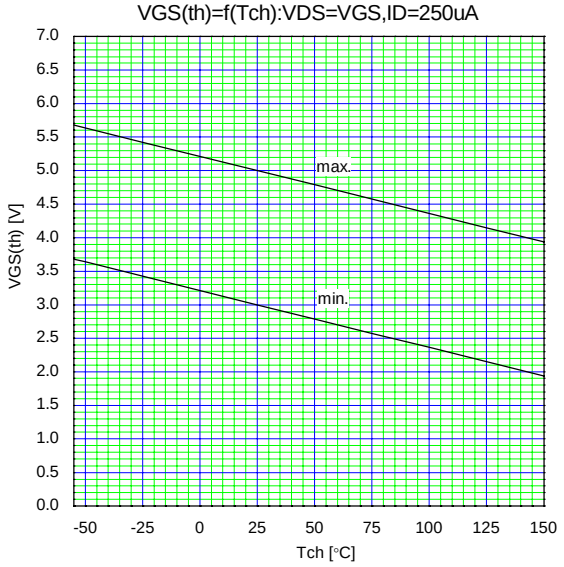
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80 μs pulse test,Tch=25 °C



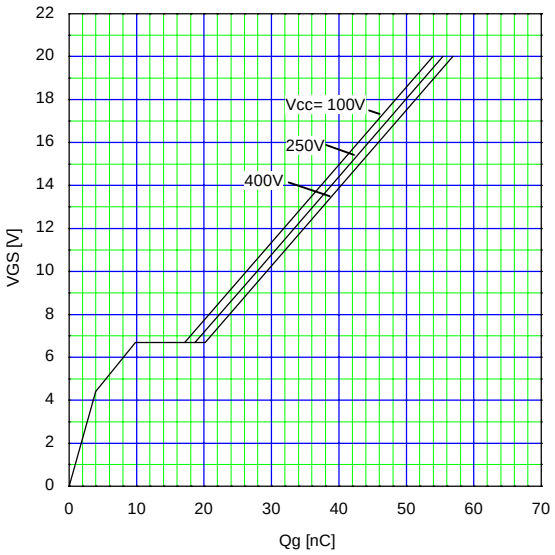
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=6.5A,VGS=10V



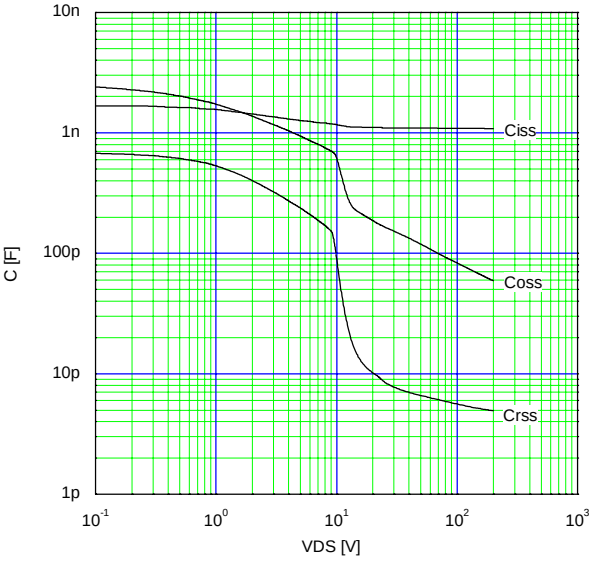
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=250uA



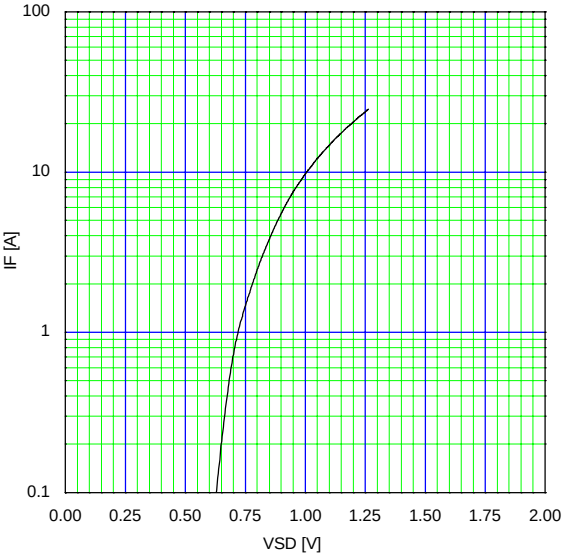
Typical Gate Charge Characteristics
VGS=f(Qg):ID=13A,Tch=25 °C



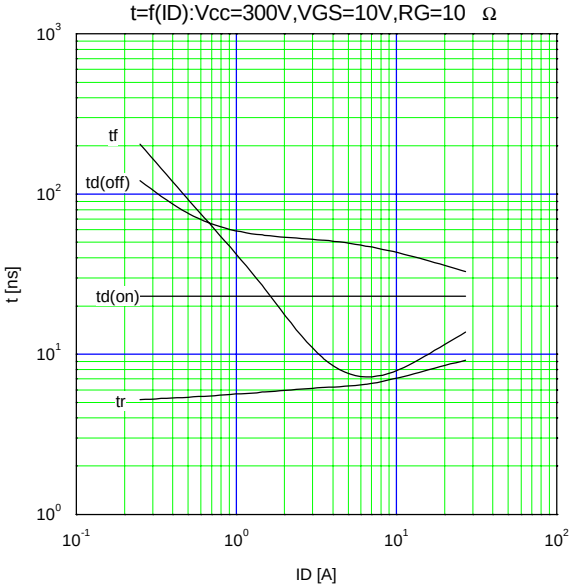
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



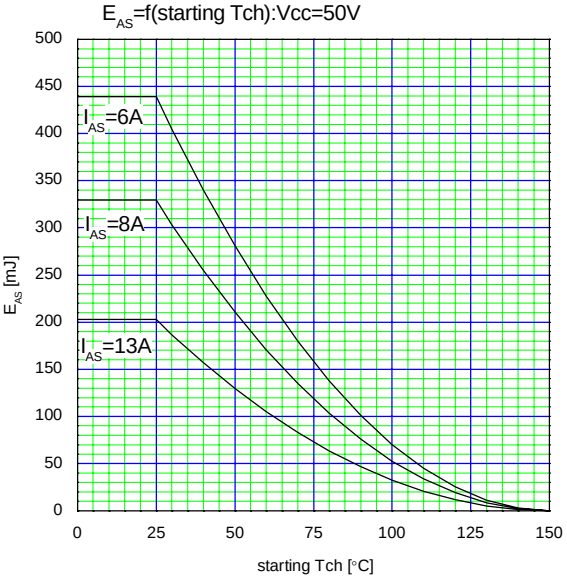
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80 μs pulse test,Tch=25 °C



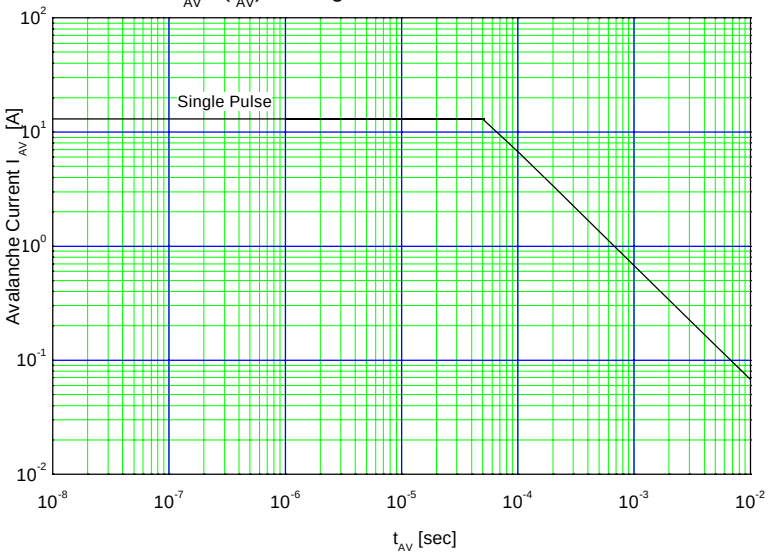
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=300V,VGS=10V,RG=10 Ω



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



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



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