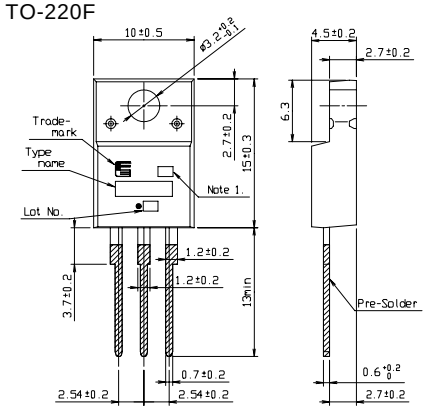
2SK3770-01MR

e-Front runners

N-CHANNEL SILICON POWER MOSFET

■ Outline Drawings (mm) 200407

TO-220F



FUJI POWER MOSFET
Super FAP-G Series

■ Features

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

■ Applications

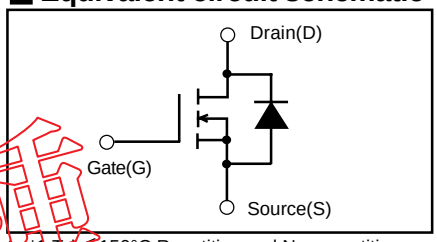
Switching regulators **DC-DC converters**
UPS (Uninterruptible Power Supply)

■ Maximum ratings and characteristic

● Absolute maximum ratings (Tc=25°C unless otherwise specified)

Item	Symbol	Ratings	Unit	Remarks
Drain-source voltage	V_{DS}	120	V	
	V_{DSX}	90	V	V_{GS}=-30V
Continuous Drain Current	I_D	26	A	
Pulsed Drain Current	$I_{D(puls)}$	±104	A	
Gate-Source Voltage	V_{GS}	±30	V	
Maximum Avalanche current	I_{AR}	26	A	Note *1
Non-Repetitive Maximum Avalanche Energy	E_{AS}	342.2	mJ	Note *2
Repetitive Maximum Avalanche Energy	E_{AR}	3.7	mJ	Note *3
Maximum Drain-Source dV/dt	dV_{DS}/dt	20	kV/μs	V_{DS}≦120V
Peak Diode Recovery dV/dt	dV/dt	5	kV/μs	Note *4
Max. Power Dissipation	P_D	37	W	Tc=25°C
		2.16	W	Ta=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

■ Equivalent circuit schematic



Note *1:Tch≦150°C,Repetitive and Non-repetitive
Note *2:StartingTch=25°C,I_{AS}=11A,L=3.77mH,
V_{CC}=48V,R_G=50Ω
E_{AS} limited by maximum channel temperature and Avalanche current.
See to the 'Avalanche Energy' graph
Note *3:Repetitive rating:Pulse width limited by maximum channel temperature.
See to the 'Transient Thermal impedance' graph.
Note *4:I_F≦-I_D, -di/dt = 50A/μs,V_{CC}≦BV_{DSS},Tch≦150°C

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

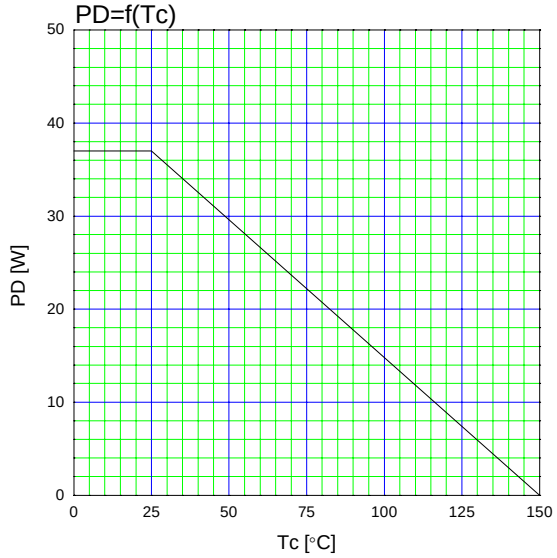
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D= 250μA V_{GS}=0V		120			V
Gate Threshold Voltage	$V_{GS(th)}$	I_D= 250μA V_{DS}=V_{GS}		3.0		5.0	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V V_{GS}=0V	Tch=25°C			25	μA
		V_{DS}=96V V_{GS}=0V	Tch=125°C			250	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V V_{DS}=0V				100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	I_D=13A V_{GS}=10V			63	78	mΩ
Forward Transconductance	g_{fs}	I_D=13A V_{DS}=25V		6	12		S
Input Capacitance	C_{iss}	V_{DS}=75V			760	1140	pF
Output Capacitance	C_{oss}	V_{GS}=0V			170	255	
Reverse Transfer Capacitance	C_{rss}	f=1MH			11	17	
Turn-On Time t_{on}	$t_{d(on)}$	V_{CC}=48V			13	20	ns
	t_r	I_D=13A			5	7.5	
Turn-Off Time t_{off}	$t_{d(off)}$	V_{GS}=10V			20	30	
	t_f	R_{GS}=10 Ω			7.5	11	
Total Gate Charge	Q_G	V_{CC}=60V			26	39	nC
Gate-Source Charge	Q_{GS}	I_D=26A			12	18	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			7	11	
Diode forward on-voltage	V_{SD}	I_F=26A V_{GS}=0V Tch=25°C			1.00	1.50	V
Reverse recovery time	t_{rr}	I_F=26A V_{GS}=0V			130		ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs Tch=25°C			0.7		μC

● Thermal characteristics

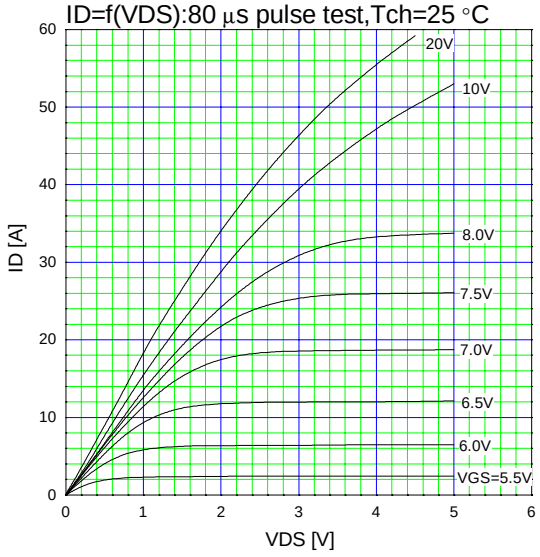
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			3.378	°C/W
	$R_{th(ch-a)}$	channel to ambient			58	°C/W

Characteristics

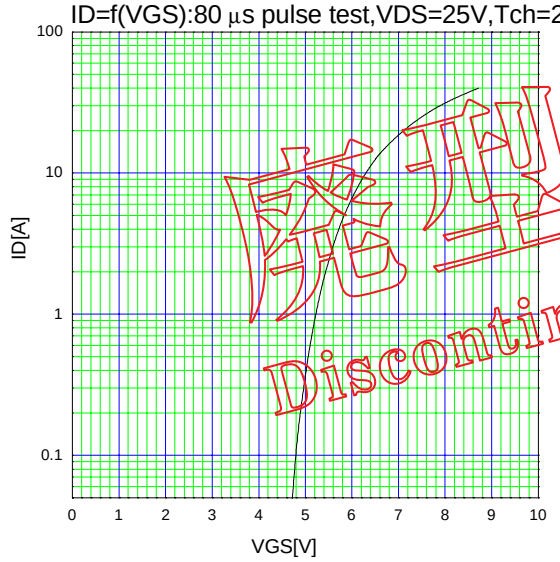
Allowable Power Dissipation
PD=f(Tc)



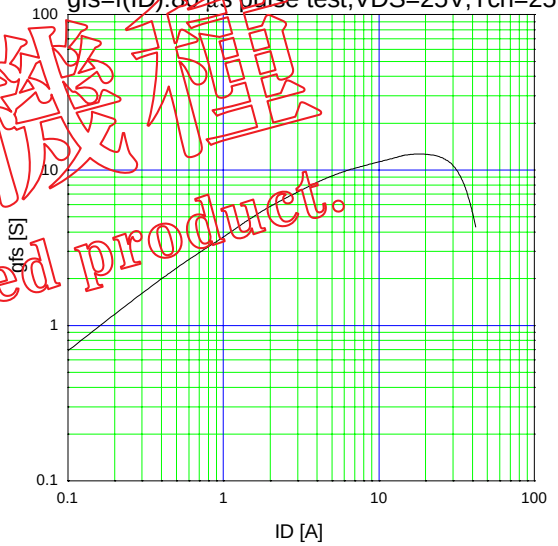
Typical Output Characteristics
ID=f(VDS):80 μs pulse test,Tch=25 °C



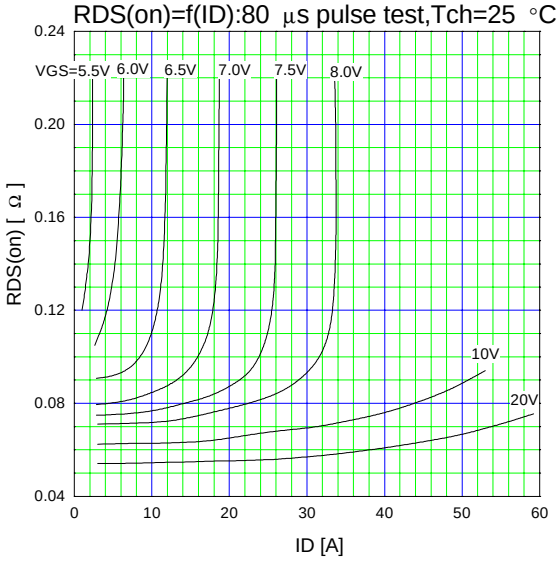
Typical Transfer Characteristic
ID=f(VGS):80 μs pulse test,VDS=25V,Tch=25 °C



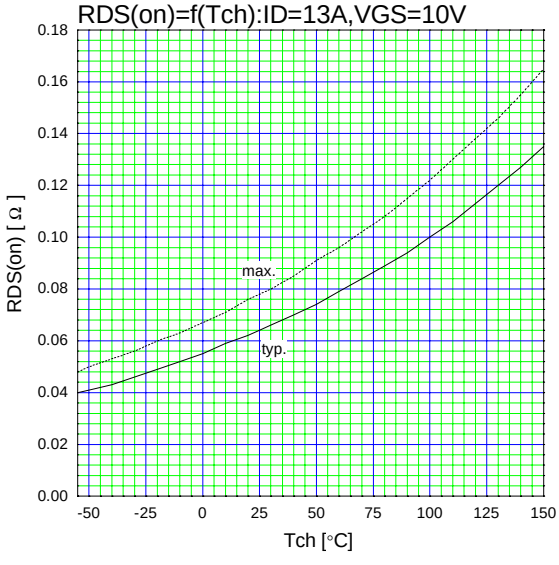
Typical Transconductance
gfs=f(ID):80 μs pulse test,VDS=25V,Tch=25°C



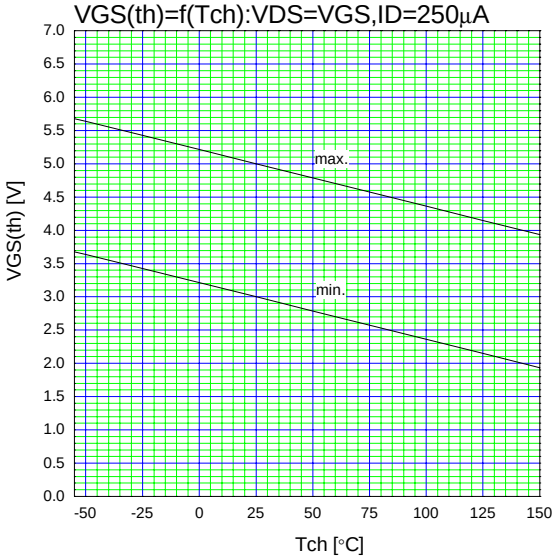
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80 μs pulse test,Tch=25 °C



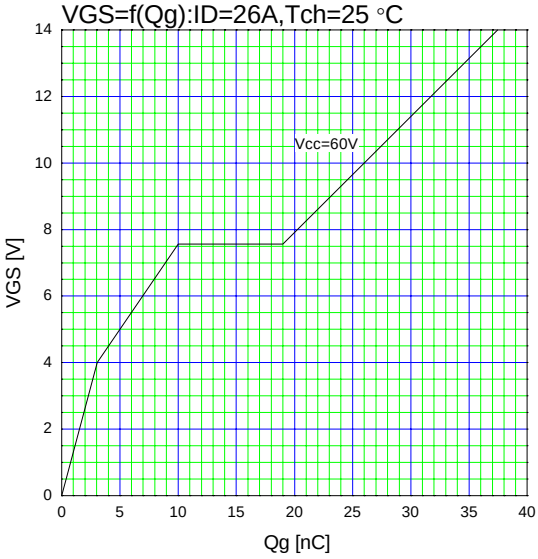
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=13A,VGS=10V



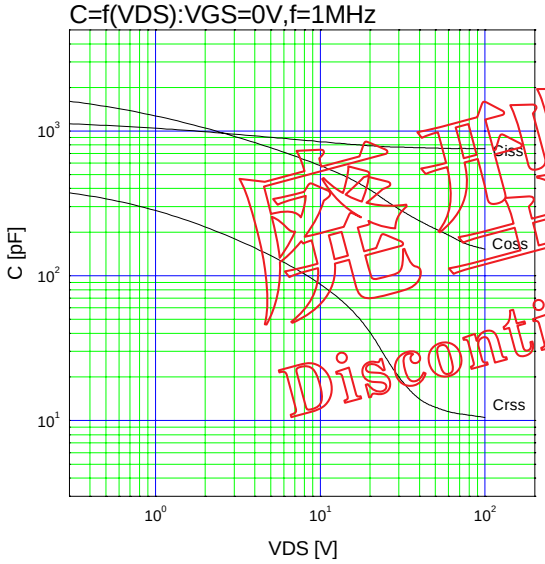
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=250μA



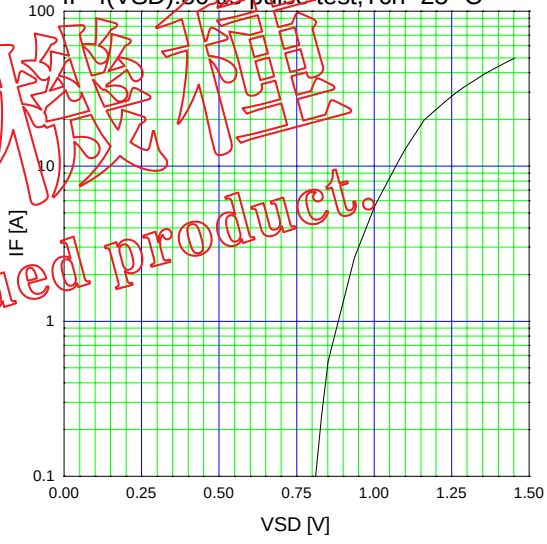
Typical Gate Charge Characteristics
VGS=f(Qg):ID=26A,Tch=25 °C



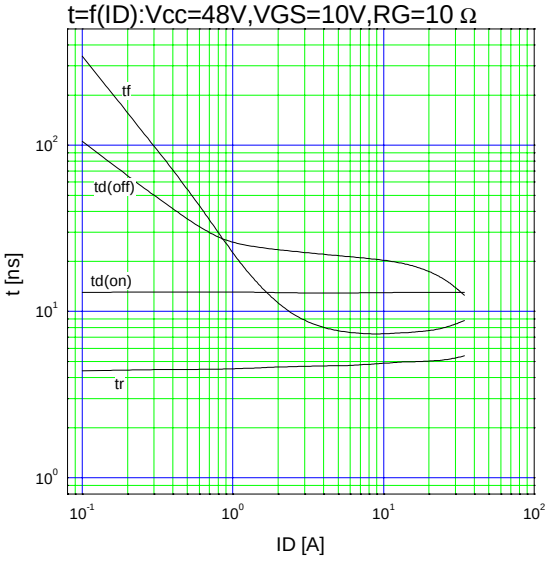
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



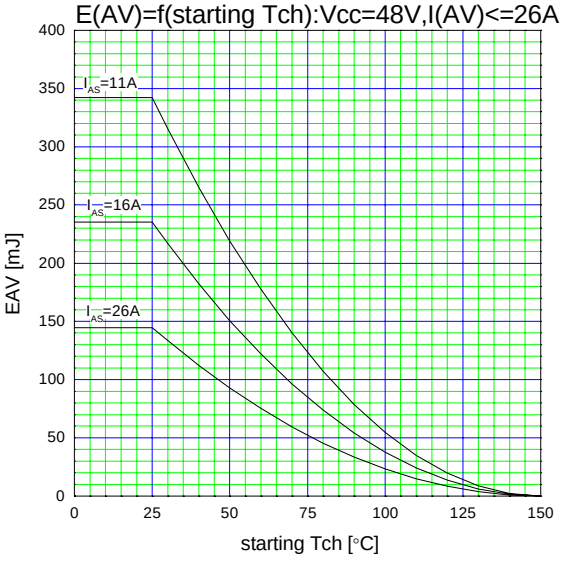
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80 μs pulse test,Tch=25 °C



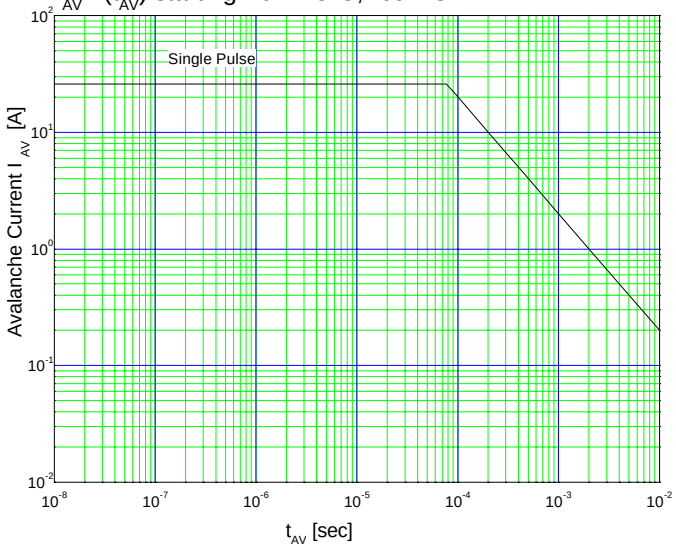
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=48V,VGS=10V,RG=10 Ω



Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=48V,I(AV)<=26A



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



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