2SK3580-01MR

FUJI ELECTRIC

FUJI POWER MOSFET
Super FAP-G Series

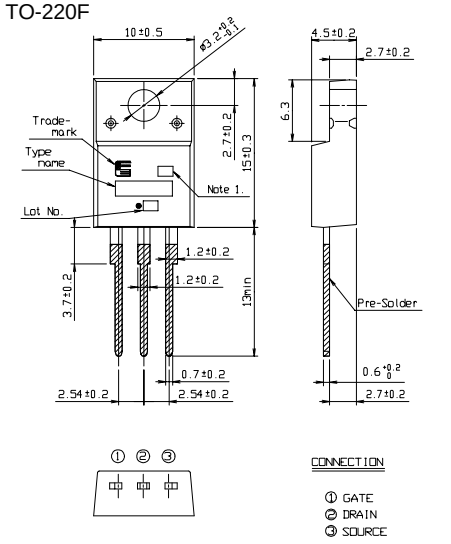
N-CHANNEL SILICON POWER MOSFET

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

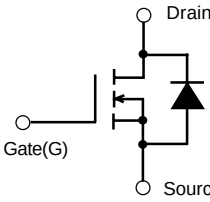
■ Applications
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

■ Outline Drawings

TO-220F



■ Equivalent circuit schematic



■ Maximum ratings and characteristic Absolute maximum ratings

● (Tc=25°C unless otherwise specified)

Item	Symbol		Ratings	Unit
Drain-source voltage	V_{DS}		300	V
	V_{DSX} *5		270	V
Continuous drain current	I_D		±12	A
Pulsed drain current	$I_{D(puls)}$		±48	A
Gate-source voltage	V_{GS}		±30	V
Repetitive or non-repetitive	I_{AR} *2		12	A
Maximum Avalanche Energy	E_{AS} *1		193	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	2.16	W
		Tc=25°C	35	
Operating and storage temperature range	T_{ch}		+150	°C
	T_{stg}		-55 to +150	°C
Isolation Voltage	V_{ISO} *6		2	kVrms

*1 L=2.32mH, Vcc=48V *2 Tch≦150°C *3 IF≦-ID, -di/dt=50A/μs, Vcc≦BVDSS, Tch≦150°C
*4 VDS≦300V *5 VGS=-30V *6 t=60sec f=60Hz

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

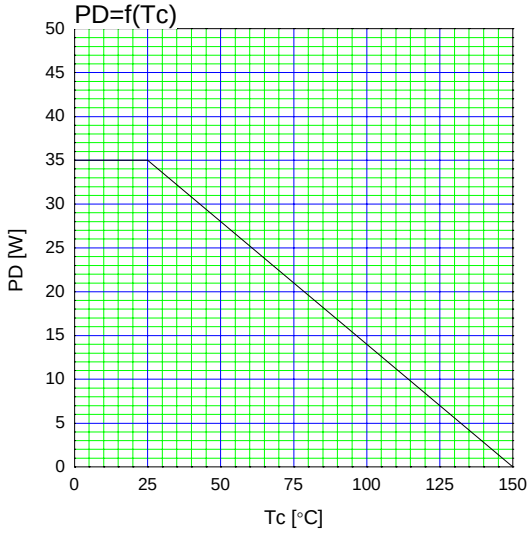
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D=250μA V_{GS}=0V		300			V
Gate threshold voltage	$V_{GS(th)}$	I_D= 250μA V_{DS}=V_{GS}		3.5		4.5	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=300V V_{GS}=0V	Tch=25°C			25	μA
		V_{DS}=240V V_{GS}=0V	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=6A V_{GS}=10V			1.22	0.28	Ω
Forward transcondutance	g_{fs}	I_D=6A V_{DS}=25V		5	10.5		S
Input capacitance	C_{iss}	V_{DS}=25V			980	1470	pF
Output capacitance	C_{oss}	V_{GS}=0V			170	255	
Reverse transfer capacitance	C_{rss}	f=1MHz			5.5	11	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=150V I_D=6A			14.5	29	ns
	t_r	V_{GS}=10V			6.5	9.8	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			28	42	
	t_f				4	6	
Total Gate Charge	Q_G	V_{CC}=150V			23	34.5	nC
Gate-Source Charge	Q_{GS}	I_D=12A			9.7	14.6	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			5.6	11.2	
Avalanche capability	I_{AV}	L=100μH Tch=25°C		12			A
Diode forward on-voltage	V_{SD}	I_F=12A V_{GS}=0V Tch=25°C			1.20	1.80	V
Reverse recovery time	t_{rr}	I_F=12A V_{GS}=0V			0.2		μs
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs Tch=25°C			1.80		μC

● Thermalcharacteristics

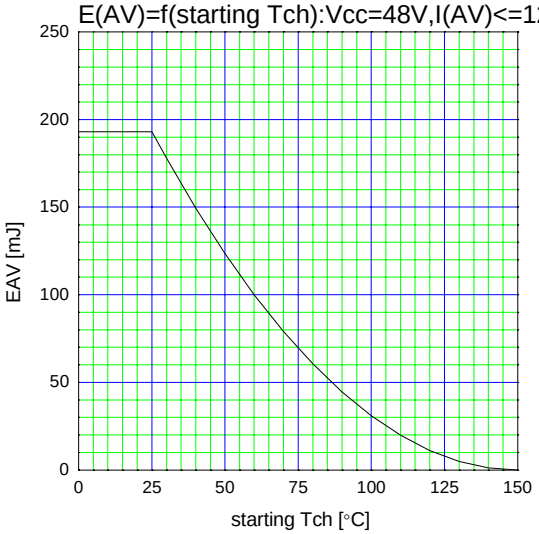
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			3.57	°C/W
	$R_{th(ch-a)}$	channel to ambient			58.0	°C/W

Characteristics

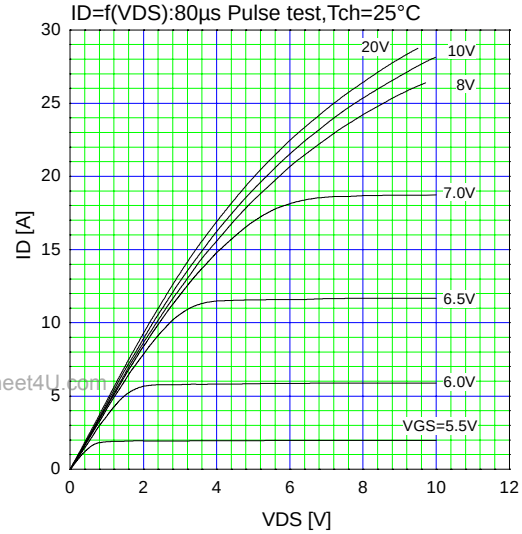
Allowable Power Dissipation
PD=f(Tc)



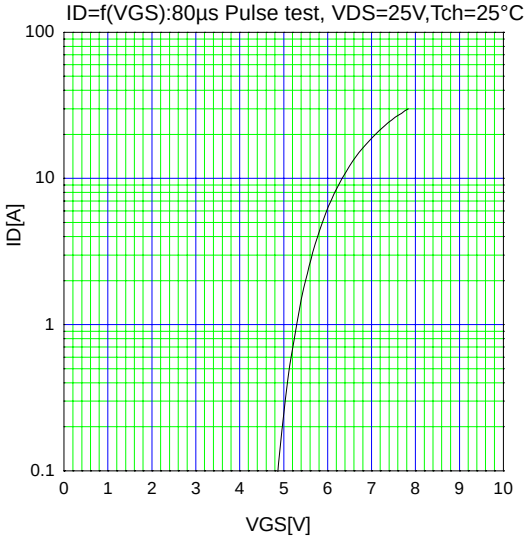
Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=48V,I(AV)<=12A



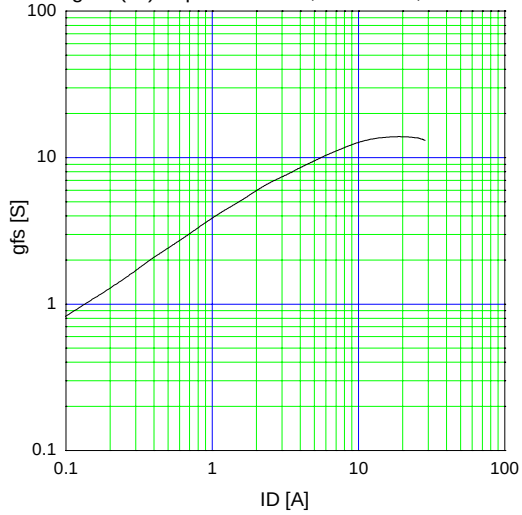
Typical Output Characteristics
ID=f(VDS):80µs Pulse test,Tch=25°C



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

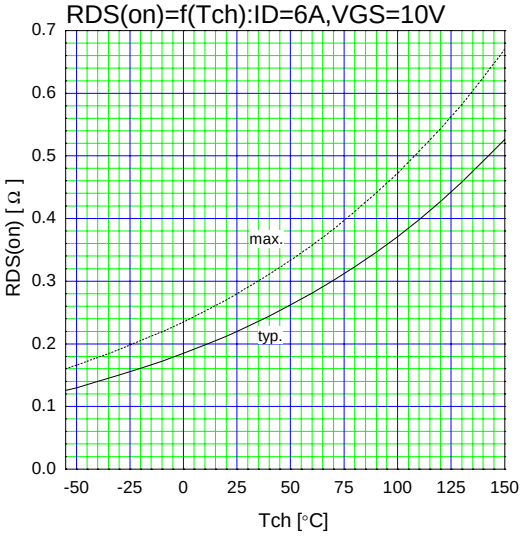


Typical Transconductance
gfs=f(ID):80µs Pulse test, VDS=25V,Tch=25°C

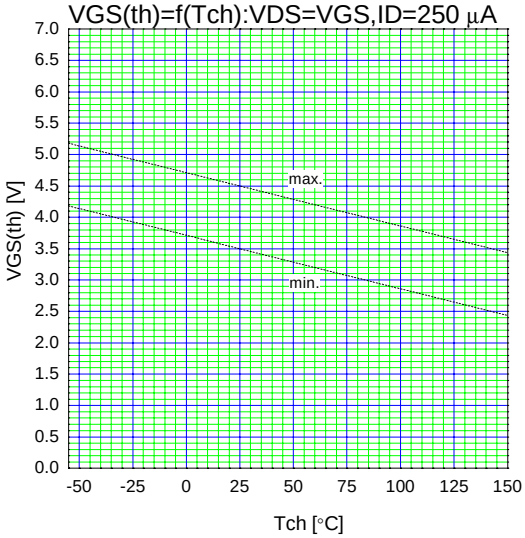


RDS(on)=f(ID):80µs Pulse test, Tch=25°C

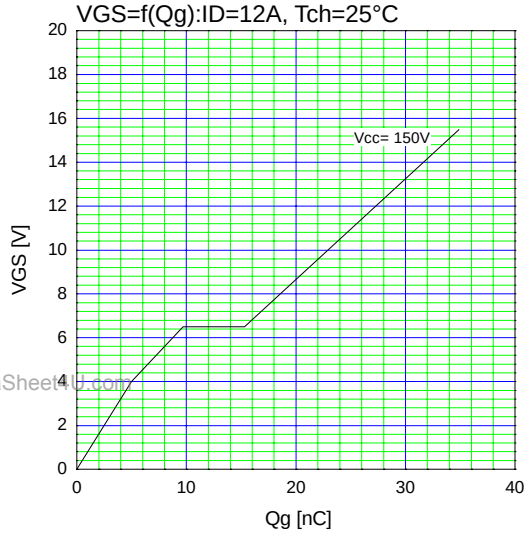
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=6A,VGS=10V



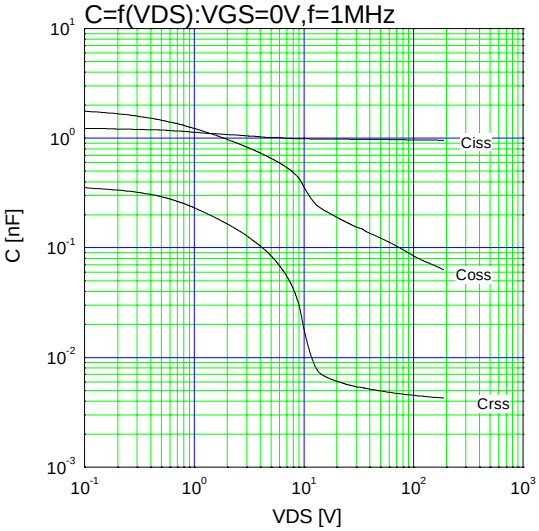
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=250 μA



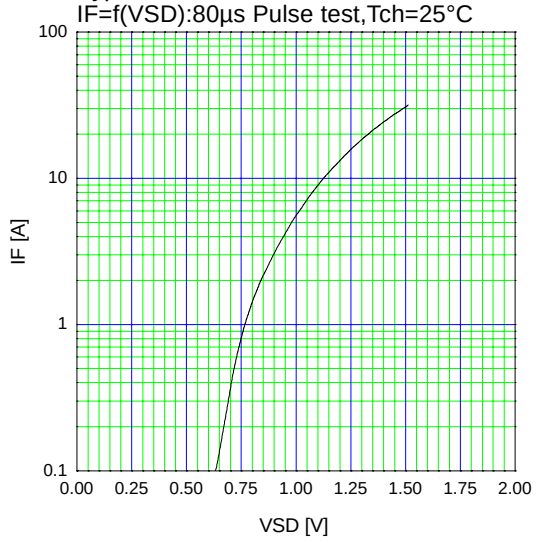
Typical Gate Charge Characteristics
VGS=f(Qg):ID=12A, Tch=25°C



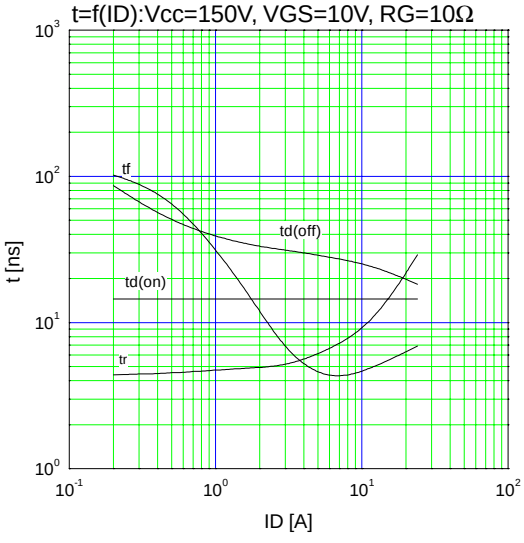
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



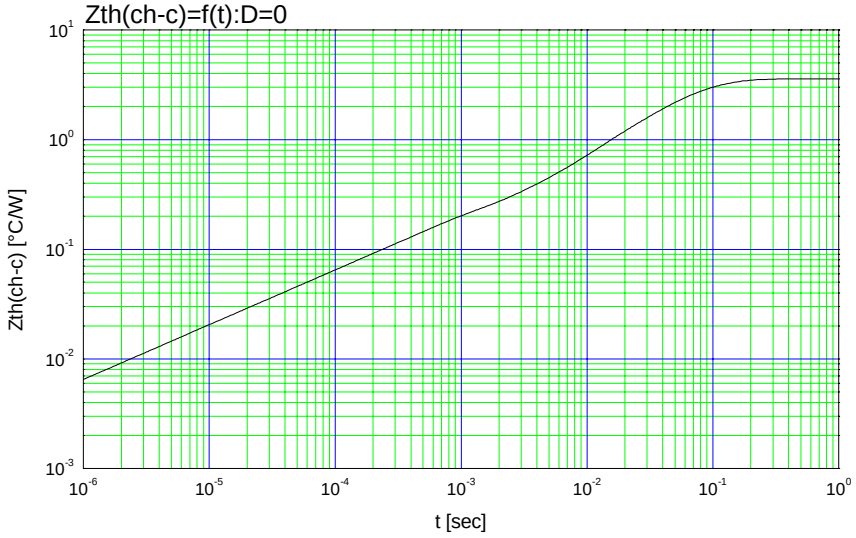
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80μs Pulse test,Tch=25°C



Typical Switching Characteristics vs. ID
t=f(ID):Vcc=150V, VGS=10V, RG=10Ω



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