2SK3693-01MR

200305

FUJI POWER MOSFET
Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

■ Features

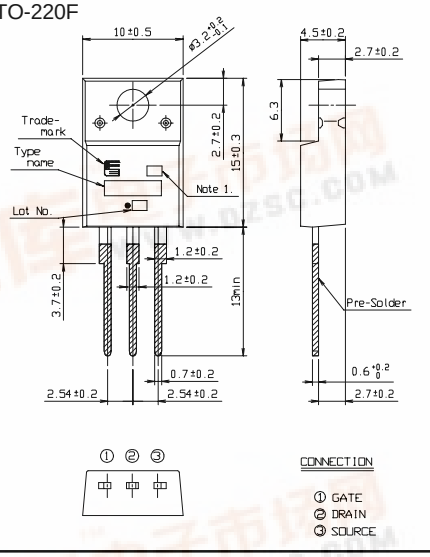
- High speed switching
- Low on-resistance
- No secondary breadown
- Low driving power
- Avalanche-proof

■ Applications

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

■ Outline Drawings [mm]

TO-220F



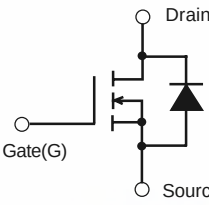
■ Maximum ratings and characteristic Absolute maximum ratings

● (Tc=25°C unless otherwise specified)

Item	Symbol		Ratings	Unit
Drain-source voltage	V_{DS}		450	V
	V_{DSX} *5		450	V
Continuous drain current	I_D		±17	A
Pulsed drain current	$I_{D(puls)}$		±68	A
Gate-source voltage	V_{GS}		±30	V
Repetitive or non-repetitive	I_{AR}	*2	17	A
Maximum Avalanche Energy	E_{AS}	*1	221.9	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	80	
Operating and storage temperature range	T_{ch}		+150	°C
	T_{stg}		-55 to +150	°C
Isolation Voltage	Viso	*6	2000	V

*1 L=1.41mH, Vcc=45V, Tch=25°C 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 V_{DS}≦450V *5 V_{GS}=-30V *6 f=6-Hz, t=60sec.

■ Equivalent circuit schematic



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

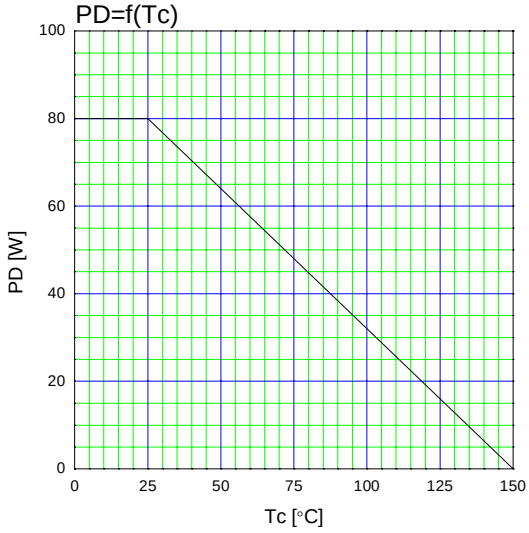
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D= 250μA V_{GS}=0V		450			V
Gate threshold voltage	$V_{GS(th)}$	I_D= 250μA V_{DS}=V_{GS}		3.0		5.0	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=450V V_{GS}=0V	Tch=25°C			25	μA
		V_{DS}=360V V_{GS}=0V	Tch=125°C			250	
Gate-source leakage current	I_{GSS}	V_{GS}=±30V V_{DS}=0V				100	nA
Drain-source on-state resistance	$R_{DS(on)}$	I_D=8.5A V_{GS}=10V			0.29	0.38	Ω
Forward transcondutance	gfs	I_D=8.5A V_{DS}=25V		7	14		S
Input capacitance	Ciss	V_{DS}=25V			1275	1900	pF
Output capacitance	Coss	V_{GS}=0V			200	300	
Reverse transfer capacitance	Crss	f=1MHz			9.5	14	
Turn-on time ton	td(on)	Vcc=300V I_D=8.5A			27	40	ns
	tr	V_{GS}=10V			27	40	
Turn-off time toff	td(off)	R_{GS}=10 Ω			48	72	
	tf				7	11	
Total Gate Charge	Q_G	Vcc=225V			33	50	nC
Gate-Source Charge	Q_{GS}	I_D=17A			13.5	20.3	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			10.5	16	
Avalanche capability	I_{AV}	L=1.41mH Tch=25°C		17			A
Diode forward on-voltage	V_{SD}	I_F=17A V_{GS}=0V Tch=25°C			1.20	1.80	V
Reverse recovery time	trr	I_F=17A V_{GS}=0V			0.57		μs
Reverse recovery charge	Qrr	-di/dt=100A/μs Tch=25°C			6.5		μC

● Thermal characteristics

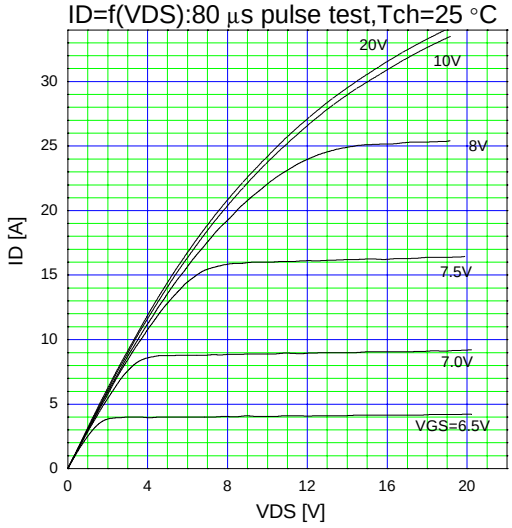
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.563	°C/W

Characteristics

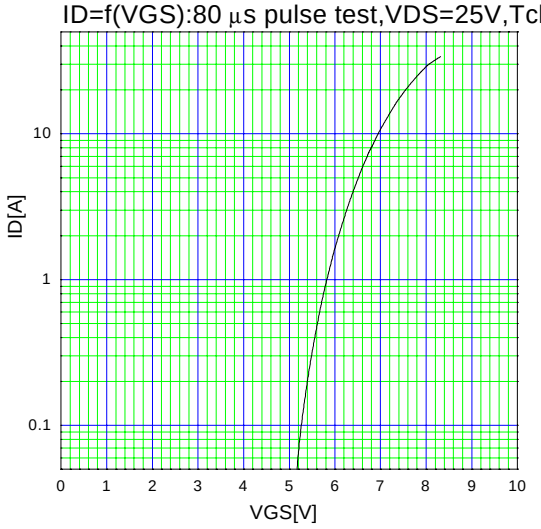
Allowable Power Dissipation
PD=f(Tc)



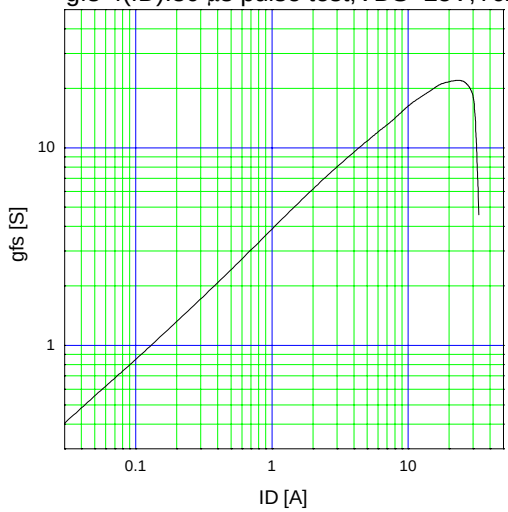
Typical Output Characteristics
ID=f(VDS):80 μs pulse test,Tch=25 °C



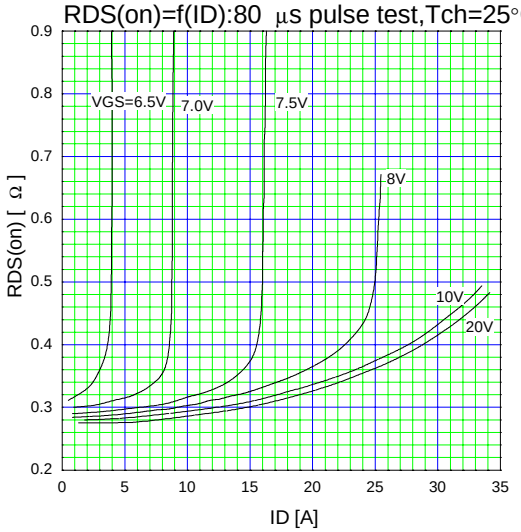
Typical Transfer Characteristic
ID=f(VGS):80 μs pulse test,VDS=25V,Tch=25°C



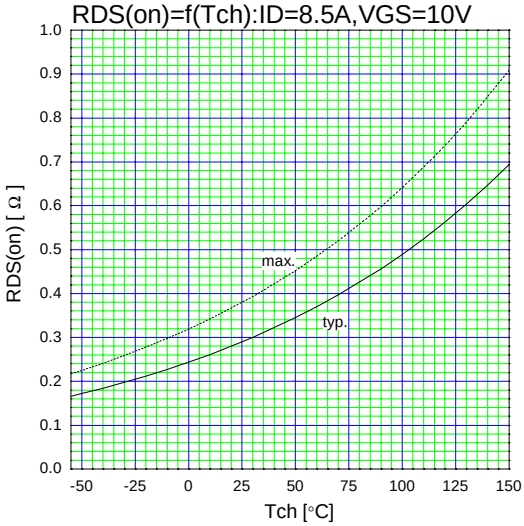
Typical Transconductance
gfs=f(ID):80 μs pulse test,VDS=25V,Tch=25°C



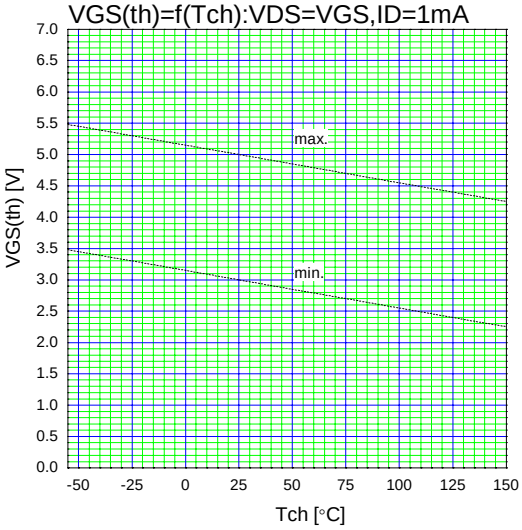
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80 μs pulse test,Tch=25°C



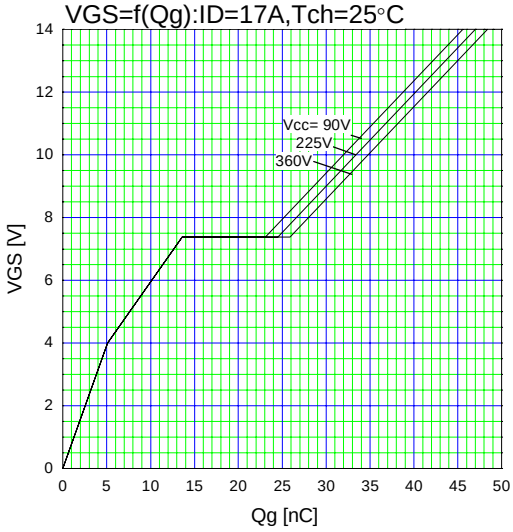
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=8.5A,VGS=10V



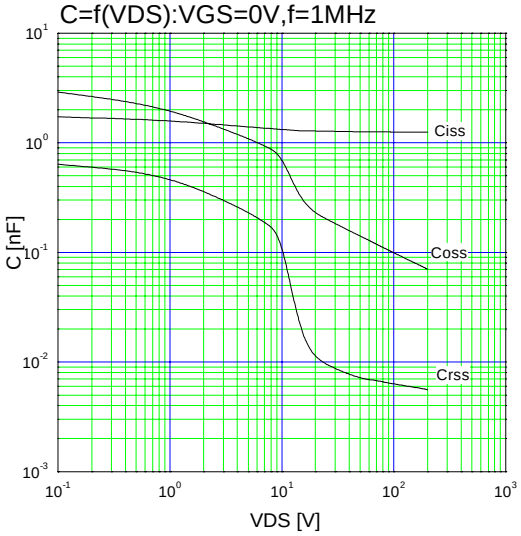
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA



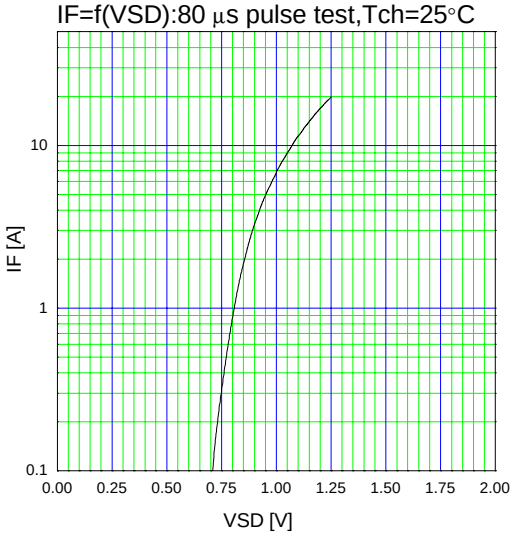
Typical Gate Charge Characteristics
VGS=f(Qg):ID=17A,Tch=25°C



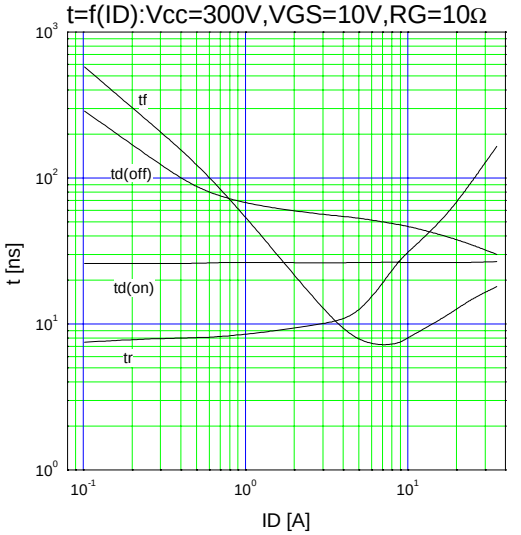
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



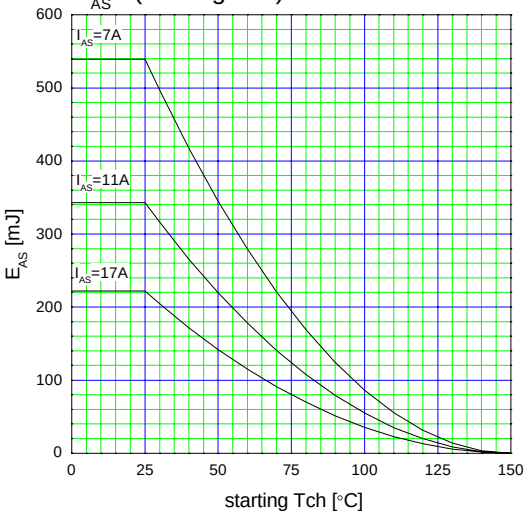
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80 μs pulse test,Tch=25°C



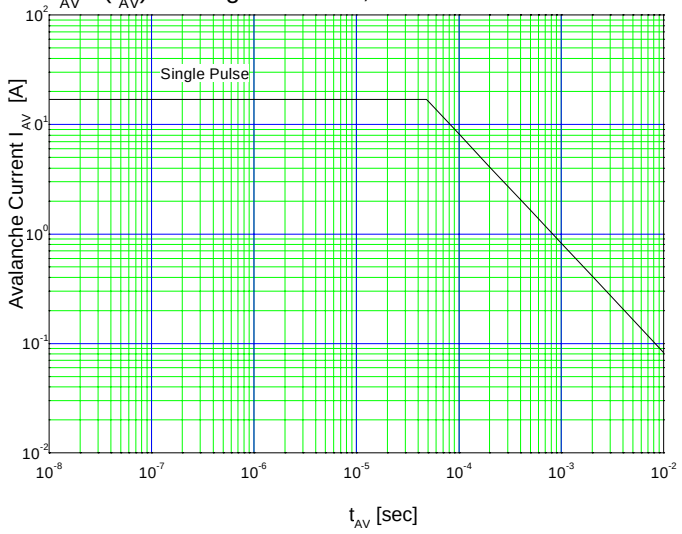
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=300V,VGS=10V,RG=10Ω



Maximum Avalanche Energy vs. starting Tch
E_{AS}=f(starting Tch):Vcc=45V



Maximum Avalanche Current Pulsewidth
I_{AV}=f(t_{AV}):starting Tch=25◦C,Vcc=45V



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