2SK3929-01MR

FUJI ELECTRIC

N-CHANNEL SILICON POWER MOSFET

FUJI POWER MOSFET

Super FAP-G Series

■ Features

High speed switching **Low on-resistance**

No secondary breadown **Low driving power**

Avalanche-proof

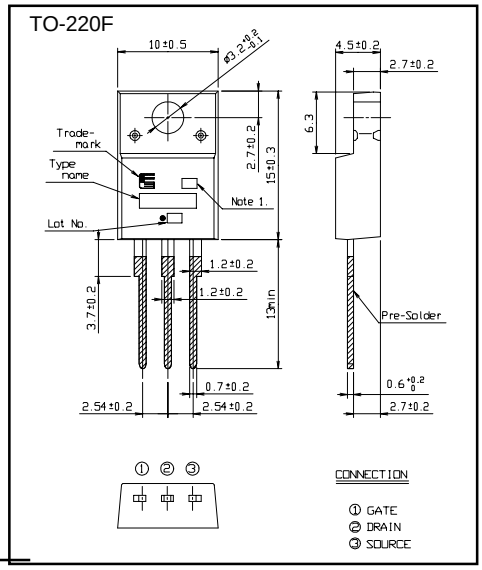
■ Applications

Switching regulators **DC-DC converters**

UPS (Uninterruptible Power Supply)

■ Outline Drawings (mm) 200406

TO-220F

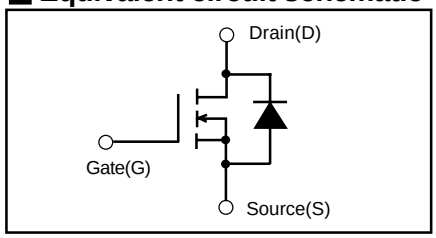


■ Maximum ratings and characteristic

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

Item	Symbol	Ratings	Unit	Remarks
Drain-source voltage	V_{DS}	600	V	
	V_{DSX}	600	V	V_{GS}=-30V
Continuous Drain Current	I_D	11	A	
Pulsed Drain Current	$I_{D(puls)}$	±44	A	
Gate-Source Voltage	V_{GS}	±30	V	
Maximum Avalanche current	I_{AR}	11	A	Note *1
Non-Repetitive Maximum Avalanche Energy	E_{AS}	439.1	mJ	Note *2
Repetitive Maximum Avalanche Energy	E_{AR}	7	mJ	Note *3
Maximum Drain-Source dV/dt	dV_{DS}/dt	20	kV/µs	V_{DS}≦600V
Peak Diode Recovery dV/dt	dV/dt	5	kV/µs	Note *4
Peak Diode Recovery -di/dt	-di/dt	100	A/µs	Note *5
Max. Power Dissipation	P_D	70	W	Tc=25°C
		2.16		Ta=25°C
Operating and Storage Temperature range	T_{ch}	+150	℃	
	T_{stg}	-55 to +150	℃	
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}=5A,L=32.2mH,
V_{CC}=60V,R_G=50Ω
EAS limited by maximum channel temperature and avalanch current.
See to the 'Avalanche Energy' graph

Note *3:Repetitive rating:Pulse width limited by maximum channel temperature.
See to the 'Transient Theemal impedance' graph

Note *4:I_F≦-I_D, -di/dt=100A/µs,V_{CC}≦BV_{DSS},Tch≦150°C

Note *5:I_F≦-I_D, dv/dt=5kV/µs,V_{CC}≦ BV_{DSS},Tch≦150°C

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

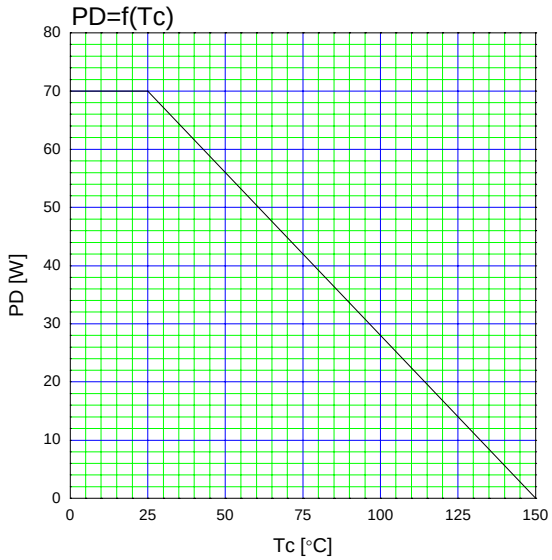
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltaget	BV_{DSS}	I_D= 250µA V_{GS}=0V		600			V
Gate Threshold Voltage	$V_{GS(th)}$	I_D= 250µA V_{DS}=V_{GS}		3.0		5.0	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V V_{GS}=0V	T_{ch}=25°C			25	µA
		V_{DS}=480V V_{GS}=0V	T_{ch}=125°C			2.0	mA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V V_{DS}=0V				100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	I_D=5.5A V_{GS}=10V			0.62	0.80	Ω
Forward Transcondutance	g_{fs}	I_D=5.5A V_{DS}=25V		5	10		S
Input Capacitance	C_{iss}	V_{DS}=25V			1100	1650	pF
Output Capacitance	C_{oss}	V_{GS}=0V			150	225	
Reverse Transfer Capacitance	C_{rss}	f=1MH			8	12	
Turn-On Time t_{on}	$t_{d(on)}$	V_{CC}=300V I_D=5.5A			17	26	ns
	t_r	V_{GS}=10V			7	11	
Turn-Off Time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			40	60	
	t_f				8	12	
Total Gate Charge	Q_G	V_{CC}=300V			30	45	nC
Gate-Source Charge	Q_{GS}	I_D=11A			9	13.5	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			10	15	
Diode forward on-voltage	V_{SD}	I_F=11A V_{GS}=0V T_{ch}=25°C			1.00	1.50	V
Reverse recovery time	t_{rr}	I_F=11A V_{GS}=0V			120	250	ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/µs T_{ch}=25°C			0.6	1.5	µC

● **Thermalcharacteristics**

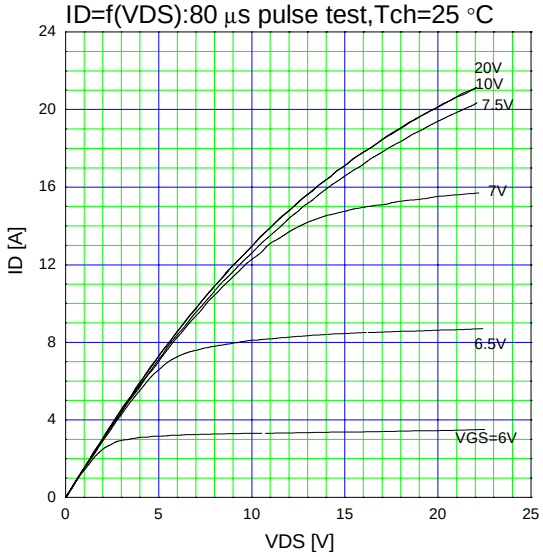
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.786	°C/W
	$R_{th(ch-a)}$	channel to ambient			58	°C/W

Characteristics

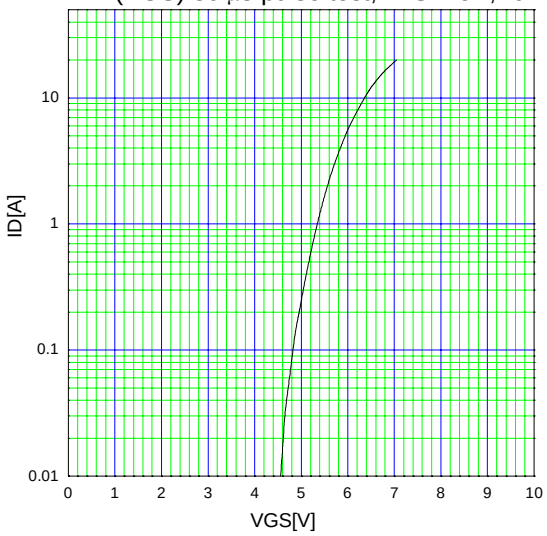
Allowable Power Dissipation
PD=f(Tc)



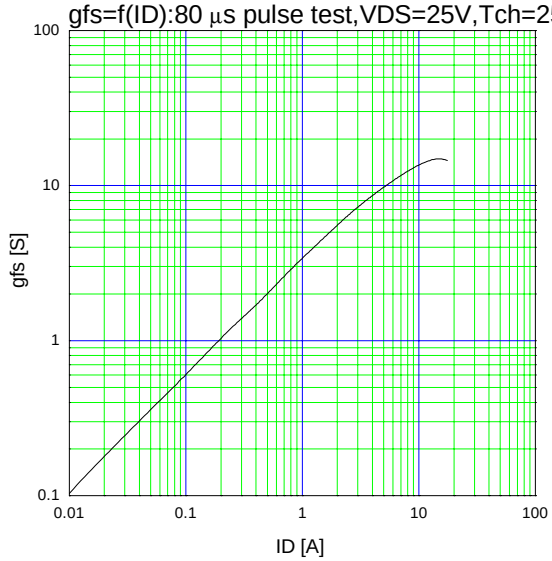
Typical Output Characteristics
ID=f(VDS):80 μs pulse test,Tch=25 °C



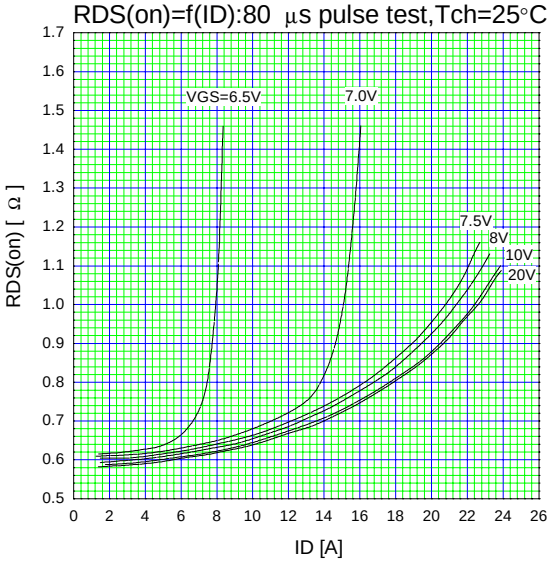
Typical Transfer Characteristic
ID=f(VGS):80 μs pulse test,VDS=25V,Tch=25°C



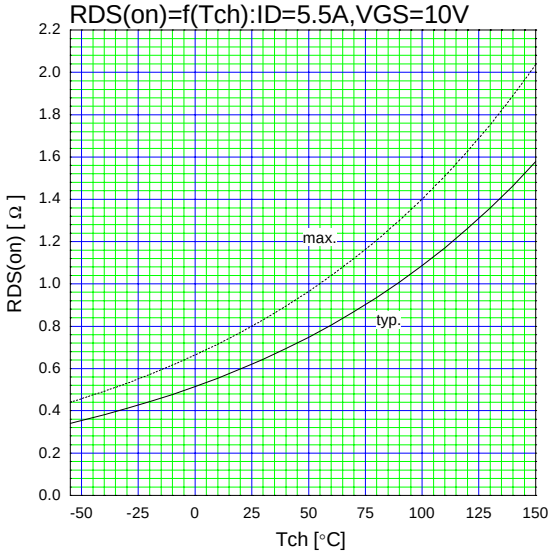
Typical Transconductance
gfs=f(ID):80 μs pulse test,VDS=25V,Tch=25°C



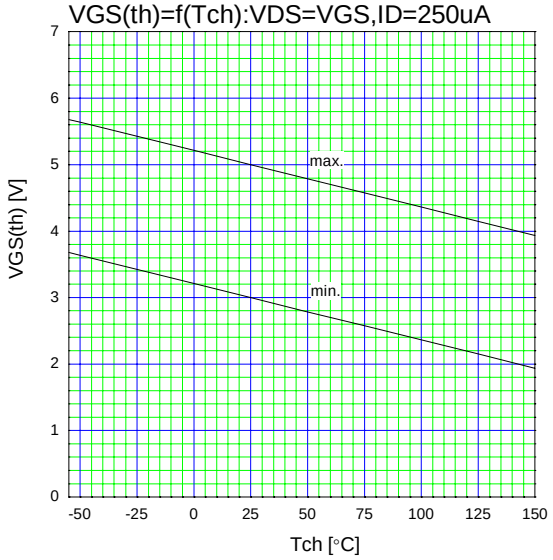
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80 μs pulse test,Tch=25°C



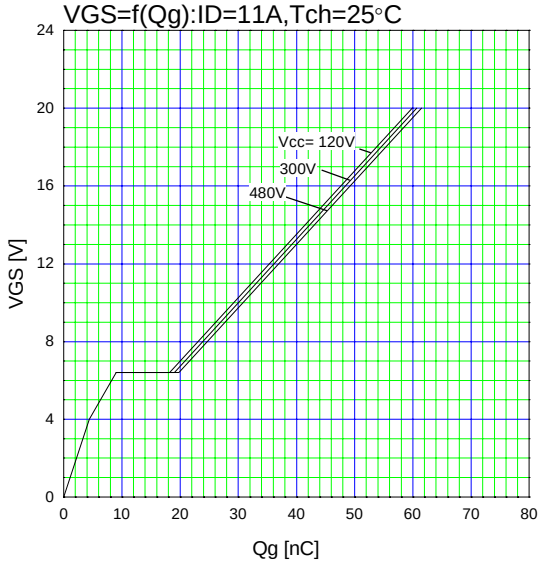
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=5.5A,VGS=10V



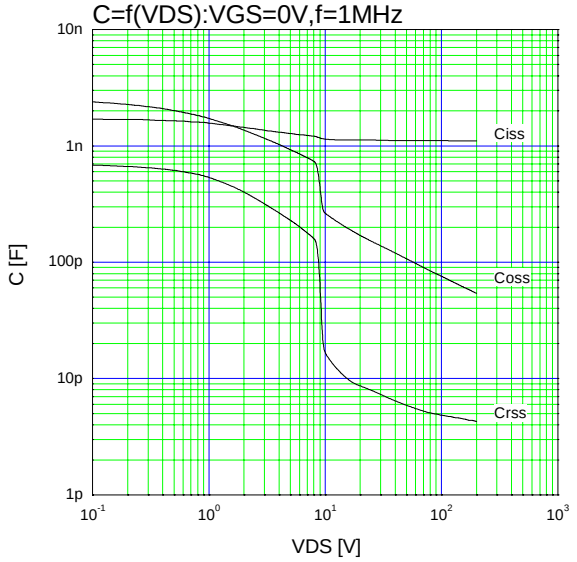
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=250uA



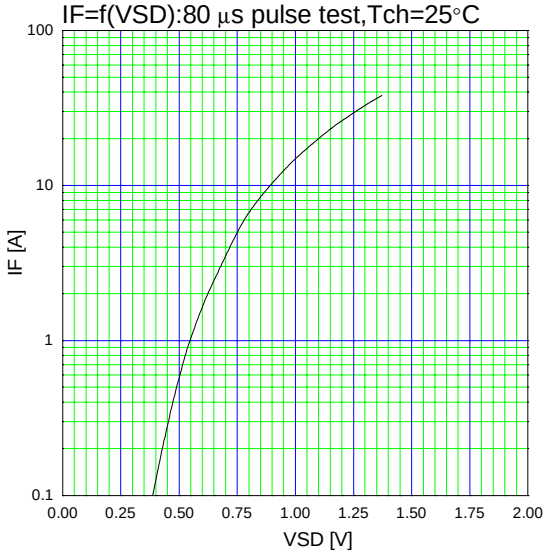
Typical Gate Charge Characteristics
VGS=f(Qg):ID=11A,Tch=25°C



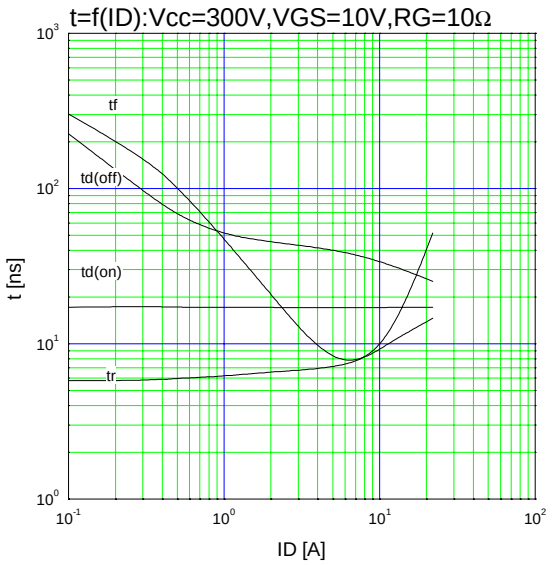
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



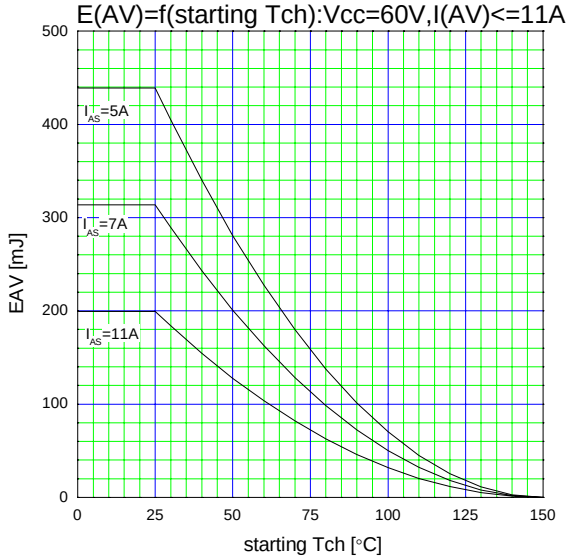
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80 μs pulse test,Tch=25°C



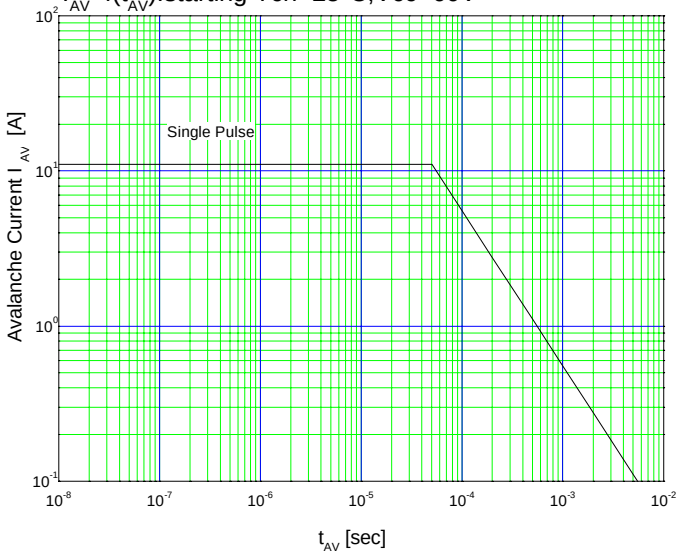
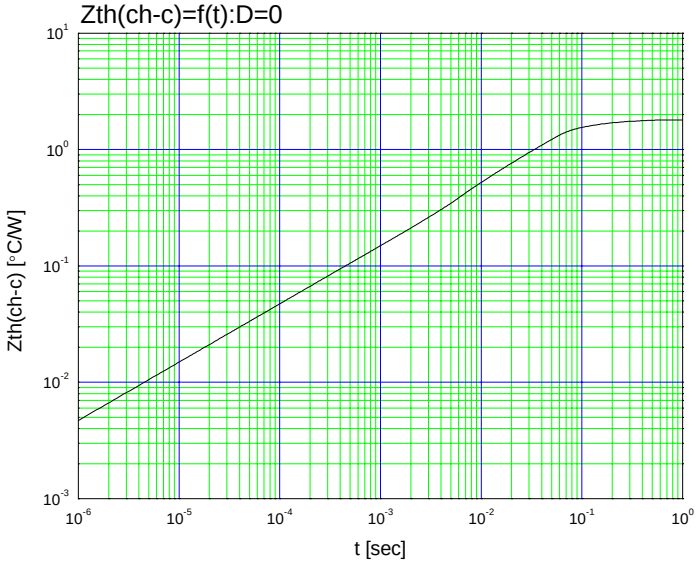
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=300V,VGS=10V,RG=10Ω



Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=60V,I(AV)<=11A



Maximum Avalanche Current Pulsewidth
I_{AV}=f(t_{AV}):starting Tch=25°C,Vcc=60V



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