2SK3609-01

200304

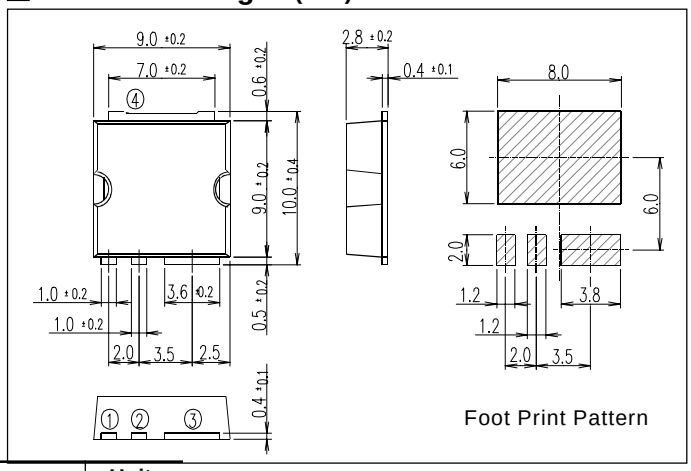
FUJI POWER MOSFET
Super FAP-G Series

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)



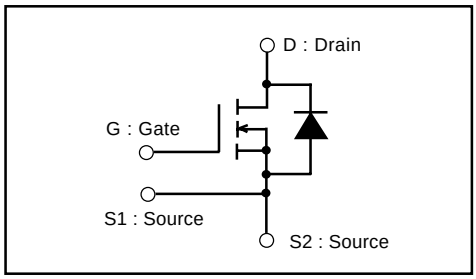
■ Maximum ratings and characteristic

Absolute maximum ratings

● (Tc=25°C unless otherwise specified)

Item	Symbol		Ratings	Unit
Drain-source voltage	V_{DS}		200	V
	V_{DSX} *5		170	V
Continuous drain current	I_D	Tc=25°C	±18	A
		Ta=25°C	±2.7 **	A
Pulsed drain current	$I_{D(puls)}$		±72	A
Gate-source voltage	V_{GS}		±30	V
Non-repetitive Avalanche current	I_{AS} *2		18	A
Maximum Avalanche Energy	E_{AS} *1		125.5	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	Tc=25°C	105	W
		Ta=25°C	2.4 **	
Operating and storage temperature range	T_{ch}		+150	℃
	T_{stg}		-55 to +150	℃

■ Equivalent circuit schematic



** Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area : 500mm²)
*1 L=620μH, Vcc=48V,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} ≦ 200V *5 V_{GS}=-30V

● 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		200			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}=200V V_{GS}=0V	Tch=25°C			25	μA
		V_{DS}=160V 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=6.5A V_{GS}=10V			131	170	mΩ
Forward transcondutance	g_{fs}	I_D=6.5A V_{DS}=25V		5.5	11		S
Input capacitance	C_{iss}	V_{DS}=75V			770	1155	pF
Output capacitance	C_{oss}	V_{GS}=0V			110	165	
Reverse transfer capacitance	C_{rss}	f=1MHz			5	7.5	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=48V I_D=6.5A			12	18	ns
	t_r	V_{GS}=10V			2.6	3.9	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			22	33	
	t_f				6.1	9.2	
Total Gate Charge	Q_G	V_{CC}=100V			21	31.5	nC
Gate-Source Charge	Q_{GS}	I_D=13A			8	12	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			5	7.5	
Avalanche capability	I_{AV}	L=620μH Tch=25°C		18			A
Diode forward on-voltage	V_{SD}	I_F=13A V_{GS}=0V Tch=25°C			1.10	1.65	V
Reverse recovery time	t_{rr}	I_F=13A V_{GS}=0V			0.15		μs
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs Tch=25°C			0.88		μC

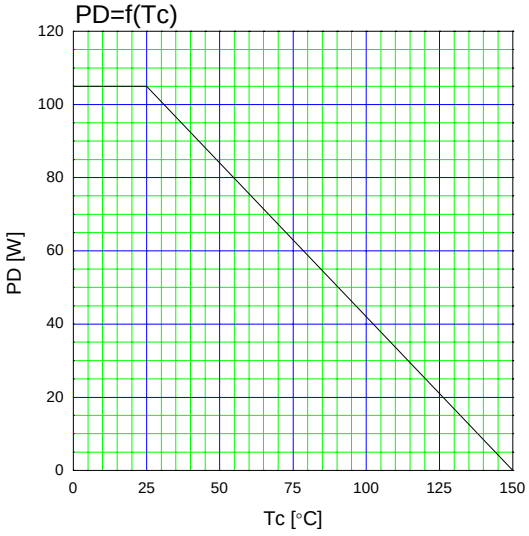
● Thermalcharacteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.191	°C/W
	$R_{th(ch-a)}$	channel to ambient			87.0	°C/W
	$R_{th(ch-a)}$ **	channel to ambient			52.0	°C/W

** Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area : 500mm²)

Characteristics

Allowable Power Dissipation
PD=f(Tc)



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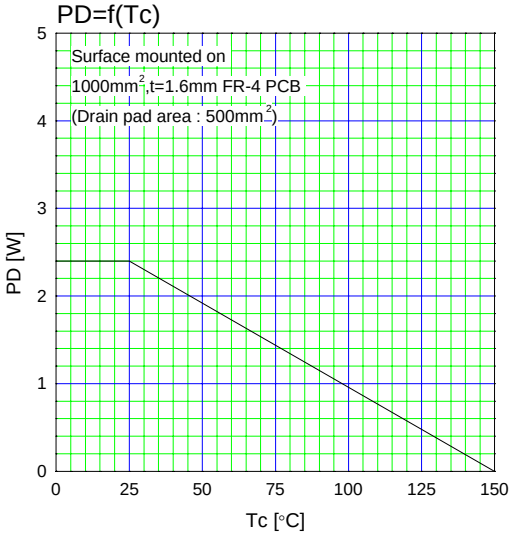
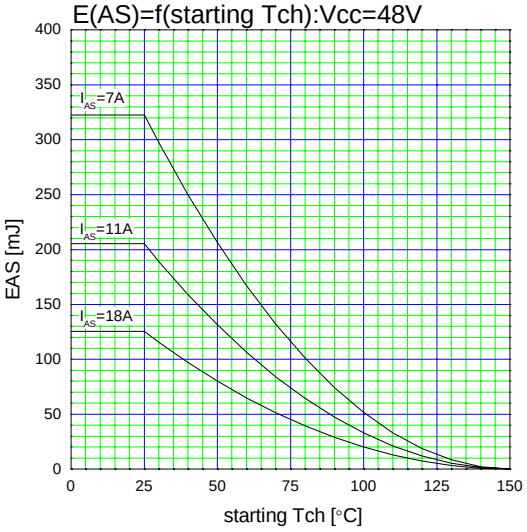
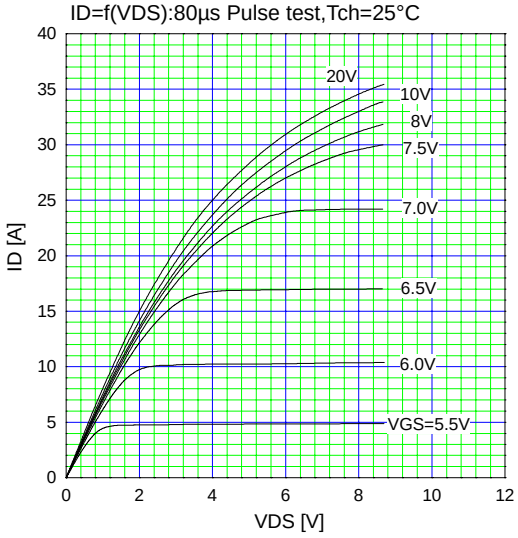
PD=f(Tc)



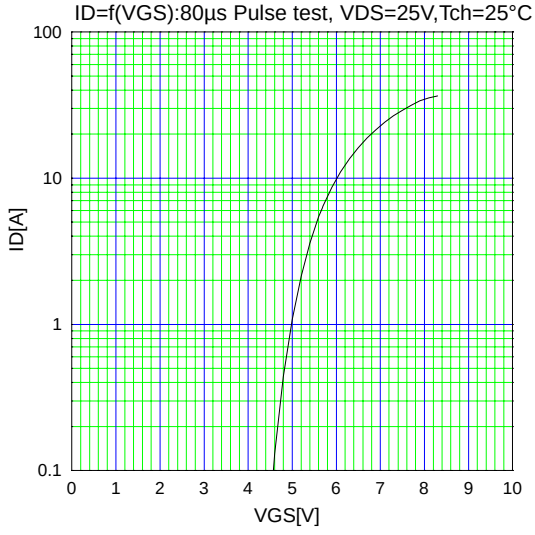
Maximum Avalanche Energy vs. starting Tch
E(AS)=f(starting Tch):Vcc=48V



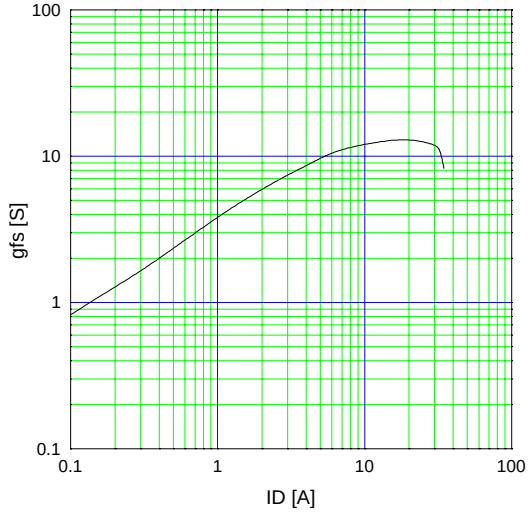
Typical Output Characteristics
ID=f(VDS):80µs Pulse test,Tch=25°C



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

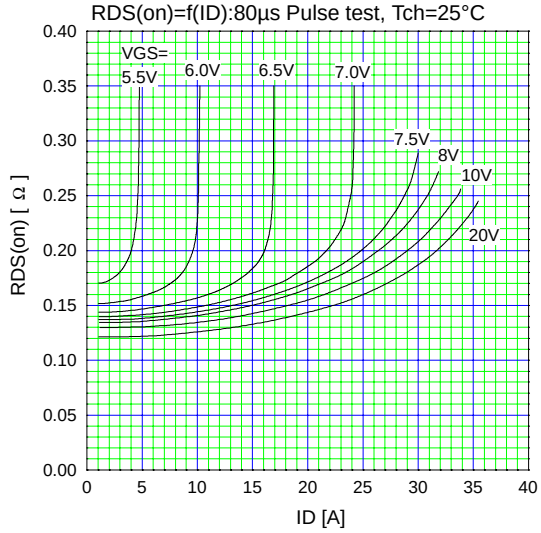


Typical Transconductance
gfs=f(ID):80µs Pulse test, VDS=25V,Tch=25°C



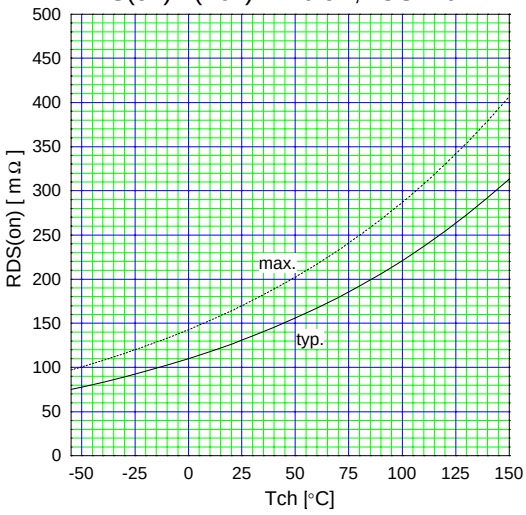
Typical Drain-Source on-state Resistance

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



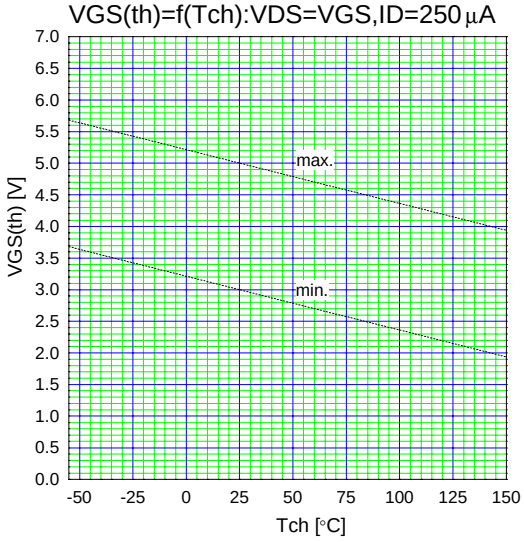
Drain-Source On-state Resistance

RDS(on)=f(Tch):ID=6.5A,VGS=10V



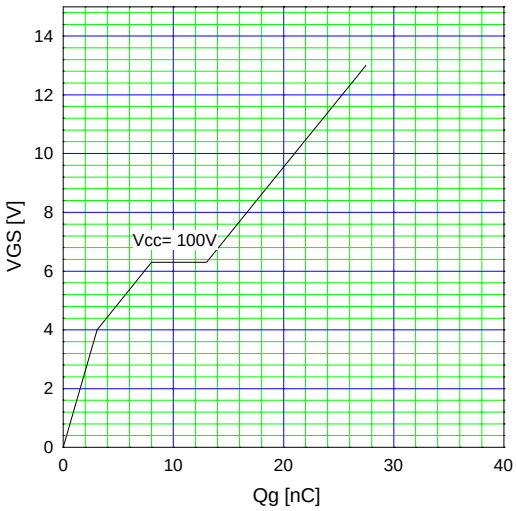
Gate Threshold Voltage vs. Tch

VGS(th)=f(Tch):VDS=VGS,ID=250µA



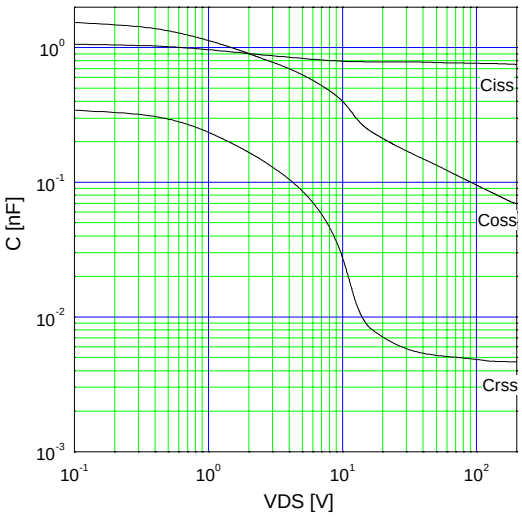
Typical Gate Charge Characteristics

VGS=f(Qg):ID=13A, Tch=25°C



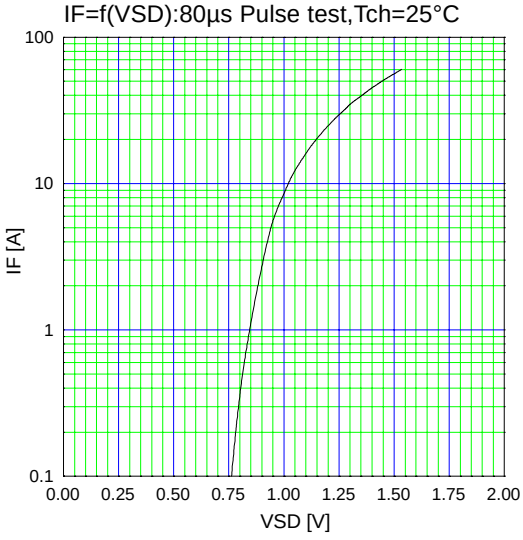
Typical Capacitance

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

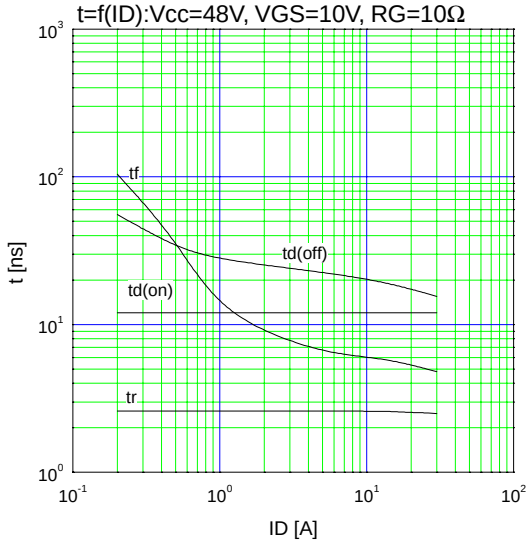


Typical Forward Characteristics of Reverse Diode

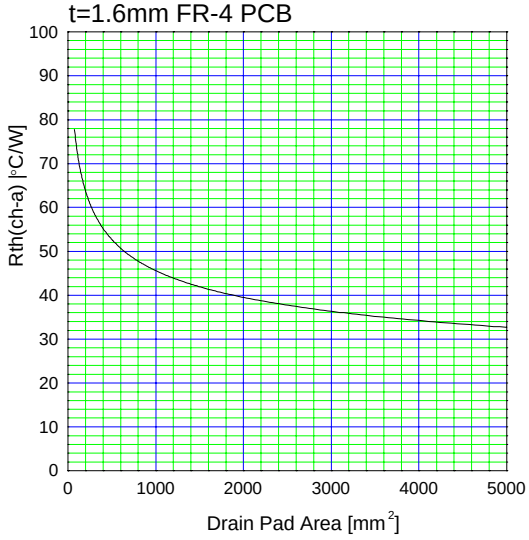
IF=f(VSD):80µs Pulse test,Tch=25°C



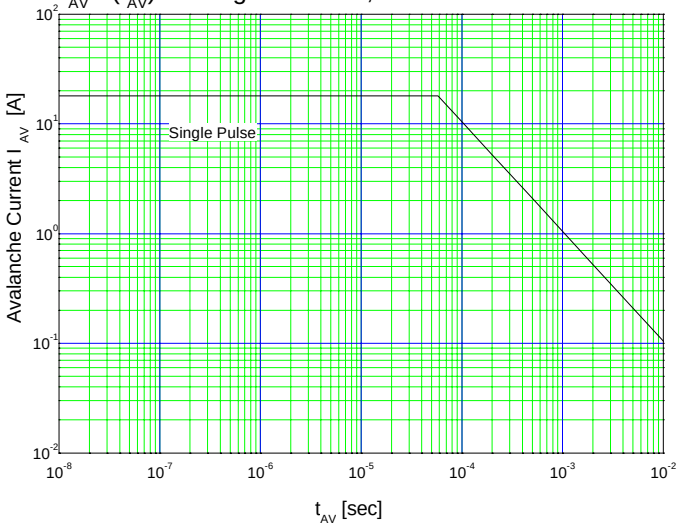
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=48V, VGS=10V, RG=10Ω



Thermal Resistance vs. Drain Pad area
t=1.6mm FR-4 PCB



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