2SK3601-01

FUJI ELECTRIC

FUJI POWER MOSFET
Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

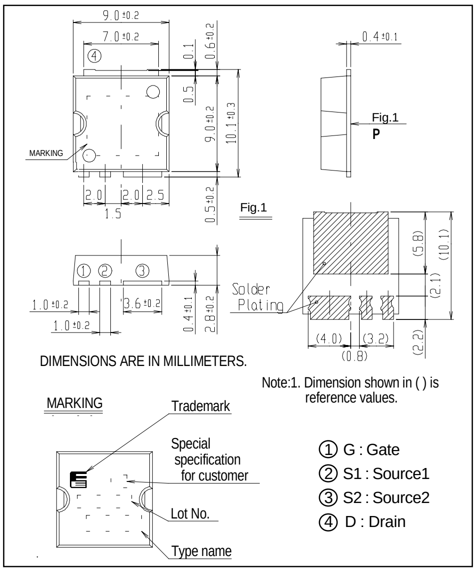
■ Features

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

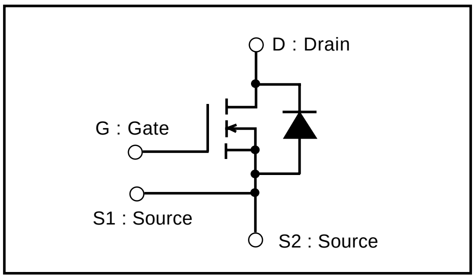
■ Applications

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

■ Outline Drawings (mm)



■ Equivalent circuit schematic



■ Maximum ratings and characteristicAbsolute maximum ratings

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

Item	Symbol		Ratings	Unit
Drain-source voltage	V_{DS}		100	V
	V_{DSX} *5		70	V
Continuous drain current	I_D	Tc=25°C	±20	A
		Ta=25°C	±4.4	A
Pulsed drain current	$I_{D(puls)}$		±80	A
Gate-source voltage	V_{GS}		±30	V
Non-repetitive Avalanche current	I_{AS} *2		20	A
Maximum Avalanche Energy	E_{AS} *1		227	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	50	W
		Ta=25°C	2.4 **	
Operating and storage	T_{ch}		+150	℃
temperature range	T_{stg}		-55 to +150	℃

** Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area : 500mm²)
*1 L=681µH, Vcc=48V *2 Tch≦150°C *3 I_F≦-I_D, -di/dt=50A/µs, Vcc≦BV_{DSS}, Tch≦150°C
*4 V_{DS} ≦100V *5 V_{GS}=-30V

● **Electrical characteristics (Tc =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		100			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}=100V V_{GS}=0V	T_{ch}=25°C			25	µA
		V_{DS}=80V V_{GS}=0V	T_{ch}=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=10A V_{GS}=10V			47	62	mΩ
Forward transcondutance	g_{fs}	I_D=10A V_{DS}=25V		6	12		S
Input capacitance	C_{iss}	V_{DS}=75V			730	1095	pF
Output capacitance	C_{oss}	V_{GS}=0V			190	285	
Reverse transfer capacitance	C_{rss}	f=1MHz			12	18	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=48V I_D=10A			12	18	ns
	t_r	V_{GS}=10V			3.8	6	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			23	35	
	t_f				8.5	13	
Total Gate Charge	Q_G	V_{CC}=50V			22	33	nC
Gate-Source Charge	Q_{GS}	I_D=20A			9	13.5	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			6	9	
Avalanche capability	I_{AV}	L=100µH T_{ch}=25°C		20			A
Diode forward on-voltage	V_{SD}	I_F=20A V_{GS}=0V T_{ch}=25°C			1.10	1.65	V
Reverse recovery time	t_{rr}	I_F=20A V_{GS}=0V			65		ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/µs T_{ch}=25°C			0.17		µC

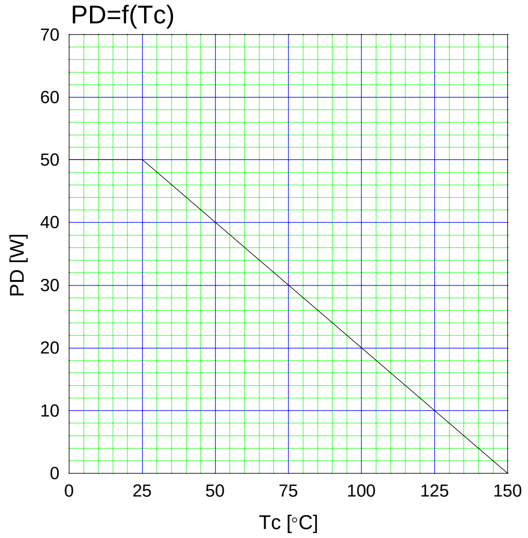
● **Thermalcharacteristics**

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			2.5	°C/W
	$R_{th(ch-a)}$	channel to ambient			87.0	°C/W
	$R_{th(ch-a)}$ **	channel to ambient			52.0	

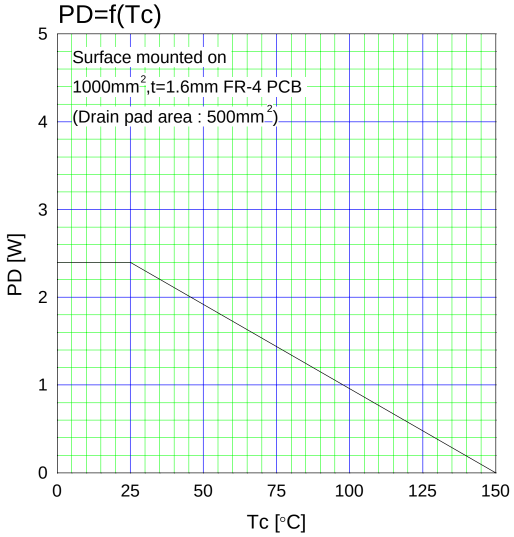
** Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area : 500mm²)

Characteristics

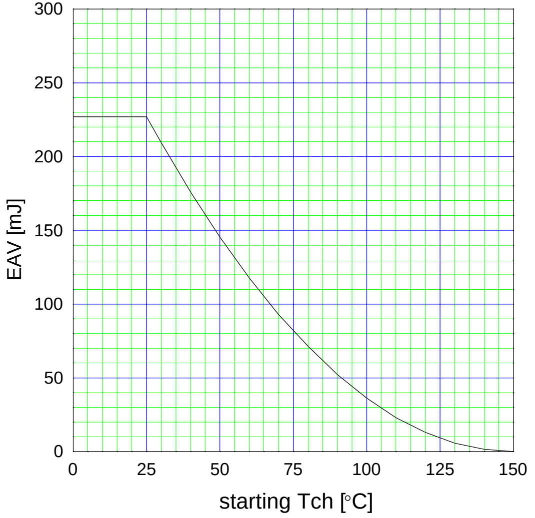
Allowable Power Dissipation
PD=f(Tc)



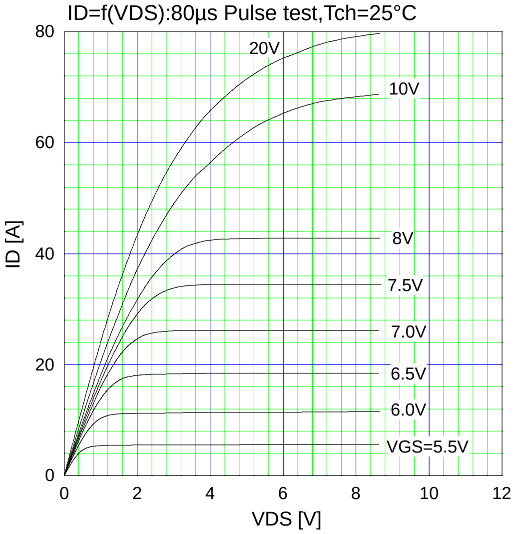
Allowable Power Dissipation
PD=f(Tc)



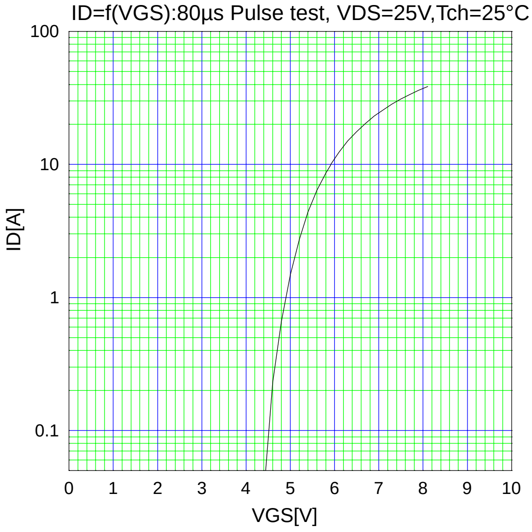
Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=48V,I(AV)<=20A



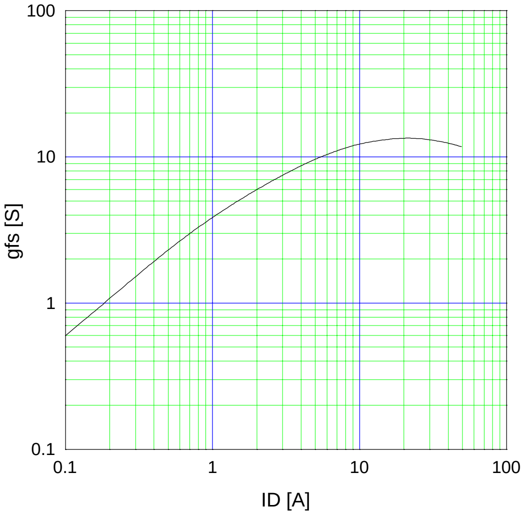
Typical Output Characteristics
ID=f(VDS):80µs Pulse test,Tch=25°C



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

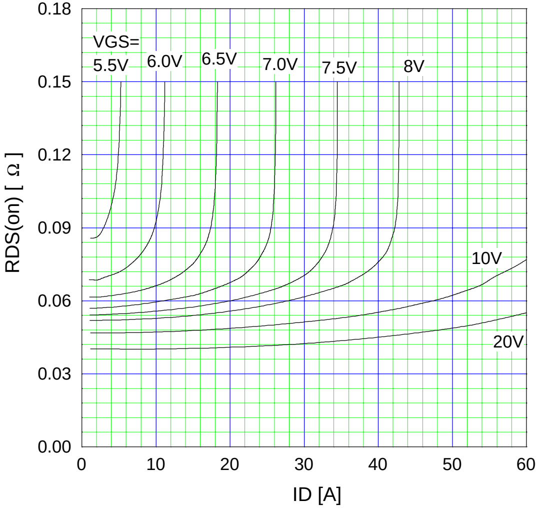


Typical Transconductance
gfs=f(ID):80µs Pulse test, VDS=25V,Tch=25°C



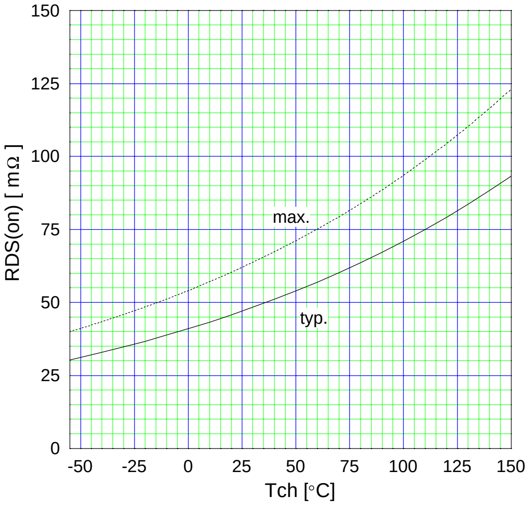
Typical Drain-Source on-state Resistance

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



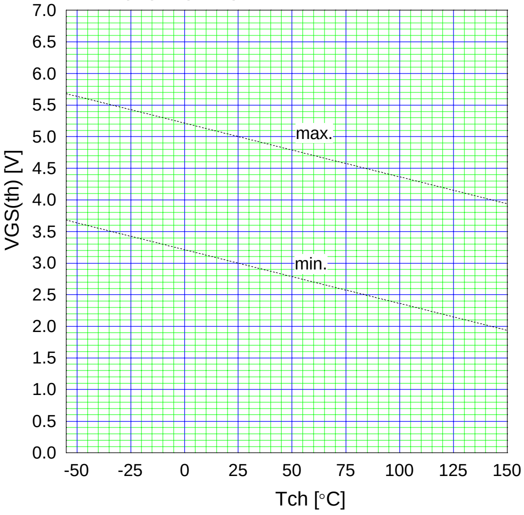
Drain-Source On-state Resistance

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



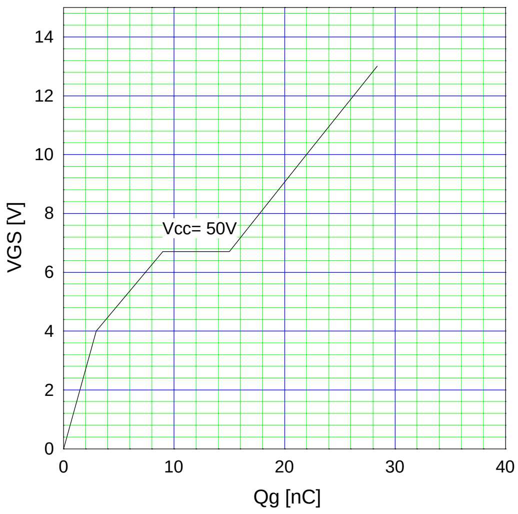
Gate Threshold Voltage vs. Tch

VGS(th)=f(Tch):VDS=VGS,ID=250µA



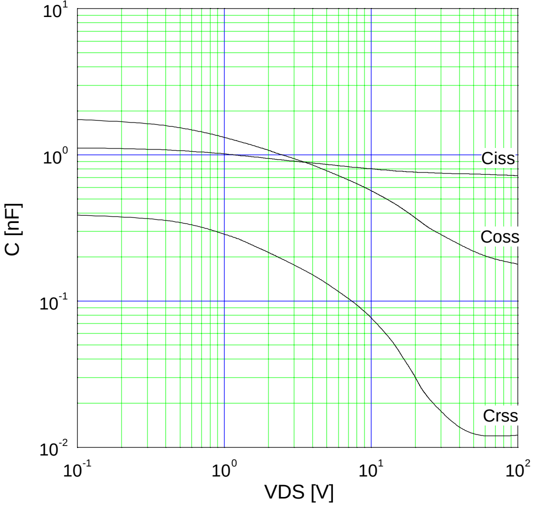
Typical Gate Charge Characteristics

VGS=f(Qg):ID=20A, Tch=25°C



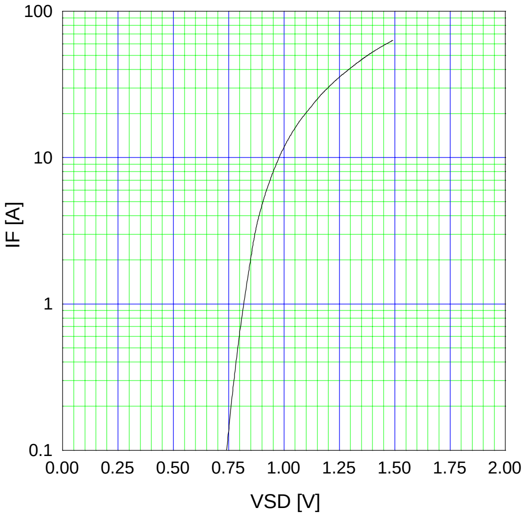
Typical Capacitance

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



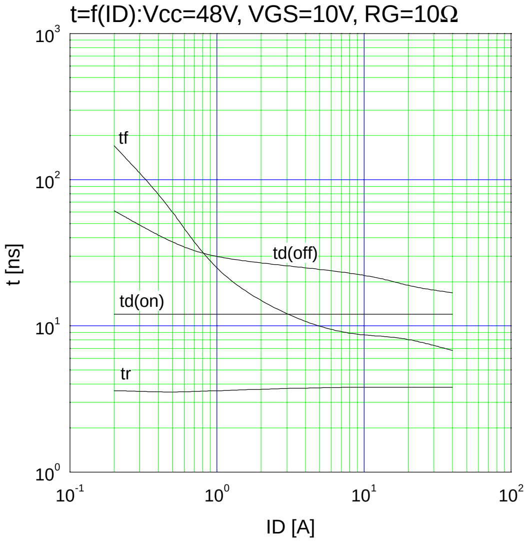
Typical Forward Characteristics of Reverse Diode

IF=f(VSD):80µs Pulse test,Tch=25°C



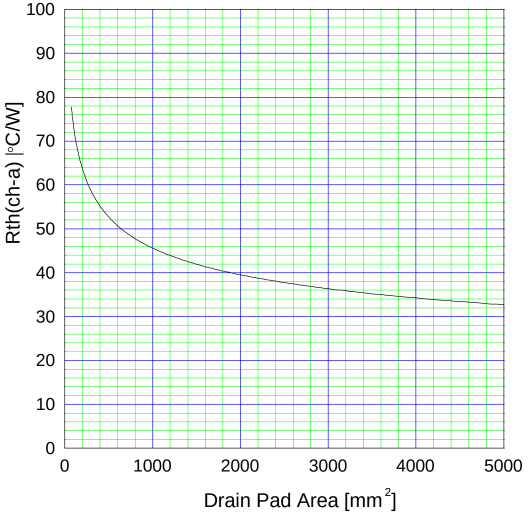
Typical Switching Characteristics vs. ID

t=f(ID):Vcc=48V, VGS=10V, RG=10Ω



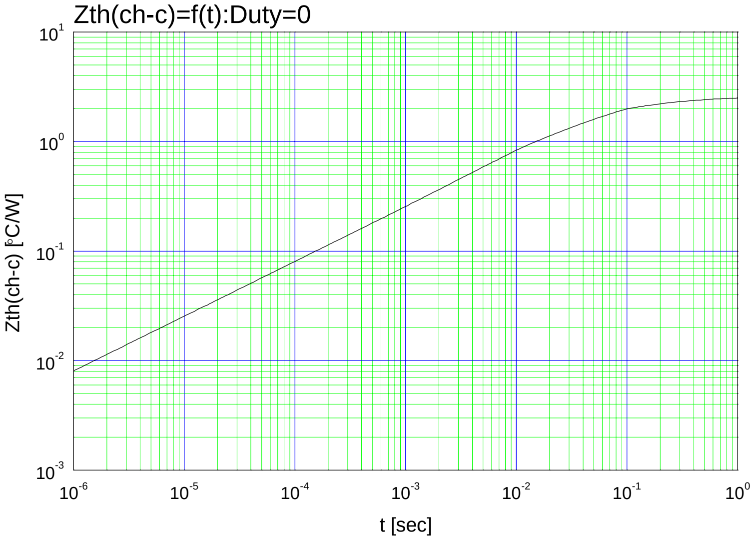
Thermal Resistance vs. Drain Pad area

t=1.6mm FR-4 PCB



Transient Thermal Impedance

Zth(ch-c)=f(t):Duty=0



Maximum Avalanche Current Pulsewidth

I_{AV}=f(t_{AV}):starting Tch=25°C. Vcc=48V