2SK3648-01

FUJI ELECTRIC

FUJI POWER MOSFET

Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

■ Features

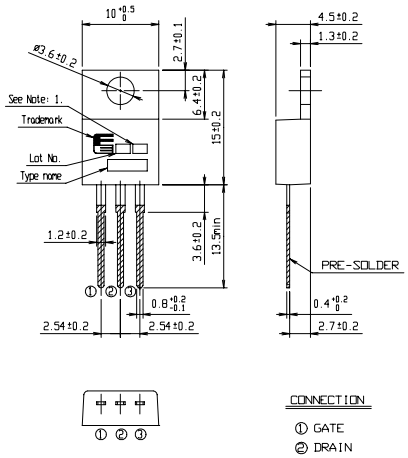
- High speed switching
- Low on-resistance
- No secondary breadown
- Low driving power
- Avalanche-proof

■ Applications

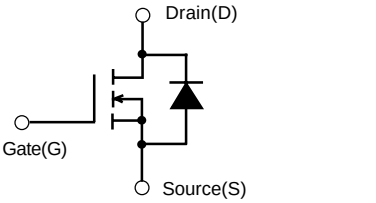
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

■ Outline Drawings

TO-220AB



■ 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}		150	V
	V_{DSX} *5		120	V
Continuous drain current	I_D		±23	A
Pulsed drain current	$I_{D(puls)}$		±92	A
Gate-source voltage	V_{GS}		±30	V
Repetitive or non-repetitive	I_{AR} *2		23	A
Maximum Avalanche Energy	E_{AS} *1		242	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	2.02	W
		Tc=25°C	75	
Operating and storage temperature range	T_{ch}		+150	°C
	T_{stg}		-55 to +150	°C

*1 L=671μH, Vcc=48V *2 Tch≦150°C *3 IF≦-ID, -di/dt=50A/μs, Vcc≦BV_{DSS}, Tch≦150°C
*4 V_{DS}≦150V *5 V_{GS}=-30V

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

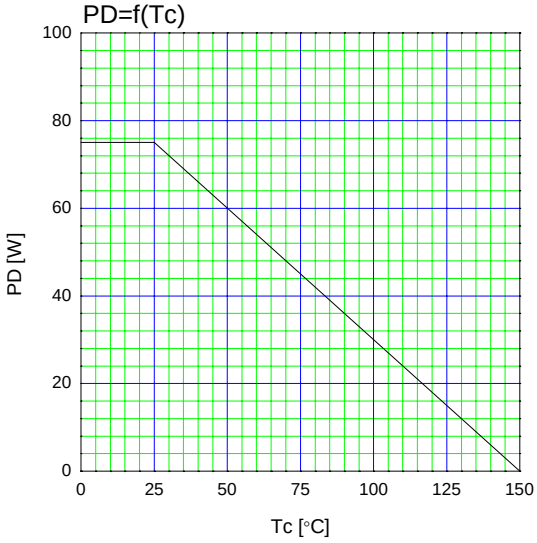
Item	Symbol	Test Conditions		Min.	Typ.	Max.	Units
Drain-source breakdown voltaget	$V_{(BR)DSS}$	I_D=250μA V_{GS}=0V		150			V
Gate threshold voltage	$V_{GS(th)}$	I_D= 250μA V_{DS}=V_{GS}		3.0		5.0	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=150V V_{GS}=0V	Tch=25°C			25	μA
		V_{DS}=120V V_{GS}=0V	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=11.5A V_{GS}=10V			54	70	mΩ
Forward transcondutance	g_{fs}	I_D=11.5A V_{DS}=25V		8	16		S
Input capacitance	C_{iss}	V_{DS}=75V			1150	1730	pF
Output capacitance	C_{oss}	V_{GS}=0V			200	300	
Reverse transfer capacitance	C_{rss}	f=1MHz			17	26	
Turn-on time t_{on}	$t_{d(on)}$	V_{CC}=48V I_D=11.5A			13	20	ns
	t_r	V_{GS}=10V			15	23	
Turn-off time t_{off}	$t_{d(off)}$	R_{GS}=10 Ω			34	51	
	t_f				15	23	
Total Gate Charge	Q_G	V_{CC}=48V			34	51	nC
Gate-Source Charge	Q_{GS}	I_D=23A			9	13.5	
Gate-Drain Charge	Q_{GD}	V_{GS}=10V			12.5	19	
Avalanche capability	I_{AV}	L=100μH Tch=25°C		23			A
Diode forward on-voltage	V_{SD}	I_F=30A V_{GS}=0V Tch=25°C			1.10	1.65	V
Reverse recovery time	t_{rr}	I_F=23A V_{GS}=0V			130		ns
Reverse recovery charge	Q_{rr}	-di/dt=100A/μs Tch=25°C			0.6		μC

● Thermalcharacteristics

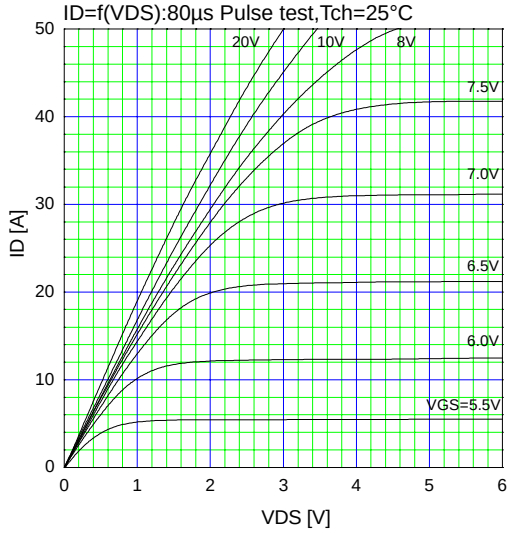
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.67	°C/W
	$R_{th(ch-a)}$	channel to ambient			62.0	°C/W

Characteristics

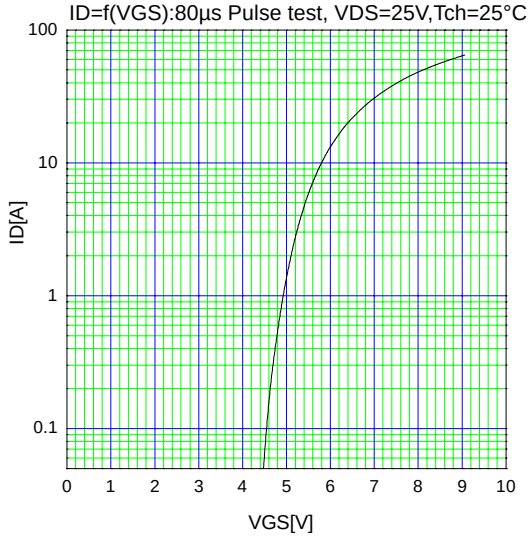
Allowable Power Dissipation
PD=f(Tc)



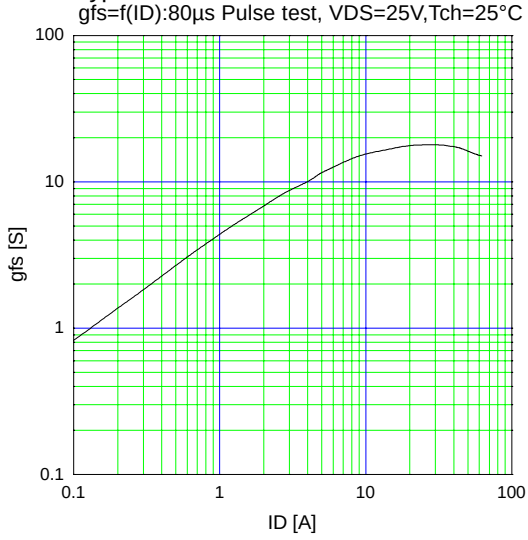
Typical Output Characteristics
ID=f(VDS):80µs Pulse test,Tch=25°C



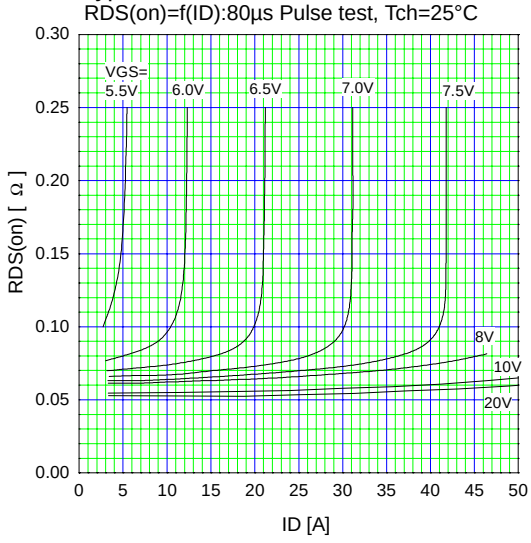
Typical Transfer Characteristic
ID=f(VGS):80µs Pulse test, VDS=25V,Tch=25°C



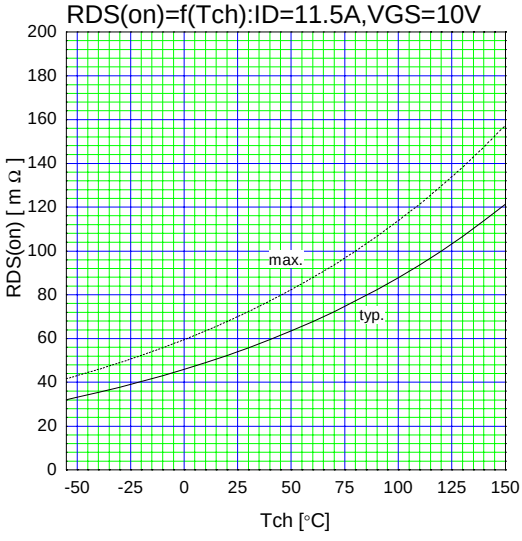
Typical Transconductance
gfs=f(ID):80µs Pulse test, VDS=25V,Tch=25°C



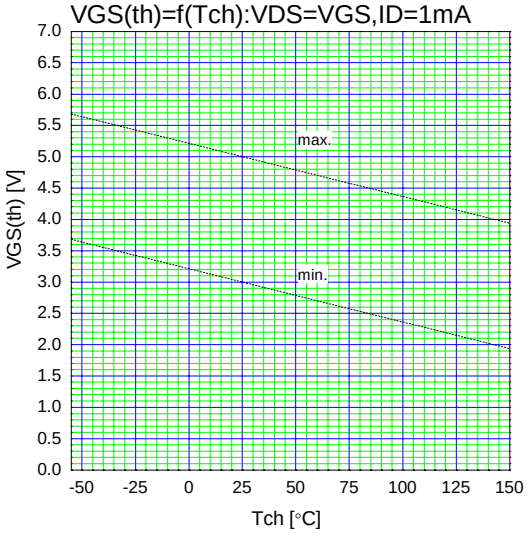
Typical Drain-Source on-state Resistance
RDS(on)=f(ID):80µs Pulse test, Tch=25°C



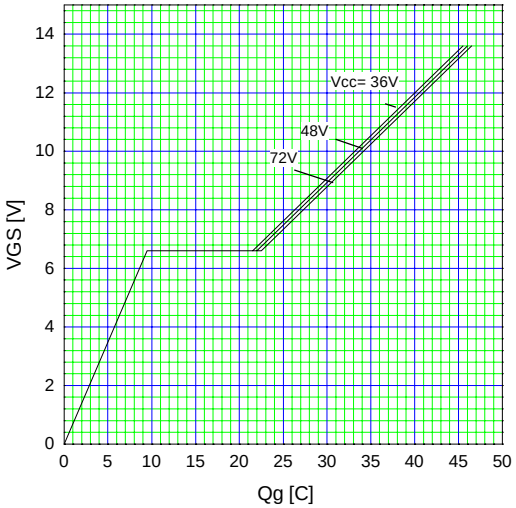
Drain-Source On-state Resistance
RDS(on)=f(Tch):ID=11.5A,VGS=10V



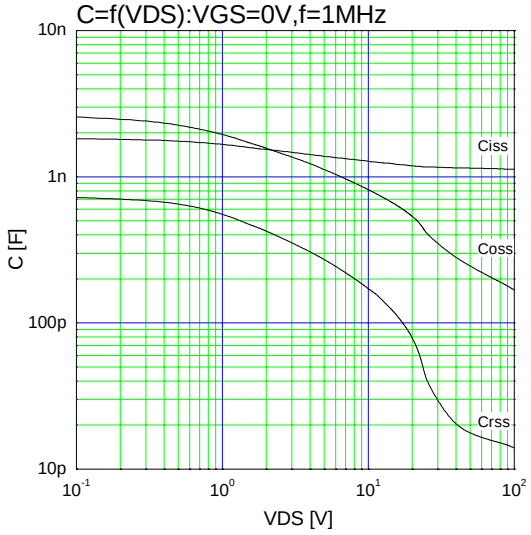
Gate Threshold Voltage vs. Tch
VGS(th)=f(Tch):VDS=VGS,ID=1mA



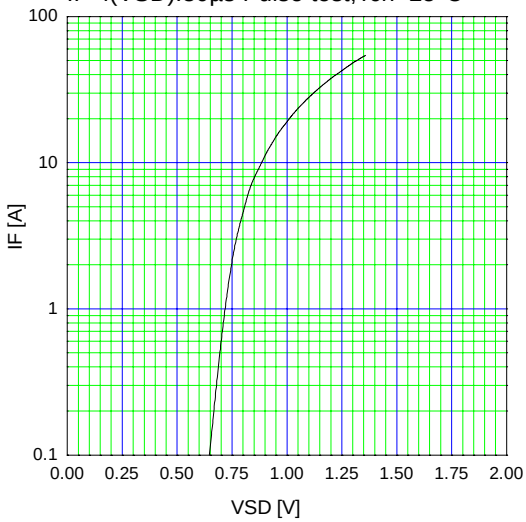
Typical Gate Charge Characteristics
VGS=f(Qg):ID=23A, Tch=25°C



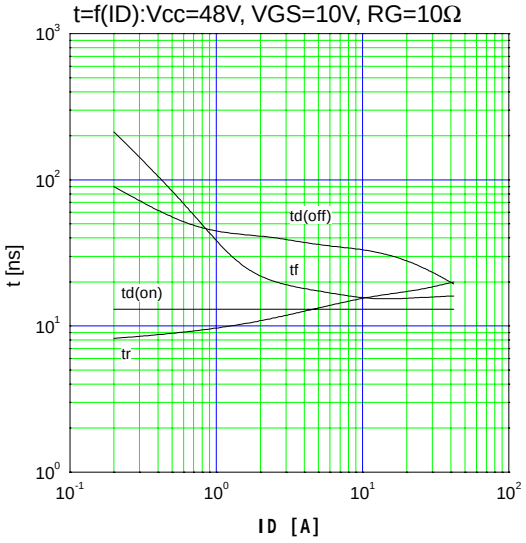
Typical Capacitance
C=f(VDS):VGS=0V,f=1MHz



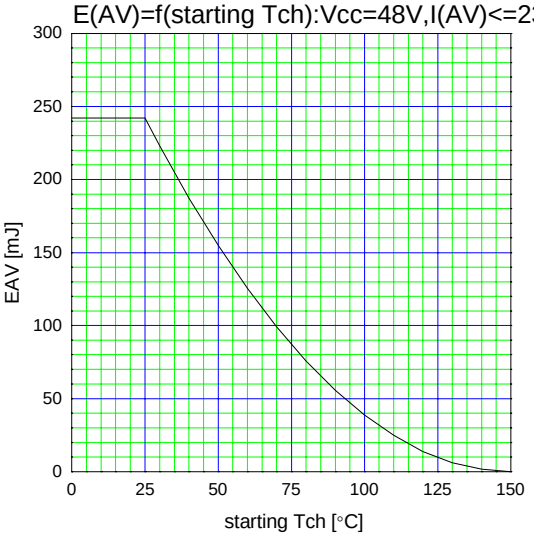
Typical Forward Characteristics of Reverse Diode
IF=f(VSD):80µs Pulse test,Tch=25°C



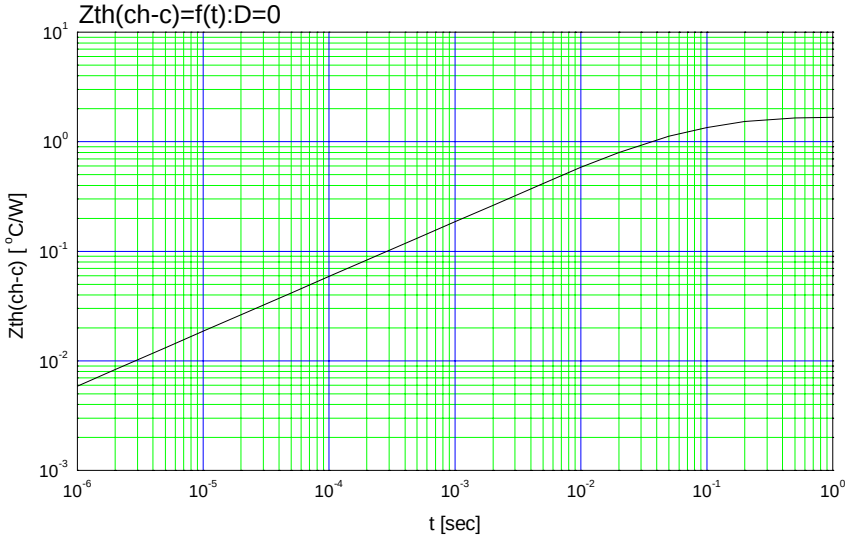
Typical Switching Characteristics vs. ID
t=f(ID):Vcc=48V, VGS=10V, RG=10Ω



Maximum Avalanche Energy vs. starting Tch
E(AV)=f(starting Tch):Vcc=48V,I(AV)<=23A



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