

FUJI POWER MOSFET

Super FAP-G Series

N-CHANNEL SILICON POWER MOSFET

Features

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

Applications

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

Maximum ratings and characteristic Absolute maximum ratings

($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Item	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	700	V
	V_{DSX}^{*5}	700	V
Continuous drain current	I_D	± 12	A
Pulsed drain current	$I_{D(puls)}$	± 48	A
Gate-source voltage	V_{GS}	± 30	V
Repetitive or non-repetitive	I_{AR}^{*2}	12	A
Maximum Avalanche Energy	E_{AS}^{*1}	276.7	mJ
Maximum Drain-Source dV/dt	dV_{DS}/dt^{*4}	40	kV/ μs
Peak Diode Recovery dV/dt	dV/dt^{*3}	5	kV/ μs
Max. power dissipation	P_D	$T_a=25^{\circ}\text{C}$	2.16
		$T_c=25^{\circ}\text{C}$	95
Operating and storage temperature range	T_{ch}	+150	$^{\circ}\text{C}$
	T_{stg}	-55 to +150	$^{\circ}\text{C}$
Isolation Voltage	V_{iso}^{*6}	2	kVrms

*1 $L=3.53\text{mH}$, $V_{CC}=70\text{V}$, $T_{ch}=25^{\circ}\text{C}$, See to Avalanche Energy Graph *2 $T_{ch}\leq 150^{\circ}\text{C}$

*3 $I_F\leq I_D$, $-di/dt=50\text{A}/\mu\text{s}$, $V_{CC}\leq BV_{DSS}$, $T_{ch}\leq 150^{\circ}\text{C}$ *4 $V_{DS}\leq 700\text{V}$ *5 $V_{GS}=-30\text{V}$ *6 $t=60\text{sec}$, $f=60\text{Hz}$

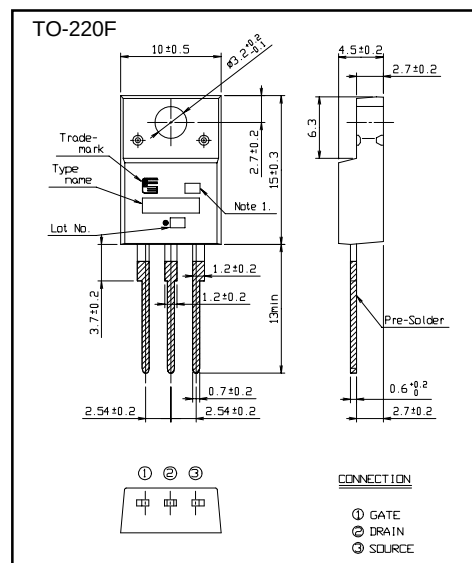
Electrical characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$	700			V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}$ $V_{DS}=V_{GS}$	3.0		5.0	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=700\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=25^{\circ}\text{C}$			25	μA
		$V_{DS}=560\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=125^{\circ}\text{C}$			250	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$			100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=6\text{A}$ $V_{GS}=10\text{V}$		0.72	0.93	Ω
Forward transconductance	g_{fs}	$I_D=6\text{A}$ $V_{DS}=25\text{V}$	6	12		S
Input capacitance	C_{iss}	$V_{DS}=25\text{V}$		1100	1650	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$		170	255	pF
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$		11	17	pF
Turn-on time t_{on}	$t_{d(on)}$	$V_{CC}=300\text{V}$ $I_D=6\text{A}$		24.5	36	ns
	t_r	$V_{GS}=10\text{V}$		7.5	12	ns
	$t_{d(off)}$	$R_{GS}=10\Omega$		47.5	72	ns
Turn-off time t_{off}	t_r			10	17	ns
	Q_G	$V_{CC}=350\text{V}$		31	46.5	nC
	Q_{GS}	$I_D=12\text{A}$		4.5	8	nC
Gate-Drain Charge	Q_{GD}	$V_{GS}=10\text{V}$		11	16.5	nC
Avalanche capability	I_{AV}	$L=3.53\text{mH}$ $T_{ch}=25^{\circ}\text{C}$	12			A
Diode forward on-voltage	V_{SD}	$I_F=12\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^{\circ}\text{C}$		0.90	1.50	V
Reverse recovery time	t_{rr}	$I_F=12\text{A}$ $V_{GS}=0\text{V}$		2.6		μs
Reverse recovery charge	Q_{rr}	$-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^{\circ}\text{C}$		16.0		μC

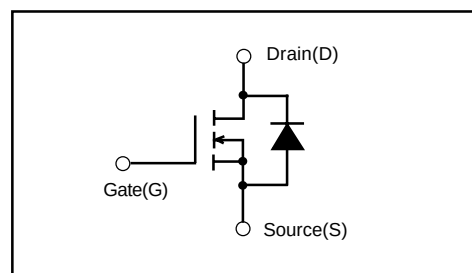
Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.316	$^{\circ}\text{C}/\text{W}$
	$R_{th(ch-a)}$	channel to ambient			38.0	$^{\circ}\text{C}/\text{W}$

Outline Drawings [mm]



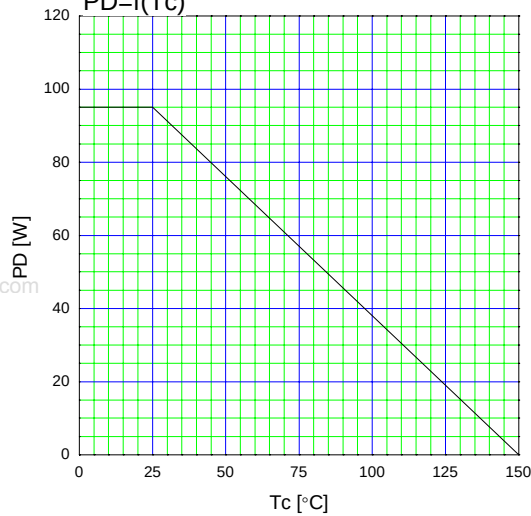
Equivalent circuit schematic



Characteristics

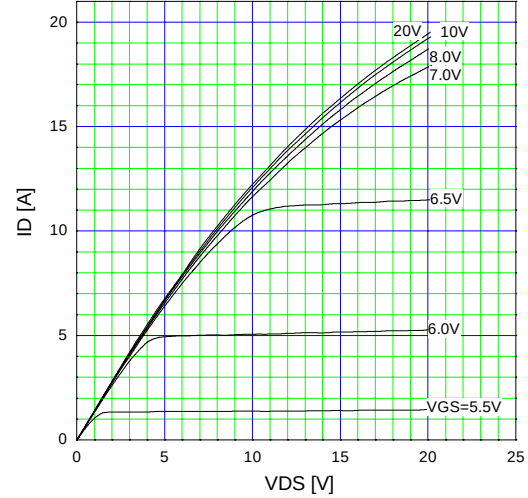
Allowable Power Dissipation

$$PD=f(T_c)$$



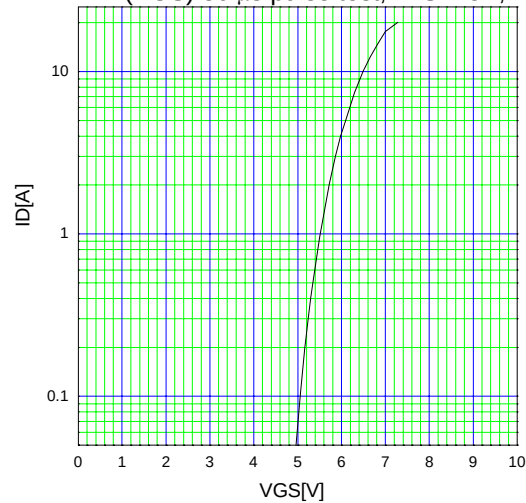
Typical Output Characteristics

$$I_D=f(V_{DS}):80\ \mu\text{s pulse test, } T_{ch}=25^{\circ}\text{C}$$



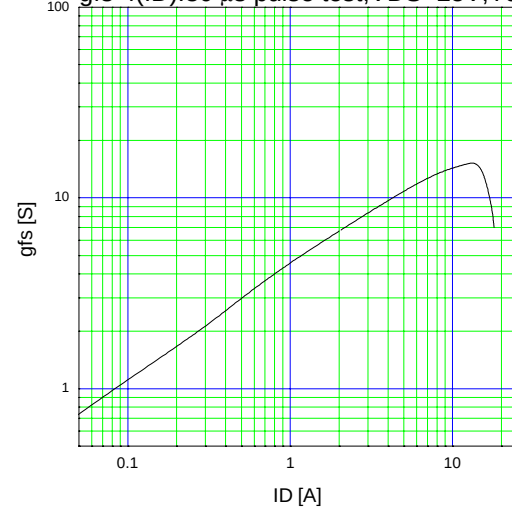
Typical Transfer Characteristic

$$I_D=f(V_{GS}):80\ \mu\text{s pulse test, } V_{DS}=25\text{V, } T_{ch}=25^{\circ}\text{C}$$



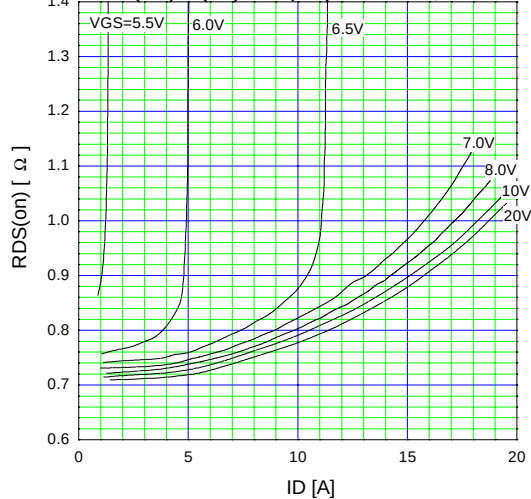
Typical Transconductance

$$g_{fs}=f(I_D):80\ \mu\text{s pulse test, } V_{DS}=25\text{V, } T_{ch}=25^{\circ}\text{C}$$



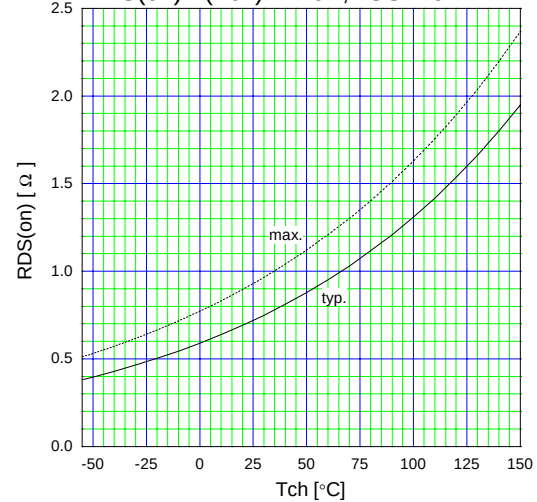
Typical Drain-Source on-state Resistance

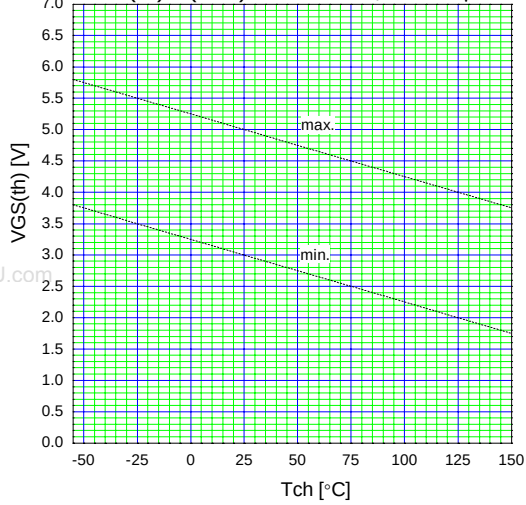
$$R_{DS(on)}=f(I_D):80\ \mu\text{s pulse test, } T_{ch}=25^{\circ}\text{C}$$



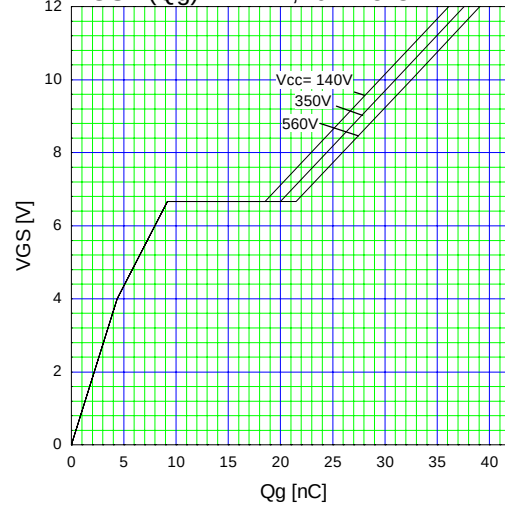
Drain-Source On-state Resistance

$$R_{DS(on)}=f(T_{ch}):I_D=6\text{A, } V_{GS}=10\text{V}$$

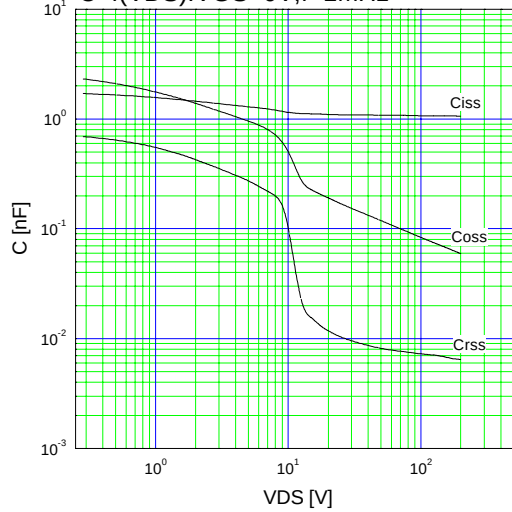


Gate Threshold Voltage vs. T_{ch}V_{GS(th)}=f(T_{ch}):V_{DS}=V_{GS},I_D=250μA

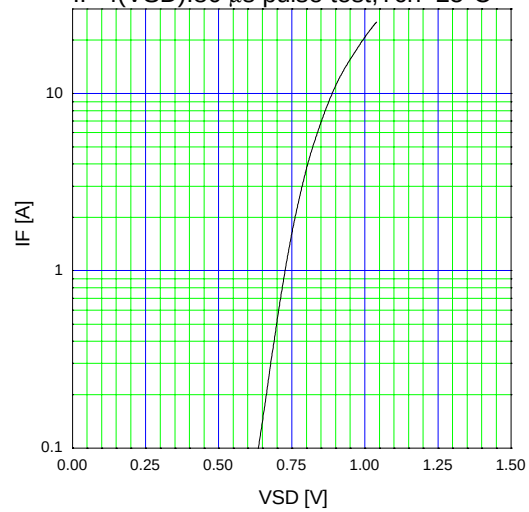
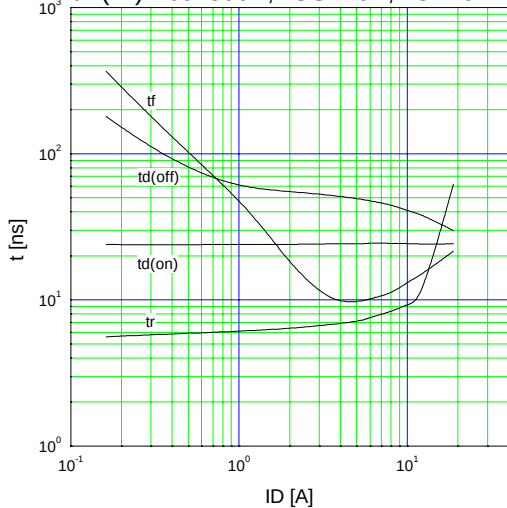
Typical Gate Charge Characteristics

V_{GS}=f(Q_g):I_D=12A,T_{ch}=25°C

Typical Capacitance

C=f(V_{DS}):V_{GS}=0V,f=1MHz

Typical Forward Characteristics of Reverse Diode

I_F=f(V_{SD}):80 μs pulse test,T_{ch}=25°CTypical Switching Characteristics vs. I_Dt=f(I_D):V_{CC}=300V,V_{GS}=10V,R_G=10 ΩMaximum Avalanche Energy vs. starting T_{ch}E_{AS}=f(starting T_{ch}):V_{CC}=70V