

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}	150	V
	V_{DSX}^{*5}	120	V
Continuous drain current	I_D	± 57	A
Pulsed drain current	$I_{D(puls)}$	± 228	A
Gate-source voltage	V_{GS}	± 30	V
Non-repetitive Avalanche current	I_{AS}^{*2}	57	A
Maximum Avalanche Energy	E_{AS}^{*1}	272.5	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	$T_a=25^\circ\text{C}$	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 $L=123\mu\text{H}$, $V_{CC}=48\text{V}$, 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 $V_{DS} \leq 150\text{V}$ *5 $V_{GS}=-30\text{V}$ *6 $t=60\text{sec}$ $f=60\text{Hz}$

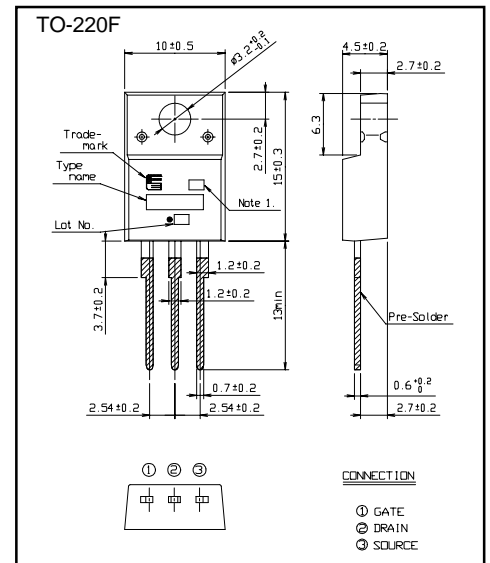
Electrical characteristics ($T_c=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$	150			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}	$V_{DS}=150\text{V}$ $V_{GS}=0\text{V}$			25	μA
		$V_{DS}=120\text{V}$ $V_{GS}=0\text{V}$			250	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 30\text{V}$ $V_{DS}=0\text{V}$		10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=20\text{A}$ $V_{GS}=10\text{V}$		31	41	$\text{m}\Omega$
Forward transconductance	g_{fs}	$I_D=20\text{A}$ $V_{DS}=25\text{V}$	13	26		S
Input capacitance	C_{iss}	$V_{DS}=75\text{V}$		1940	2910	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$		310	465	pF
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$		24	36	pF
Turn-on time t_{on}	$t_{d(on)}$	$V_{CC}=48\text{V}$ $I_D=20\text{A}$		20	30	ns
	t_r	$V_{GS}=10\text{V}$		26	39	
Turn-off time t_{off}	$t_{d(off)}$	$R_{GS}=10\Omega$		50	75	ns
	t_f			20	30	
Total Gate Charge	Q_G	$V_{CC}=75\text{V}$		52	78	nC
Gate-Source Charge	Q_{GS}	$I_D=40\text{A}$		15	22.5	
Gate-Drain Charge	Q_{GD}	$V_{GS}=10\text{V}$		18	27	
Avalanche capability	I_{AV}	$L=123\mu\text{H}$ $T_{ch}=25^\circ\text{C}$	57			A
Diode forward on-voltage	V_{SD}	$I_F=40\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		1.10	1.65	V
Reverse recovery time	t_{rr}	$I_F=40\text{A}$ $V_{GS}=0\text{V}$		0.14		μs
Reverse recovery charge	Q_{rr}	$-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$		0.77		μC

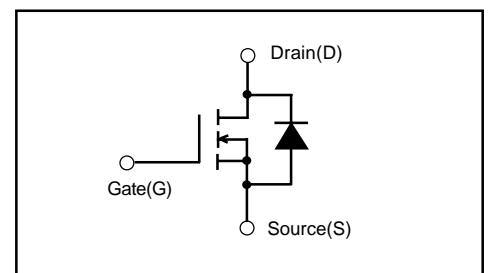
Thermal characteristics

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			58.0	$^\circ\text{C}/\text{W}$

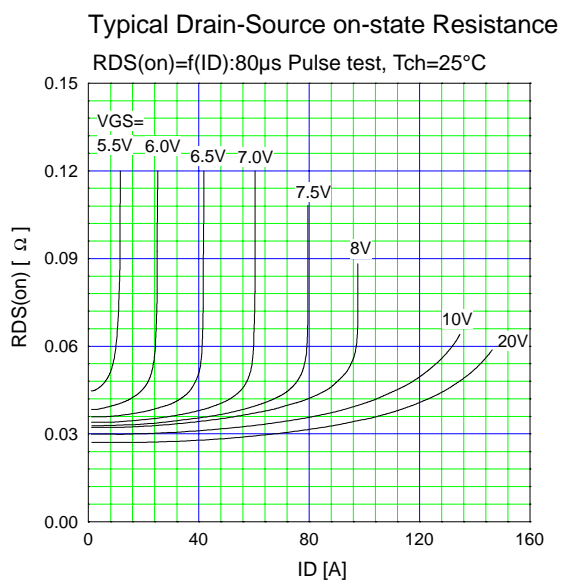
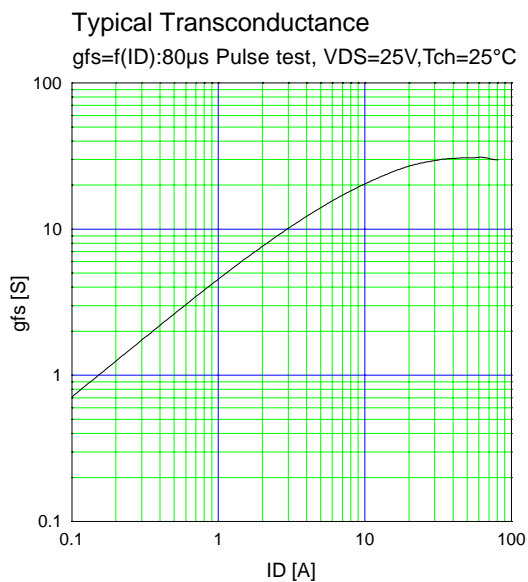
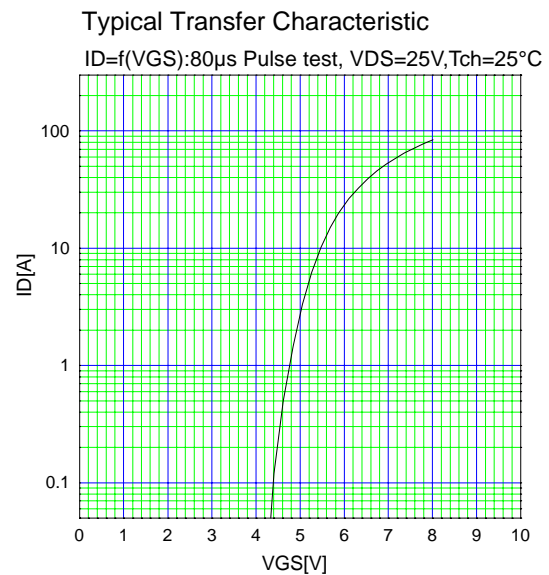
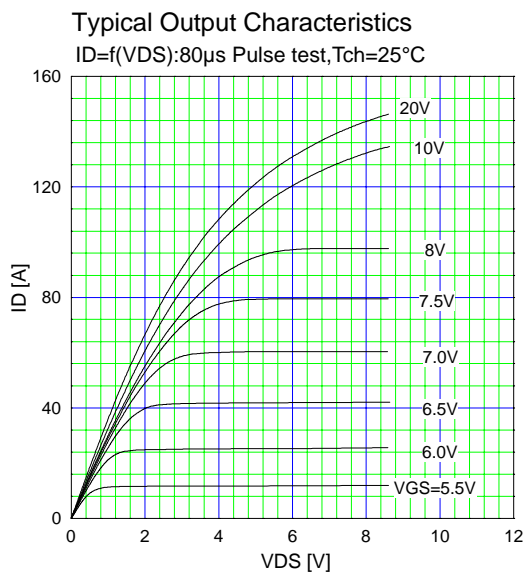
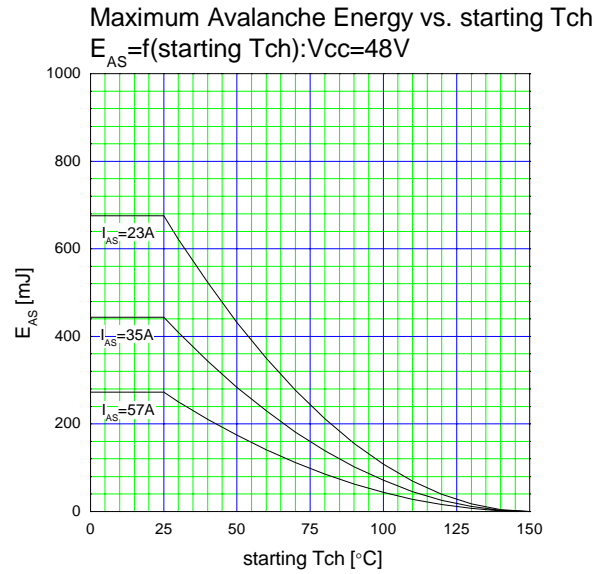
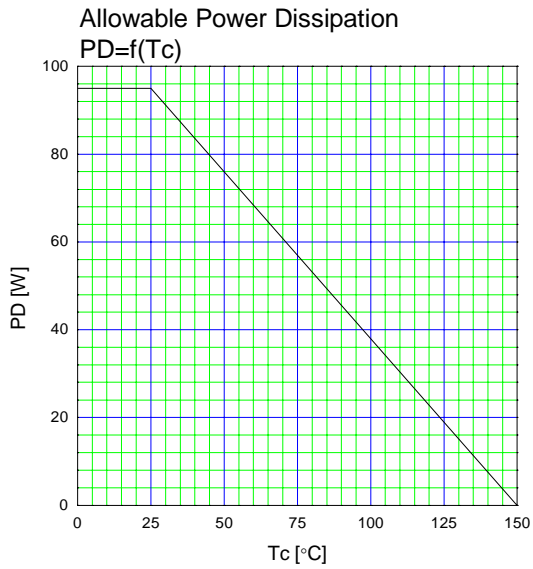
Outline Drawings (mm)



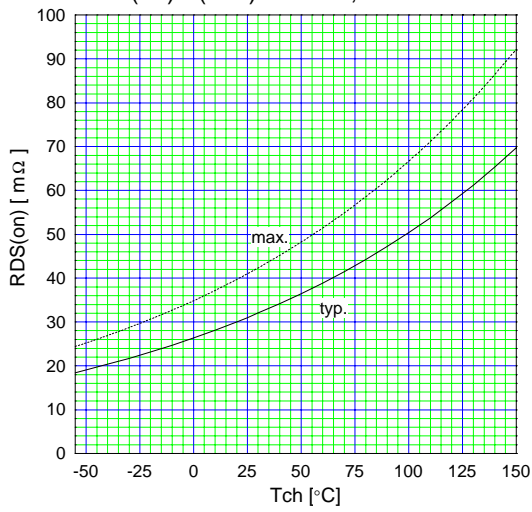
Equivalent circuit schematic



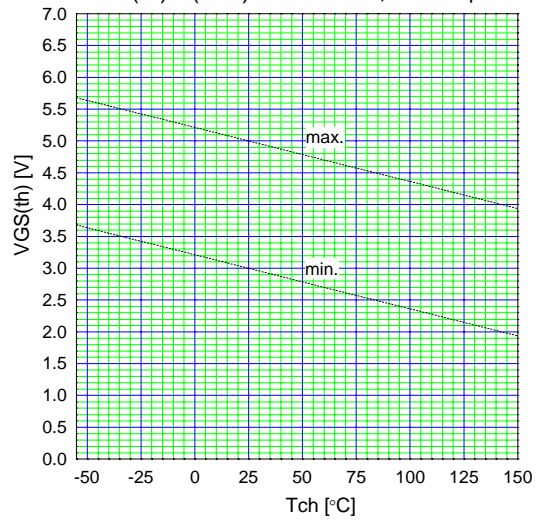
Characteristics



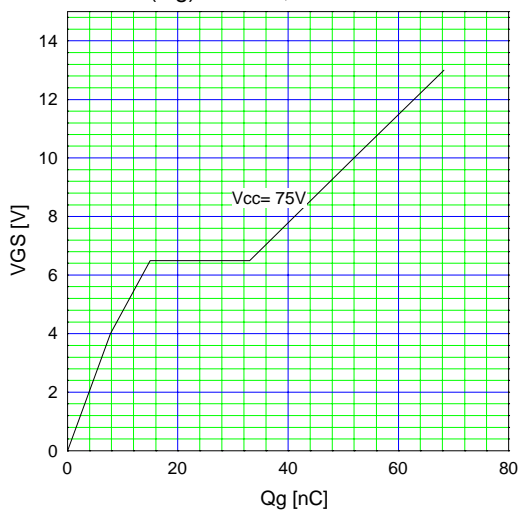
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 20A, V_{GS} = 10V$



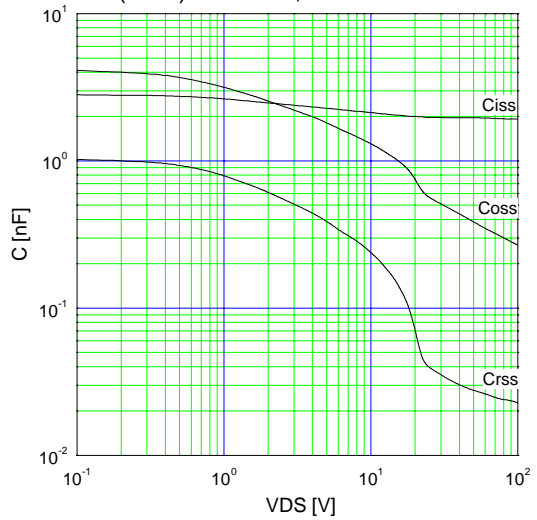
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$



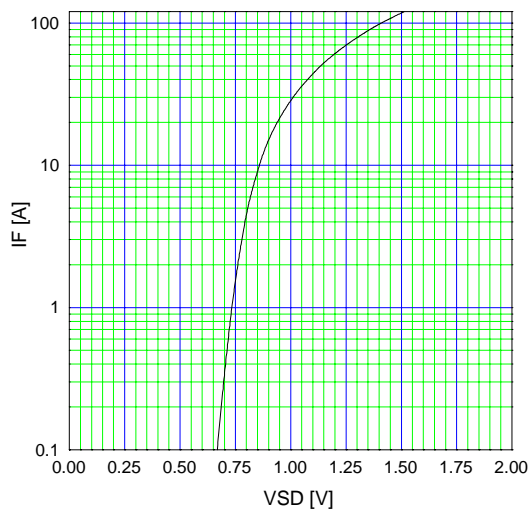
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 40A, T_{ch} = 25^{\circ}C$



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



Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD}): 80\mu s$ Pulse test, $T_{ch} = 25^{\circ}C$



Typical Switching Characteristics vs. I_D
 $t = f(I_D): V_{CC} = 48V, V_{GS} = 10V, R_G = 10\Omega$

