

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

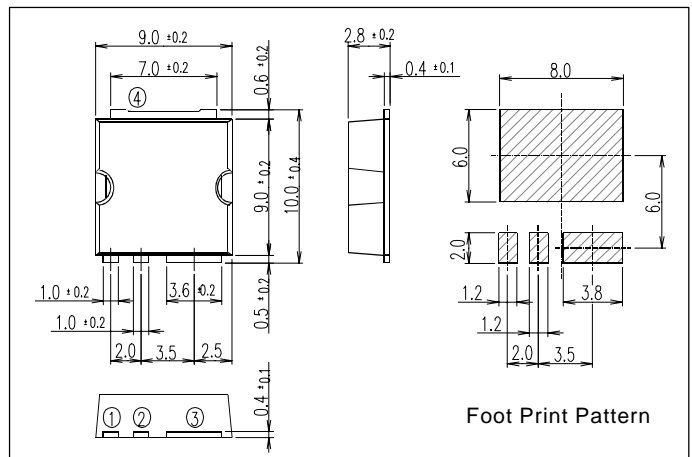
- Switching regulators
- UPS (Uninterruptible Power Supply)
- DC-DC converters

Maximum ratings and characteristic

Absolute maximum ratings

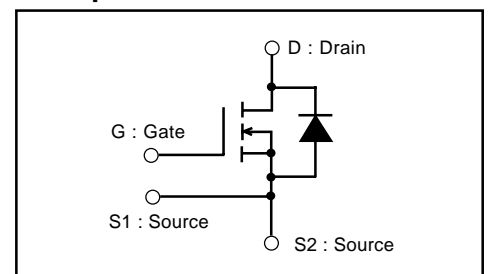
($T_c=25^\circ\text{C}$ unless otherwise specified)

Outline Drawings (mm)



Item	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	200	V
	V_{DSX}^*5	170	V
Continuous drain current	I_D	$T_c=25^\circ\text{C}$	± 45
		$T_a=25^\circ\text{C}$	$\pm 4.3^{**}$
Pulsed drain current	$I_{D(puls)}$	± 180	A
Gate-source voltage	V_{GS}	± 30	V
Non-repetitive Avalanche current	I_{AS}^*2	45	A
Maximum Avalanche Energy	E_{AS}^*1	258.9	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	$T_c=25^\circ\text{C}$	270
		$T_a=25^\circ\text{C}$	2.4 ^{**}
Operating and storage temperature range	T_{ch}	+150	$^\circ\text{C}$
	T_{stg}	-55 to +150	$^\circ\text{C}$

Equivalent circuit schematic



^{**} Surface mounted on 1000mm², t=1.6mm FR-4 PCB(Drain pad area : 500mm²) $T_a=25^\circ\text{C}$

^{*1} L=205 μH , $V_{CC}=48\text{V}$, $T_{ch}=25^\circ\text{C}$, 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} $V_{DS}\leq 200\text{V}$ ^{*5} $V_{GS}=-30\text{V}$

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

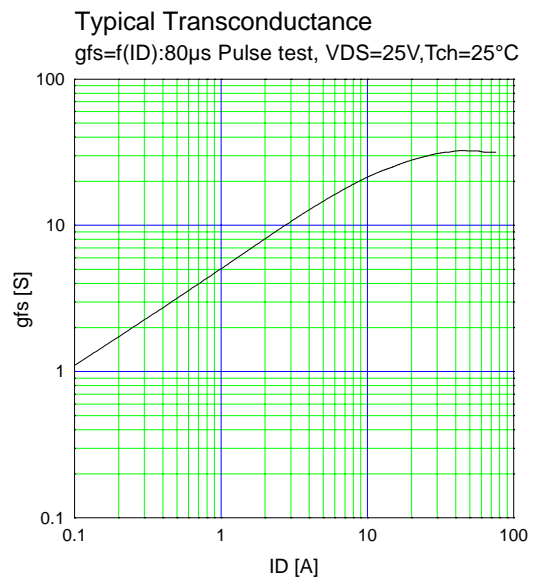
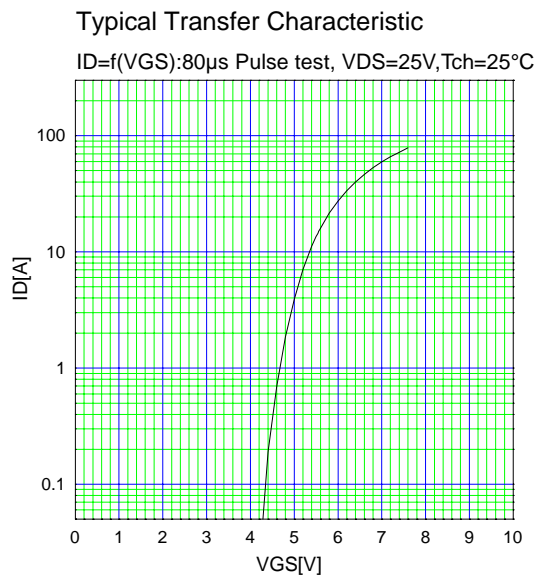
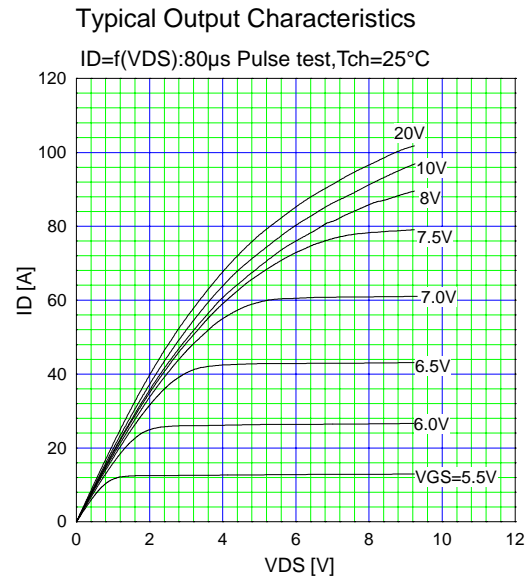
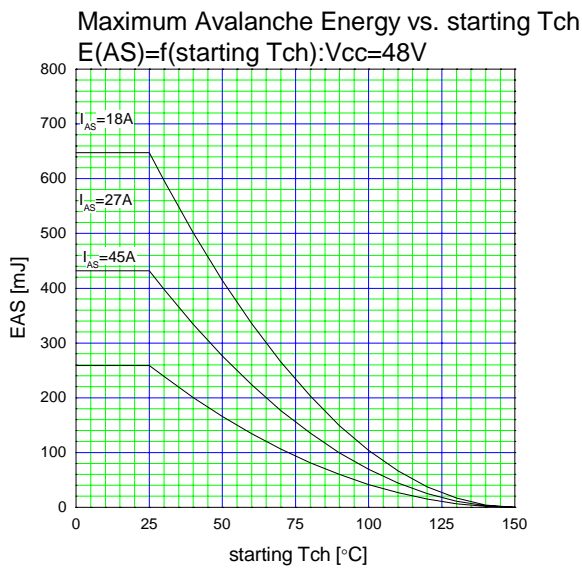
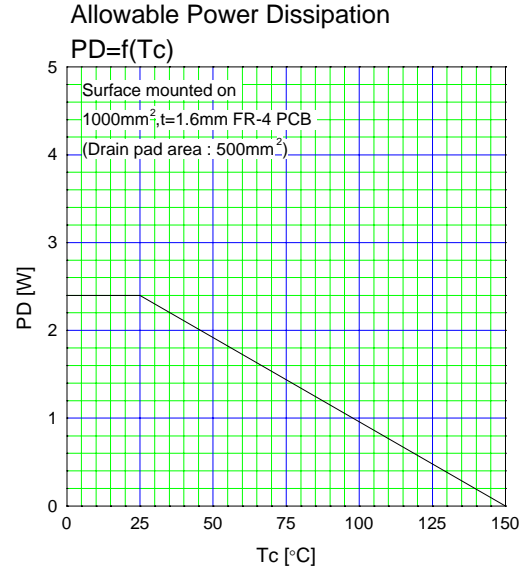
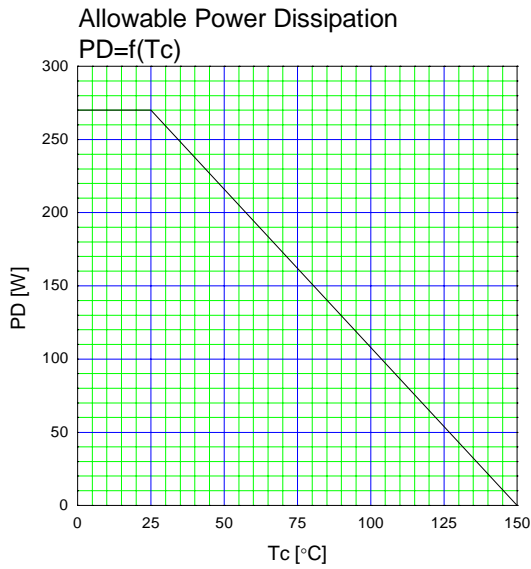
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$	200			V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}$ $V_{DS}=V_{GS}$	3.0		5.0	V
Zero gate voltage drain current	I_{DSS}	$V_{DS}=200\text{V}$ $V_{GS}=0\text{V}$			25	μA
		$V_{DS}=160\text{V}$ $V_{GS}=0\text{V}$			250	
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	$R_{DS(on)}$	$I_D=15\text{A}$ $V_{GS}=10\text{V}$		50	66	m Ω
Forward transconductance	g_{fs}	$I_D=15\text{A}$ $V_{DS}=25\text{V}$	12.5	25		S
Input capacitance	C_{iss}	$V_{DS}=75\text{V}$		1960	2940	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$		260	390	
Reverse transfer capacitance	C_{rss}	f=1MHz		18	27	
Turn-on time t_{on}	$t_{d(on)}$	$V_{CC}=48\text{V}$ $I_D=15\text{A}$		20	30	ns
	t_r	$V_{GS}=10\text{V}$		17	26	
Turn-off time t_{off}	$t_{d(off)}$	$R_{GS}=10\Omega$		53	80	ns
	t_f			19	29	
Total Gate Charge	Q_G	$V_{CC}=100\text{V}$		51	76.5	nC
Gate-Source Charge	Q_{GS}	$I_D=30\text{A}$		15	22.5	
Gate-Drain Charge	Q_{GD}	$V_{GS}=10\text{V}$		16	24	
Avalanche capability	I_{AV}	L=205 μH $T_{ch}=25^\circ\text{C}$	45			A
Diode forward on-voltage	V_{SD}	$I_F=30\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		1.10	1.65	V
Reverse recovery time	t_{rr}	$I_F=30\text{A}$ $V_{GS}=0\text{V}$		0.19		μs
Reverse recovery charge	Q_{rr}	$-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$		1.4		μC

Thermal characteristics

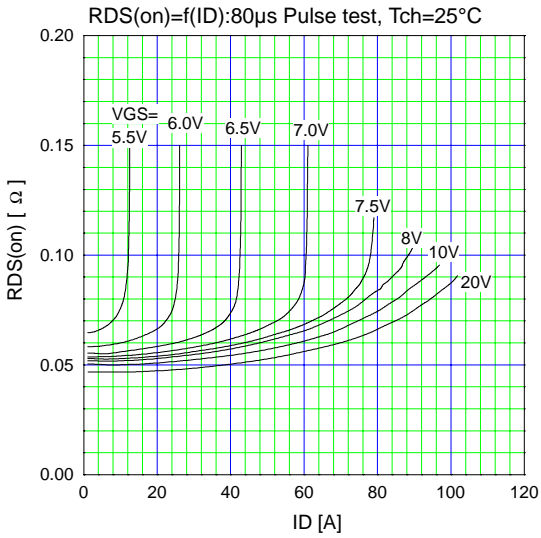
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			0.463	$^\circ\text{C}/\text{W}$
	$R_{th(ch-a)}$	channel to ambient			87.0	$^\circ\text{C}/\text{W}$
	$R_{th(ch-a)^{**}}$	channel to ambient			52.0	

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

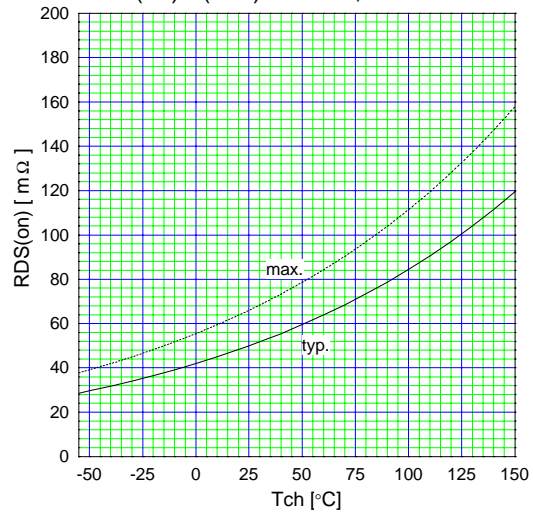
Characteristics



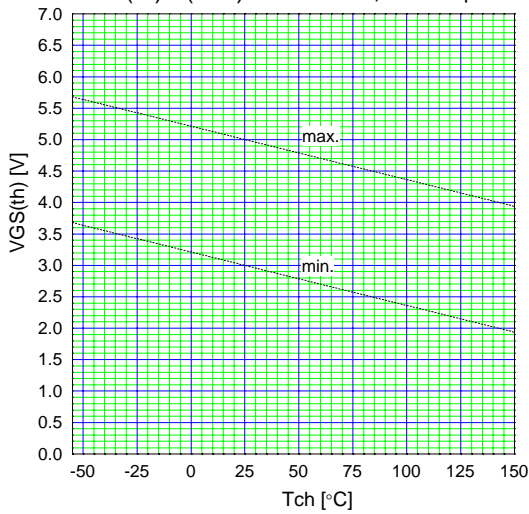
Typical Drain-Source on-state Resistance



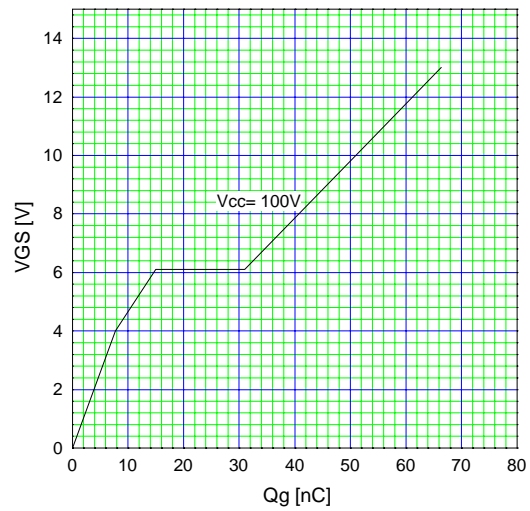
Drain-Source On-state Resistance
 $R_{DS(on)}=f(T_{ch})$: $I_D=15\text{A}$, $V_{GS}=10\text{V}$



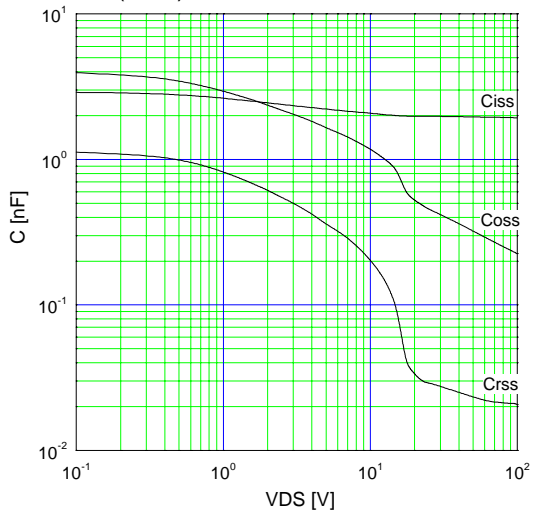
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)}=f(T_{ch})$: $V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$



Typical Gate Charge Characteristics
 $V_{GS}=f(Q_g)$: $I_D=30\text{A}$, $T_{ch}=25^\circ\text{C}$



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



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

