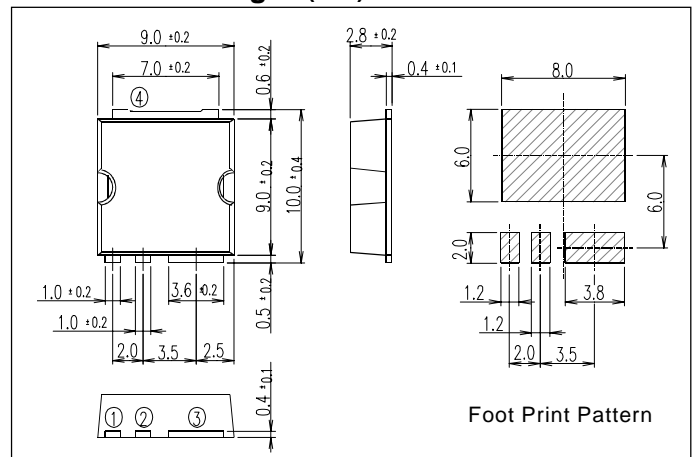


## FUJI POWER MOSFET Super FAP-G Series

### N-CHANNEL SILICON POWER MOSFET

#### ■ Outline Drawings (mm)



#### ■ 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)

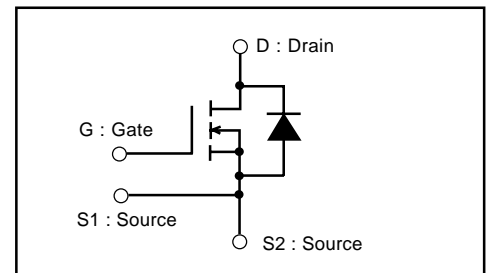
Item	Symbol	Ratings	Unit
Drain-source voltage	$V_{DS}$	100	V
	$V_{DSX}^*5$	70	V
Continuous drain current	$I_D$	$T_c=25^\circ\text{C}$	$\pm 41$
		$T_a=25^\circ\text{C}$	$\pm 5.2^{**}$
Pulsed drain current	$I_{D(puls)}$	$\pm 164$	A
Gate-source voltage	$V_{GS}$	$\pm 30$	V
Non-repetitive Avalanche current	$I_{AS}^*2$	41	A
Maximum Avalanche Energy	$E_{AS}^*1$	204.7	mJ
Maximum Drain-Source dV/dt	$dV_{DS}/dt^*4$	20	kV/ $\mu\text{s}$
Peak Diode Recovery dV/dt	$dV/dt^*3$	5	kV/ $\mu\text{s}$
Max. power dissipation	$P_D$	$T_c=25^\circ\text{C}$	150
		$T_a=25^\circ\text{C}$	2.4 <sup>**</sup>
Operating and storage temperature range	$T_{ch}$	+150	$^\circ\text{C}$
	$T_{stg}$	-55 to +150	$^\circ\text{C}$

\*\* Surface mounted on 1000mm<sup>2</sup>, t=1.6mm FR-4 PCB(Drain pad area : 500mm<sup>2</sup>)

\*1 L=146 $\mu\text{H}$ ,  $V_{CC}=48\text{V}$ ,  $T_{ch}=25^\circ\text{C}$ , 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  $V_{DS} \leq 100\text{V}$  \*5  $V_{GS} = -30\text{V}$  \*6 t=60sec f=60Hz

#### ■ Equivalent circuit schematic



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

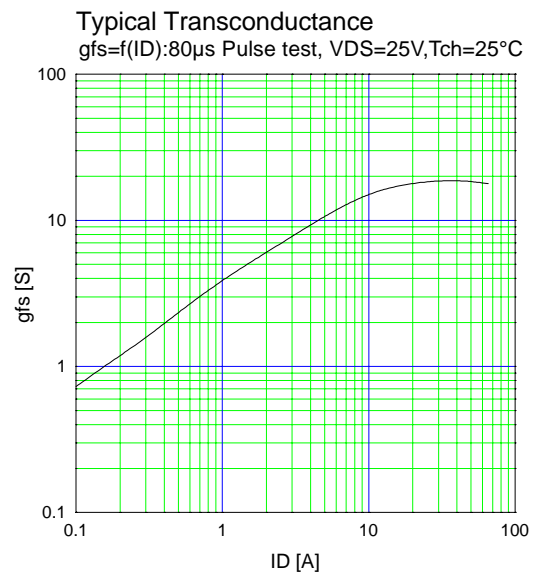
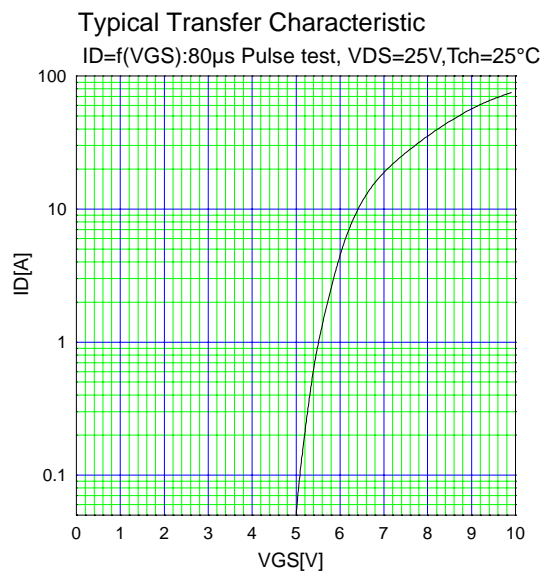
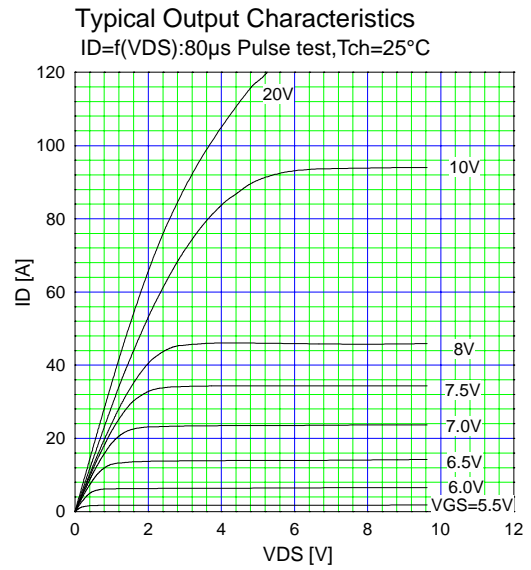
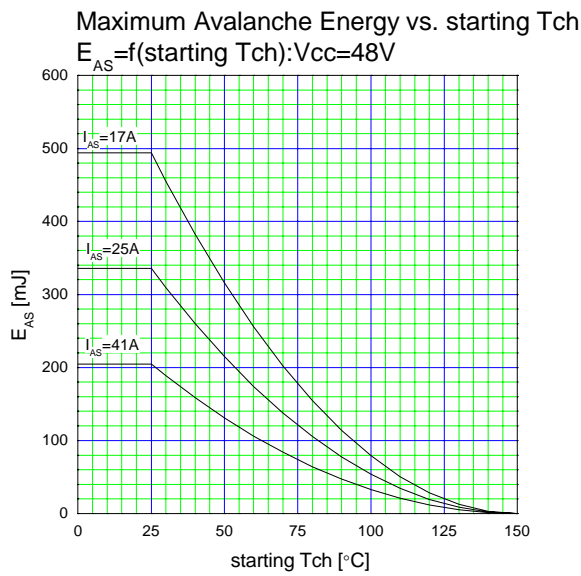
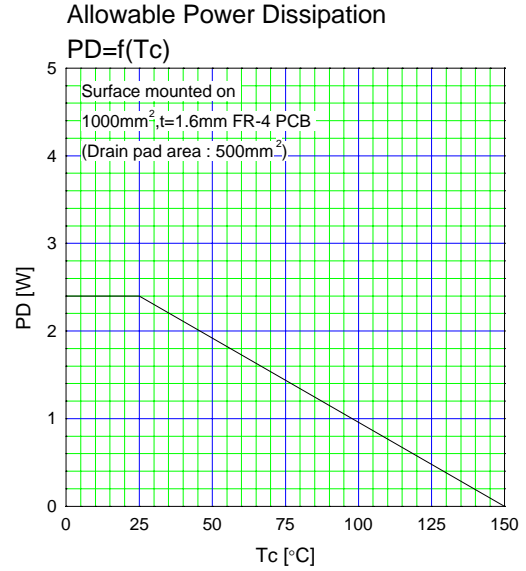
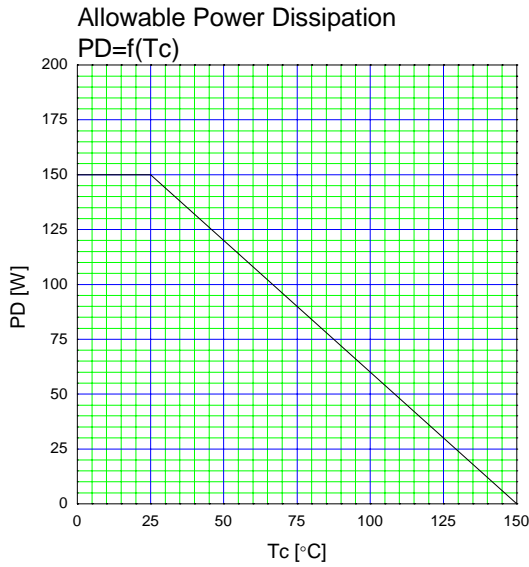
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$ $V_{GS} = 0\text{V}$	100			V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 250\mu\text{A}$ $V_{DS} = V_{GS}$	3.0		5.0	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 100\text{V}$ $V_{GS} = 0\text{V}$			25	$\mu\text{A}$
		$V_{DS} = 80\text{V}$ $V_{GS} = 0\text{V}$			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	$R_{DS(on)}$	$I_D = 15\text{A}$ $V_{GS} = 10\text{V}$		34	44	m $\Omega$
Forward transconductance	$g_{fs}$	$I_D = 15\text{A}$ $V_{DS} = 25\text{V}$	9	18		S
Input capacitance	$C_{iss}$	$V_{DS} = 75\text{V}$		1110	1665	pF
Output capacitance	$C_{oss}$	$V_{GS} = 0\text{V}$		280	420	
Reverse transfer capacitance	$C_{rss}$	f=1MHz		22	33	
Turn-on time $t_{on}$	$t_{d(on)}$	$V_{CC} = 48\text{V}$ $I_D = 15\text{A}$		16	24	ns
	$t_r$	$V_{GS} = 10\text{V}$		23	35	
Turn-off time $t_{off}$	$t_{d(off)}$	$R_{GS} = 10\Omega$		31	47	
	$t_f$			16	24	
Total Gate Charge	$Q_G$	$V_{CC} = 50\text{V}$		32	48	nC
Gate-Source Charge	$Q_{GS}$	$I_D = 30\text{A}$		13	20	
Gate-Drain Charge	$Q_{GD}$	$V_{GS} = 10\text{V}$		9	14	
Avalanche capability	$I_{AV}$	L=146 $\mu\text{H}$ $T_{ch} = 25^\circ\text{C}$	41			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	$t_{rr}$	$I_F = 30\text{A}$ $V_{GS} = 0\text{V}$		0.1		$\mu\text{s}$
Reverse recovery charge	$Q_{rr}$	$-di/dt = 100\text{A}/\mu\text{s}$ $T_{ch} = 25^\circ\text{C}$		0.38		$\mu\text{C}$

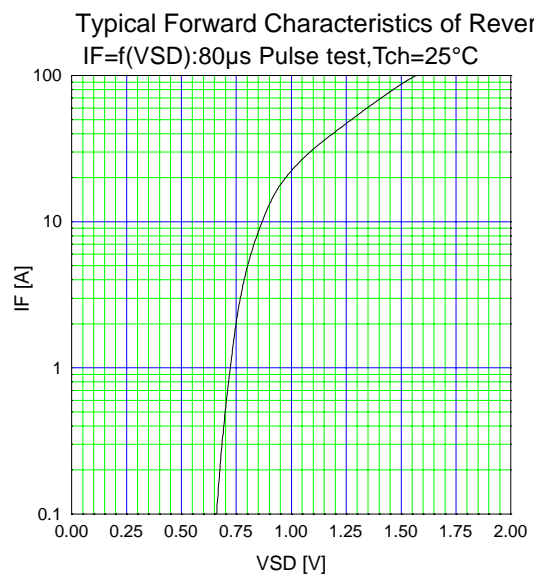
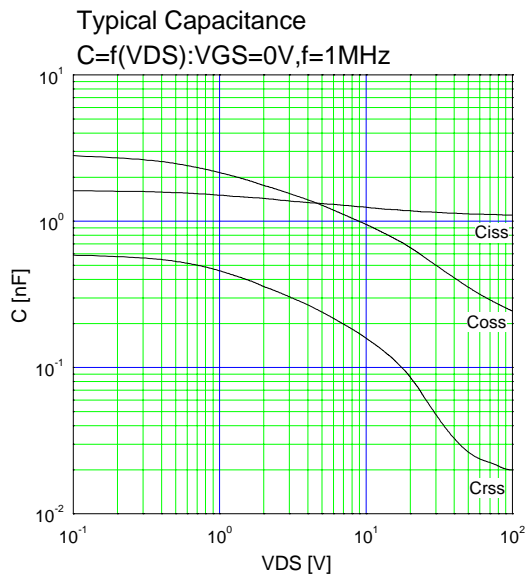
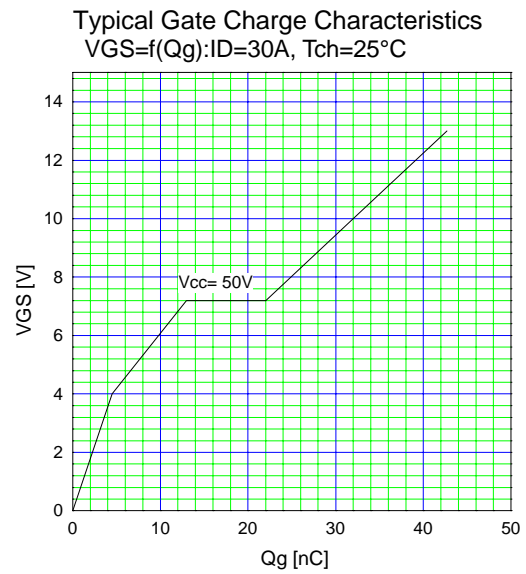
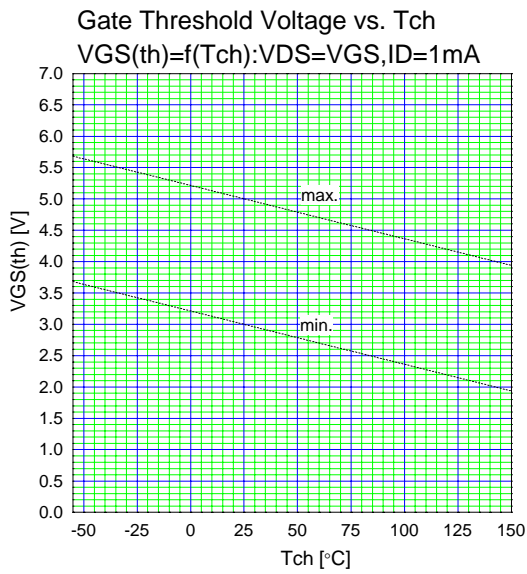
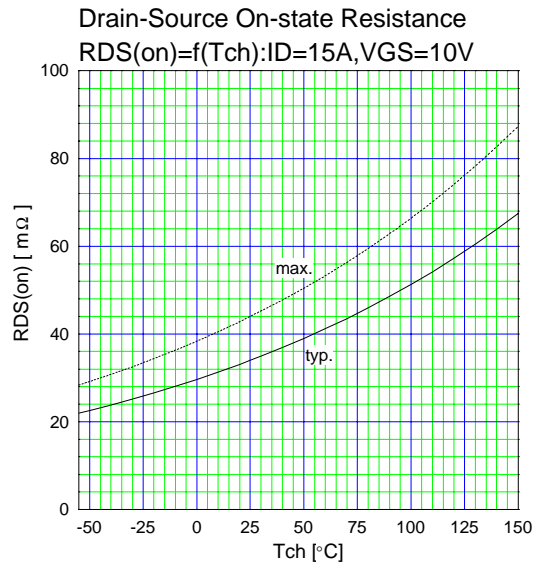
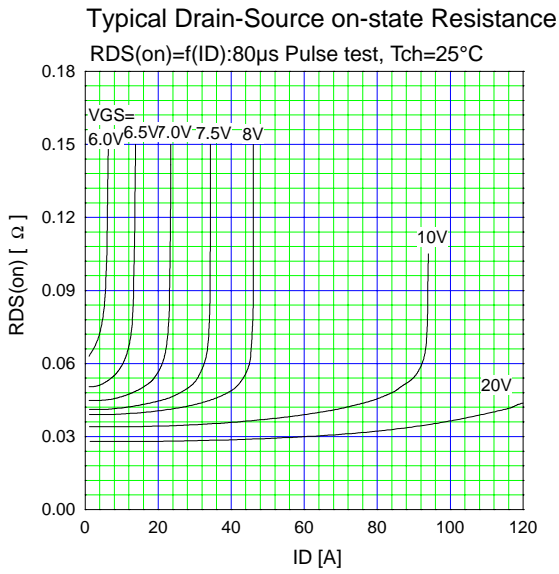
#### ● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			0.833	$^\circ\text{C}/\text{W}$
	$R_{th(ch-a)}$	channel to ambient			87.0	$^\circ\text{C}/\text{W}$
	$R_{th(ch-a)}^{**}$	channel to ambient			52.0	$^\circ\text{C}/\text{W}$

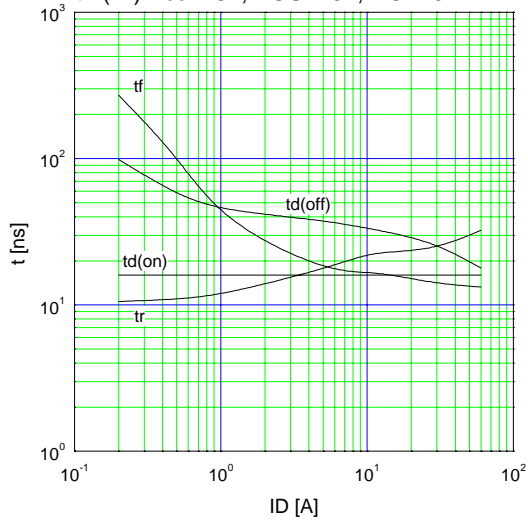
\*\* Surface mounted on 1000mm<sup>2</sup>, t=1.6mm FR-4 PCB(Drain pad area : 500mm<sup>2</sup>)

## Characteristics

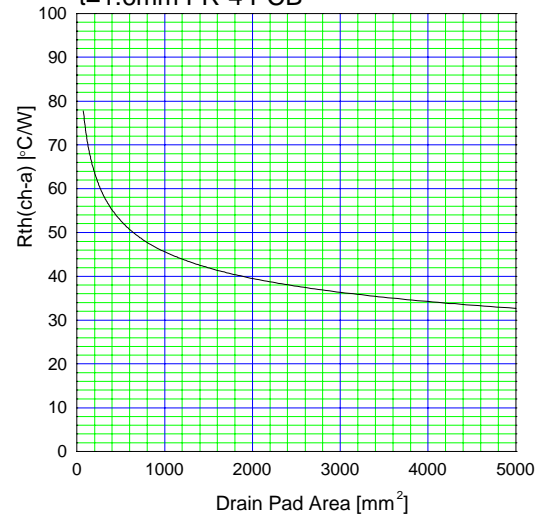




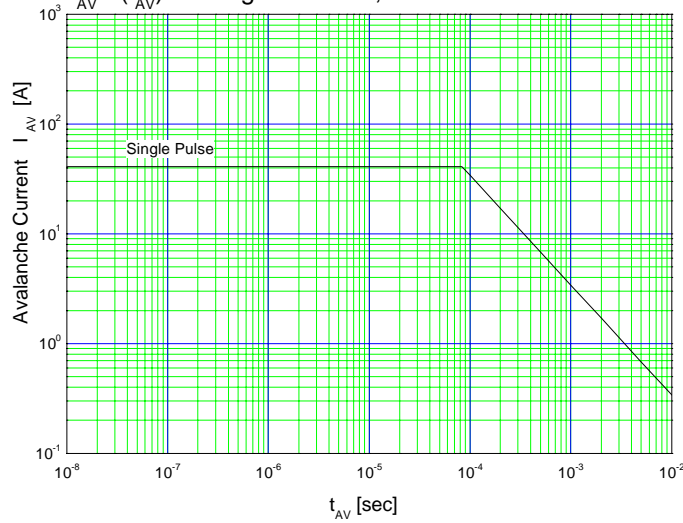
Typical Switching Characteristics vs. ID  
 $t=f(I_D): V_{CC}=48V, V_{GS}=10V, R_G=10\Omega$



Thermal Resistance vs. Drain Pad area  
 $t=1.6mm$  FR-4 PCB



Maximum Avalanche Current Pulsewidth  
 $I_{AV}=f(t_{AV}): \text{starting } T_{ch}=25^\circ C, V_{CC}=48V$



Maximum Transient Thermal Impedance  
 $Z_{th}(ch-c)=f(t): D=0$

