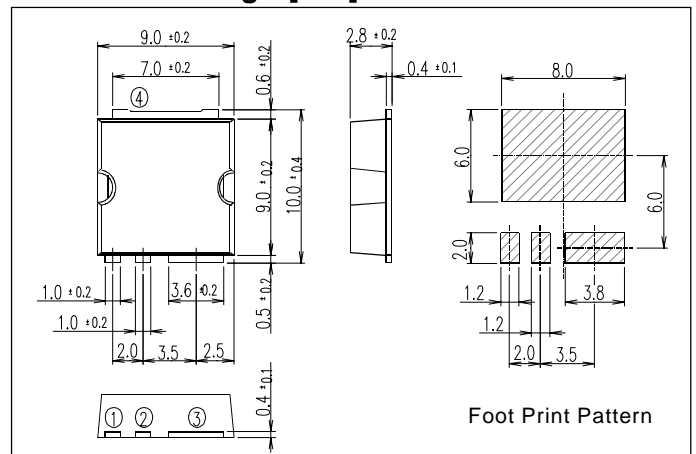


## Super FAP-G Series

### N-CHANNEL SILICON POWER MOSFET

#### ■ Outline Drawings [mm]



#### ■ Features

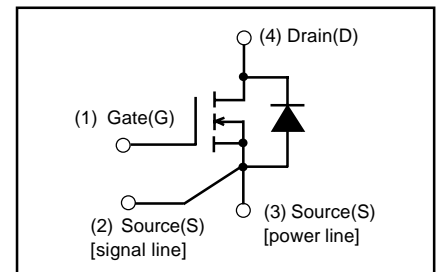
- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- Avalanche-proof

#### ■ Applications for Switching

#### ■ Absolute Maximum Ratings at Tc=25°C ( unless otherwise specified)

Item	Symbol	Ratings	Unit	Remarks
Drain-source voltage	V <sub>DS</sub>	150	V	
	V <sub>DSX</sub>	120	V	V <sub>GS</sub> =30V
Continuous drain current	I <sub>D</sub>	±33	A	
		±4.1 *4	A	T <sub>a</sub> =25°C
Pulsed drain current	I <sub>D(puls)</sub>	±132	A	
Gate-source voltage	V <sub>GS</sub>	±30	V	
Repetitive or non-repetitive	I <sub>AR</sub> *2	33	A	
Maximum Avalanche Energy	E <sub>AS</sub> *1	169	mJ	
Maximum Drain-Source dV/dt	dV <sub>DS</sub> /dt	20	kV/μs	V <sub>DS</sub> ≤150V
Peak Diode Recovery dV/dt	dV/dt *3	5	kV/μs	
Max. power dissipation	P <sub>D</sub>	2.4 *4	W	T <sub>a</sub> =25°C
		150	W	
Operating and storage temperature range	T <sub>ch</sub>	+150	°C	
	T <sub>stg</sub>	-55 to +150	°C	

#### ■ Equivalent circuit schematic



\*1 L=0.228mH, V<sub>CC</sub>=48V, See to Avalanche Energy Graph \*2 T<sub>ch</sub>≤150°C \*3 I<sub>F</sub>≤-I<sub>D</sub>, -di/dt=50A/μs, V<sub>CC</sub>≤BV<sub>DSS</sub>, T<sub>ch</sub>≤150°C  
\*4 Surface mounted on 1000mm<sup>2</sup>, t=1.6mm FR-4 PCB(Drain pad area:500mm<sup>2</sup>)

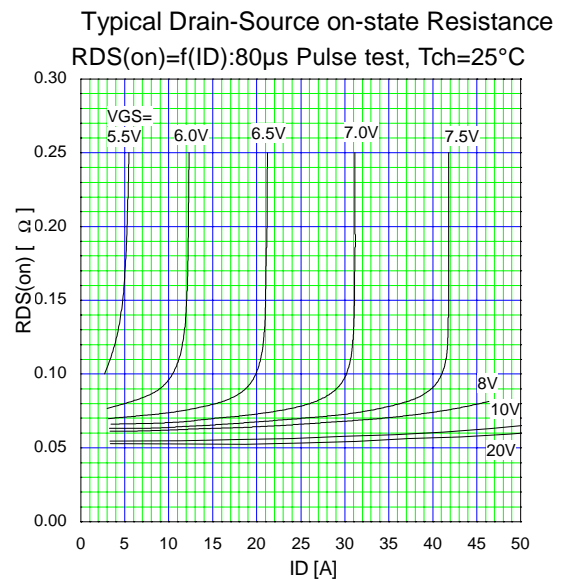
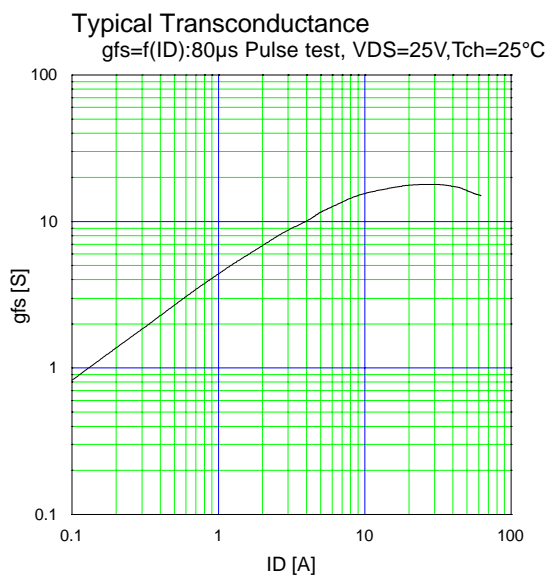
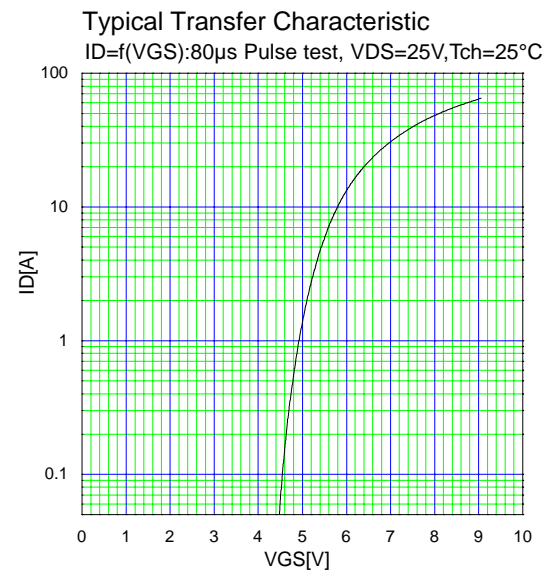
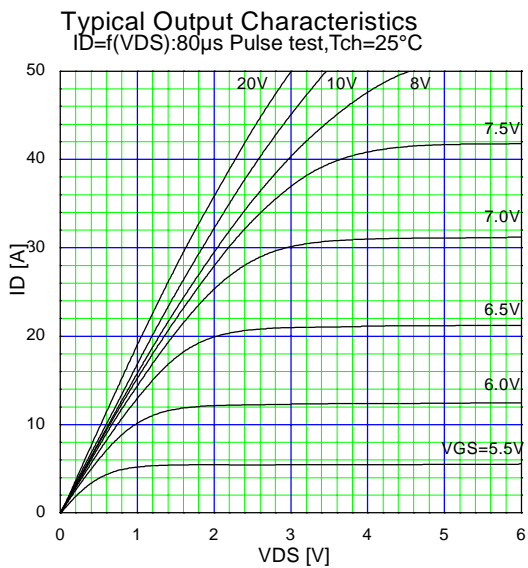
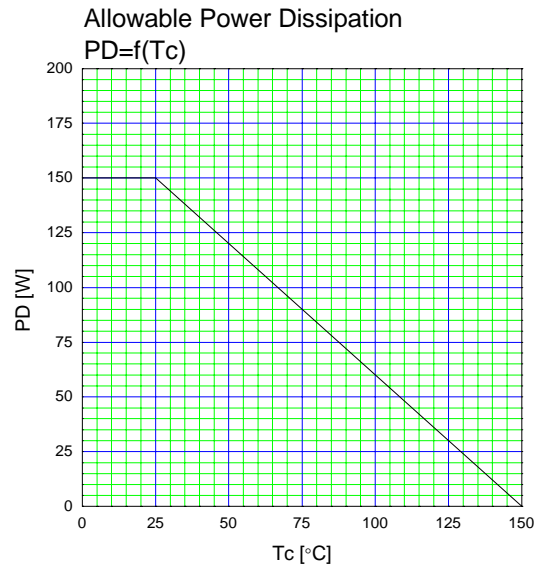
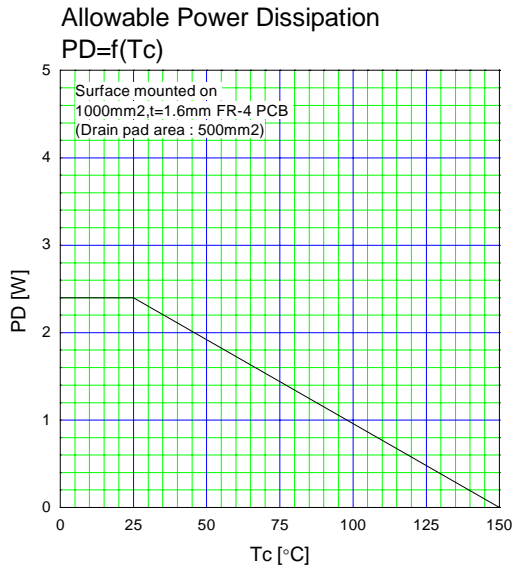
#### ● Electrical characteristics at Tc =25°C ( unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =250μA V <sub>GS</sub> =0V	150			V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =250μA V <sub>DS</sub> =V <sub>GS</sub>	3.0		5.0	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =150V V <sub>GS</sub> =0V			25	μA
		V <sub>DS</sub> =120V V <sub>GS</sub> =0V			250	
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V V <sub>DS</sub> =0V		10	100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =11.5A V <sub>GS</sub> =10V		54	70	mΩ
Forward transconductance	g <sub>fs</sub>	I <sub>D</sub> =11.5A V <sub>DS</sub> =25V	8	16		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =75V		1500	1730	pF
Output capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		200	300	
Reverse transfer capacitance	C <sub>rss</sub>	f=1MHz		17	26	
Turn-on time t <sub>on</sub>	t <sub>d(on)</sub>	V <sub>CC</sub> =48V I <sub>D</sub> =11.5A		13	20	ns
	t <sub>r</sub>	V <sub>GS</sub> =10V		15	23	
Turn-off time t <sub>off</sub>	t <sub>d(off)</sub>	R <sub>GS</sub> =10Ω		34	51	
	t <sub>f</sub>			15	23	
Total Gate Charge	Q <sub>G</sub>	V <sub>CC</sub> =48V		34	51	nC
Gate-Source Charge	Q <sub>GS</sub>	I <sub>D</sub> =23A		9	13.5	
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> =10V		12.5	19	
Avalanche capability	I <sub>AV</sub>	L=228μH T <sub>ch</sub> =25°C	33			A
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =23A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		1.10	1.60	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =23A V <sub>GS</sub> =0V		0.13		μs
Reverse recovery charge	Q <sub>rr</sub>	-di/dt=100A/μs T <sub>ch</sub> =25°C		0.6		μC

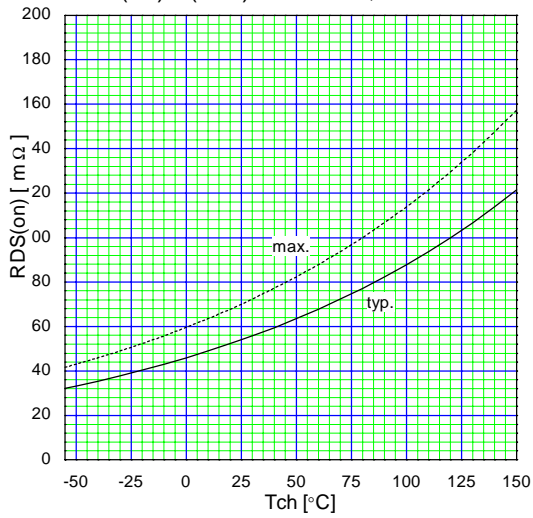
#### ● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-c)</sub>	channel to case			0.833	°C/W
	R <sub>th(ch-a)</sub>	channel to ambient			87.0	°C/W
	R <sub>th(ch-a)</sub> *4	channel to ambient			52.0	°C/W

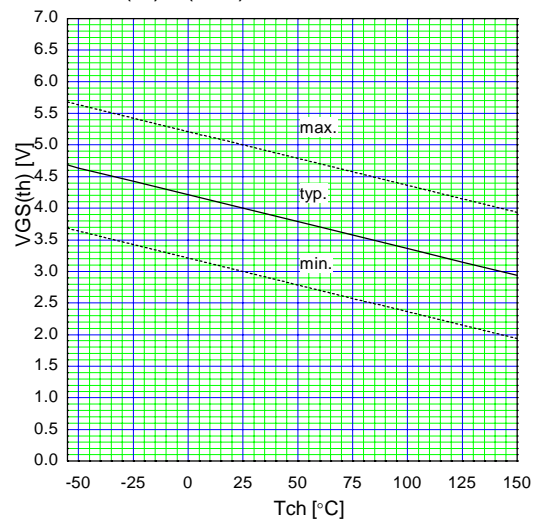
Characteristics



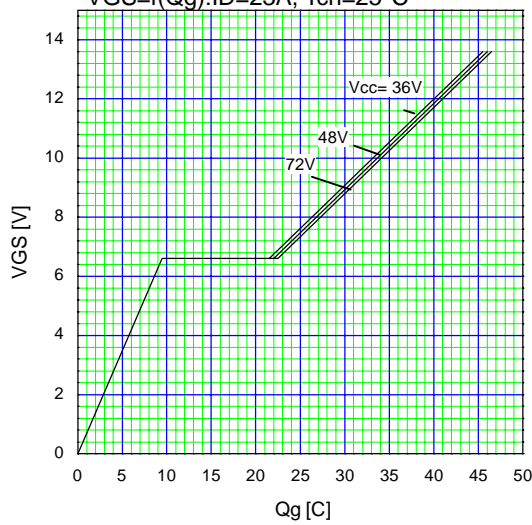
Drain-Source On-state Resistance  
 $R_{DS(on)}=f(T_{ch}):I_D=11.5A, V_{GS}=10V$



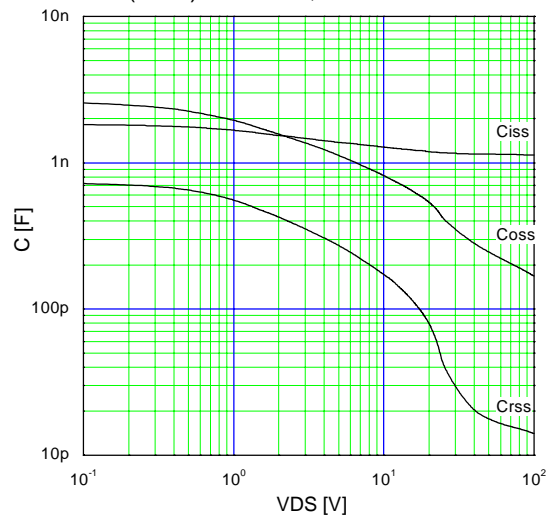
Gate Threshold Voltage vs. Tch  
 $V_{GS(th)}=f(T_{ch}):V_{DS}=V_{GS}, I_D=1mA$



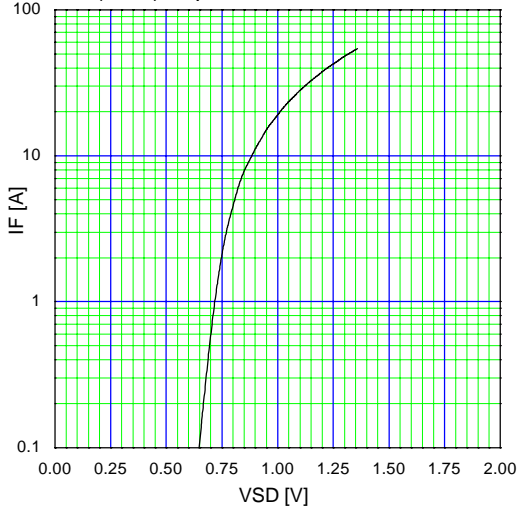
Typical Gate Charge Characteristics  
 $V_{GS}=f(Q_g):I_D=23A, T_{ch}=25°C$



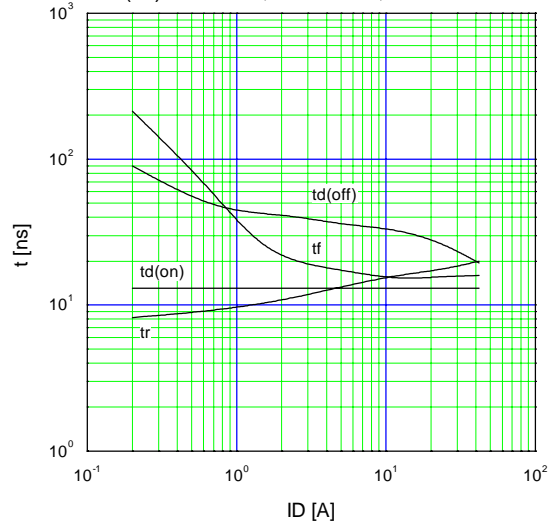
Typical Capacitance  
 $C=f(V_{DS}):V_{GS}=0V, f=1MHz$



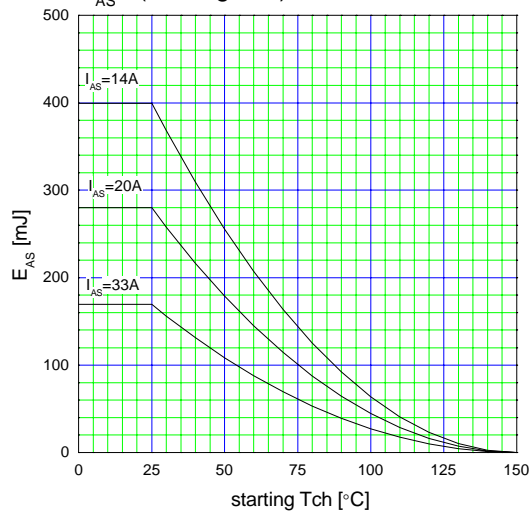
Typical Forward Characteristics of Reverse Diode  
 $I_F=f(V_{SD}):80\mu s \text{ Pulse test}, T_{ch}=25°C$



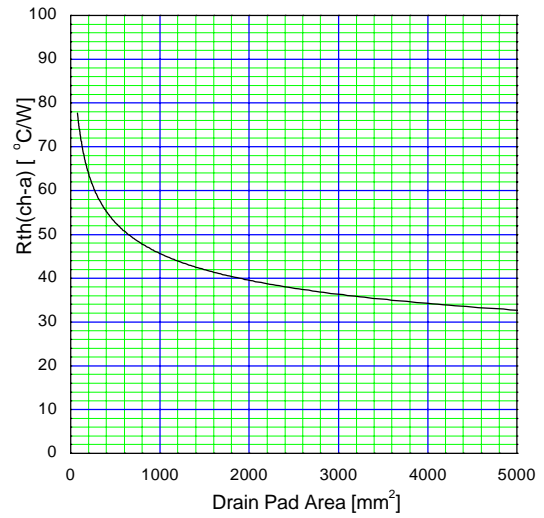
Typical Switching Characteristics vs. ID  
 $t=f(I_D):V_{cc}=48V, V_{GS}=10V, R_G=10\Omega$



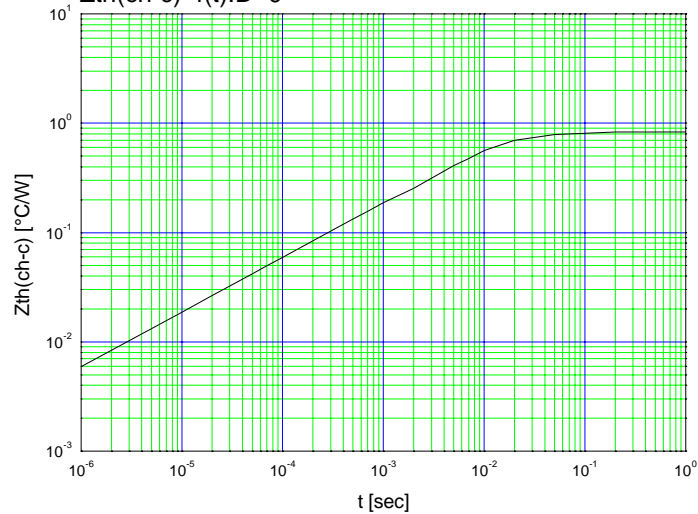
Maximum Avalanche Energy vs. starting Tch  
 $E_{AS}=f(\text{starting Tch}):V_{CC}=48V$



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



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



Maximum Avalanche Current Pulsewidth

$I_{AV}=f(t_{AV}): \text{starting Tch}=25^{\circ}C, V_{CC}=48V$

