

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

● (Tc=25°C unless otherwise specified)

Item	Symbol	Ratings	Unit
Drain-source voltage	V _{DS}	450	V
Continuous drain current	I _D	±10	A
Pulsed drain current	I _{D(puls)}	±40	A
Gate-source voltage	V _{GS}	±30	V
Repetitive or non-repetitive	I _{AR} *2	10	A
Maximum Avalanche Energy	E _{AS} *1	155.3	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	Ta=25°C	2.16
		Tc=25°C	48
Operating and storage temperature range	T _{ch}	+150	°C
	T _{stg}	-55 to +150	°C

*1 L=2.85mH, V_{CC}=45V, See to Avalanche Energy Graph *2 T_{ch}≤150°C*3 I_F≤-I_D, -di/dt=50A/μs, V_{CC}≤BV_{DSS}, T_{ch}≤150°C *4 V_{DS}≤450V

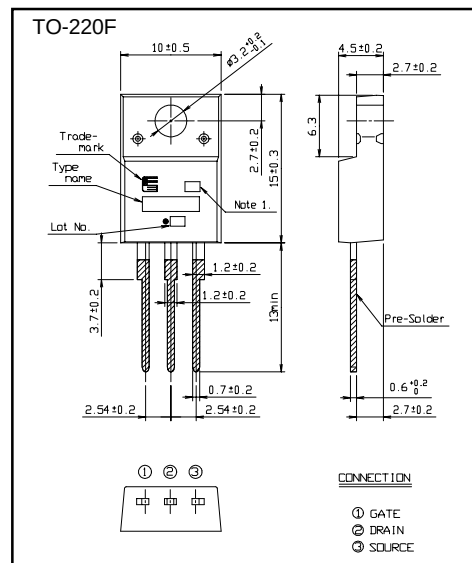
● Electrical characteristics (Tc=25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V(BR) _{DSS}	I _D =250μA V _{GS} =0V	450			V
Gate threshold voltage	V _{GS(th)}	I _D =250μA V _{DS} =V _{GS}	3.0		5.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =450V V _{GS} =0V T _{ch} =25°C			25	μA
		V _{DS} =360V V _{GS} =0V T _{ch} =125°C			250	
Gate-source leakage current	I _{GSS}	V _{GS} =±30V V _{DS} =0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D =4A V _{GS} =10V		0.50	0.65	Ω
Forward transconductance	g _{fs}	I _D =4A V _{DS} =25V	4	8		S
Input capacitance	C _{iss}	V _{DS} =25V		800	1200	pF
Output capacitance	C _{oss}	V _{GS} =0V		120	150	
Reverse transfer capacitance	C _{rss}	f=1MHz		4.5	7	
Turn-on time t _{on}	td(on)	V _{CC} =300V I _D =4A		15	23	ns
	tr	V _{GS} =10V		12	18	
Turn-off time t _{off}	td(off)	R _{GS} =10Ω		25	38	
	tr			7	11	
Total Gate Charge	Q _G	V _{CC} =225V		22	33	nC
Gate-Source Charge	Q _{GS}	I _D =8A		9.5	14.5	
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		6.5	10	
Avalanche capability	I _{AV}	L=2.85mH T _{ch} =25°C	10			A
Diode forward on-voltage	V _{SD}	I _F =8A V _{GS} =0V T _{ch} =25°C		1.00	1.50	V
Reverse recovery time	t _{rr}	I _F =8A V _{GS} =0V		0.7		μs
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		3.5		μC

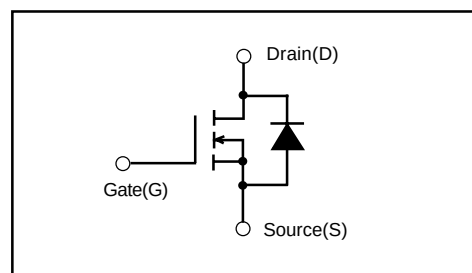
● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			2.60	°C/W
	R _{th(ch-a)}	channel to ambient			58.0	°C/W

■ Outline Drawings [mm]

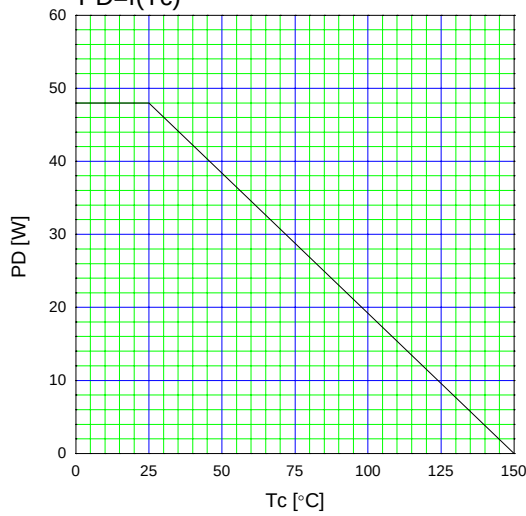


■ Equivalent circuit schematic

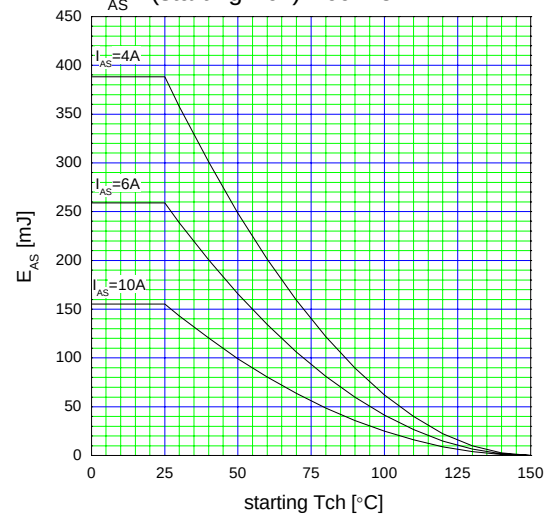


■ Characteristics

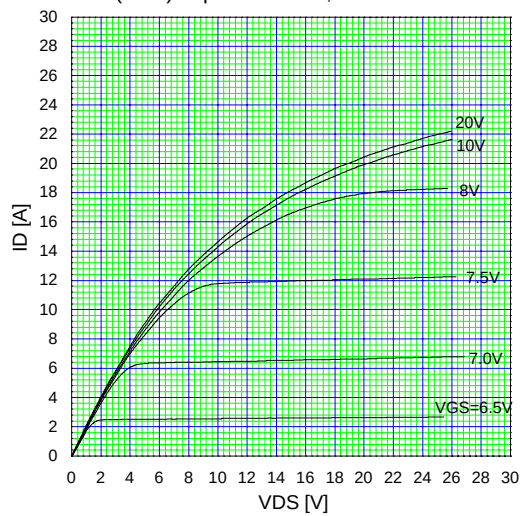
Allowable Power Dissipation
 $PD=f(T_c)$



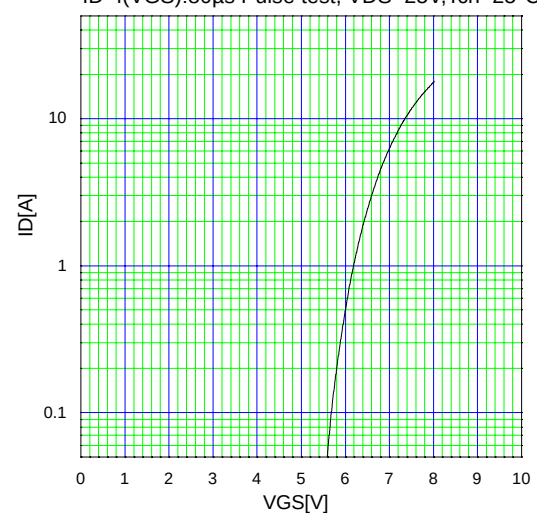
Maximum Avalanche Energy vs. starting T_{ch}
 $E_{AS}=f(\text{starting } T_{ch}):V_{cc}=45\text{V}$



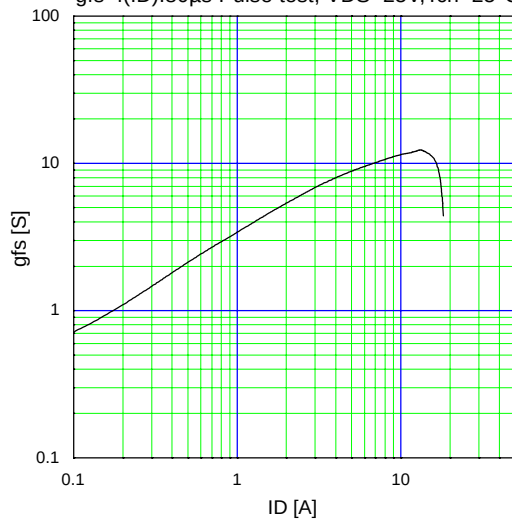
Typical Output Characteristics
 $ID=f(V_{DS}):80\mu\text{s}$ Pulse test, $T_{ch}=25^{\circ}\text{C}$



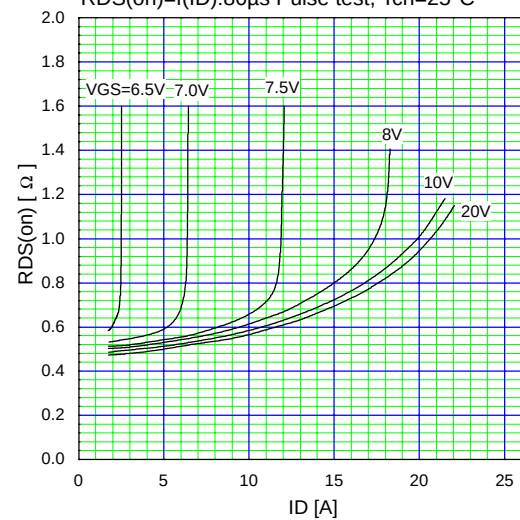
Typical Transfer Characteristic
 $ID=f(V_{GS}):80\mu\text{s}$ Pulse test, $V_{DS}=25\text{V}$, $T_{ch}=25^{\circ}\text{C}$



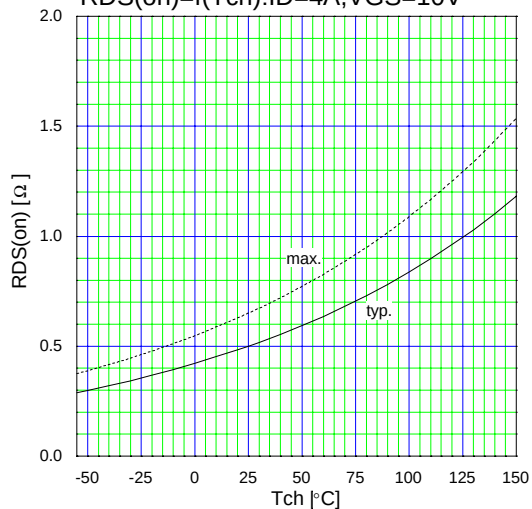
Typical Transconductance
 $g_{fs}=f(ID):80\mu\text{s}$ Pulse test, $V_{DS}=25\text{V}$, $T_{ch}=25^{\circ}\text{C}$



Typical Drain-Source on-state Resistance
 $R_{DS(on)}=f(ID):80\mu\text{s}$ Pulse test, $T_{ch}=25^{\circ}\text{C}$

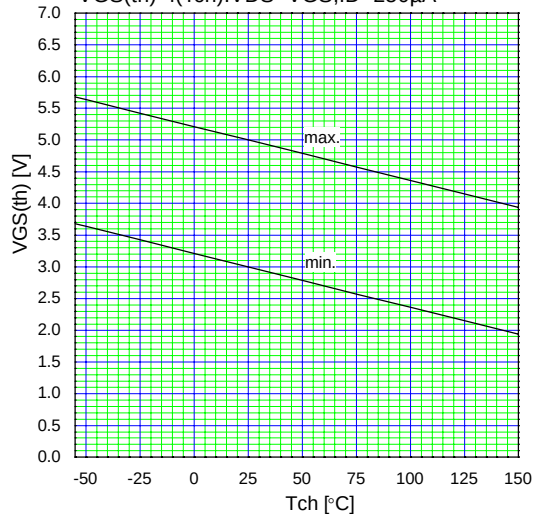


Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 4A, V_{GS} = 10V$

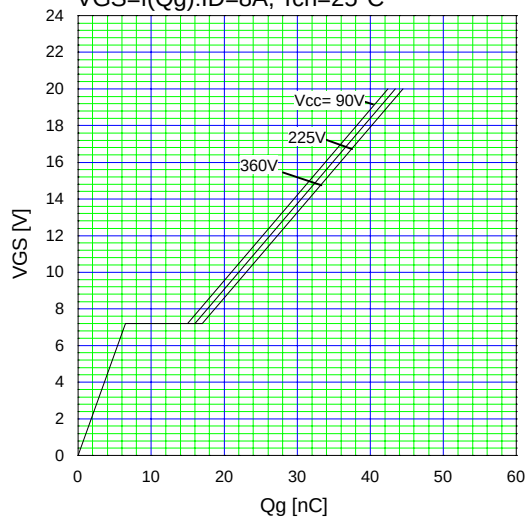


Gate Threshold Voltage vs. T_{ch}

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

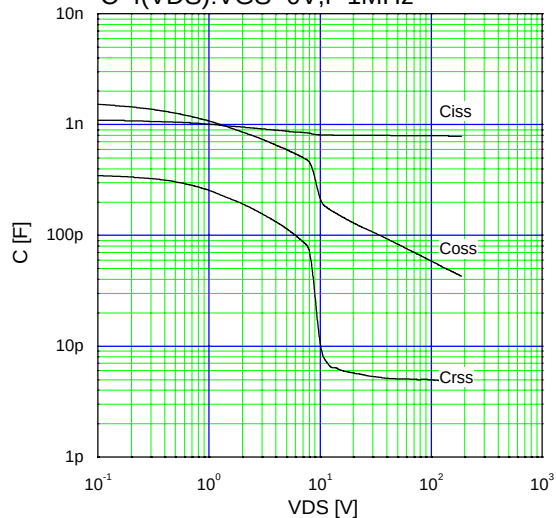


Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 8A, T_{ch} = 25^{\circ}C$

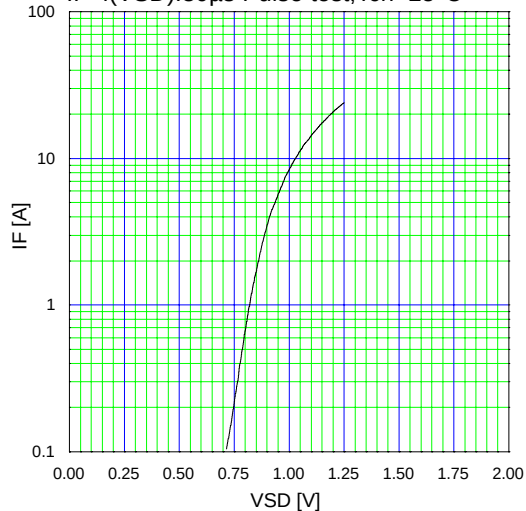


Typical Capacitance

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



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
 $t = f(I_D): V_{CC} = 300V, V_{GS} = 10V, R_G = 10\Omega$

