

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}	500	V	
Continuous drain current	I _D	±14	A	
Pulsed drain current	I _D (puls]	±56	A	
Gate-source voltage	V _{GS}	±30	V	
Repetitive or non-repetitive	I _{AR} *2	14	A	
Maximum Avalanche Energy	E _{AS} *1	188.2	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°C	2.16	W
		T _c =25°C	70	
Operating and storage temperature range	T _{ch}	+150	°C	
	T _{stg}	-55 to +150	°C	
Isolation Voltage	V _{ISO} *5	2	kVrms	

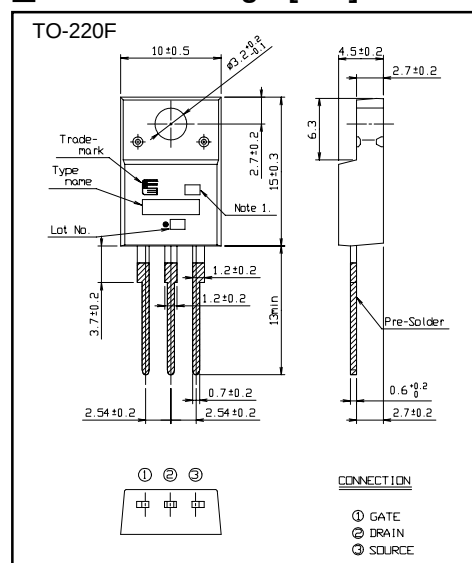
*1 $L=1.76\text{mH}$, $V_{CC}=50\text{V}$, See to Avalanche Energy Graph *2 $T_{ch}\leq 150^\circ\text{C}$ *3 $I_F\leq I_D$, $-di/dt=50\text{A}/\mu\text{s}$, $V_{CC}\leq BV_{DSS}$, $T_{ch}\leq 150^\circ\text{C}$ *4 $V_{DS}\leq 500\text{V}$ *5 $t=60\text{sec}$, $f=60\text{Hz}$ ● Electrical characteristics ($T_c=25^\circ\text{C}$ unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$ $V_{GS}=0\text{V}$	500			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}	$V_{DS}=500\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$			25	μA
		$V_{DS}=400\text{V}$ $V_{GS}=0\text{V}$ $T_{ch}=125^\circ\text{C}$			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	$R_{DS(on)}$	$I_D=6\text{A}$ $V_{GS}=10\text{V}$		0.40	0.52	Ω
Forward transconductance	g_{fs}	$I_D=6\text{A}$ $V_{DS}=25\text{V}$	5.5	11		S
Input capacitance	C_{iss}	$V_{DS}=25\text{V}$		1200	1800	pF
Output capacitance	C_{oss}	$V_{GS}=0\text{V}$		140	210	
Reverse transfer capacitance	C_{rss}	$f=1\text{MHz}$		6.0	9.0	
Turn-on time t_{on}	$t_{d(on)}$	$V_{CC}=300\text{V}$ $I_D=6\text{A}$		17	26	ns
	t_r	$V_{GS}=10\text{V}$		15	23	
Turn-off time t_{off}	$t_{d(off)}$	$R_{GS}=10\Omega$		34	51	
	t_f			7	11	
Total Gate Charge	Q_G	$V_{CC}=250\text{V}$		30	45	nC
Gate-Source Charge	Q_{GS}	$I_D=12\text{A}$		10	15	
Gate-Drain Charge	Q_{GD}	$V_{GS}=10\text{V}$		11	16.5	
Avalanche capability	I_{AV}	$L=1.76\text{mH}$ $T_{ch}=25^\circ\text{C}$	14			A
Diode forward on-voltage	V_{SD}	$I_F=12\text{A}$ $V_{GS}=0\text{V}$ $T_{ch}=25^\circ\text{C}$		1.00	1.50	V
Reverse recovery time	t_{rr}	$I_F=12\text{A}$ $V_{GS}=0\text{V}$		0.7		μs
Reverse recovery charge	Q_{rr}	$-di/dt=100\text{A}/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$		4.5		μC

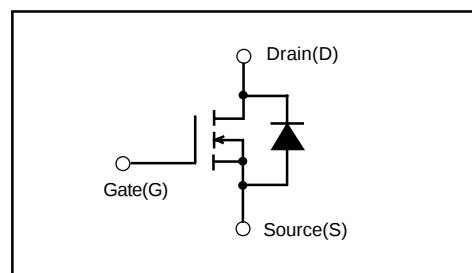
● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	$R_{th(ch-c)}$	channel to case			1.79	$^\circ\text{C}/\text{W}$
	$R_{th(ch-a)}$	channel to ambient			58.0	$^\circ\text{C}/\text{W}$

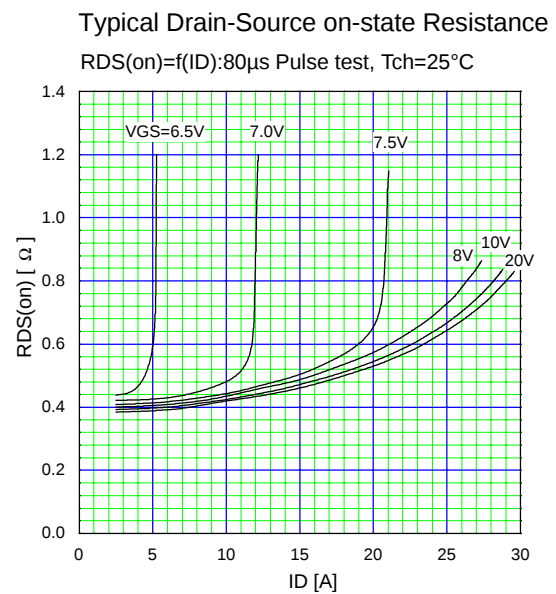
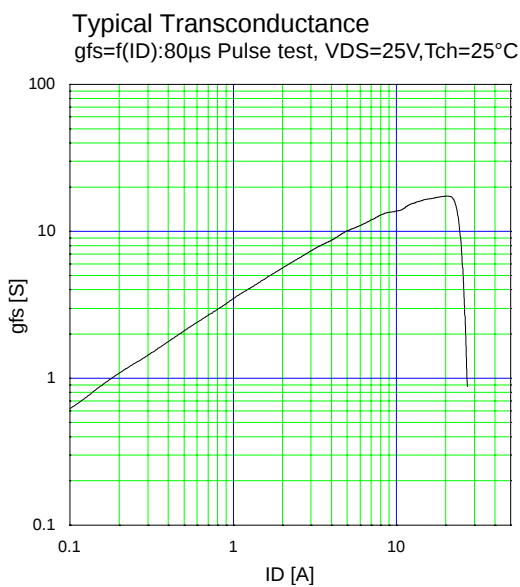
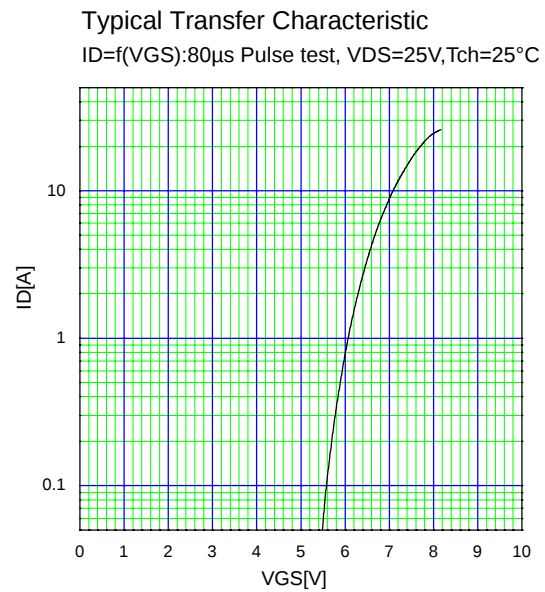
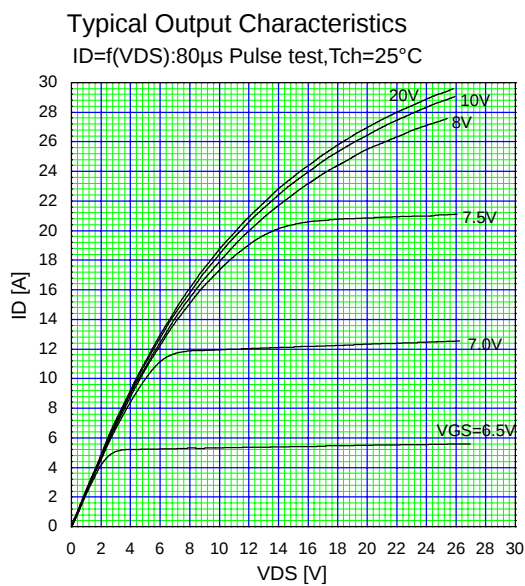
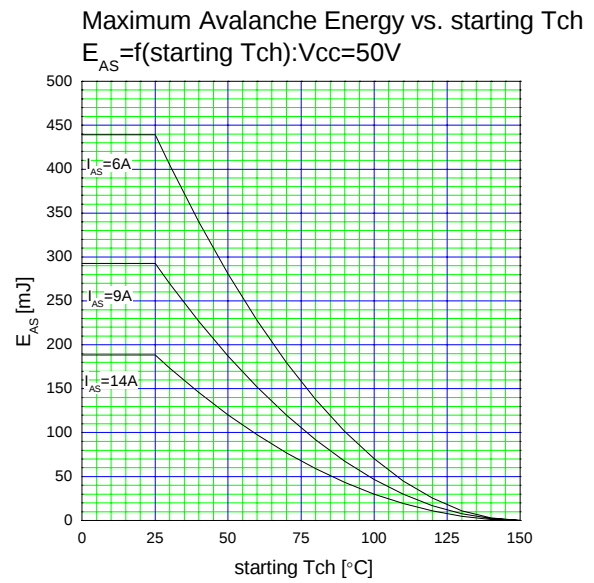
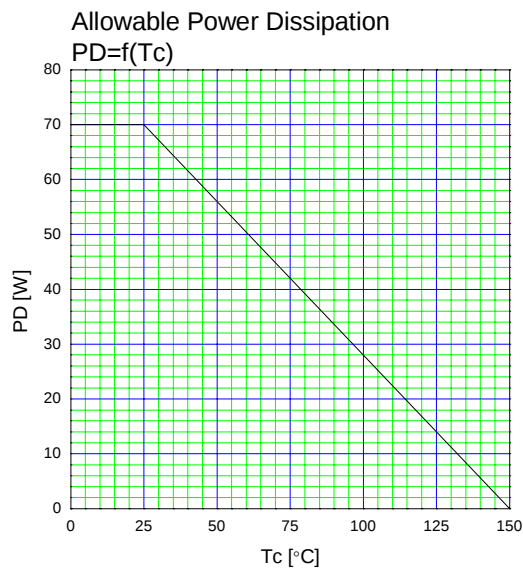
■ Outline Drawings [mm]



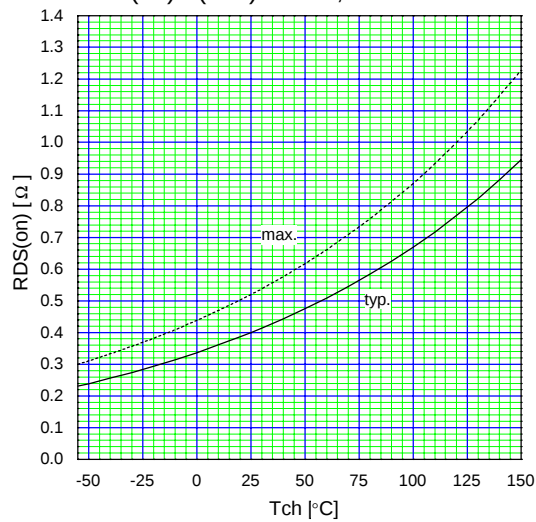
■ Equivalent circuit schematic



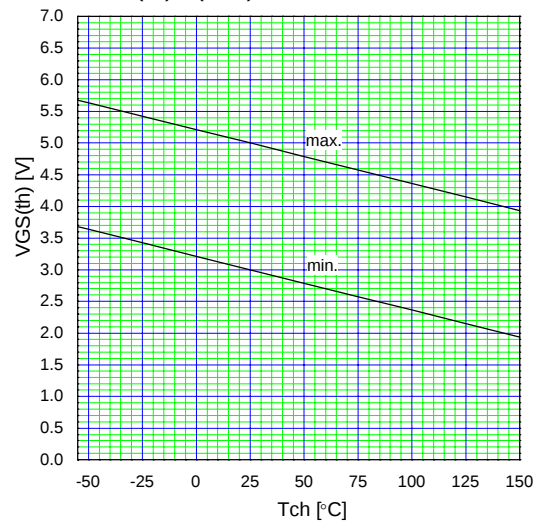
Characteristics



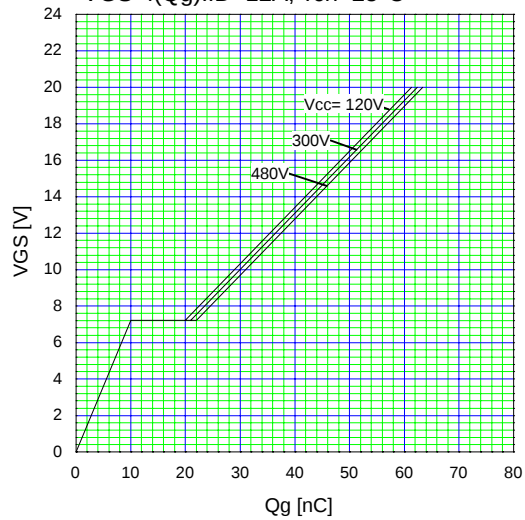
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 6A, V_{GS} = 10V$



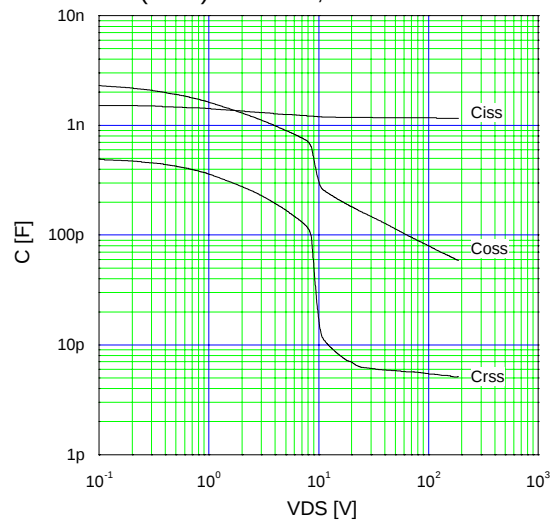
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 250\mu A$



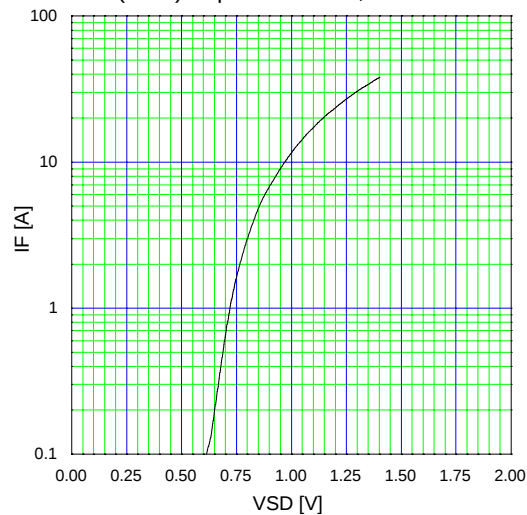
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 12A, T_{ch} = 25^{\circ}C$



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

