

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}	500	V
Continuous drain current	I _D	±6	A
Pulsed drain current	I _D (puls)	±24	A
Gate-source voltage	V _{GS}	±30	V
Repetitive or non-repetitive	I _{AR} *2	6	A
Maximum Avalanche Energy	E _{AS} *1	115	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 32	W
Operating and storage temperature range	T _{ch} T _{stg}	+150 -55 to +150	°C
Isolation Voltage	V _{ISO} *5	2	kVrms

*1 L=5.90mH, V_{CC}=50V, 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} ≤ 500V *5 t=60sec, f=60Hz

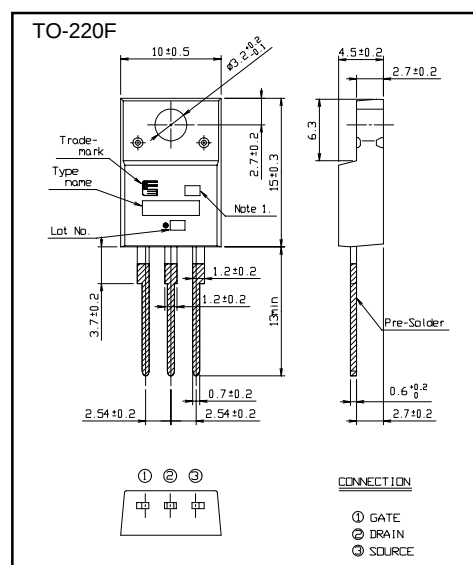
● Electrical characteristics (Tc =25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V(BR) _{DSS}	I _D =250μA V _{GS} =0V	500			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} =500V V _{GS} =0V T _{ch} =25°C V _{DS} =400V V _{GS} =0V T _{ch} =125°C			25 250	μA
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 =3A V _{GS} =10V		1.15	1.50	Ω
Forward transconductance	g _{fs}	I _D =3A V _{DS} =25V	2.5	5		S
Input capacitance	C _{iss}	V _{DS} =25V		430	675	pF
Output capacitance	C _{oss}	V _{GS} =0V		60	90	pF
Reverse transfer capacitance	C _{rss}	f=1MHz		2.5	4.5	pF
Turn-on time t _{on}	t _{d(on)} t _r	V _{CC} =300V I _D =3A V _{GS} =10V		10 5	15 7.5	ns
Turn-off time t _{off}	t _{d(off)} t _r	R _{GS} =10Ω		20 5	30 7.5	ns
Total Gate Charge	Q _G	V _{CC} =250V		15	22.5	nC
Gate-Source Charge	Q _{GS}	I _D =6A		6.5	10.5	nC
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		2.5	4.5	nC
Avalanche capability	I _{AV}	L=5.9mH T _{ch} =25°C	6			A
Diode forward on-voltage	V _{SD}	I _F =6A V _{GS} =0V T _{ch} =25°C		1.00	1.50	V
Reverse recovery time	t _{rr}	I _F =6A V _{GS} =0V		0.5		μs
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		1.7		μC

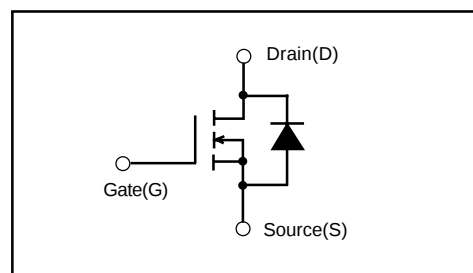
● Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			3.91	°C/W
	R _{th(ch-a)}	channel to ambient			58.0	°C/W

■ Outline Drawings [mm]

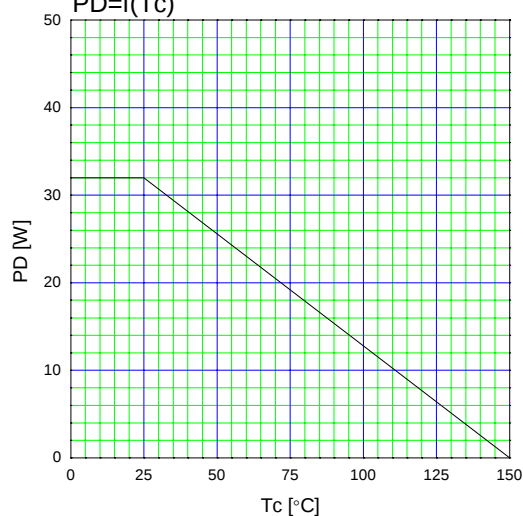


■ Equivalent circuit schematic



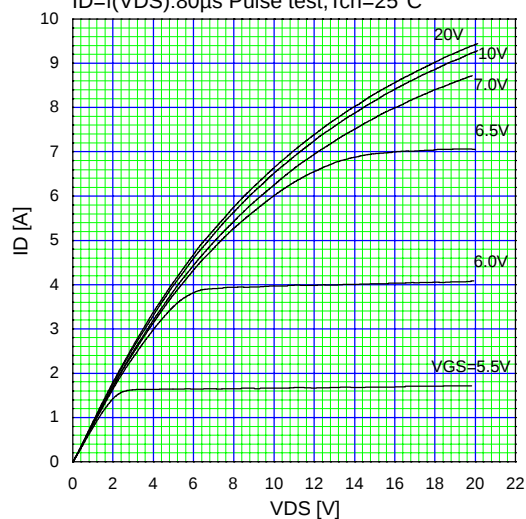
Characteristics

Allowable Power Dissipation
 $PD=f(T_c)$



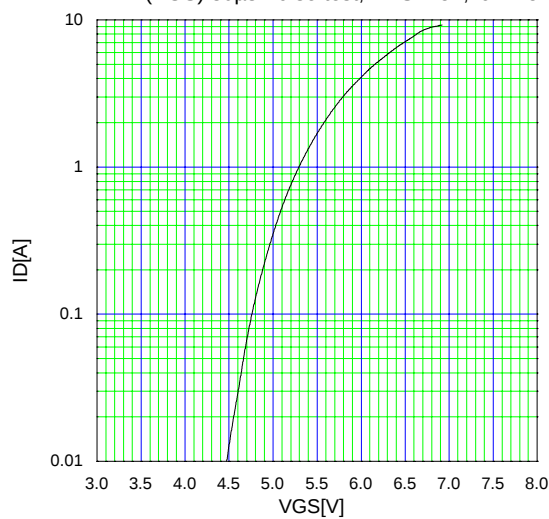
Typical Output Characteristics

$ID=f(V_{DS})$: 80 μ s Pulse test, $T_{ch}=25^{\circ}C$



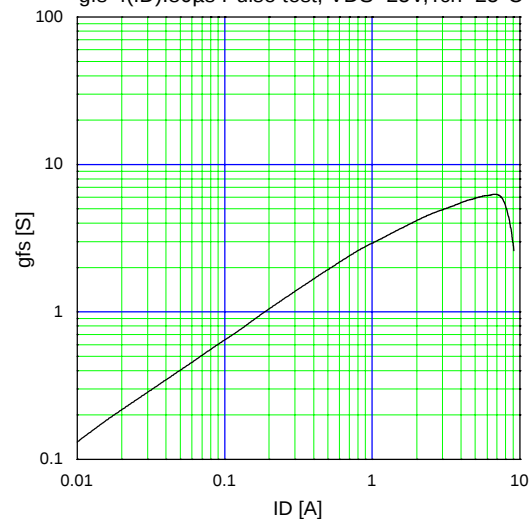
Typical Transfer Characteristic

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



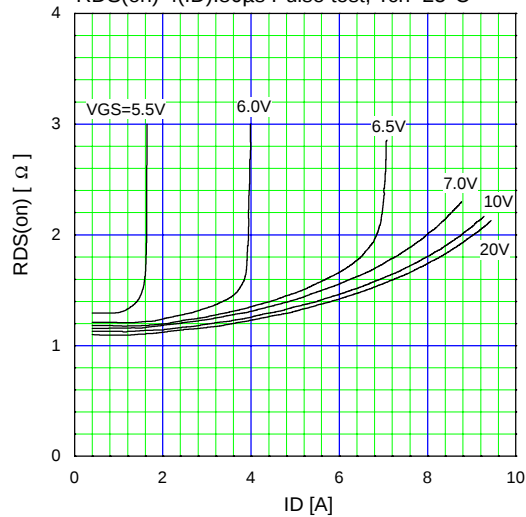
Typical Transconductance

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



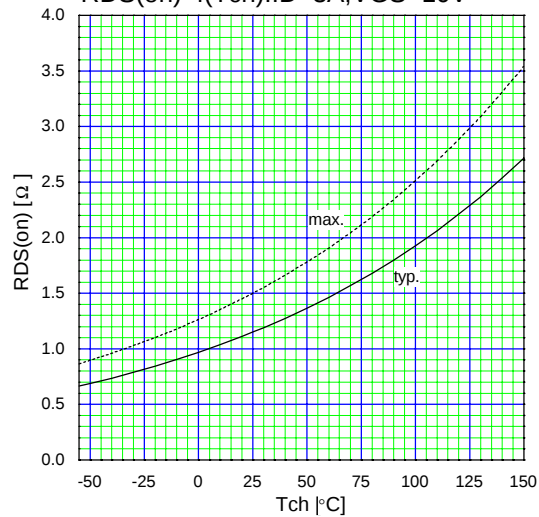
Typical Drain-Source on-state Resistance

$R_{DS(on)}=f(ID)$: 80 μ s Pulse test, $T_{ch}=25^{\circ}C$

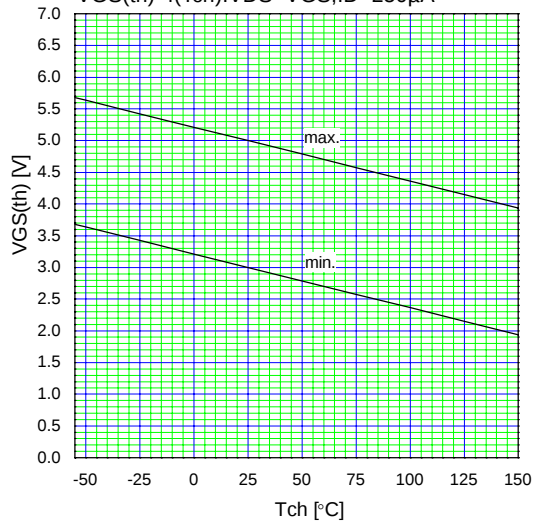


Drain-Source On-state Resistance

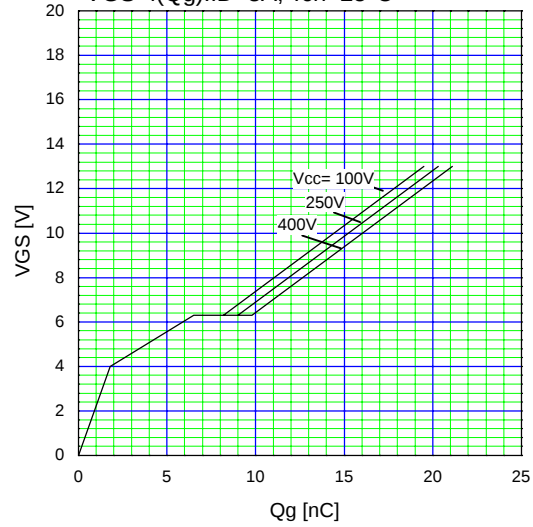
$R_{DS(on)}=f(T_{ch})$: $ID=3A$, $V_{GS}=10V$



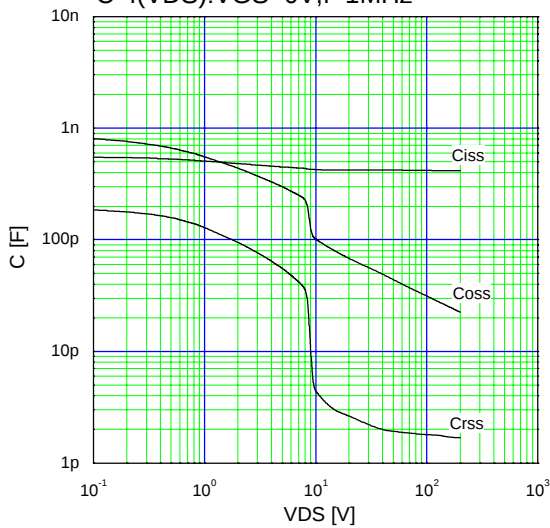
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch})$: $V_{DS} = V_{GS}$, $I_D = 250\mu A$



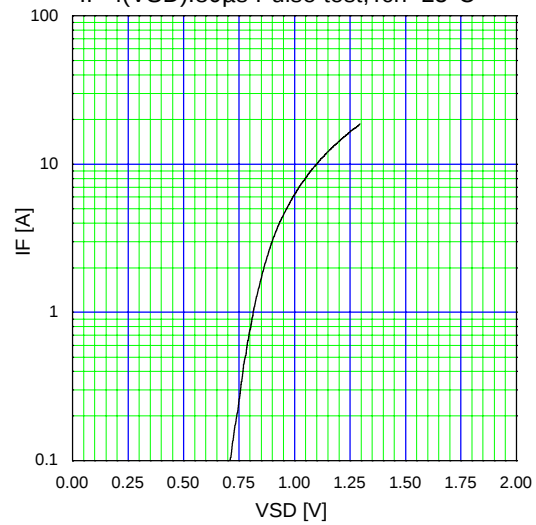
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g)$: $I_D = 3A$, $T_{ch} = 25^\circ C$



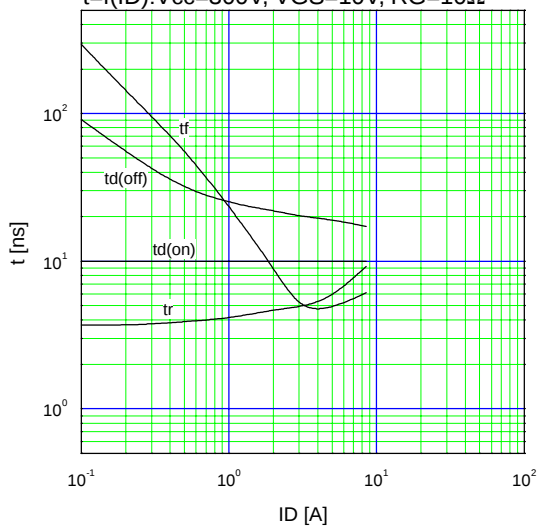
Typical Capacitance
 $C = f(V_{DS})$: $V_{GS} = 0V$, $f = 1MHz$



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



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



Maximum Avalanche Energy vs. starting T_{ch}
 $E_{AS} = f(\text{starting } T_{ch})$: $V_{CC} = 50V$

