

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	±16	A
Pulsed drain current	I _{D(puls)}	±64	A
Gate-source voltage	V _{GS}	±30	V
Repetitive or non-repetitive	IAR *2	16	A
Maximum Avalanche Energy	EAS *1	212.2	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	2.02
		T _c =25°C	225
Operating and storage temperature range	T _{ch}	+150	°C
	T _{stg}	-55 to +150	°C

*1 L=1.52mH, 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

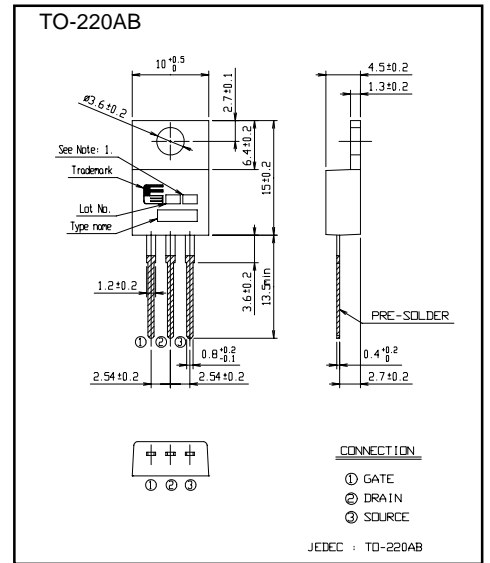
Electrical characteristics (Tc =25°C unless otherwise specified)

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			25	μA
		V _{DS} =400V V _{GS} =0V			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 =7A V _{GS} =10V		0.35	0.46	Ω
Forward transconductance	g _{fs}	I _D =7A V _{DS} =25V	7	14		S
Input capacitance	C _{iss}	V _{DS} =25V		1600	2400	pF
Output capacitance	C _{oss}	V _{GS} =0V		160	240	pF
Reverse transfer capacitance	C _{rss}	f=1MHz		7	10.5	pF
Turn-on time t _{on}	td(on)	V _{CC} =300V I _D =7A		18	27	ns
	t _r	V _{GS} =10V		16	24	ns
Turn-off time t _{off}	td(off)	R _{GS} =10 Ω		35	50	ns
	t _f			8	15	ns
Total Gate Charge	Q _G	V _{CC} =250V		33	50	nC
Gate-Source Charge	Q _{GS}	I _D =14A		12.5	19	nC
Gate-Drain Charge	Q _{GD}	V _{GS} =10V		10.5	16	nC
Avalanche capability	I _{AV}	L=1.52mH T _{ch} =25°C	16			A
Diode forward on-voltage	V _{SD}	I _F =14A V _{GS} =0V T _{ch} =25°C		1.00	1.50	V
Reverse recovery time	t _{rr}	I _F =14A V _{GS} =0V		0.65		μs
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		6.0		μC

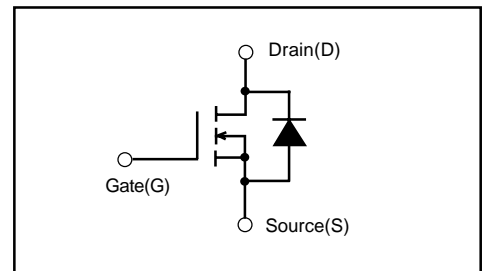
Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}	channel to case			0.556	°C/W
	R _{th(ch-a)}	channel to ambient				°C/W

Outline Drawings [mm]

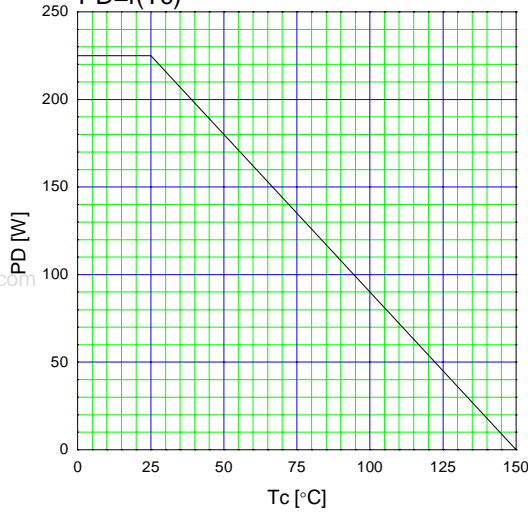


Equivalent circuit schematic

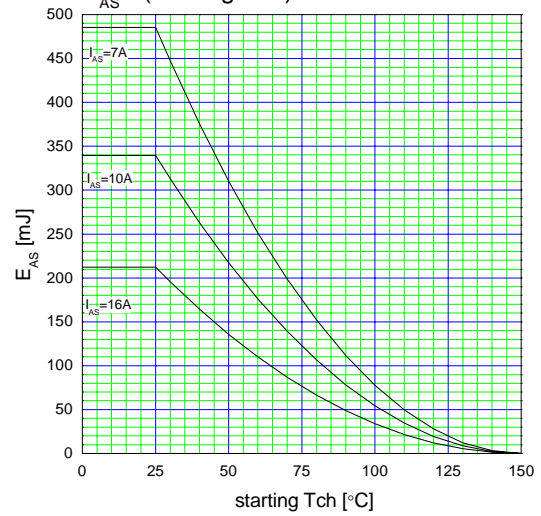


Characteristics

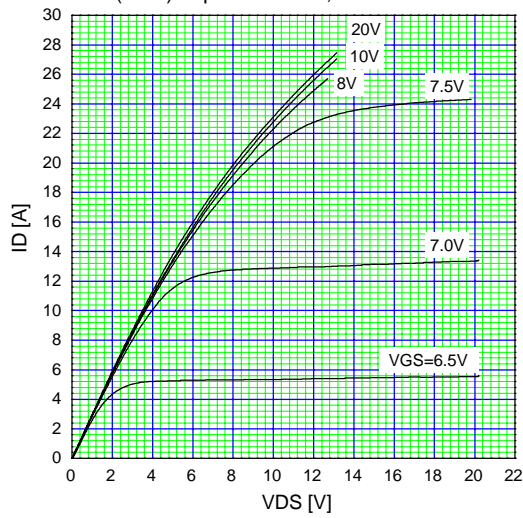
Allowable Power Dissipation
 $PD=f(T_c)$



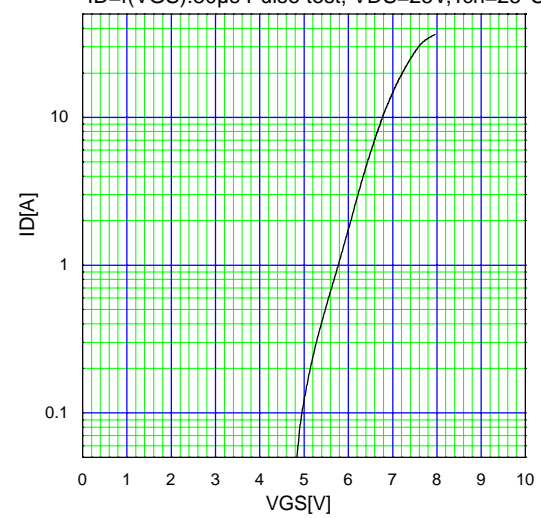
Maximum Avalanche Energy vs. starting T_{ch}
 $E_{AS}=f(\text{starting } T_{ch}):V_{CC}=50V$



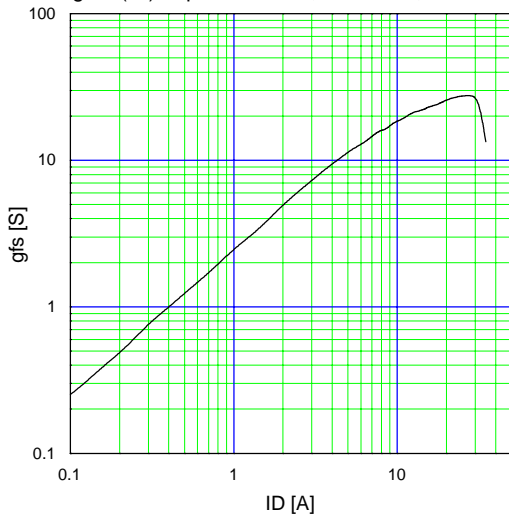
Typical Output Characteristics
 $ID=f(V_{DS}):80\mu s \text{ Pulse test}, T_{ch}=25^\circ C$



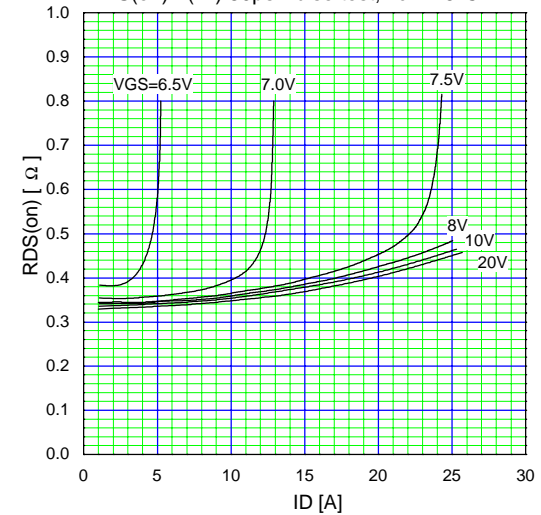
Typical Transfer Characteristic
 $ID=f(V_{GS}):80\mu s \text{ Pulse test}, V_{DS}=25V, T_{ch}=25^\circ C$



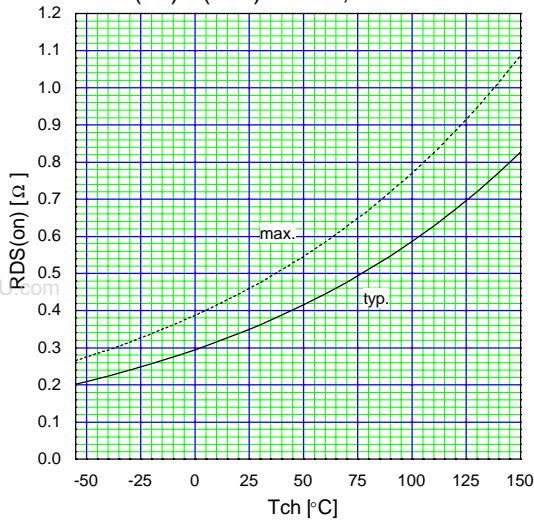
Typical Transconductance
 $g_{fs}=f(I_D):80\mu s \text{ Pulse test}, V_{DS}=25V, T_{ch}=25^\circ C$



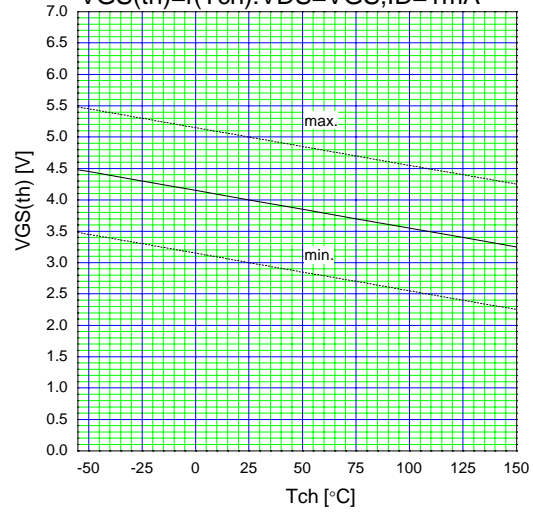
Typical Drain-Source on-state Resistance
 $R_{DS(on)}=f(I_D):80\mu s \text{ Pulse test}, T_{ch}=25^\circ C$



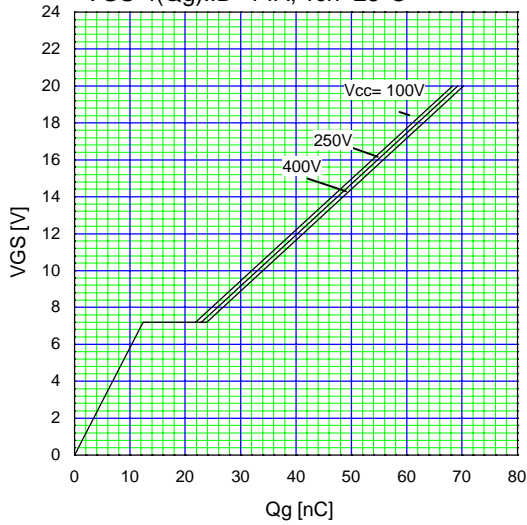
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}): I_D = 7A, V_{GS} = 10V$



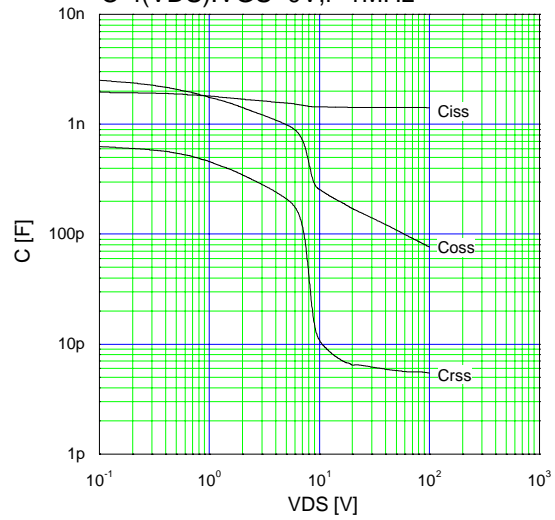
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}): V_{DS} = V_{GS}, I_D = 1mA$



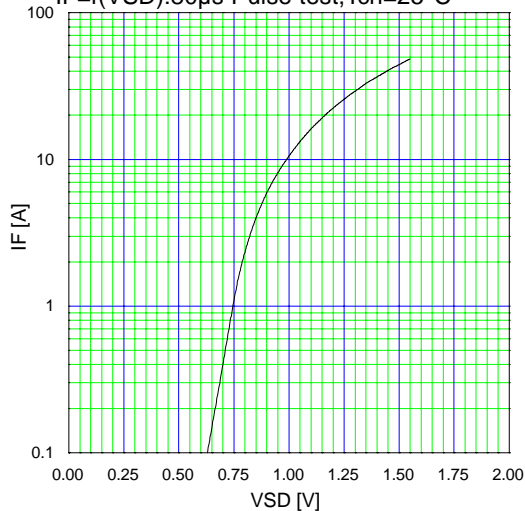
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g): I_D = 14A, T_{ch} = 25°C$



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

