

### Super FAP-G Series

### N-CHANNEL SILICON POWER MOSFET

#### Features

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

#### 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	Remarks
Drain-source voltage	V <sub>DS</sub>	900	V	
	V <sub>DSX</sub>	900	V	V <sub>GS</sub> =-30V
Continuous drain current	I <sub>D</sub>	2.6	A	
Pulsed drain current	I <sub>D(puls)</sub>	±10.4	A	
Gate-source voltage	V <sub>GS</sub>	±30	V	
Repetitive or non-repetitive	I <sub>AR</sub>	2.6	A	Note *1
Non-repetitive Maximum avalanche energy	E <sub>AS</sub>	349.1	mJ	Note *2
Repetitive Maximum avalanche energy	E <sub>AR</sub>	9.0	mJ	Note *3
Maximum drain-source dV/dt	dV <sub>DS</sub> /dt	40	kV/μs	V <sub>DS</sub> ≤ 900V
Peak diode recovery dV/dt	dV/dt	5	kV/μs	Note *4
Maximum power dissipation	P <sub>D</sub>	90	W	T <sub>c</sub> =25°C
		2.02	W	T <sub>a</sub> =25°C
Operating and storage temperature range	T <sub>ch</sub>	+150	°C	
	T <sub>stg</sub>	-55 to +150	°C	

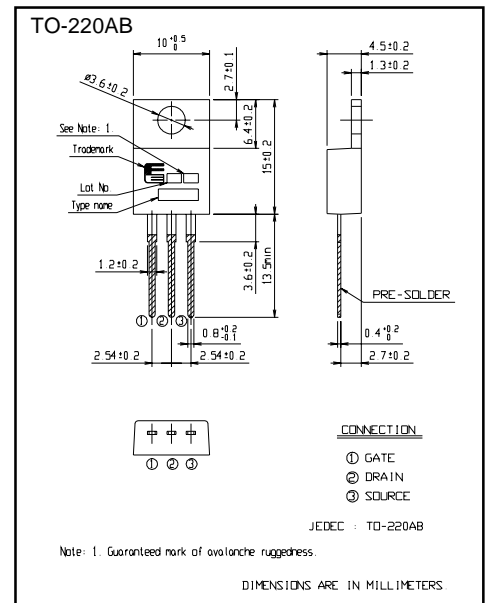
Note \*1 T<sub>ch</sub> ≤ 150°C

Note \*2 Starting T<sub>ch</sub>=25°C, I<sub>AS</sub>=1.1A, L=524mH, V<sub>CC</sub>=100V, R<sub>G</sub>=50Ω  
E<sub>AS</sub> limited by maximum channel temperature and avalanche current.  
See to 'Avalanche Energy' graph.

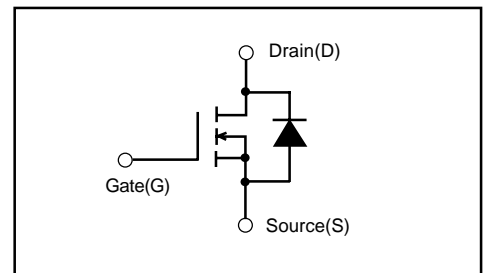
Note \*3 Repetitive rating : Pulse width limited by maximum channel temperature.  
See to 'Transient Thermal impedance' graph.

Note \*4 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

#### Outline Drawings [mm]



#### Equivalent circuit schematic



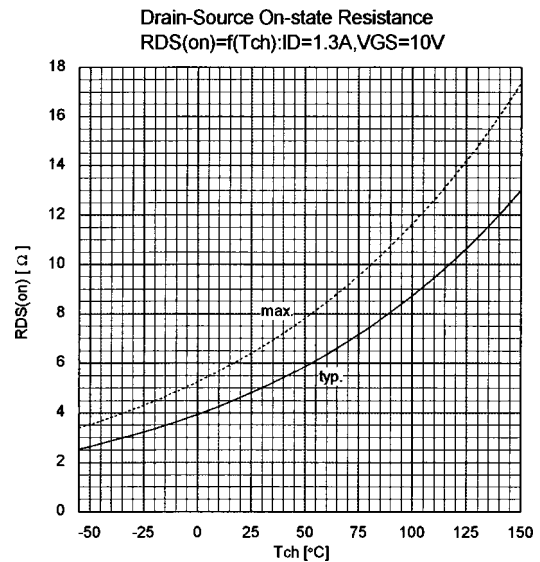
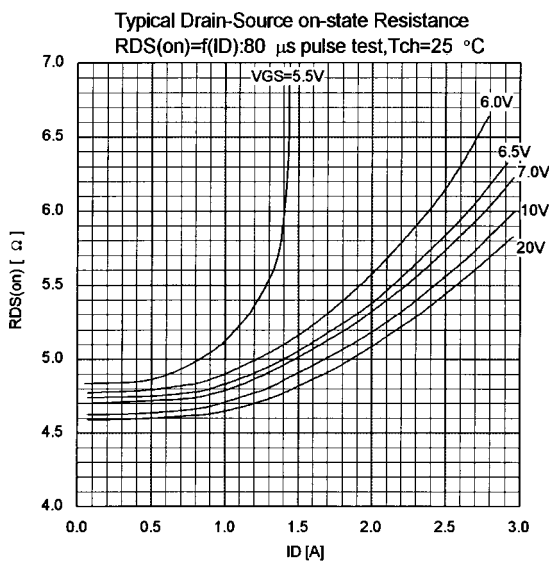
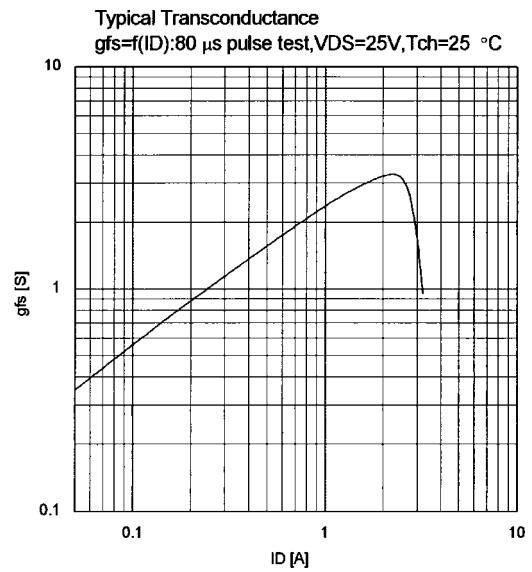
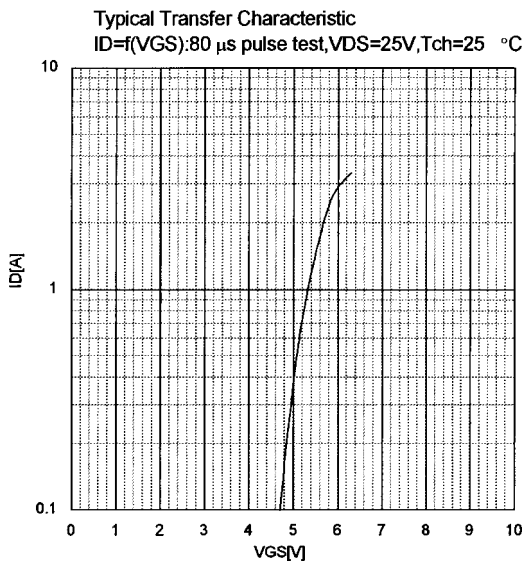
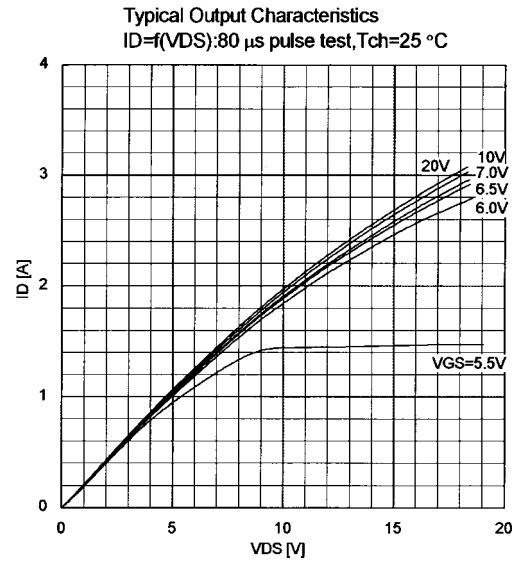
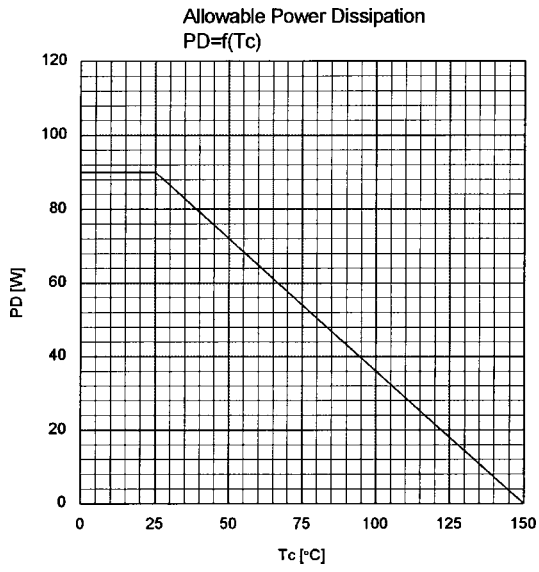
#### Electrical characteristics (Tc = 25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA V <sub>GS</sub> =0V	900			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> =900V V <sub>GS</sub> =0V T <sub>ch</sub> =25°C			25	μA
		V <sub>DS</sub> =720V V <sub>GS</sub> =0V T <sub>ch</sub> =125°C			250	
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V V <sub>DS</sub> =0V			100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =1.3A V <sub>GS</sub> =10V		4.8	6.4	Ω
Forward transconductance	g <sub>fs</sub>	I <sub>D</sub> =1.3A V <sub>DS</sub> =25V	1.3	2.6		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V		330	495	pF
Output capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		44	66	
Reverse transfer capacitance	C <sub>rss</sub>	f=1MHz		2.5	5.0	
Turn-on time t <sub>on</sub>	td(on)	V <sub>CC</sub> =600V I <sub>D</sub> =1.3A		10.5	15.8	ns
	t <sub>r</sub>	V <sub>GS</sub> =10V		6.5	9.8	
Turn-off time t <sub>off</sub>	td(off)	R <sub>G</sub> =10 Ω		28	42	
	t <sub>r</sub>			20	30	
Total Gate Charge	Q <sub>G</sub>	V <sub>CC</sub> =450V		13	19.5	nC
Gate-Source Charge	Q <sub>GS</sub>	I <sub>D</sub> =2.6A		4.5	6.5	
Gate-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> =10V		4.3	6.8	
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =2.6A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		1.00	1.50	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =2.6A V <sub>GS</sub> =0V		1.5		μs
Reverse recovery charge	Q <sub>rr</sub>	-di/dt=100A/μs T <sub>ch</sub> =25°C		4.0		μC

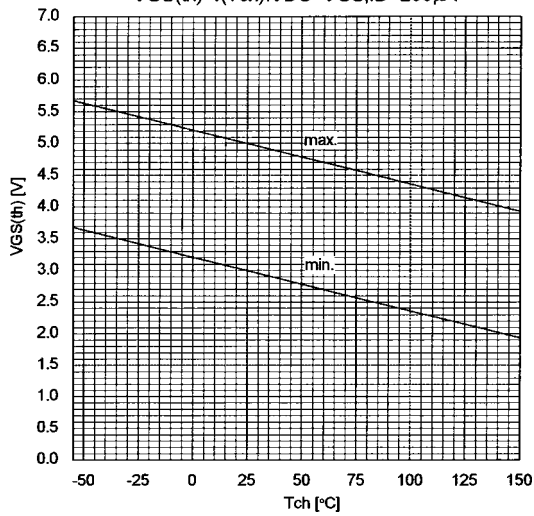
#### Thermal characteristics

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-c)</sub>	channel to case			1.389	°C/W
	R <sub>th(ch-a)</sub>	channel to ambient			62.0	°C/W

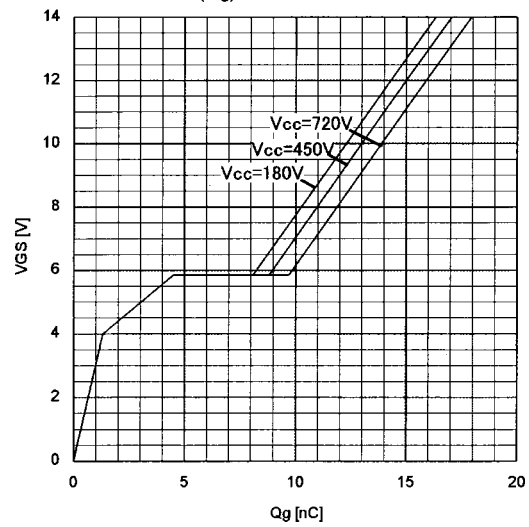
Characteristics



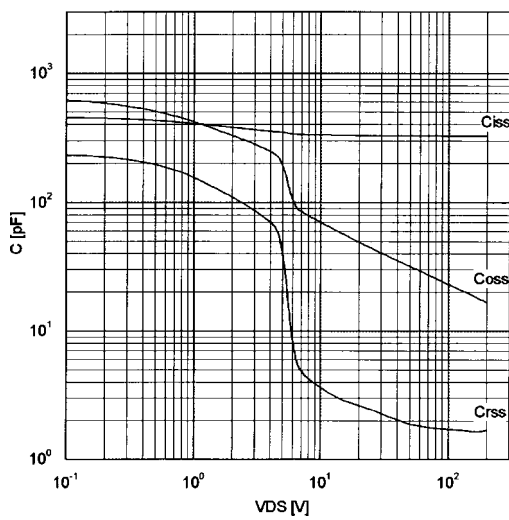
Gate Threshold Voltage vs. T<sub>ch</sub>  
 $V_{GS(th)} = f(T_{ch})$ ;  $V_{DS} = V_{GS}$ ,  $I_D = 250 \mu A$



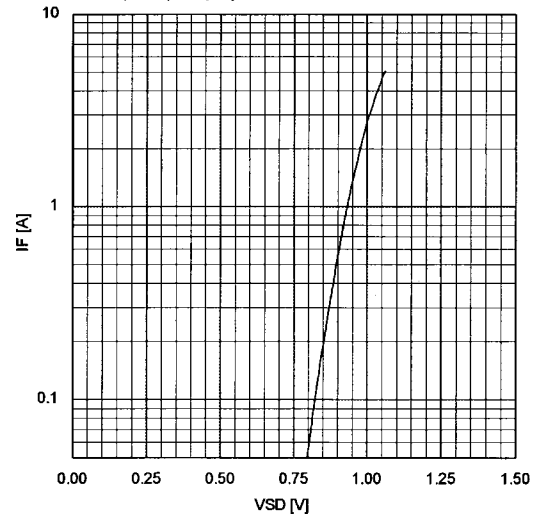
Typical Gate Charge Characteristics  
 $V_{GS} = f(Q_g)$ ;  $I_D = 2.6A$ ,  $T_{ch} = 25 \text{ °C}$



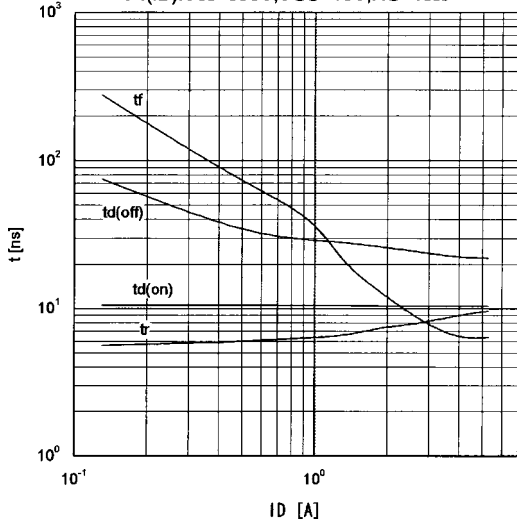
Typical Capacitance  
 $C = f(V_{DS})$ ;  $V_{GS} = 0V$ ,  $f = 1MHz$



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



Typical Switching Characteristics vs. I<sub>D</sub>  
 $t = f(I_D)$ ;  $V_{cc} = 600V$ ,  $V_{GS} = 10V$ ,  $R_G = 10\Omega$



Maximum Avalanche Energy vs. starting T<sub>ch</sub>  
 $E_{(AV)} = f(\text{starting } T_{ch})$ ;  $V_{cc} = 100V$ ,  $I_{(AV)} \leq 2.6A$

