

## P-CHANNEL SILICON POWER MOSFET

## FAP-III SERIES

### Features

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

### Applications

- Switching regulators
- DC-DC converters
- General purpose power amplifier

### Maximum ratings and characteristics

#### Absolute maximum ratings (Tc=25°C unless otherwise specified)

Item	Symbol	Rating	Unit
Drain-source voltage	V <sub>DS</sub>	-60	V
Continuous drain current	I <sub>D</sub>	±25	A
Pulsed drain current	I <sub>D(puls)</sub>	±100	A
Gate-source voltage	V <sub>GS</sub>	±20	V
Maximum avalanche energy *1	E <sub>AV</sub>	325.9	mJ
Maximum power dissipation(Tc=25°C)	P <sub>D</sub>	50	W
Operating and storage temperature range	T <sub>ch</sub>	+150	°C
	T <sub>stg</sub>	-55 to +150	°C

\*1 L=0.695mH, V<sub>CC</sub>= -24V

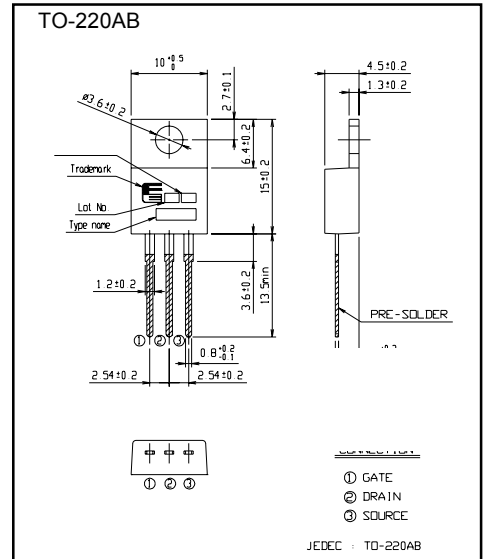
#### Electrical characteristics (Tc =25°C unless otherwise specified)

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	BV <sub>DSS</sub>	I <sub>D</sub> =1mA V <sub>GS</sub> =0V	-60			V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =1mA V <sub>DS</sub> =V <sub>GS</sub>	-1.0	-1.5	-2.5	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -60V V <sub>GS</sub> =0V	T <sub>ch</sub> =25°C	-10	-500	μA
			T <sub>ch</sub> =125°C	-0.2	-1.0	mA
Gate-source leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V V <sub>DS</sub> =0V		10	100	nA
Drain-source on-state resistance	R <sub>DSON</sub>	I <sub>D</sub> = -12.5A	V <sub>GS</sub> = -4V	80	110	mΩ
			V <sub>GS</sub> = -10V	45	60	mΩ
Forward transconductance	g <sub>fs</sub>	I <sub>D</sub> =12.5A V <sub>DS</sub> = -25V	7.5	15.0		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -25V		2000	3000	pF
Output capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		700	1050	
Reverse transfer capacitance	C <sub>rss</sub>	f=1MHz		450	680	ns
Turn-on time	t <sub>d(on)</sub>	V <sub>CC</sub> = -30V R <sub>G</sub> =10 Ω		15	25	
	t <sub>r</sub>	I <sub>D</sub> = -25A		80	120	
Turn-off time	t <sub>d(off)</sub>	V <sub>GS</sub> = -10V		190	290	
	t <sub>f</sub>			90	140	
Avalanche capability	I <sub>AV</sub>	L=100μH T <sub>ch</sub> =25°C	-25			A
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =2I <sub>IDR</sub> V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		-2	-3	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =I <sub>IDR</sub> V <sub>GS</sub> =0V		160		ns
Reverse recovery charge	Q <sub>rr</sub>	-di/dt=100A/μs T <sub>ch</sub> =25°C		0.9		μC

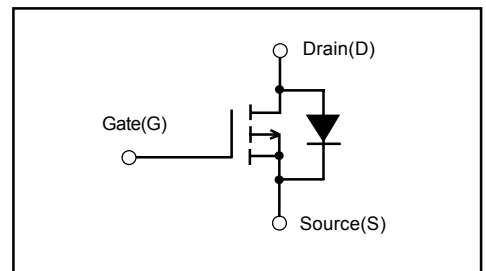
### Thermal characteristics

Item	Symbol	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-c)</sub>			2.50	°C/W
	R <sub>th(ch-a)</sub>			75	°C/W

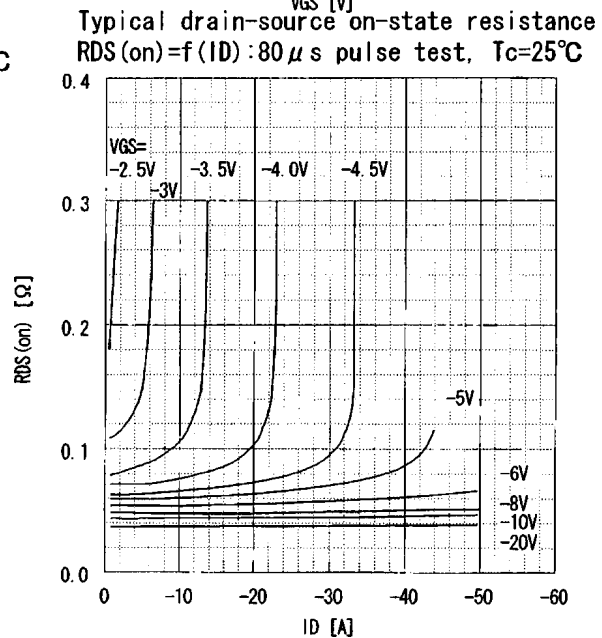
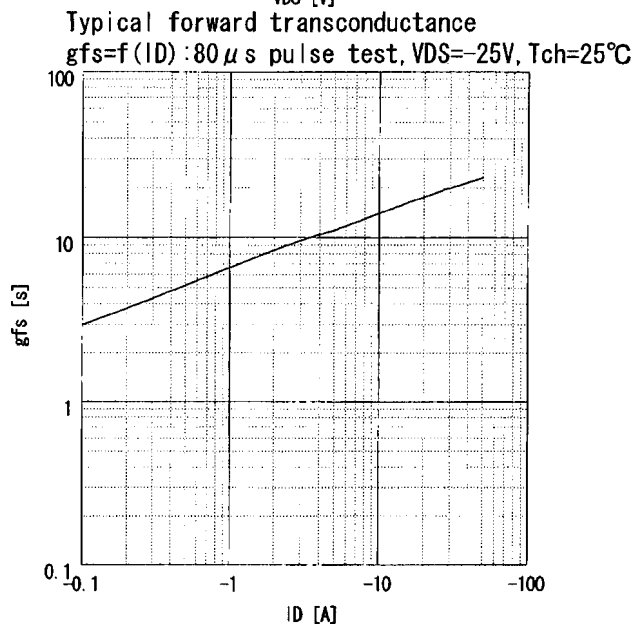
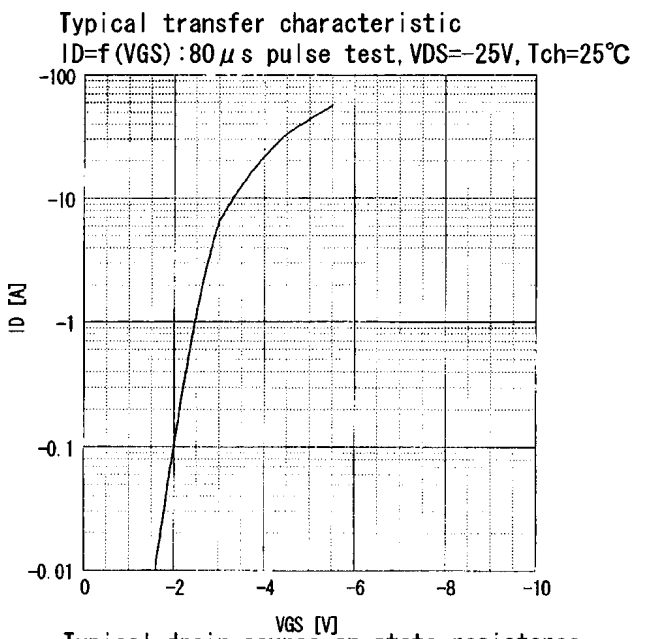
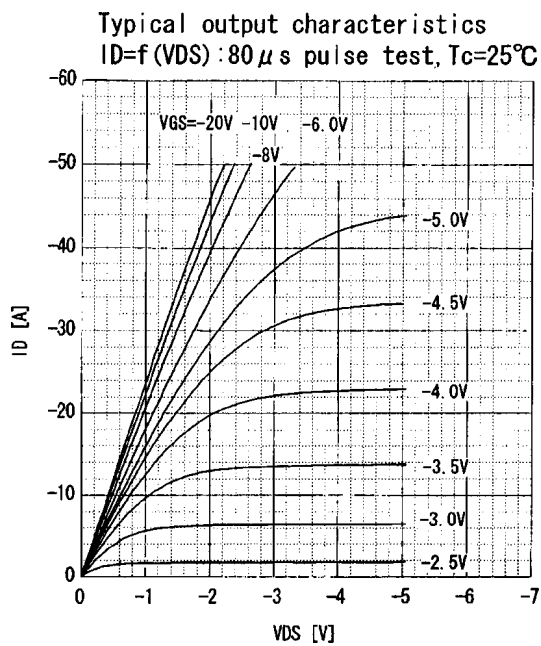
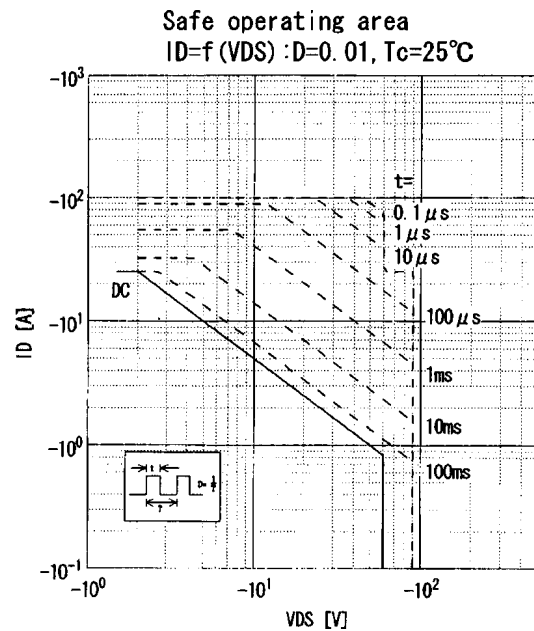
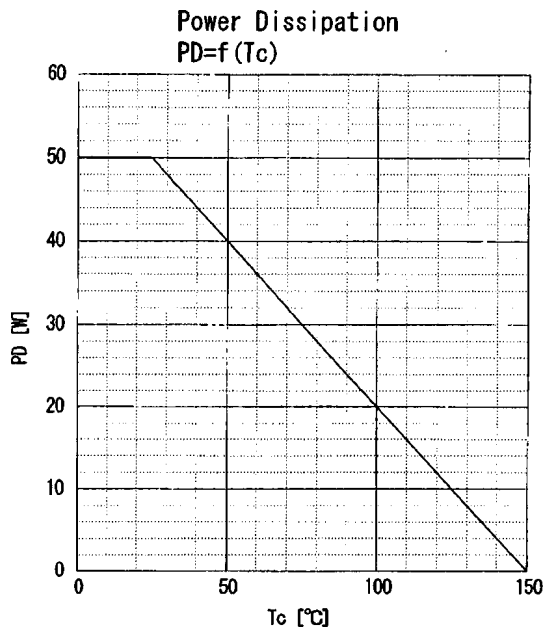
### Outline Drawings



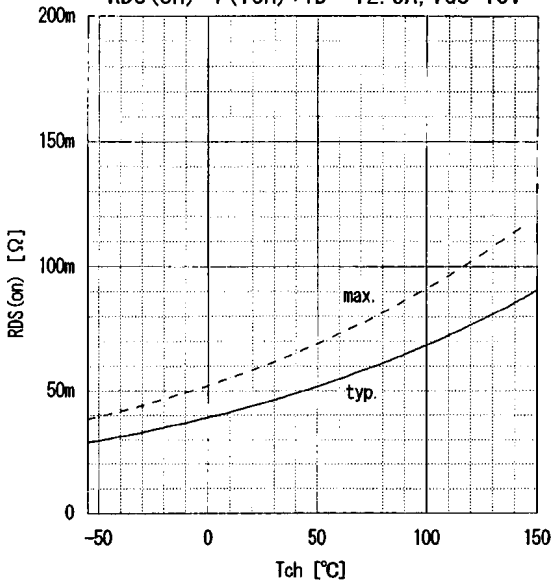
### Equivalent circuit schematic



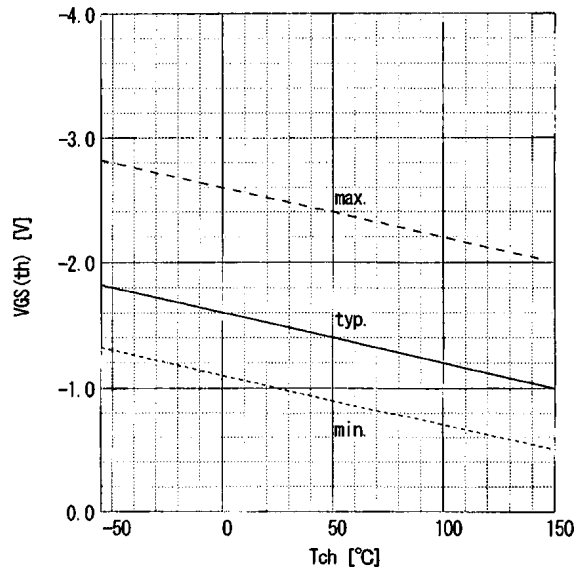
Characteristics



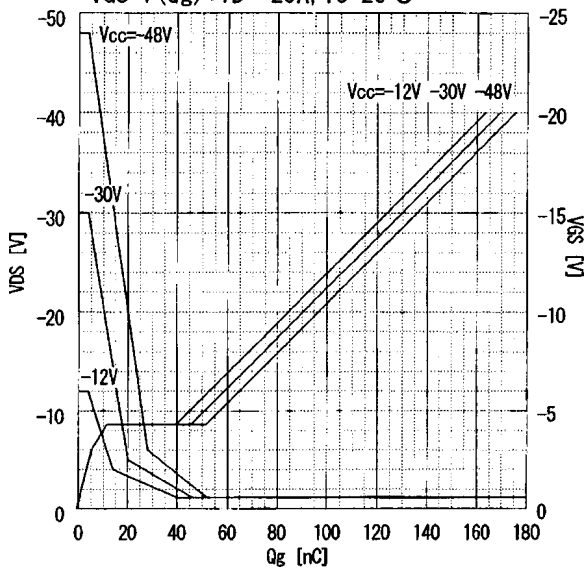
Drain-source on-state resistance  
 $R_{DS(on)} = f(T_{ch}) : I_D = -12.5A, V_{GS} = 10V$



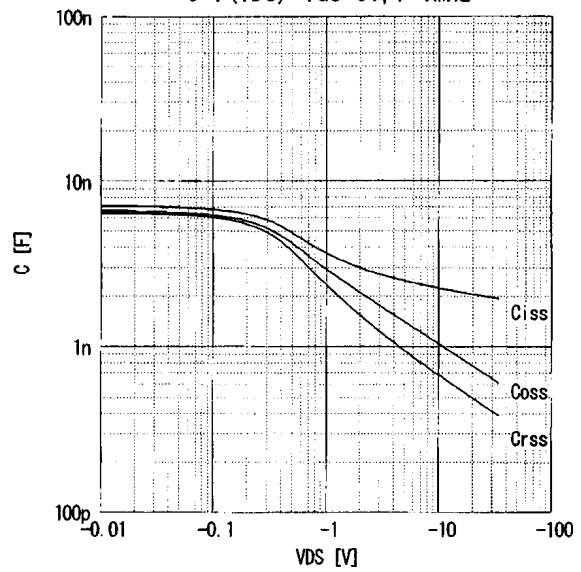
Gate threshold voltage  
 $V_{GS(th)} = f(T_{ch}) : I_D = -1mA, V_{DS} = V_{GS}$



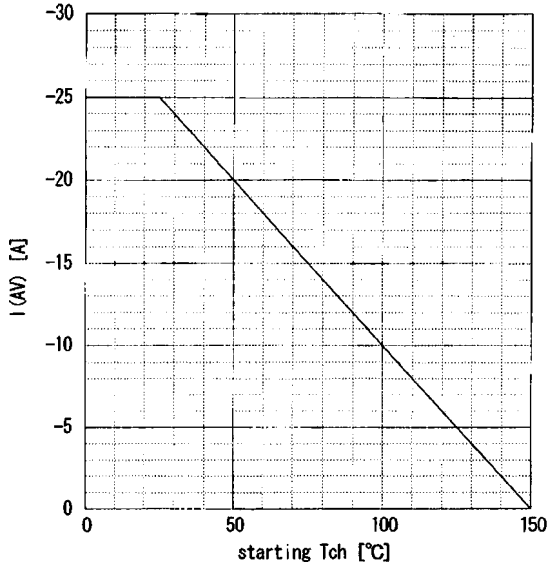
Typical gate charge characteristic  
 $V_{GS} = f(Q_g) : I_D = -25A, T_c = 25°C$



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



Maximum Avalanche Current vs. starting  $T_{ch}$   
 $I_{(AV)} = f(\text{starting } T_{ch})$



Maximum Avalanche Energy vs. starting  $T_{ch}$   
 $E_{(AV)} = f(\text{starting } T_{ch}) : V_{CC} = -24V, I_{(AV)} \geq -25A$

