

## P-CHANNEL SILICON POWER MOSFET

## FAP-III SERIES

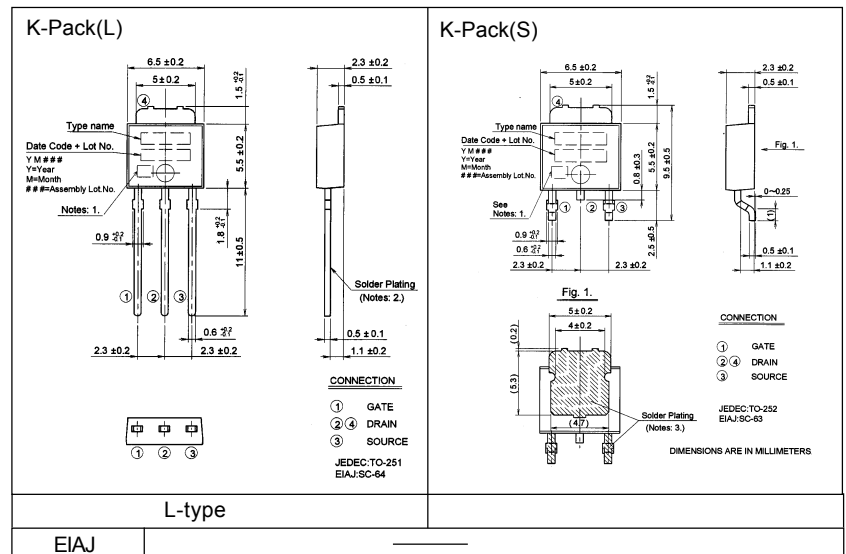
### Features

- 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

### Outline Drawings

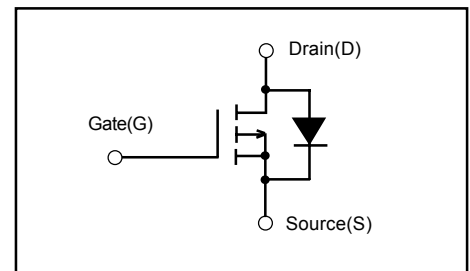


### Maximum ratings and characteristics

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

Item	Symbol	Rating	Unit
Drain-source voltage	V <sub>DS</sub>	-60	V
Drain-gate voltage (R <sub>GS</sub> =20kΩ)	V <sub>DGR</sub>	-60	V
Continuous drain current	I <sub>D</sub>	-5	A
Pulsed drain current	I <sub>D(puls)</sub>	-20	A
Gate-source voltage	V <sub>GS</sub>	±20	V
Max. power dissipation	P <sub>D</sub>	20	W
Operating and storage temperature range	T <sub>ch</sub>	+150	°C
	T <sub>slg</sub>	-55 to +150	°C

### Equivalent circuit schematic



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

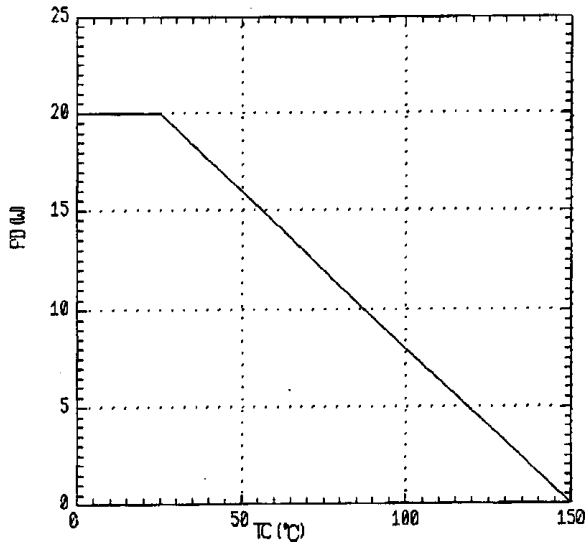
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =1mA V <sub>GS</sub> =0V	-60			V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =1mA V <sub>DS</sub> =V <sub>GS</sub>	-1.0	-1.5	-2.5	V
Zero gate voltage drain current	I <sub>DSS</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>DS(on)</sub>	I <sub>D</sub> =-2.5A V <sub>GS</sub> =-4V		280	480	mΩ
			V <sub>GS</sub> =-10V	200	300	mΩ
Forward transconductance	g <sub>fs</sub>	I <sub>D</sub> =2.5A V <sub>DS</sub> =-25V	2.0	4.5		S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-25V		500	750	pF
Output capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V		200	300	
Reverse transfer capacitance	C <sub>rss</sub>	f=1MHz		120	180	
Turn-on time t <sub>on</sub> (t <sub>on</sub> =t <sub>d(on)</sub> +t <sub>r</sub> )	t <sub>d(on)</sub> t <sub>r</sub>	V <sub>CC</sub> =-30V R <sub>G</sub> =25 Ω I <sub>D</sub> =-3A		15	23	ns
			V <sub>GS</sub> =-10V		20	
Turn-off time t <sub>off</sub> (t <sub>off</sub> =t <sub>d(off)</sub> +t <sub>f</sub> )	t <sub>d(off)</sub> t <sub>f</sub>			100	150	
				80	120	
Avalanche capability	I <sub>AV</sub>	L=100μH T <sub>ch</sub> =25°C	-5			A
Continuous reverse drain current	I <sub>DR</sub>	T <sub>c</sub> =25°C			-5	A
Pulsed reverse drain current	I <sub>DRM</sub>	T <sub>c</sub> =25°C			-20	A
Diode forward on-voltage	V <sub>SD</sub>	I <sub>F</sub> =2I <sub>DR</sub> V <sub>GS</sub> =0V T <sub>ch</sub> =25°C		-4.0		V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =I <sub>DR</sub> V <sub>GS</sub> =0V		80		ns
Reverse recovery charge	Q <sub>rr</sub>	-di/dt=100A/μs T <sub>ch</sub> =25°C		0.18		μC

### Thermal characteristics

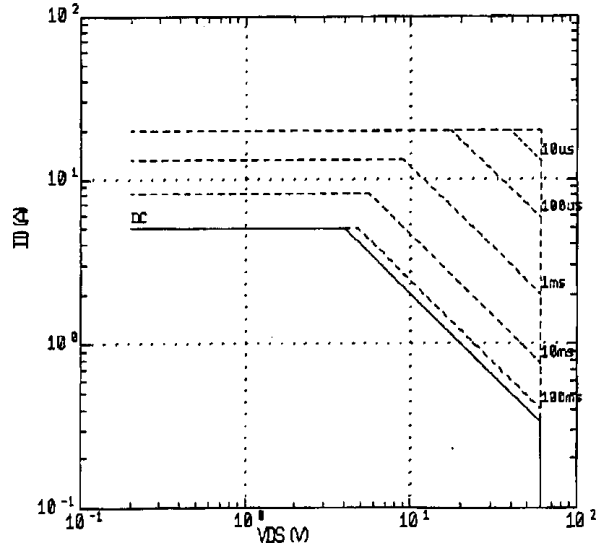
Item	Symbol	Min.	Typ.	Max.	Units
Thermal resistance	R <sub>th(ch-c)</sub>			6.25	°C/W
	R <sub>th(ch-a)</sub>			125.0	°C/W

Characteristics

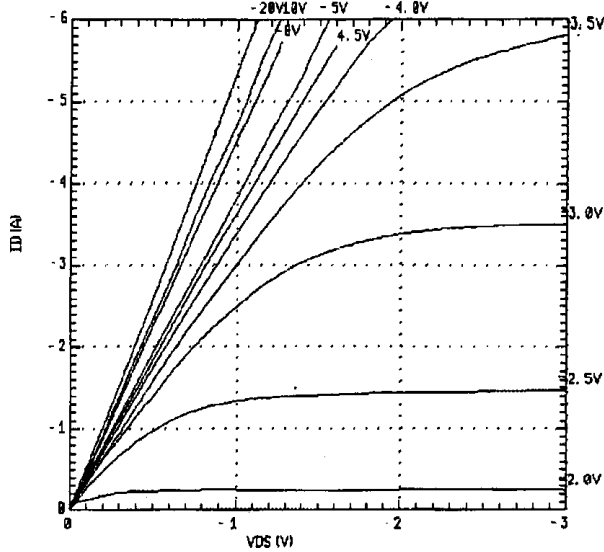
Power Dissipation  
 $P_D = f(T_C)$



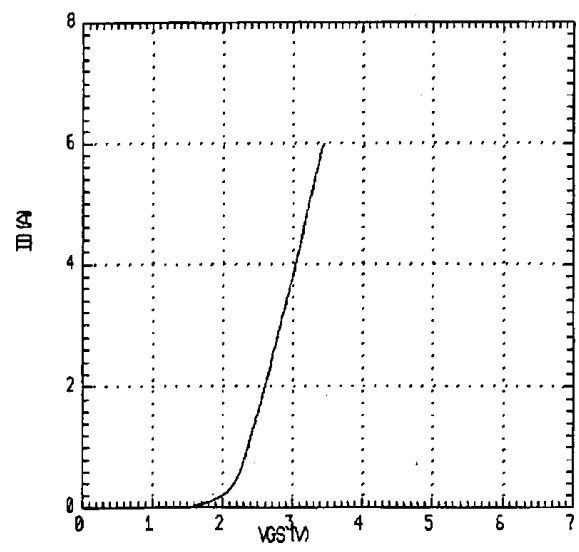
Safe operating area  
 $I_D = f(V_{DS}) : D=0.01, T_C=25^\circ C$



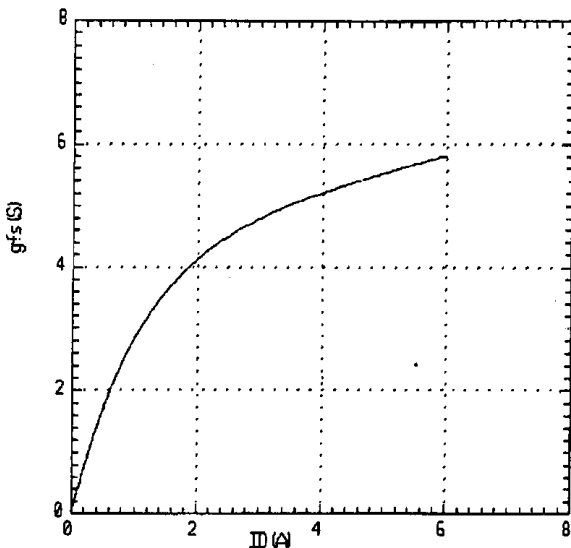
Typical output characteristics  
 $I_D = f(V_{DS}) : 80 \mu s$  pulse test,  $T_{ch}=25^\circ C$



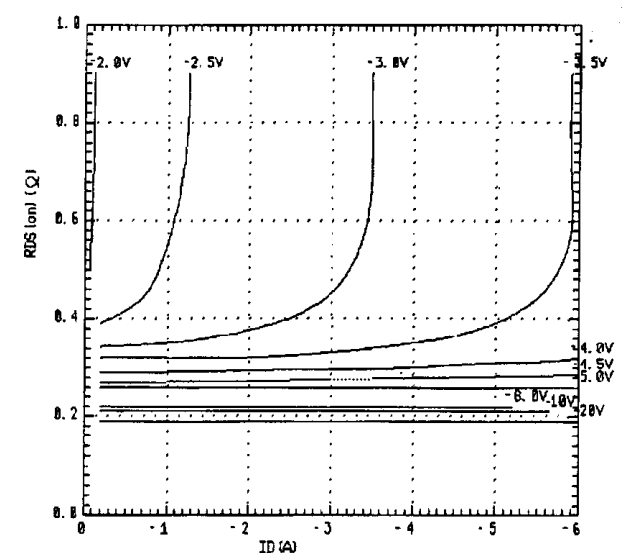
Typical Transfer Characteristic  
 $I_D = f(V_{GS}) : 80 \mu s$  pulse test,  $V_{DS}=25V$



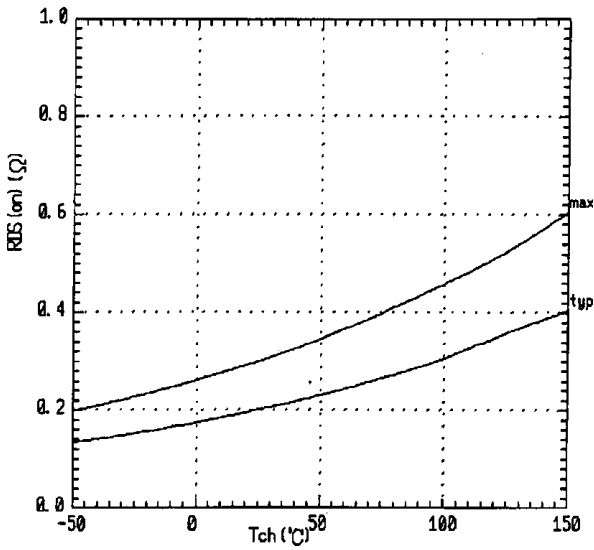
Typical Transconductance  
 $g_{fs} = f(I_D) : 80 \mu s$  pulse test,  $V_{DS}=25V, T_J=25^\circ C$



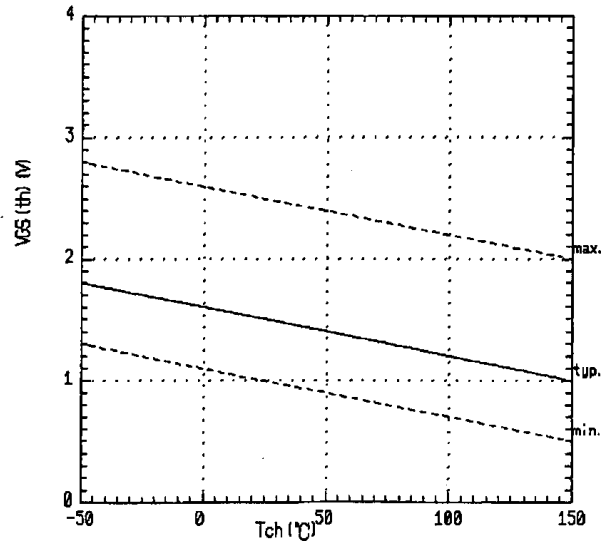
Typical Drain-source on-state resistance  
 $R_{DS(on)} = f(I_D) : 80 \mu s$  pulse test,  $T_{ch}=25^\circ C$



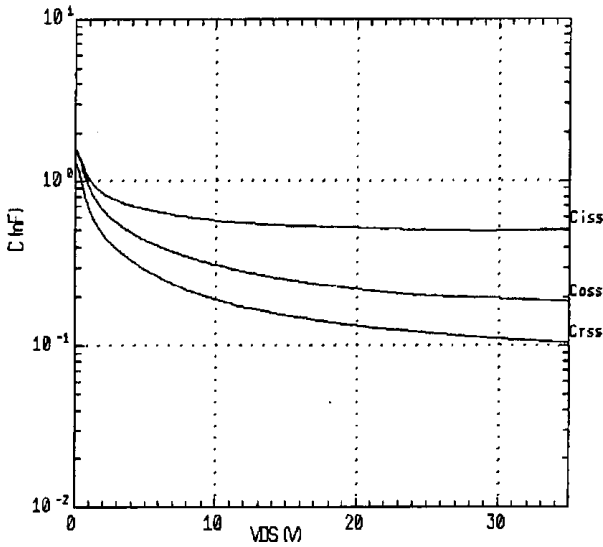
Drain-source on-state resistance  
 $R_{DS(on)} = f(T_{ch}) : I_D = 2.5A, V_{GS} = 10V$



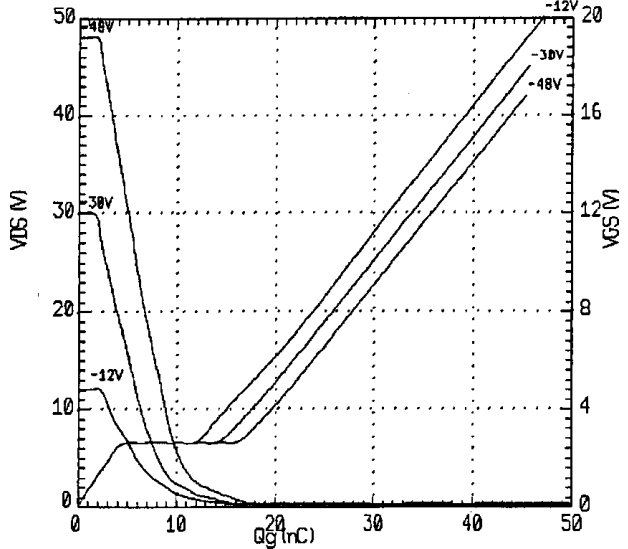
Gate threshold voltage  
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 1mA$



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



Typical gate charge characteristics  
 $V_{GS} = f(Q_g) : I_D = 3A$



Transient thermal impedance  $Z_{thch-c} = f(t)$  parameter:  $D = t/T$

