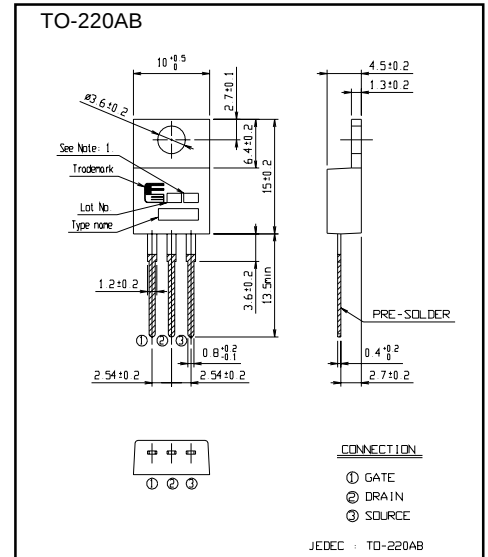


N-CHANNEL SILICON POWER MOSFET**FAP-IIIB SERIES****■ Features**

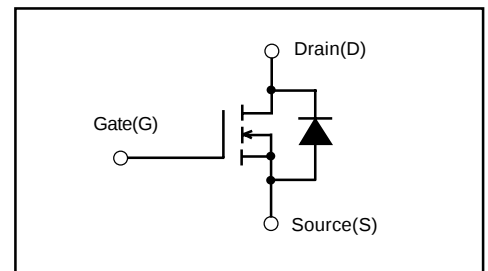
- High speed switching
- Low on-resistance
- No secondary breakdown
- Low driving power
- High voltage
- Avalanche-proof

■ Applications

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

■ Outline Drawings**■ Maximum ratings and characteristics****● Absolute maximum ratings (T_c=25°C unless otherwise specified)**

Item	Symbol	Rating	Unit	Remarks
Drain-source voltage	V _{DS}	60	V	
Continuous drain current	I _D	±50	A	
Pulsed drain current	I _D [puls]	±200	A	
Gate-source peak voltage	V _{GS}	±20	V	
Maximum avalanche energy	E _{AV}	867	mJ	*1
Maximum power dissipation	P _D	80	W	
Operating and storage temperature range	T _{ch} T _{stg}	+150 -55 to +150	°C	

*1 L=0.463mH, V_{CC}=24V**■ Equivalent circuit schematic****● Electrical characteristics (T_c =25°C unless otherwise specified)**

Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V _{(BR)DSS}	I _D =1mA V _{GS} =0V	60			V
Gate threshold voltage	V _{GS(th)}	I _D =1mA V _{DS} =V _{GS}	1.0	1.5	2.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V V _{GS} =0V		10	500	μA
				0.2	1.0	mA
Gate-source leakage current	I _{GSS}	V _{GS} =±20V V _{DS} =0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D =40A V _{GS} =10V		12	17	mΩ
		V _{GS} =4V		7.5	10	mΩ
Forward transconductance	g _{fs}	I _D =40A V _{DS} =25V	25	55		S
Input capacitance	C _{iss}	V _{DS} =25V		3500	5250	pF
Output capacitance	C _{oss}	V _{GS} =0V		1250	1870	
Reverse transfer capacitance	C _{rss}	f=1MHz		360	540	
Turn-on time	t _{d(on)}	V _{CC} =30V R _G =10 Ω		15	23	ns
	t _r	I _D =75A		75	120	
Turn-off time	t _{d(off)}	V _{GS} =10V		190	285	
	t _f			110	165	
Avalanche capability	I _{AV}	L=100μH T _{ch} =25°C	50			A
Diode forward on-voltage	V _{SD}	I _F =160A V _{GS} =0V T _{ch} =25°C		1.15	1.65	V
Reverse recovery time	t _{rr}	I _F =80A		75	120	ns
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		0.17		μC

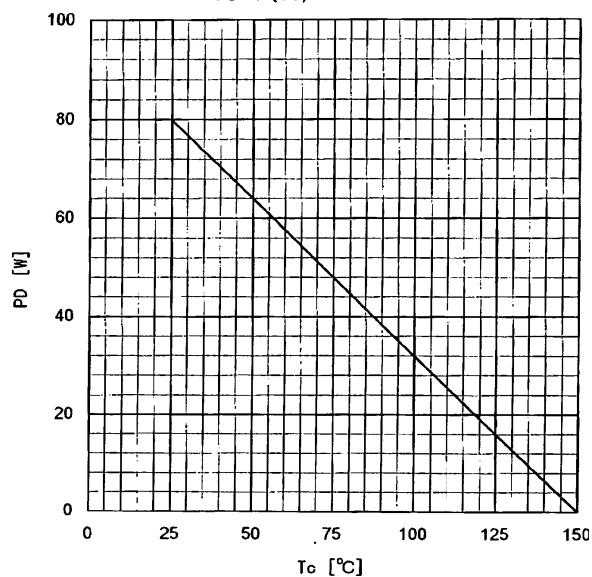
● Thermal characteristics

Item	Symbol	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}			1.56	°C/W
	R _{th(ch-a)}			75.0	°C/W

Characteristics

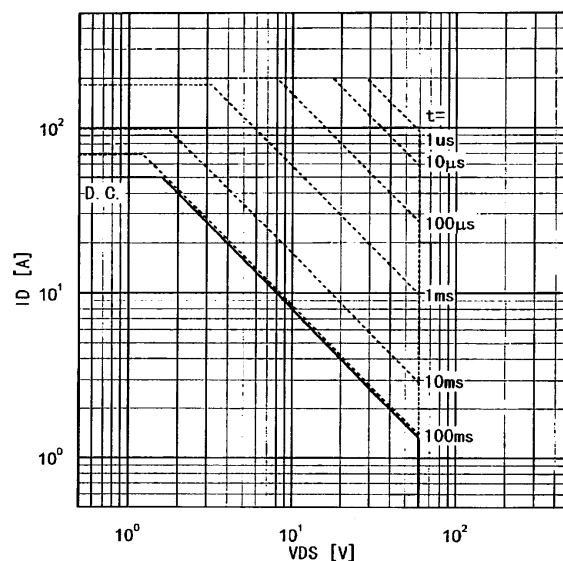
Power Dissipation

$$PD=f(T_c)$$



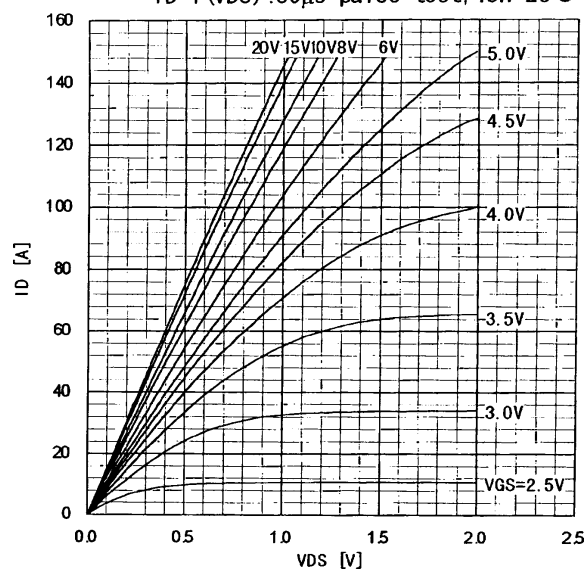
Safe operating area

$$ID=f(V_{DS}):D=0.01, T_c=25^{\circ}C$$



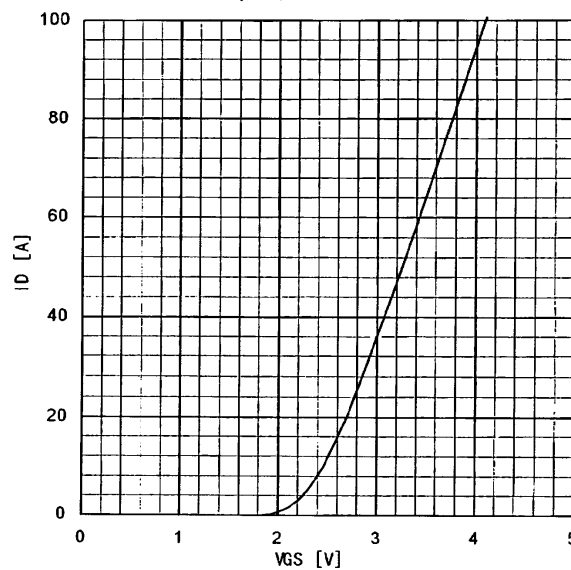
Typical Output Characteristics

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



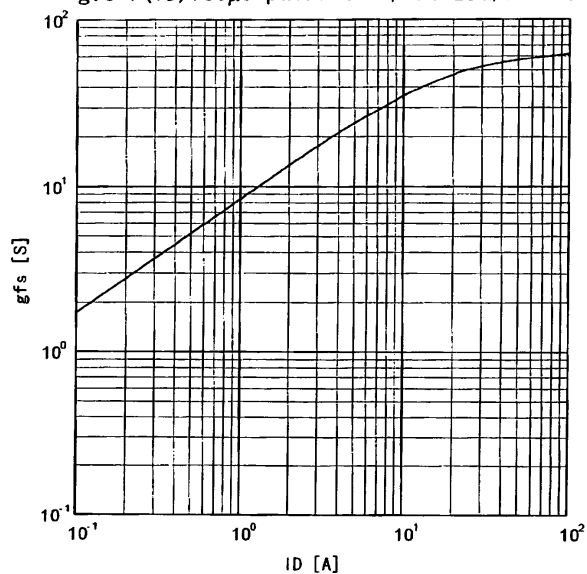
Typical Transfer Characteristic

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



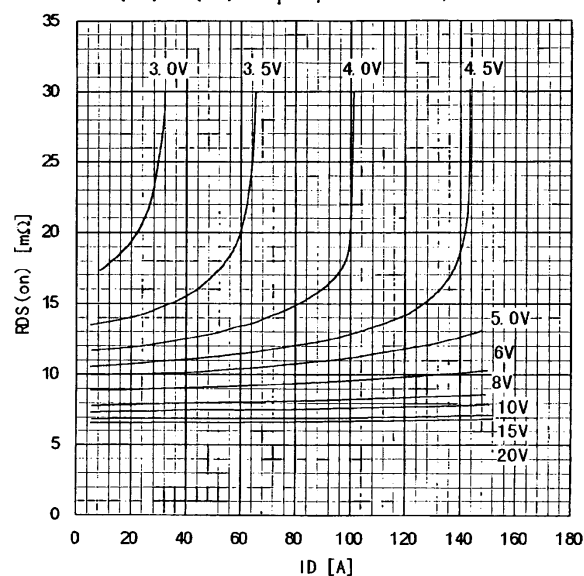
Typical Transconductance

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

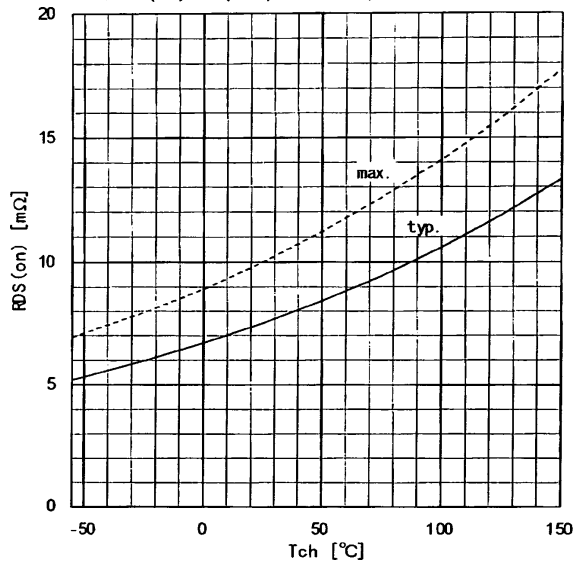


Typical Drain-Source on-State Resistance

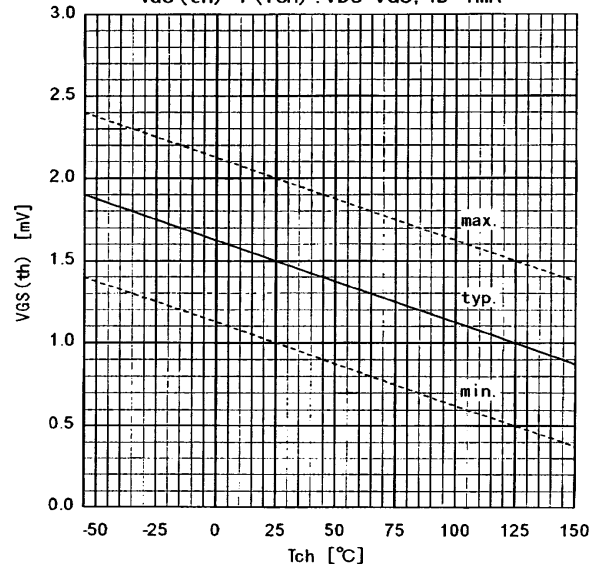
$$R_{DS(on)}=f(ID):80\mu s \text{ pulse test}, T_{ch}=25^{\circ}C$$



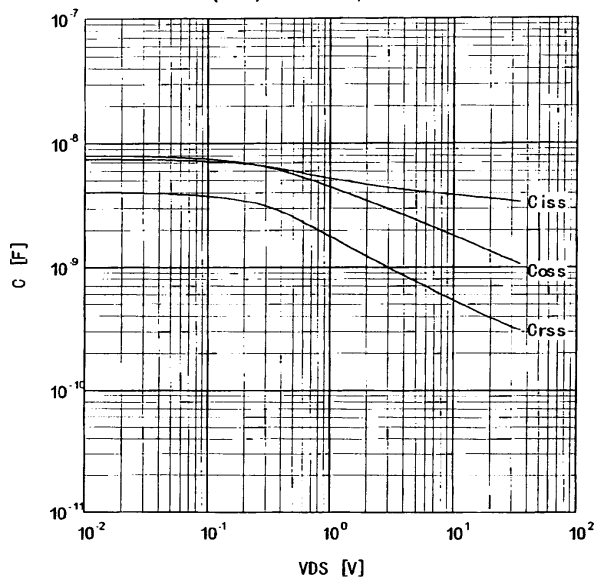
Drain-Source On-state Resistance
 $R_{DS(on)} = f(T_{ch}) : I_D = 25A, V_{GS} = 10V$



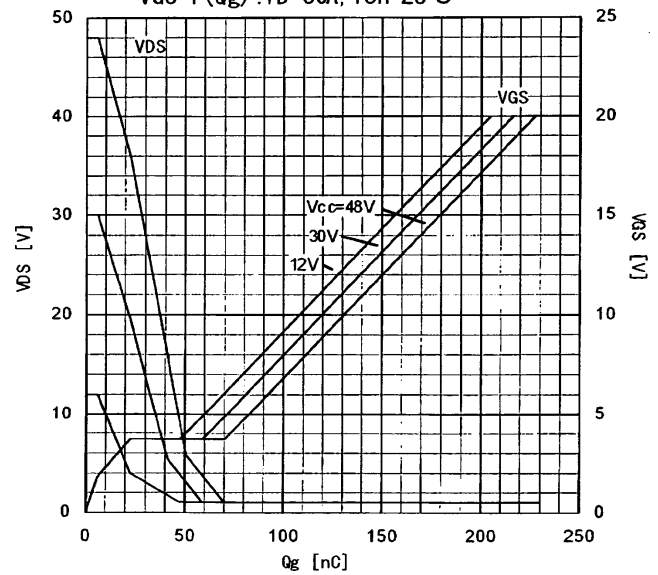
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch}) : V_{DS} = V_{GS}, I_D = 1mA$



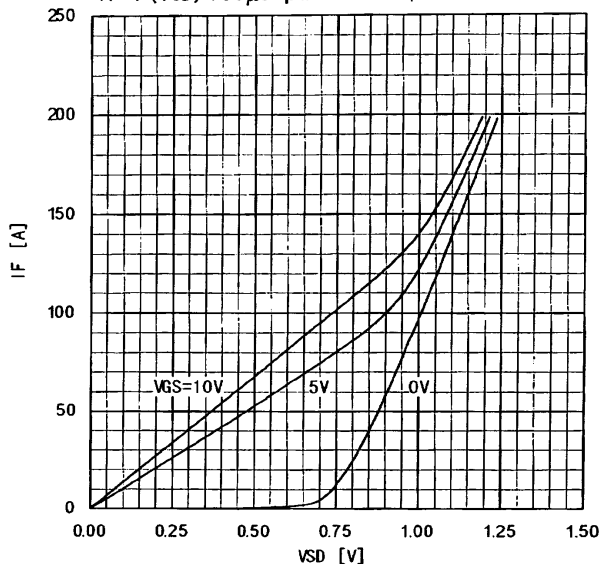
Typical Capacitance
 $C = f(V_{DS}) : V_{GS} = 0V, f = 1MHz$



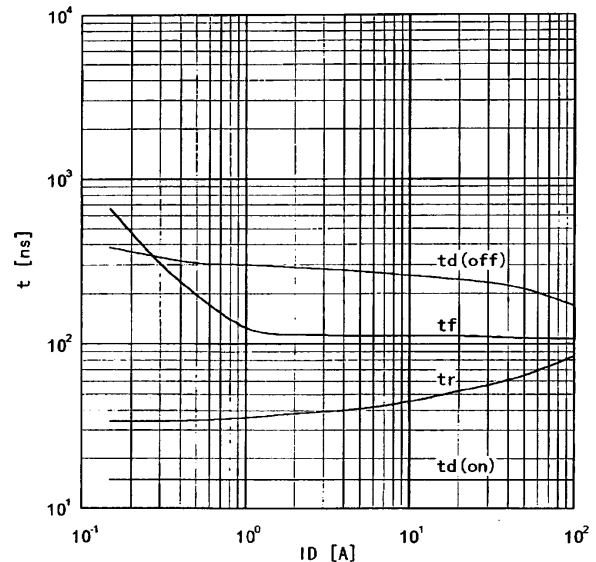
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g) : I_D = 80A, T_{ch} = 25^{\circ}C$



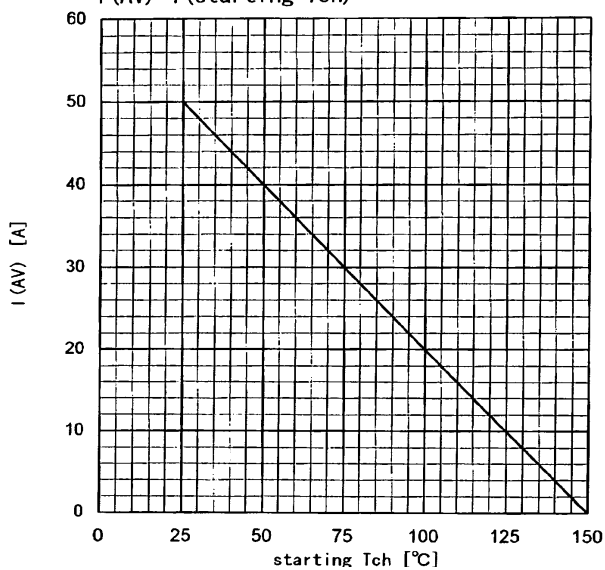
Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD}) : 80\mu s$ pulse test, $T_{ch} = 25^{\circ}C$



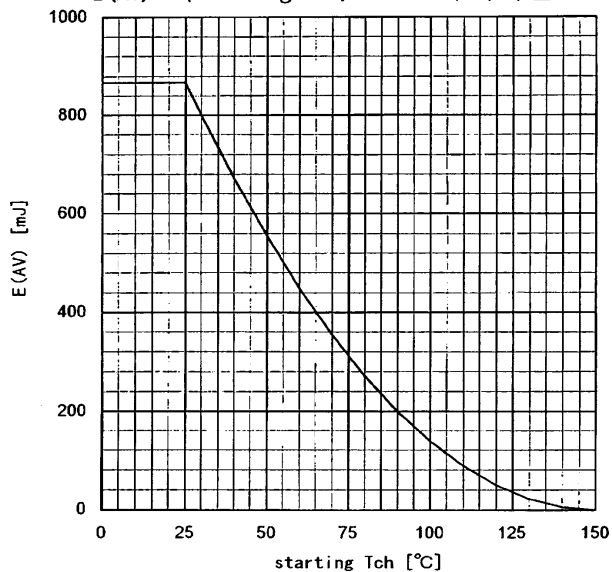
Typical Switching Characteristics vs. I_D
 $t = f(I_D) : V_{CC} = 30V, V_{GS} = 10V, R_G = 10\Omega$



Maximum Avalanche Current vs. starting Tch
 $I(AV)=f(\text{starting Tch})$



Maximum Avalanche Energy vs. starting Tch
 $E(AV)=f(\text{starting Tch}) : V_{CC}=24V, I(AV) \leq 50A$



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

