

N-CHANNEL SILICON POWER MOSFET

FAP-III B SERIES

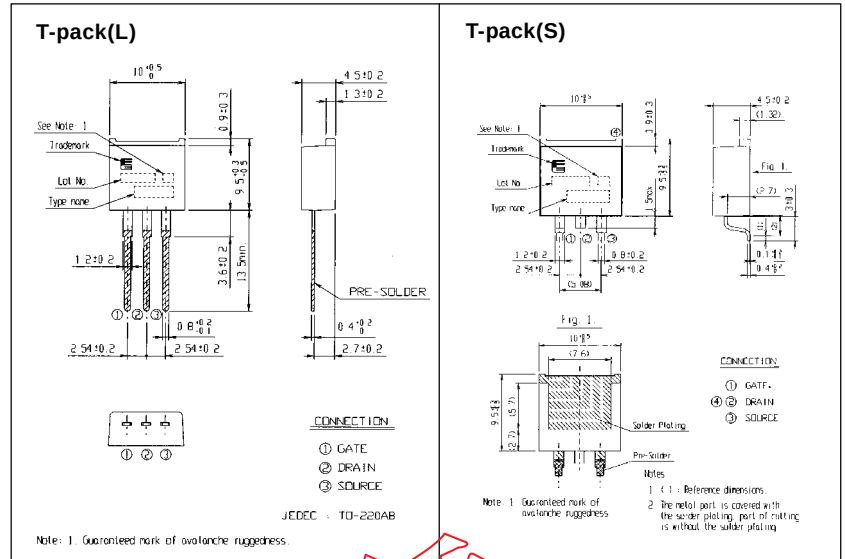
■ Features

- 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



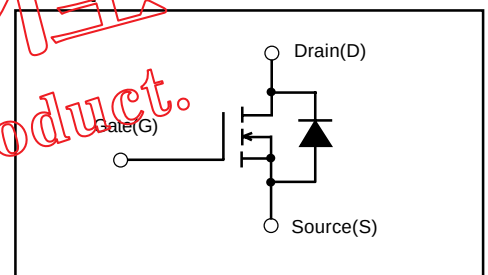
■ Maximum ratings and characteristics

● Absolute maximum ratings (T_c=25°C unless otherwise specified)

Item	Symbol	Rating	Unit	Remarks
Drain-source voltage	V _{DS}	30	V	
Continuous drain current	I _D	±35	A	
Pulsed drain current	I _{D(puls)}	±140	A	
Gate-source peak voltage	V _{GS}	±16	V	
Maximum avalanche energy	E _{AV}	129.3	mJ	*1
Maximum power dissipation	P _D	30	W	
Operating and storage temperature range	T _{ch} T _{stg}	-55 to +150	°C	

*1 L=0.70mH, V_{CC}=12V

■ Equivalent circuit schematic

● Electrical characteristics (T_c =25°C unless otherwise specified)

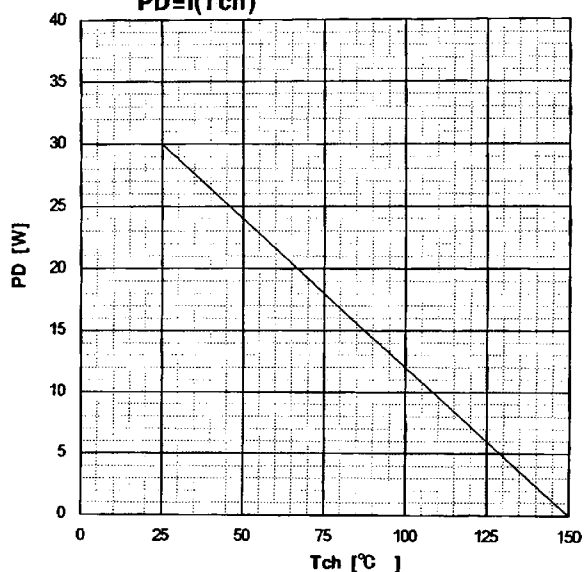
Item	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-source breakdown voltage	V _{(BR)DSS}	I _D =1mA V _{GS} =0V	30			V
Gate threshold voltage	V _{GS(th)}	I _D =1mA V _{DS} =V _{GS}	1.0	1.5	2.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V V _{GS} =0V		10	500	μA
				0.2	1.0	mA
Gate-source leakage current	I _{GSS}	V _{GS} =±16V V _{DS} =0V		10	100	nA
Drain-source on-state resistance	R _{DS(on)}	I _D =17.5A V _{GS} =10V		22	30	mΩ
		V _{GS} =4V		14	20	mΩ
Forward transconductance	g _{fs}	I _D =17.5A V _{DS} =25V	16	33		S
Input capacitance	C _{iss}	V _{DS} =25V		1100	1650	pF
Output capacitance	C _{oss}	V _{GS} =0V		550	830	pF
Reverse transfer capacitance	C _{rss}	f=1MHz		240	360	pF
Turn-on time	td(on)	V _{CC} =15V R _G =10 Ω		9	15	ns
	t _r	I _D =35A		15	23	ns
Turn-off time	td(off)	V _{GS} =10V		75	115	ns
	t _f			50	75	ns
Avalanche capability	I _{AV}	L=100μH T _{ch} =25°C	35			A
Diode forward on-voltage	V _{SD}	I _F =2I _{LDR} V _{GS} =0V T _{ch} =25°C		0.98	1.71	V
Reverse recovery time	t _{rr}	I _F =2I _{LDR} V _{GS} =0V		50		ns
Reverse recovery charge	Q _{rr}	-di/dt=100A/μs T _{ch} =25°C		0.08		μC

● Thermal characteristics

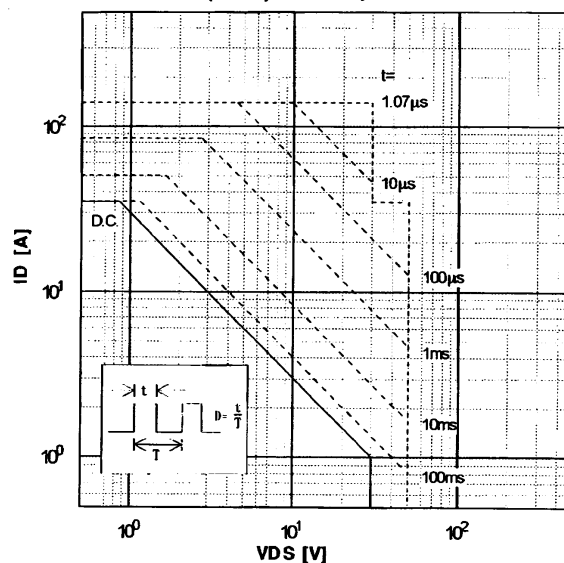
Item	Symbol	Min.	Typ.	Max.	Units
Thermal resistance	R _{th(ch-c)}			4.16	°C/W
	R _{th(ch-a)}			125.0	°C/W

Characteristics

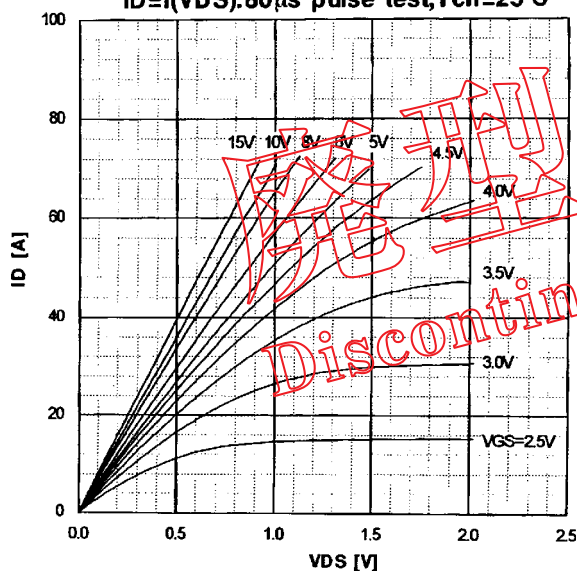
Allowable Power Dissipation vs. T_{ch}
 $PD=f(T_{ch})$



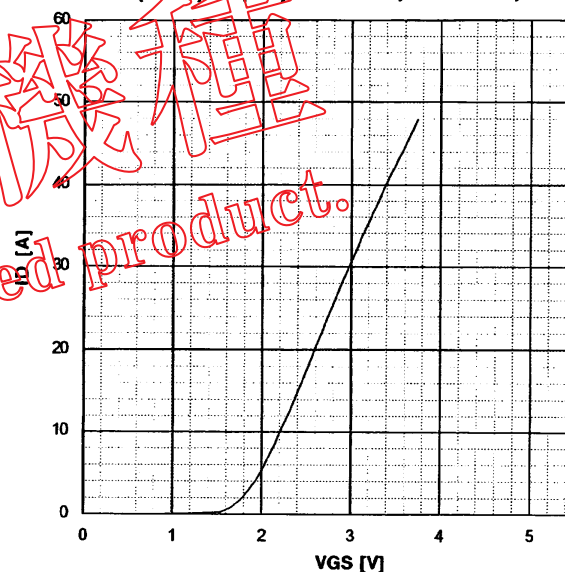
Safe operating area
 $ID=f(V_{DS}):D=0.01, T_c=25^\circ C$



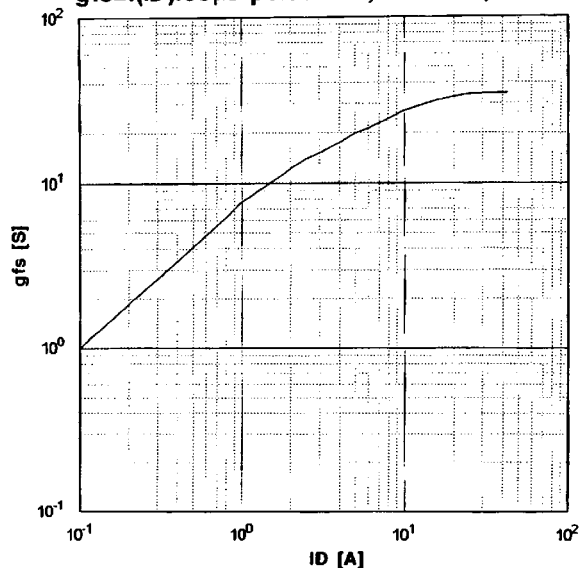
Typical Output Characteristics
 $ID=f(V_{DS}):80\mu s \text{ pulse test}, T_{ch}=25^\circ C$



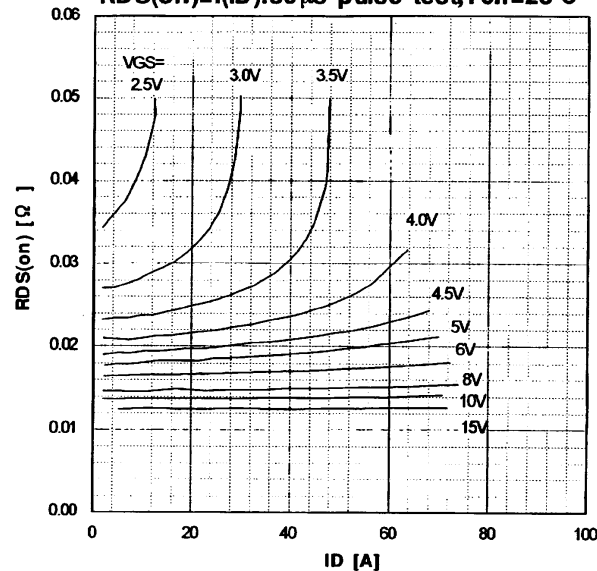
Typical Transfer Characteristic
 $ID=f(V_{GS}):80\mu s \text{ pulse test}, V_{DS}=25V, T_{ch}=25^\circ C$



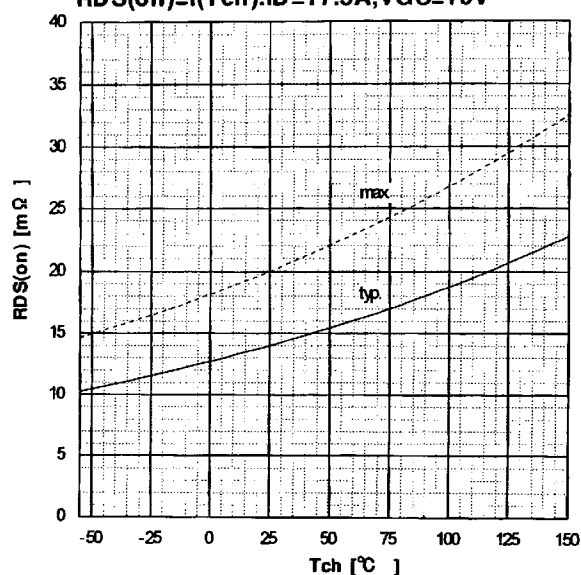
Typical Transconductance
 $g_{fs}=f(I_D):80\mu s \text{ pulse test}, V_{DS}=25V, T_{ch}=25^\circ C$



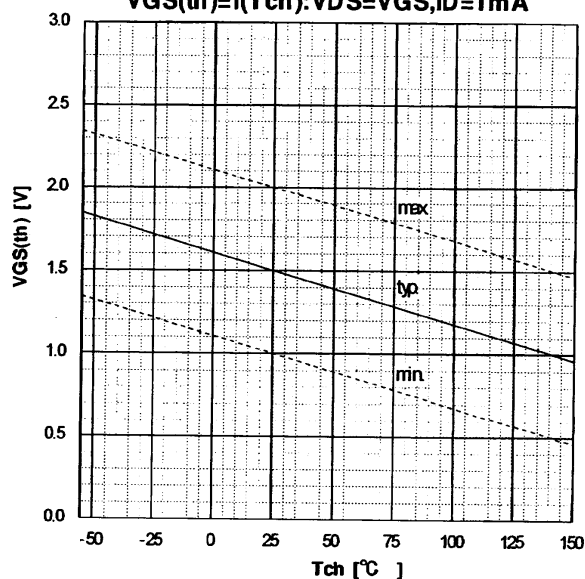
Typical Drain-Source on-state Resistance vs. I_D
 $R_{DS(on)}=f(I_D):80\mu s \text{ pulse test}, T_{ch}=25^\circ C$



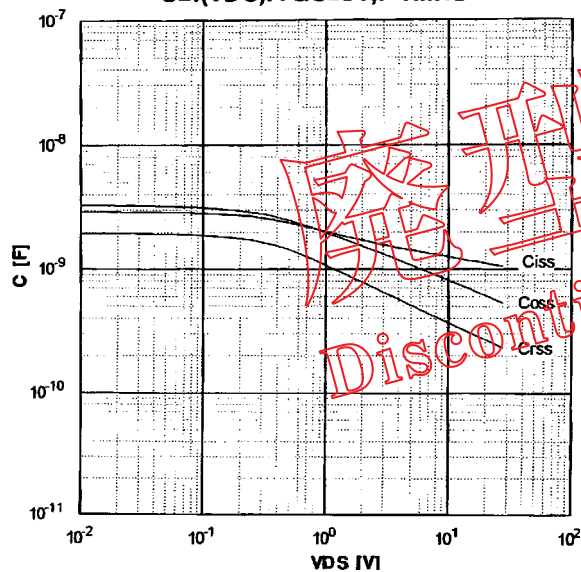
Drain-Source On-state Resistance vs. T_{ch}
 $R_{DS(on)} = f(T_{ch})$: $I_D = 17.5A$, $V_{GS} = 10V$



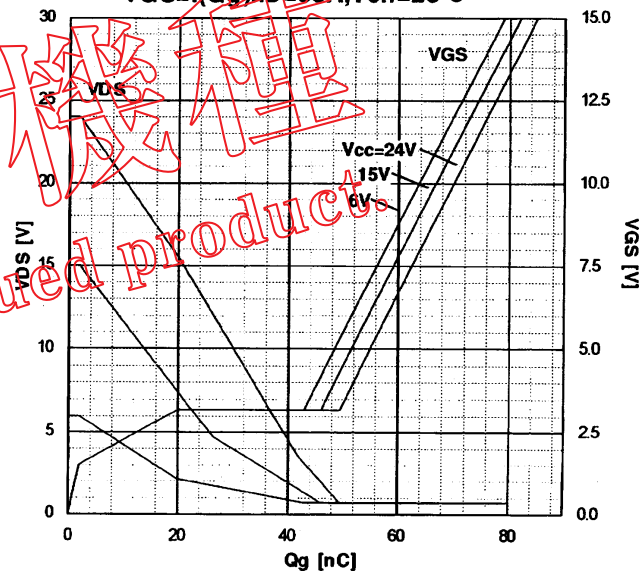
Gate Threshold Voltage vs. T_{ch}
 $V_{GS(th)} = f(T_{ch})$: $V_{DS} = V_{GS}$, $I_D = 1mA$



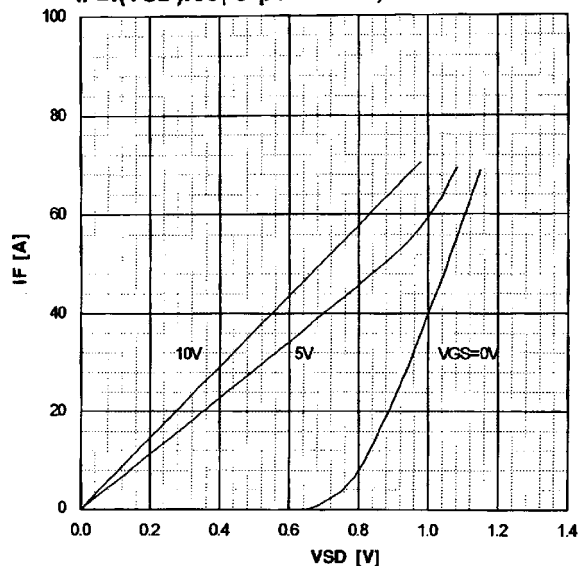
Typical Capacitances vs. V_{DS}
 $C = f(V_{DS})$: $V_{GS} = 0V$, $f = 1MHz$



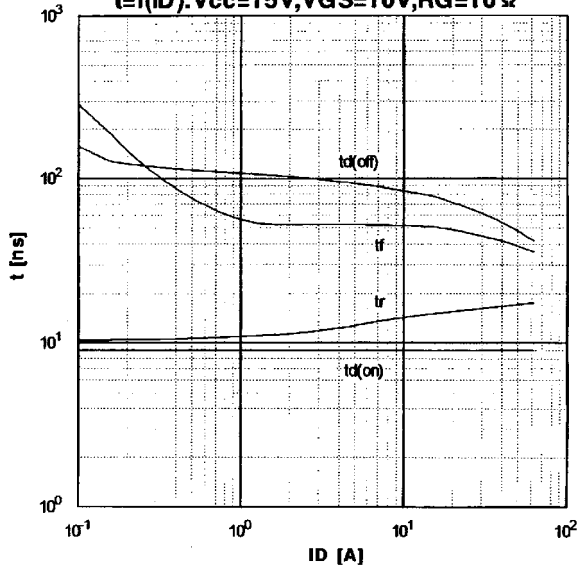
Typical Gate Charge Characteristics
 $V_{GS} = f(Q_g)$: $I_D = 35A$, $T_{ch} = 25^{\circ}C$



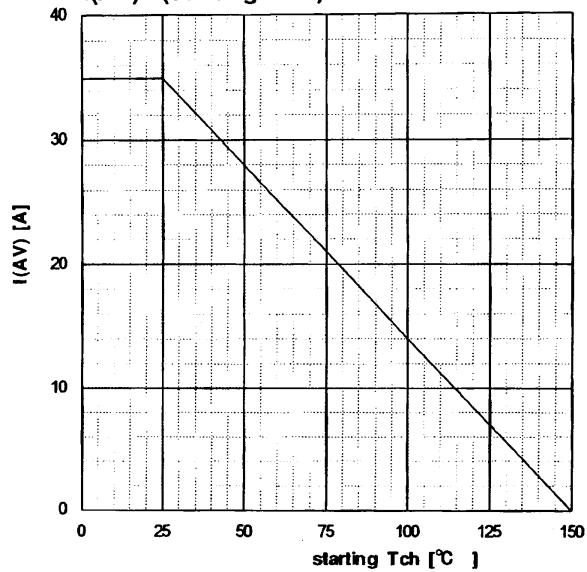
Typical Forward Characteristics of Reverse Diode
 $I_F = f(V_{SD})$: $80\mu s$ pulse test, $T_{ch} = 25^{\circ}C$



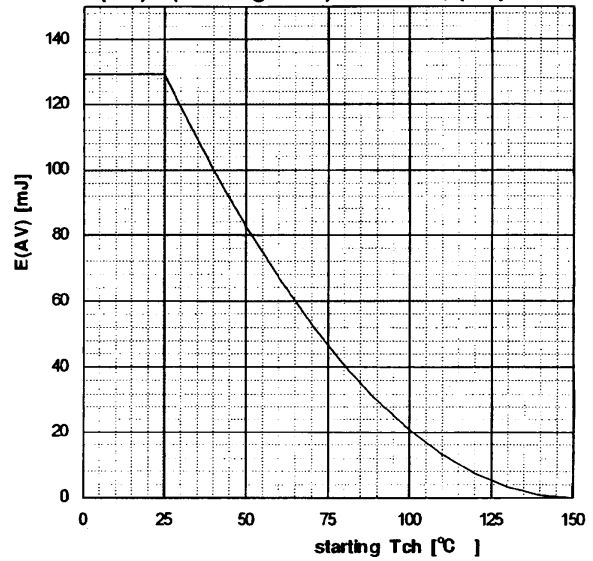
Typical Switching Characteristics vs. I_D
 $t = f(I_D)$: $V_{CC} = 15V$, $V_{GS} = 10V$, $R_G = 10\Omega$



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



Maximum Avalanche Energy vs. starting Tch
 $E(AV)=f(\text{starting Tch}):V_{CC}=12V, I(AV) \leq 35A$



Transient Thermal Impedance
 $Z_{th(ch-c)}=f(t): \text{parameter } D=t/T$

