

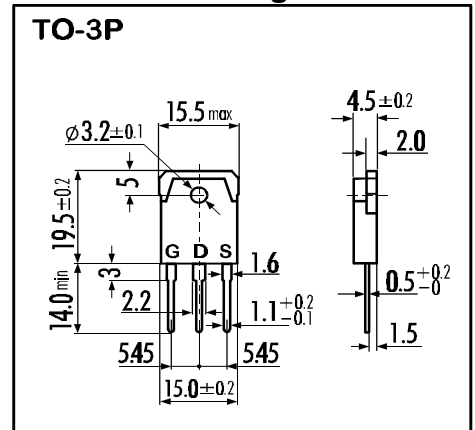
> **Features**

- High Current
- Low On-Resistance
- No Secondary Breakdown
- Low Driving Power
- Avalanche Rated

> **Applications**

- Motor Control
- General Purpose Power Amplifier
- DC-DC converters

> **Outline Drawing**



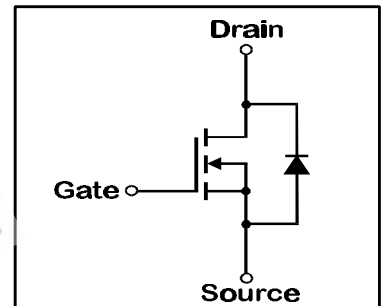
> **Maximum Ratings and Characteristics**

- Absolute Maximum Ratings (T_C=25°C), unless otherwise specified

| Item | Symbol | Rating | Unit |
|---|----------------------|------------|------|
| Drain-Source-Voltage | V _{DS} | 60 | V |
| Continous Drain Current | I _D | 80 | A |
| Pulsed Drain Current | I _{D(puls)} | 320 | A |
| Gate-Source-Voltage | V _{GS} | ±20 | V |
| Maximum Avalanche Energy | E _{AV} | 599 | mJ* |
| Max. Power Dissipation | P _D | 125 | W |
| Operating and Storage Temperature Range | T _{ch} | 150 | °C |
| | T _{stg} | -55 ~ +150 | °C |

* L=0,125mH, V_{CC}=24V

> **Equivalent Circuit**



- Electrical Characteristics (T_C=25°C), unless otherwise specified

| Item | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|---|----------------------|--|------|--------|-------|------|
| 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 T _{ch} =25°C | | 10 | 500 | μA |
| | | V _{GS} =0V T _{ch} =125°C | | 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} =4V | | 0,012 | 0,017 | Ω |
| | | I _D =40A V _{GS} =10V | | 0,0075 | 0,01 | Ω |
| 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 | pF |
| Reverse Transfer Capacitance | C _{rss} | f=1MHz | | 360 | 540 | pF |
| Turn-On-Time t _{on} (t _{on} =t _{d(on)} +t _r) | t _{d(on)} | V _{CC} =30V | | 15 | 23 | ns |
| | | I _D =75A | | 75 | 120 | ns |
| Turn-Off-Time t _{off} (t _{off} =t _{d(off)} +t _f) | t _{d(off)} | V _{GS} =10V | | 190 | 285 | ns |
| | | R _{GS} =10 Ω | | 110 | 165 | ns |
| Avalanche Capability | I _{AV} | L = 100μH T _{ch} =25°C | 80 | | | 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 V _{GS} =0V | | 75 | 120 | ns |
| Reverse Recovery Charge | Q _{rr} | -dI _F /dt=100A/μs T _{ch} =25°C | | 0,17 | | μC |

- Thermal Characteristics

| Item | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|--------------------|-----------------------|-----------------|------|------|------|------|
| Thermal Resistance | R _{th(ch-a)} | channel to air | | | 35 | °C/W |
| | R _{th(ch-c)} | channel to case | | | 1,0 | °C/W |

| | | | |
|-------------------|-------|-----|------|
| N-channel MOS-FET | | | |
| 60V | 0,01Ω | 80A | 125W |

2SK2690-01

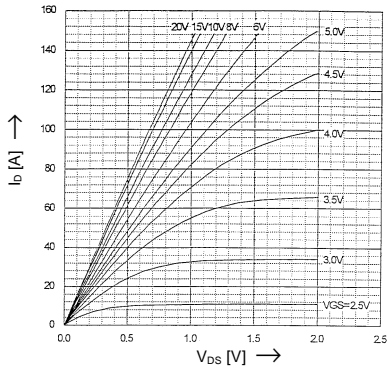
FAP-IIIB Series



> Characteristics

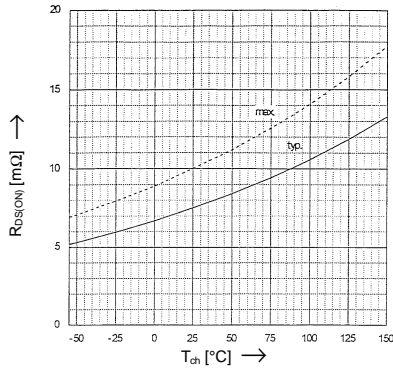
Typical Output Characteristics

$I_D=f(V_{DS})$; 80μs pulse test; $T_C=25^\circ\text{C}$



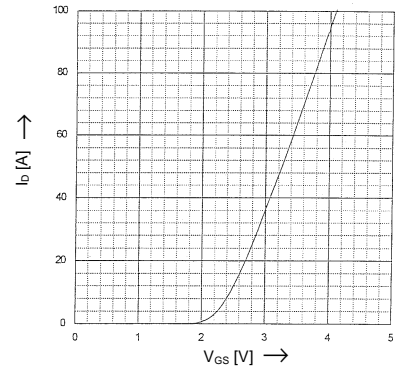
Drain-Source On-State Resistance vs. T_{ch}

$R_{DS(on)}=f(T_{ch})$; $I_D=40\text{A}$; $V_{GS}=10\text{V}$



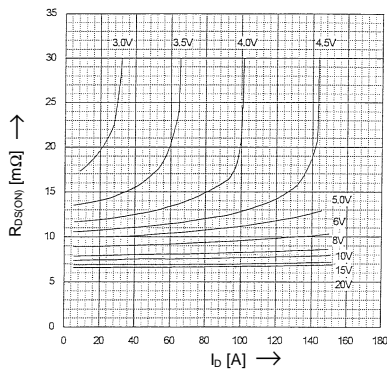
Typical Transfer Characteristics

$I_D=f(V_{GS})$; 80μs pulse test; $V_{DS}=25\text{V}$; $T_{ch}=25^\circ\text{C}$



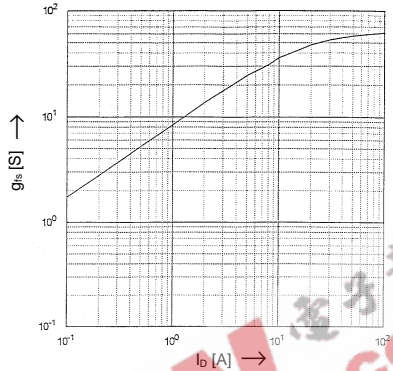
Typical Drain-Source On-State-Resistance vs. I_D

$R_{DS(on)}=f(I_D)$; 80μs pulse test; $T_C=25^\circ\text{C}$



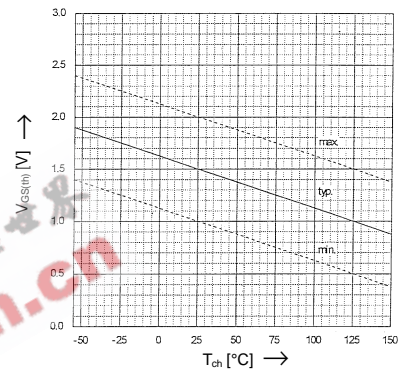
Typical Forward Transconductance vs. I_D

$g_{fs}=f(I_D)$; 80μs pulse test; $V_{DS}=25\text{V}$; $T_{ch}=25^\circ\text{C}$



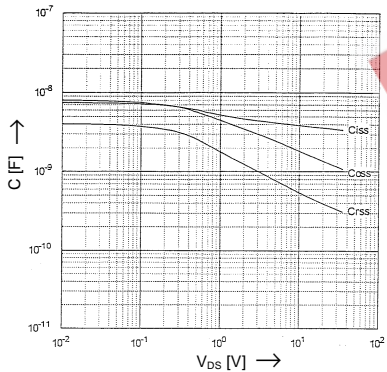
Gate Threshold Voltage vs. T_{ch}

$V_{GS(th)}=f(T_{ch})$; $I_D=1\text{mA}$; $V_{DS}=V_{GS}$



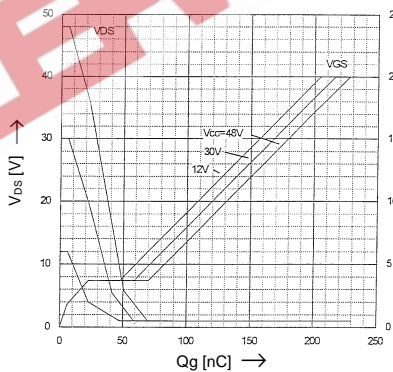
Typical Capacitances vs. V_{DS}

$C=f(V_{DS})$; $V_{GS}=0\text{V}$; $f=1\text{MHz}$



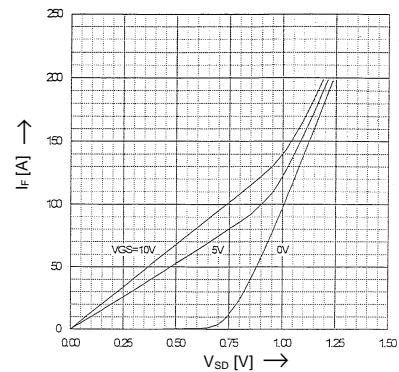
Typical Gate Charge Characteristic

$V_{GS}=f(Q_g)$; $I_D=80\text{A}$; $T_C=25^\circ\text{C}$



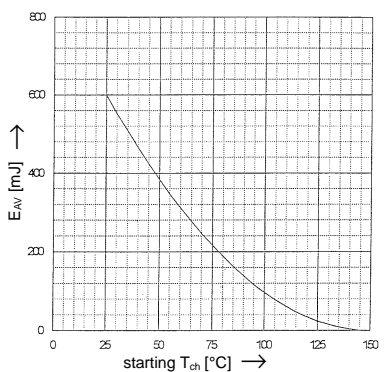
Forward Characteristics of Reverse Diode

$I_F=f(V_{SD})$; 80μs pulse test; $T_{ch}=25^\circ\text{C}$



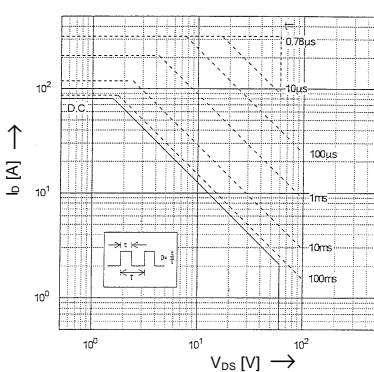
Maximum Avalanche Energy vs. starting T_{ch}

$E_{AV}=f(\text{starting } T_{ch})$; $V_{CC}=24\text{V}$; $I_{AV} \leq 80\text{A}$



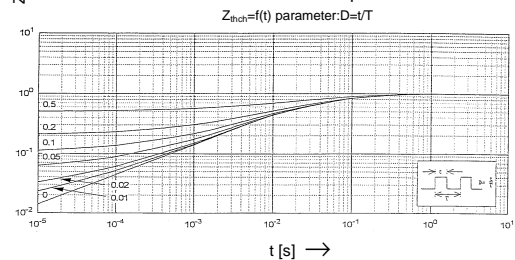
Safe Operation Area

$I_D=f(V_{DS})$; $D=0,01$; $T_C=25^\circ\text{C}$



Transient Thermal impedance

$Z_{th(ch-e)}=f(t)$ parameter: $D=t/T$



| | | | |
|-------------------|-------|-----|------|
| N-channel MOS-FET | | | |
| 60V | 0,01Ω | 80A | 125W |

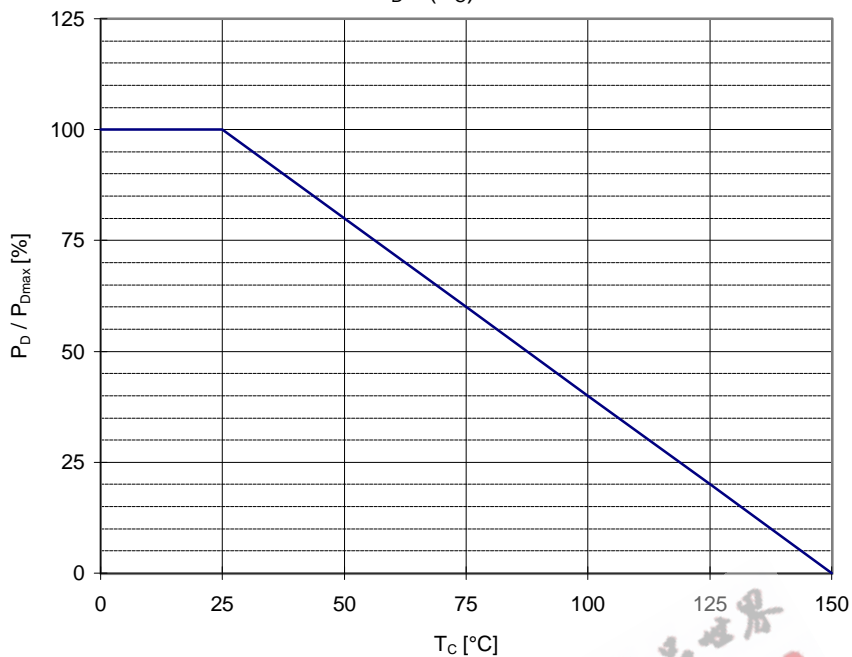
2SK2690-01

FAP-III B Series



> Characteristics

Power Dissipation
 $P_D=f(T_c)$



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

