

> Features

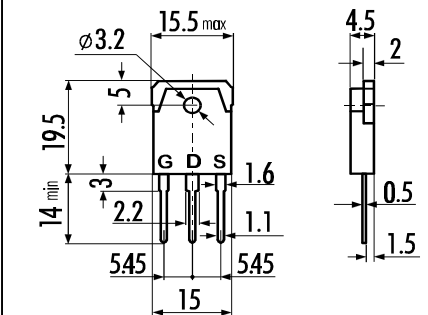
- High Current
- Low On-Resistance
- No Secondary Breakdown
- Low Driving Power
- Avalanche Rated

> Applications

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

> Outline Drawing

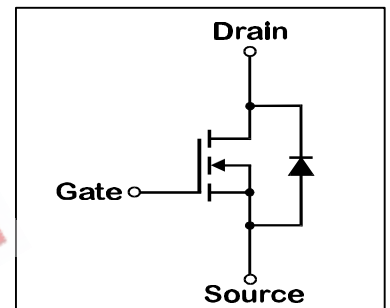
TO-3P



> Maximum Ratings and Characteristics

- Absolute Maximum Ratings (T<sub>C</sub>=25°C), unless otherwise specified

| Item                                    | Symbol               | Characteristics | Unit |
|---|----------------------|-----------------|------|
| Drain-Source-Voltage                    | V <sub>DS</sub>      | 30              | V    |
| Continous Drain Current                 | I <sub>D</sub>       | ±100            | A    |
| Pulsed Drain Current                    | I <sub>D(puls)</sub> | ±400            | A    |
| Gate-Source-Voltage                     | V <sub>GS</sub>      | ±16             | V    |
| Maximum Avalanche Energy                | E <sub>AV</sub>      | 2536.7          | mJ*  |
| Max. Power Dissipation                  | P <sub>D</sub>       | 150             | W    |
| Operating and Storage Temperature Range | T <sub>ch</sub>      | 150             | °C   |
|   | T <sub>stg</sub>     | -55 ~ +150      | °C   |



- Electrical Characteristics (T<sub>C</sub>=25°C), unless otherwise specified

| Item  | Symbol              | Test conditions  | Min. | Typ. | Max. | Unit |
|---|---------------------|--|------|------|------|------|
| Drain-Source Breakdown-Voltage  | BV <sub>DSS</sub>   | I <sub>D</sub> =1mA V <sub>GS</sub> =0V                        | 30   |      |      | 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  | 2,0  | V    |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>    | V <sub>DS</sub> =30V T <sub>ch</sub> =25°C                     |      | 10   | 500  | μA   |
|   |                     | V <sub>GS</sub> =0V T <sub>ch</sub> =125°C                     |      | 0,2  | 1,0  | mA   |
| Gate Source Leakage Current   | I <sub>DSS</sub>    | V <sub>GS</sub> =±16V V <sub>DS</sub> =0V                      |      | 10   | 100  | nA   |
| Drain Source On-State Resistance  | R <sub>DS(on)</sub> | I <sub>D</sub> =50A V <sub>GS</sub> =4V                        |      | 4,8  | 7,0  |      |
|   |                     | I <sub>D</sub> =50A V <sub>GS</sub> =10V                       |      | 3,2  | 4,0  | mΩ   |
| Forward Transconductance  | g <sub>fs</sub>     | I <sub>D</sub> =50A V <sub>DS</sub> =25V                       | 45   | 90   |      | S    |
| Input Capacitance   | C <sub>iss</sub>    | V <sub>DS</sub> =25V   |      | 6600 | 9900 | pF   |
| Output Capacitance  | C <sub>oss</sub>    | V <sub>GS</sub> =0V  |      | 3300 | 4950 | pF   |
| Reverse Transfer Capacitance  | C <sub>rss</sub>    | f=1MHz   |      | 1400 | 2100 | pF   |
| 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>  | V <sub>CC</sub> =15V   |      | 20   | 30   | ns   |
|   | t <sub>r</sub>      | V <sub>GS</sub> =10V   |      | 150  | 230  | ns   |
| 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> | I <sub>D</sub> =100A   |      | 470  | 710  | ns   |
|   | t <sub>f</sub>      | R <sub>GS</sub> =10 Ω  |      | 370  | 560  | ns   |
| Avalanche Capability  | I <sub>AV</sub>     | L = 100μH T <sub>ch</sub> =25°C                                | 100  |      |      | A    |
| Diode Forward On-Voltage  | V <sub>SD</sub>     | I <sub>F</sub> =100A V <sub>GS</sub> =0V T <sub>ch</sub> =25°C |      | 1,0  | 1,5  | V    |
| Reverse Recovery Time   | t <sub>rr</sub>     | I <sub>F</sub> =50A V <sub>GS</sub> =0V                        |      | 95   |      | ns   |
| Reverse Recovery Charge   | Q <sub>rr</sub>     | -di/dt=100A/μs T <sub>ch</sub> =25°C                           |      | 0.22 |      | μC   |

- Thermal Characteristics

| Item               | Symbol                | Min. | Typ. | Max.  | Unit |
|--------------------|-----------------------|------|------|-------|------|
| Thermal Resistance | R <sub>th(ch-c)</sub> |      |      | 0,83  | °C/W |
|                    | R <sub>th(ch-a)</sub> |      |      | 35,00 | °C/W |

|                   |     |       |      |
|-------------------|-----|-------|------|
| N-channel MOS-FET |     |       |      |
| 30V               | 4mΩ | ±100A | 150W |

# 2SK2893-01

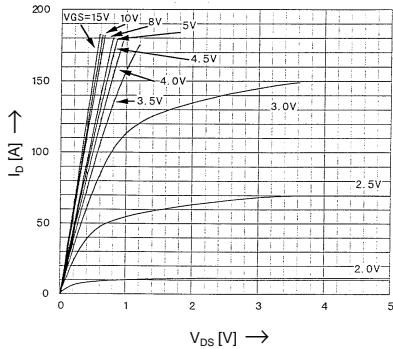
## FAP-IIIB Series



### > Characteristics

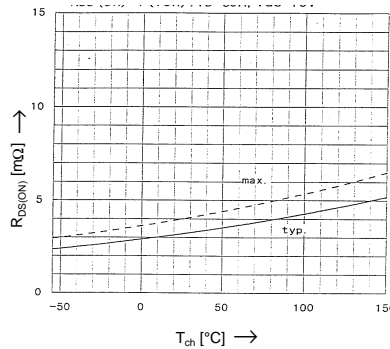
Typical Output Characteristics

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



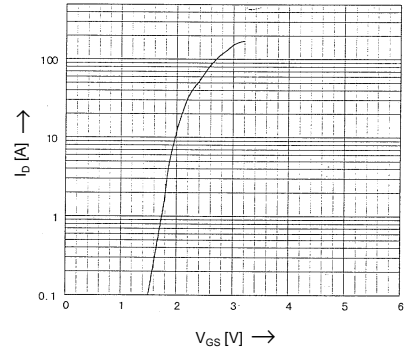
Drain-Source On-State Resistance vs.  $T_{ch}$

$R_{DS(on)} = f(T_{ch})$ ;  $I_D = 25\text{A}$ ;  $V_{GS} = 10\text{V}$



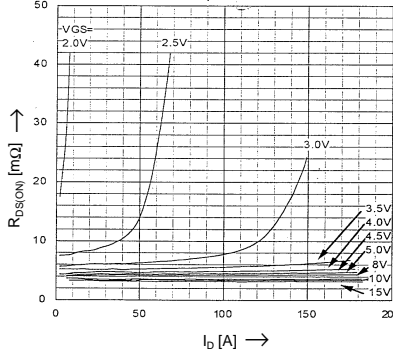
Typical Transfer Characteristics

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



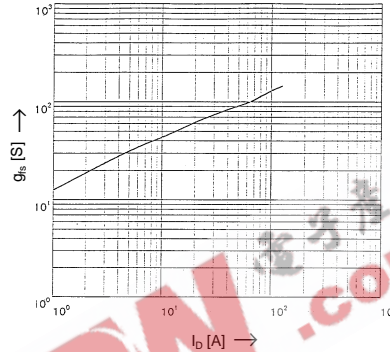
Typical Drain-Source On-State-Resistance vs.  $I_D$

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



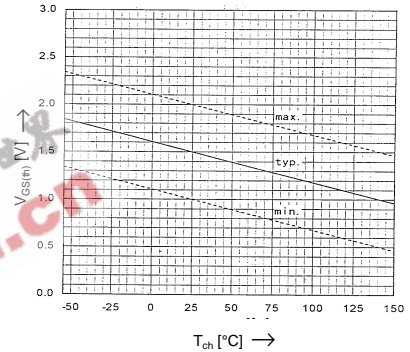
Typical Forward Transconductance vs.  $I_D$

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



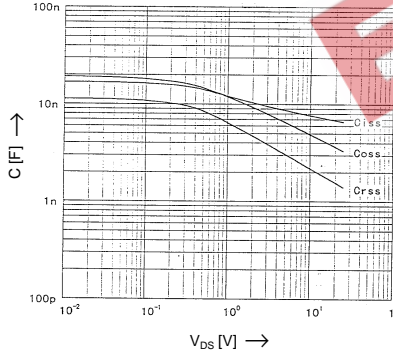
Gate Threshold Voltage vs.  $T_{ch}$

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



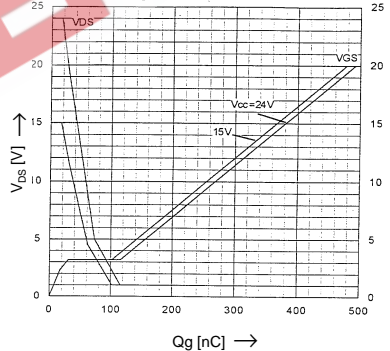
Typical Capacitances vs.  $V_{DS}$

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



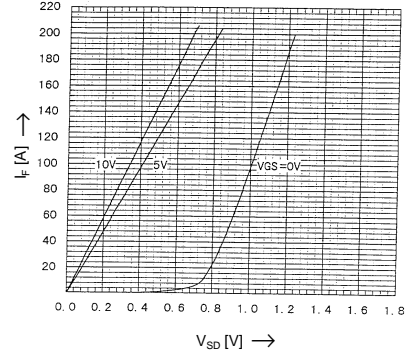
Typical Gate Charge Characteristic

$V_{GS} = f(Q_g)$ ;  $I_D = 50\text{A}$ ;  $T_C = 25^\circ\text{C}$



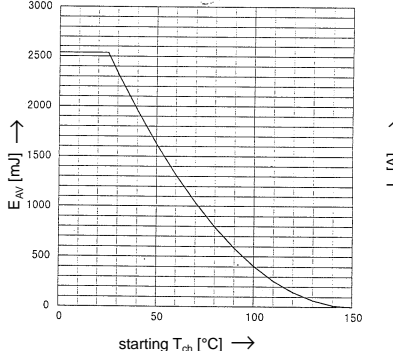
Forward Characteristics of Reverse Diode

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



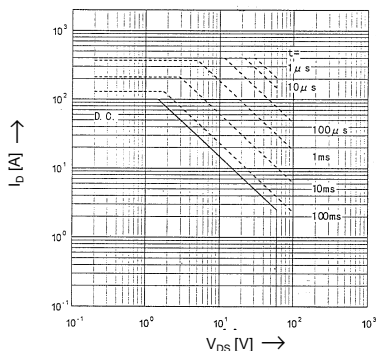
Maximum Avalanche Energy vs. starting  $T_{ch}$

$E_{AV} = f(\text{starting } T_{ch})$ ;  $V_{CC} = 12\text{V}$ ;  $I_{AV} \leq 50\text{A}$



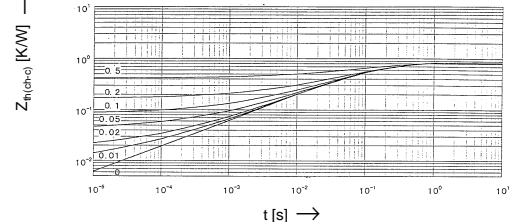
Safe Operation Area

$I_D = f(V_{DS})$ ;  $D = 0.01$ ;  $T_C = 25^\circ\text{C}$



Transient Thermal Impedance

$Z_{th(ch-c)} = f(t)$  parameter:  $D = 1/T$



|                   |     |       |      |
|-------------------|-----|-------|------|
| N-channel MOS-FET |     |       |      |
| 30V               | 4mΩ | ±100A | 150W |

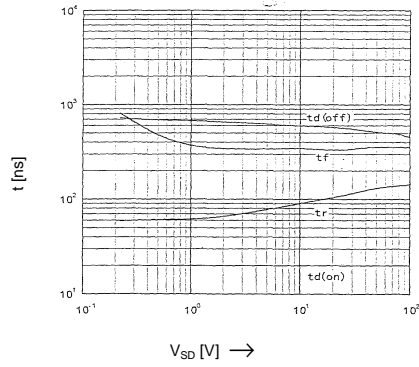
# 2SK2893-01

## FAP-IIIB Series

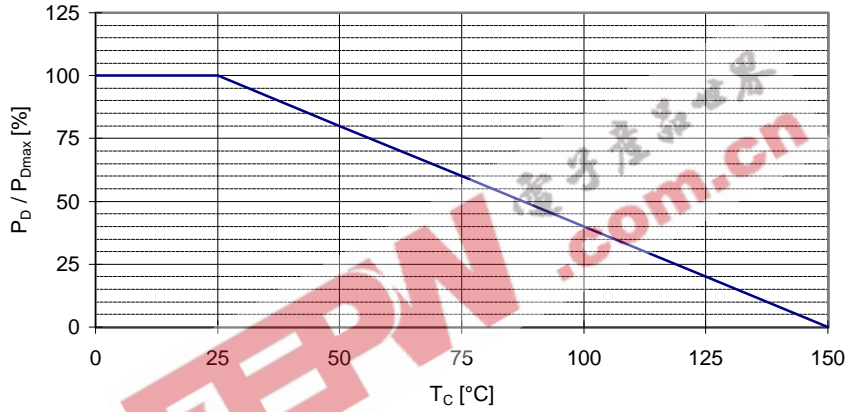


### > Characteristics

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



Power Dissipation  
 $P_D=f(T_C)$



Maximum Avalanche Current vs. starting T<sub>ch</sub>  
 $I_{AV}=f(\text{starting } T_{ch})$

