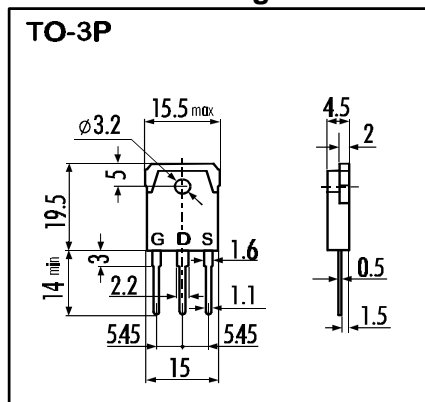


**> Features**

- High Speed Switching
- Low On-Resistance
- No Secondary Breakdown
- Low Driving Power
- High Voltage
- VGS = ± 30V Guarantee
- Repetitive Avalanche Rated

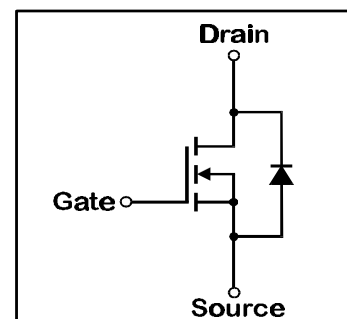
**> Applications**

- Switching Regulators
- UPS
- DC-DC converters
- General Purpose Power Amplifier

**> Outline Drawing**

**> Maximum Ratings and Characteristics**

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

| Item   | Symbol               | Rating     | Unit |
|--|----------------------|------------|------|
| Drain-Source-Voltage                                   | V <sub>DS</sub>      | 800        | V    |
| Continous Drain Current                                | I <sub>D</sub>       | 9          | A    |
| Pulsed Drain Current                                   | I <sub>D(puls)</sub> | 36         | A    |
| Gate-Source-Voltage                                    | V <sub>GS</sub>      | ±30        | V    |
| Repetitive or Non-Repetitive (T <sub>ch</sub> ≤ 150°C) | I <sub>AR</sub>      | 9          | A    |
| Avalanche Energy                                       | E <sub>AS</sub>      | 241        | 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   |

**> Equivalent Circuit**


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

| Item  | Symbol               | Test conditions  | Min. | Typ. | Max. | Unit |
|---|----------------------|--|------|------|------|------|
| Drain-Source Breakdown-Voltage  | V <sub>(BR)DSS</sub> | I <sub>D</sub> =1mA V <sub>GS</sub> =0V                                    | 800  |      |      | V    |
| Gate Threshold Voltage  | V <sub>GS(th)</sub>  | I <sub>D</sub> =1mA V <sub>DS</sub> =V <sub>GS</sub>                       | 3,5  | 4,0  | 4,5  | V    |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>     | V <sub>DS</sub> =800V 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>GSS</sub>     | V <sub>GS</sub> =±30V V <sub>DS</sub> =0V                                  |      | 10   | 100  | nA   |
| Drain Source On-State Resistance  | R <sub>DS(on)</sub>  | I <sub>D</sub> =4,5A V <sub>GS</sub> =10V                                  |      | 1,28 | 1,50 | Ω    |
| Forward Transconductance  | g <sub>fs</sub>      | I <sub>D</sub> =4,5A V <sub>DS</sub> =25V                                  |      | 6    |      | S    |
| Input Capacitance   | C <sub>iss</sub>     | V <sub>DS</sub> =25V   |      | 1200 |      | pF   |
| Output Capacitance  | C <sub>oss</sub>     | V <sub>GS</sub> =0V  |      | 180  |      | pF   |
| Reverse Transfer Capacitance  | C <sub>rss</sub>     | f=1MHz   |      | 90   |      | 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> =600V  |      | 30   |      | ns   |
|   | t <sub>r</sub>       | I <sub>D</sub> =9A   |      | 120  |      | 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>  | V <sub>GS</sub> =10V   |      | 95   |      | ns   |
|   | t <sub>f</sub>       | R <sub>GS</sub> =10 Ω  |      | 60   |      | ns   |
| Avalanche Capability  | I <sub>AV</sub>      | L = 100μH T <sub>ch</sub> =25°C  | 9    |      |      | 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 |      | 1,0  |      | V    |
| Reverse Recovery Time   | t <sub>rr</sub>      | I <sub>F</sub> =I <sub>DR</sub> V <sub>GS</sub> =0V                        |      | 900  |      | ns   |
| Reverse Recovery Charge   | Q <sub>rr</sub>      | -di <sub>F</sub> /dt=100A/μs T <sub>ch</sub> =25°C                         |      | 12   |      | μC   |

- Thermal Characteristics

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

|                   |      |    |      |
|-------------------|------|----|------|
| N-channel MOS-FET |      |    |      |
| 800V              | 1,5Ω | 9A | 150W |

# 2SK2648-01

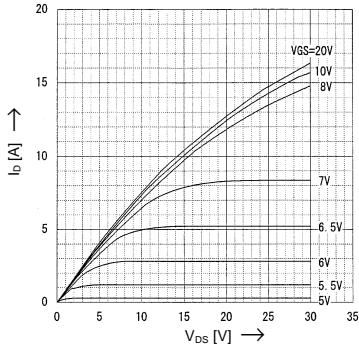
## FAP-IIS Series



### > Characteristics

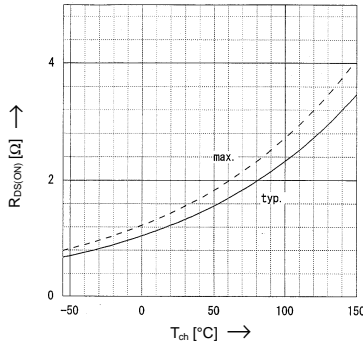
Typical Output Characteristics

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



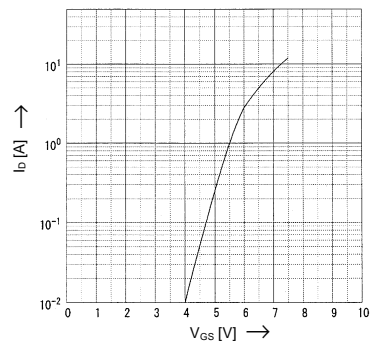
Drain-Source-On-State Resistance vs.  $T_{ch}$

$R_{DS(on)}=f(T_{ch})$ ;  $I_D=4.5\text{A}$ ;  $V_{GS}=10\text{V}$



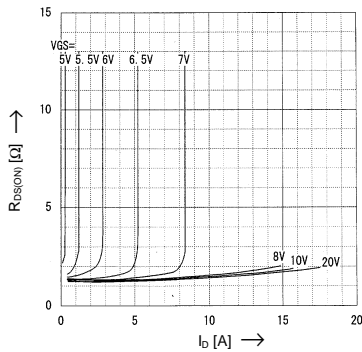
Typical Transfer Characteristics

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



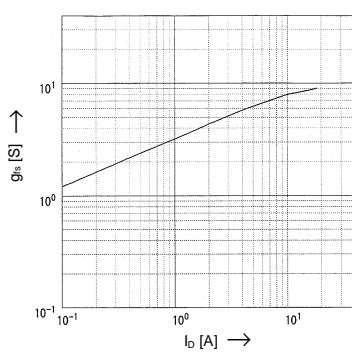
Typical Drain-Source-On-State-Resistance vs.  $I_D$

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



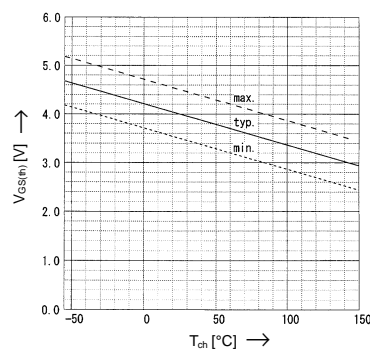
Typical Forward Transconductance vs.  $I_D$

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



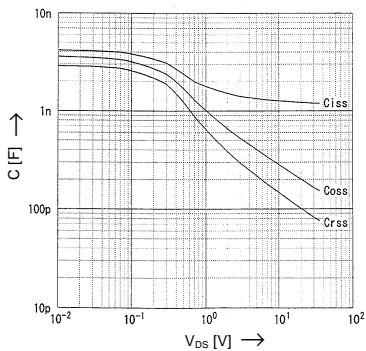
Gate Threshold Voltage vs.  $T_{ch}$

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



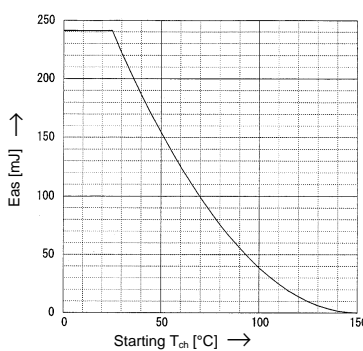
Typical Capacitances vs.  $V_{DS}$

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



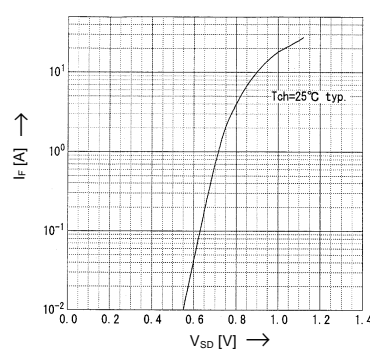
Avalanche Energy Derating

$E_{as}=f(\text{starting } T_{ch})$ ;  $V_{CC}=80\text{V}$ ;  $I_{AV}=9\text{A}$



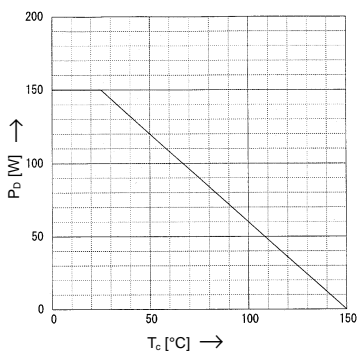
Forward Characteristics of Reverse Diode

$I_F=f(V_{SD})$ ; 80μs pulse test;  $V_{GS}=0\text{V}$



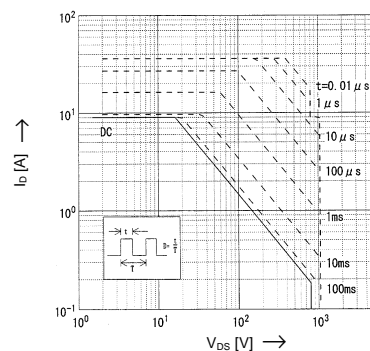
Allowable Power Dissipation vs.  $T_C$

$P_D=f(T_C)$



Safe operation area

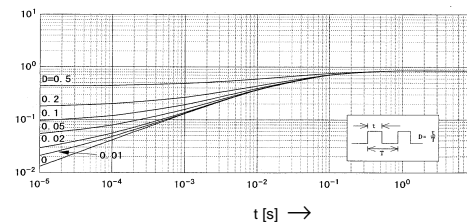
$I_D=f(V_{DS})$ ;  $D=0.01$ ;  $T_C=25^\circ\text{C}$



Transient thermal impedance

Transient thermal impedance

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



This specification is subject to change without notice!