

## > Features

- High Speed Switching
  - Low On-Resistance
  - No Secondary Breakdown
  - Low Driving Power
  - High Voltage
  - $V_{GS} = \pm 30V$  Guarantee
  - Avalanche Proof

## > Applications

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

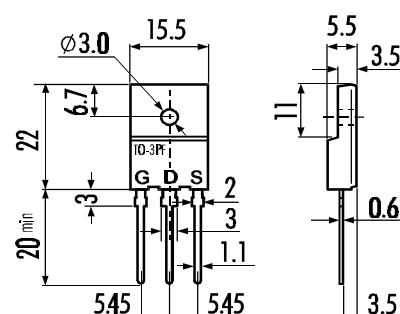
#### › Maximum Ratings and Characteristics

- Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ ), unless otherwise specified

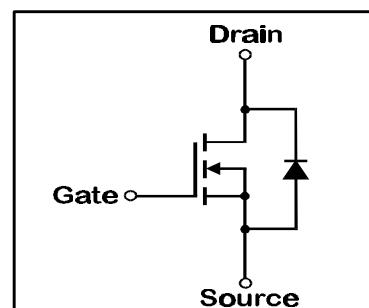
| Absolute Maximum Ratings (10–25 °C), unless otherwise specified |                      |            |      |
|---|----------------------|------------|------|
| Item  | Symbol               | Rating     | Unit |
| Drain-Source-Voltage  | V <sub>DS</sub>      | 600        | V    |
| Drain-Gate-Voltage ( $R_{GS}=20\text{K}\Omega$ )                | V <sub>DGR</sub>     | 600        | V    |
| Continuous Drain Current  | I <sub>D</sub>       | 12         | A    |
| Pulsed Drain Current  | I <sub>D(puls)</sub> | 48         | A    |
| Gate-Source-Voltage   | V <sub>GS</sub>      | ±30        | V    |
| Max. Power Dissipation  | P <sub>D</sub>       | 80         | W    |
| Operating and Storage Temperature Range                         | T <sub>ch</sub>      | 150        | °C   |
|   | T <sub>stg</sub>     | -55 ~ +150 | °C   |

## > Outline Drawing

TO-3PF



### > Equivalent Circuit



- Electrical Characteristics ( $T_C=25^\circ\text{C}$ ), 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                       | 600  |      |      | V    |
| Gate Threshold Voltage  | V <sub>GS(th)</sub>  | I <sub>D</sub> =1mA   | V <sub>DS</sub> =V <sub>GS</sub>          | 2,5  | 3,0  | 3,5  | V    |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>     | V <sub>DS</sub> =600V   | 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> =6A  | V <sub>GS</sub> =10V                      |      | 0,55 | 0,75 | Ω    |
| Forward Transconductance  | g <sub>fs</sub>      | I <sub>D</sub> =6A  | V <sub>DS</sub> =25V                      | 6    | 12   |      | S    |
| Input Capacitance   | C <sub>iss</sub>     | V <sub>DS</sub> =25V<br>V <sub>GS</sub> =0V<br>f=1MHz   |   |      | 2500 | 3800 | pF   |
| Output Capacitance  | C <sub>oss</sub>     |   |   |      | 220  | 330  | pF   |
| Reverse Transfer Capacitance  | C <sub>rss</sub>     |   |   |      | 50   | 75   | 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> =300V<br>I <sub>D</sub> =12A<br>V <sub>GS</sub> =10V<br>R <sub>GS</sub> =10 Ω |   |      | 30   | 45   | ns   |
|   | t <sub>r</sub>       |   |   |      | 60   | 90   | 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>  |   |   |      | 140  | 210  | ns   |
|   | t <sub>f</sub>       |   |   |      | 80   | 120  | ns   |
| Avalanche Capability  | I <sub>AV</sub>      | L = 100µH   | T <sub>ch</sub> =25°C                     | 12   |      |      | A    |
| Continuous Reverse Drain Current  | I <sub>DR</sub>      |   |   |      |      | 12   | A    |
| Pulsed Reverse Drain Current  | I <sub>DRM</sub>     |   |   |      |      | 48   | A    |
| Diode Forward On-Voltage  | V <sub>SD</sub>      | I <sub>F</sub> =2xI <sub>DR</sub>   | V <sub>GS</sub> =0V T <sub>ch</sub> =25°C |      | 1,05 | 1,58 | V    |
| Reverse Recovery Time   | t <sub>rr</sub>      | I <sub>F</sub> =I <sub>DR</sub>   | V <sub>GS</sub> =0V                       |      | 450  |      | ns   |
| Reverse Recovery Charge   | Q <sub>rr</sub>      | -dI <sub>F</sub> /dt=100A/µs T <sub>ch</sub> =25°C  |   |      | 3    |      | µC   |

- #### - Thermal Characteristics

| Item               | Symbol         | Test conditions | Min. | Typ. | Max. | Unit |
|--------------------|----------------|-----------------|------|------|------|------|
| Thermal Resistance | $R_{th(ch-a)}$ | channel to air  |      |      | 30   | °C/W |
|                    | $R_{th(ch-c)}$ | channel to case |      |      | 1,56 | °C/W |

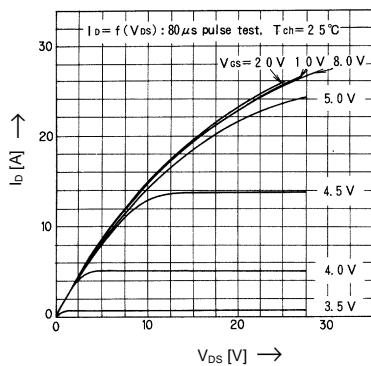
N-channel MOS-FET  
600V 0,75Ω 12A 80W

**2SK2148-01**  
**FAP-IIA Series**

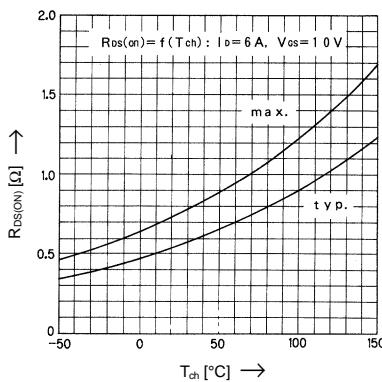
**FUJI**  
**ELECTRIC**

## > Characteristics

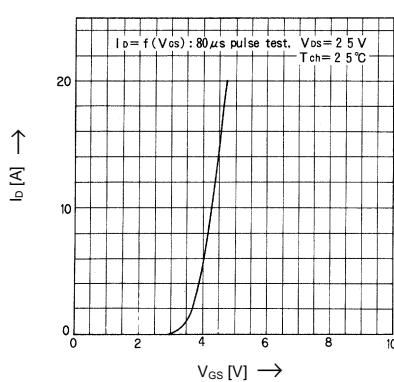
Typical Output Characteristics



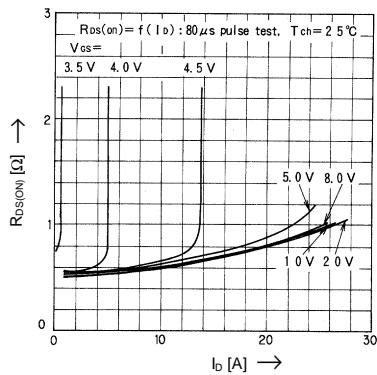
Drain-Source-On-State Resistance vs.  $T_{ch}$



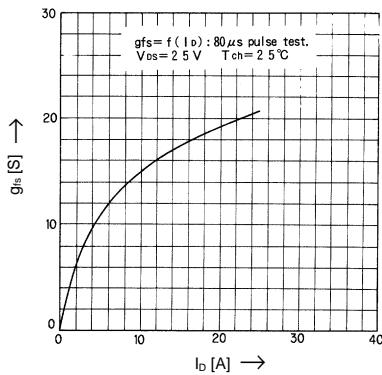
Typical Transfer Characteristics



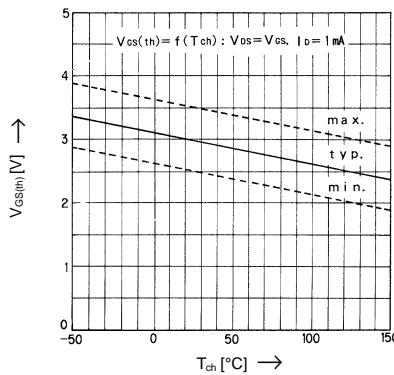
Typical Drain-Source-On-State-Resistance vs.  $I_D$



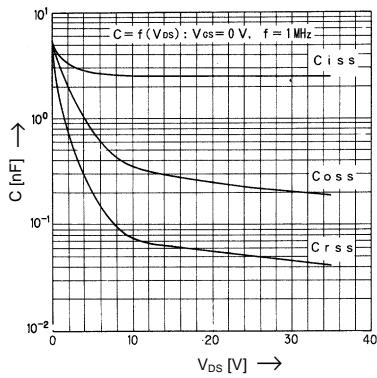
Typical Forward Transconductance vs.  $I_D$



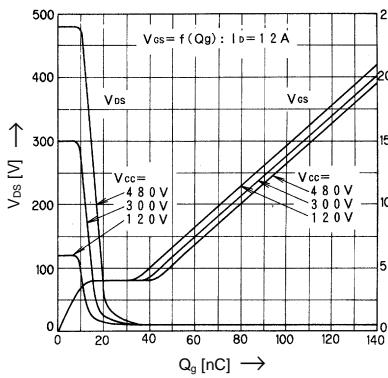
Gate Threshold Voltage vs.  $T_{ch}$



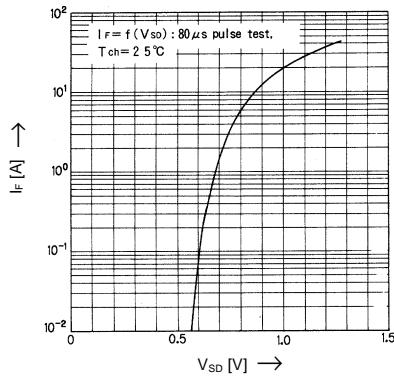
Typical Capacitance vs.  $V_{DS}$



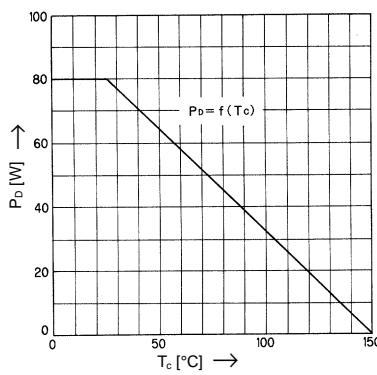
Typical Input Charge



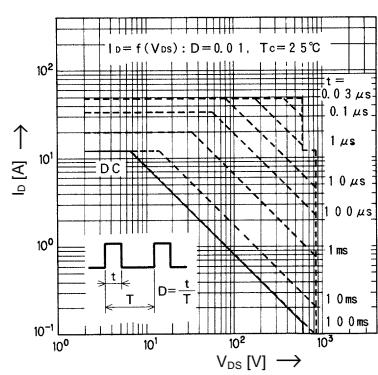
Forward Characteristics of Reverse Diode



Allowable Power Dissipation vs.  $T_c$



Safe operation area



Transient Thermal impedance

