

### > Features

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

### > 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

| Item                                                             | Symbol        | Rating     | Unit             |
|------------------------------------------------------------------|---------------|------------|------------------|
| Drain-Source-Voltage                                             | $V_{DS}$      | 500        | V                |
| Continuous Drain Current                                         | $I_D$         | 10         | A                |
| Pulsed Drain Current                                             | $I_{D(puls)}$ | 40         | A                |
| Gate-Source-Voltage                                              | $V_{GS}$      | $\pm 30$   | V                |
| Repetitive or Non-Repetitive ( $T_{ch} \leq 150^\circ\text{C}$ ) | $I_{AR}$      | 10         | A                |
| Avalanche Energy                                                 | $E_{AS}$      | 77,6       | mJ               |
| Max. Power Dissipation                                           | $P_D$         | 50         | W                |
| Operating and Storage Temperature Range                          | $T_{ch}$      | 150        | $^\circ\text{C}$ |
|                                                                  | $T_{stg}$     | -55 ~ +150 | $^\circ\text{C}$ |

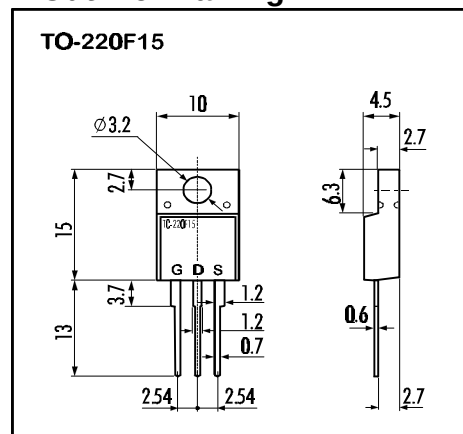
- Electrical Characteristics ( $T_C=25^\circ\text{C}$ ), unless otherwise specified

| Item                                                 | Symbol        | Test conditions                                       | Min. | Typ. | Max. | Unit          |
|------------------------------------------------------|---------------|-------------------------------------------------------|------|------|------|---------------|
| Drain-Source Breakdown-Voltage                       | $V_{(BR)DSS}$ | $I_D=1\text{mA}$ $V_{GS}=0V$                          | 500  |      |      | V             |
| Gate Threshold Voltage                               | $V_{GS(th)}$  | $I_D=1\text{mA}$ $V_{DS}=V_{GS}$                      | 3,5  | 4,0  | 4,5  | V             |
| Zero Gate Voltage Drain Current                      | $I_{DSS}$     | $V_{DS}=500V$ $T_{ch}=25^\circ\text{C}$               |      | 10   | 500  | $\mu\text{A}$ |
|                                                      |               | $V_{GS}=0V$ $T_{ch}=125^\circ\text{C}$                |      | 0,2  | 1,0  | mA            |
| Gate Source Leakage Current                          | $I_{GSS}$     | $V_{GS}=\pm 30V$ $V_{DS}=0V$                          |      | 10   | 100  | nA            |
| Drain Source On-State Resistance                     | $R_{DS(on)}$  | $I_D=5A$ $V_{GS}=10V$                                 |      | 0,73 | 0,90 | $\Omega$      |
| Forward Transconductance                             | $g_{fs}$      | $I_D=5A$ $V_{DS}=25V$                                 | 2,5  | 5    |      | S             |
| Input Capacitance                                    | $C_{iss}$     | $V_{DS}=25V$                                          |      | 950  | 1450 | pF            |
| Output Capacitance                                   | $C_{oss}$     | $V_{GS}=0V$                                           |      | 180  | 270  | pF            |
| Reverse Transfer Capacitance                         | $C_{rss}$     | $f=1\text{MHz}$                                       |      | 80   | 120  | pF            |
| Turn-On-Time $t_{on}$ ( $t_{on}=t_{d(on)}+t_r$ )     | $t_{d(on)}$   | $V_{CC}=300V$                                         |      | 25   | 40   | ns            |
|                                                      | $t_r$         | $I_D=10A$                                             |      | 70   | 110  | ns            |
| Turn-Off-Time $t_{off}$ ( $t_{off}=t_{d(off)}+t_f$ ) | $t_{d(off)}$  | $V_{GS}=10V$                                          |      | 70   | 110  | ns            |
|                                                      | $t_f$         | $R_{GS}=10\Omega$                                     |      | 45   | 70   | ns            |
| Avalanche Capability                                 | $I_{AV}$      | $L=100\mu\text{H}$ $T_{ch}=25^\circ\text{C}$          | 10   |      |      | A             |
| Diode Forward On-Voltage                             | $V_{SD}$      | $I_F=2I_{DR}$ $V_{GS}=0V$ $T_{ch}=25^\circ\text{C}$   |      | 1,1  | 1,65 | V             |
| Reverse Recovery Time                                | $t_{rr}$      | $I_F=I_{DR}$ $V_{GS}=0V$                              |      | 450  |      | ns            |
| Reverse Recovery Charge                              | $Q_{rr}$      | $-dI_F/dt=100A/\mu\text{s}$ $T_{ch}=25^\circ\text{C}$ |      | 5,5  |      | $\mu\text{C}$ |

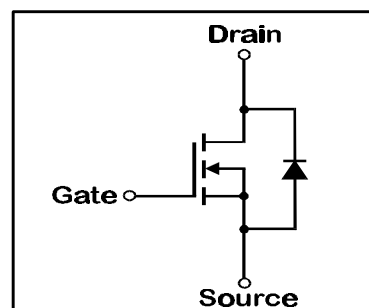
- Thermal Characteristics

| Item               | Symbol         | Test conditions | Min. | Typ. | Max. | Unit               |
|--------------------|----------------|-----------------|------|------|------|--------------------|
| Thermal Resistance | $R_{th(ch-a)}$ | channel to air  |      |      | 62,5 | $^\circ\text{C/W}$ |
|                    | $R_{th(ch-c)}$ | channel to case |      |      | 2,5  | $^\circ\text{C/W}$ |

### > Outline Drawing



### > Equivalent Circuit



| N-channel MOS-FET |      |     |     |
|-------------------|------|-----|-----|
| 500V              | 0,9Ω | 10A | 50W |

# 2SK2640-01MR

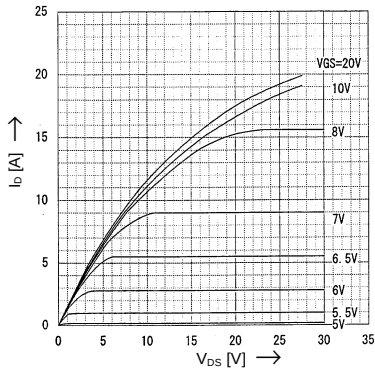
## FAP-IIS Series

**FUJI**  
ELECTRIC

### > Characteristics

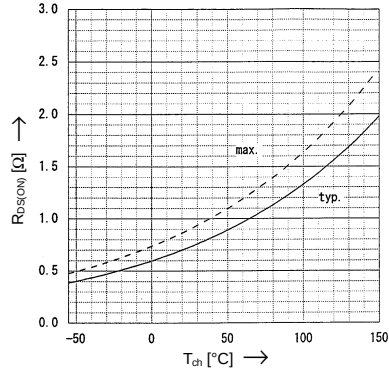
Typical Output Characteristics

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



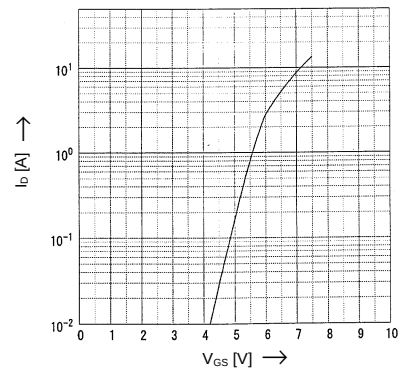
Drain-Source On-State Resistance vs.  $T_{ch}$

$R_{DS(on)} = f(T_{ch})$ ;  $I_D = 5A$ ;  $V_{GS} = 10V$



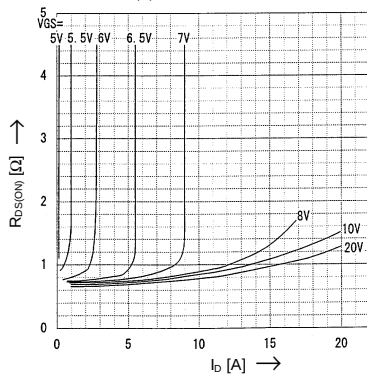
Typical Transfer Characteristics

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



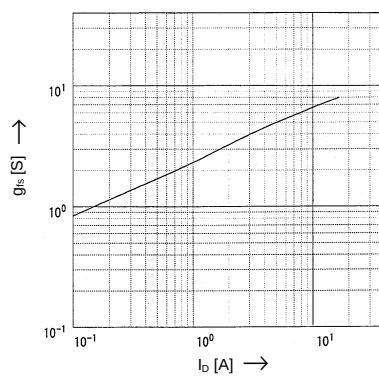
Typical Drain-Source On-State-Resistance vs.  $I_D$

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



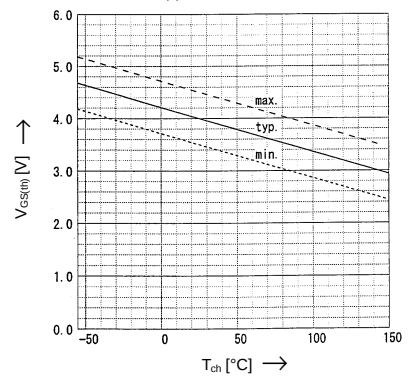
Typical Forward Transconductance vs.  $I_D$

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



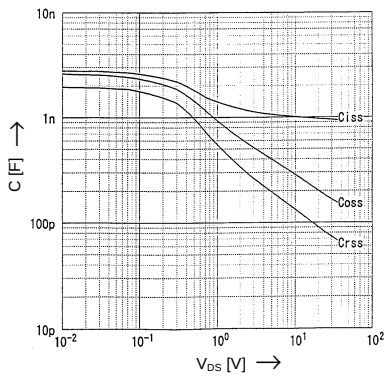
Gate Threshold Voltage vs.  $T_{ch}$

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



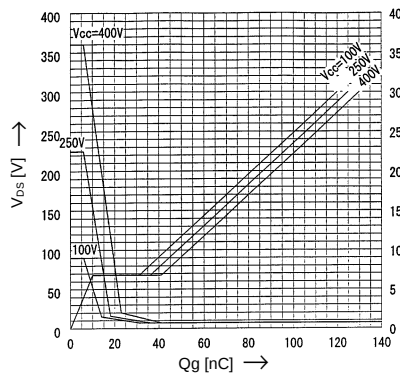
Typical Capacitances vs.  $V_{DS}$

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



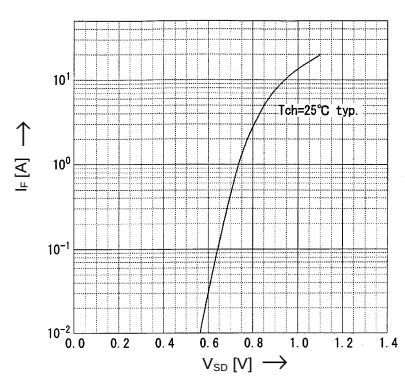
Typical Gate Charge Characteristic

$V_{GS} = f(Q_g)$ ;  $I_D = 10A$ ;  $T_C = 25^\circ\text{C}$



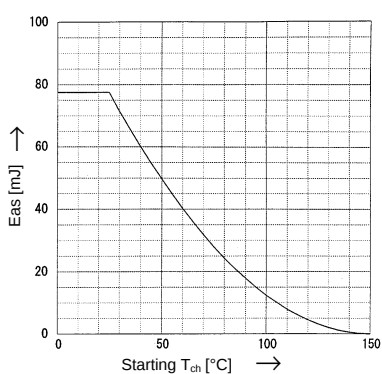
Forward Characteristics of Reverse Diode

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



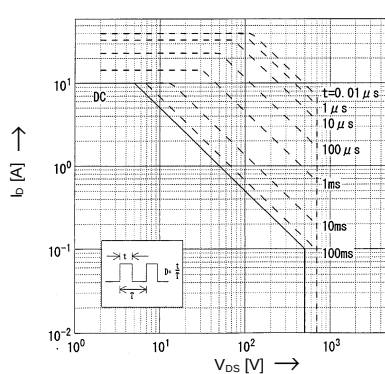
Avalanche Energy Derating

$E_{as} = f(\text{starting } T_{ch})$ ;  $V_{CC} = 50V$ ;  $I_{AV} = 10A$



Safe Operation Area

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



↑

$Z_{th(ch-e)}$  [K/W]

Transient Thermal impedance

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

