

|                   |       |     |      |
|-------------------|-------|-----|------|
| N-channel MOS-FET |       |     |      |
| 450V              | 0,65Ω | 10A | 100W |

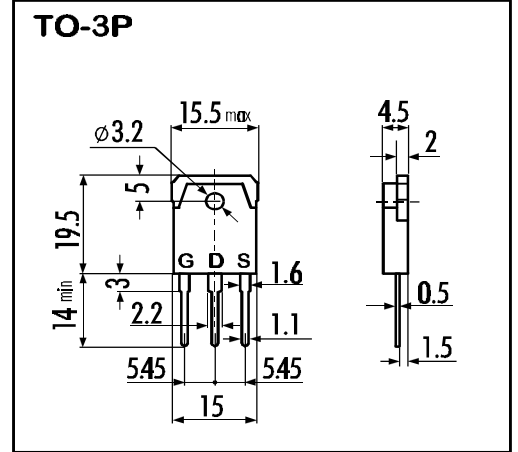
**> Features**

- 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

**> Outline Drawing**

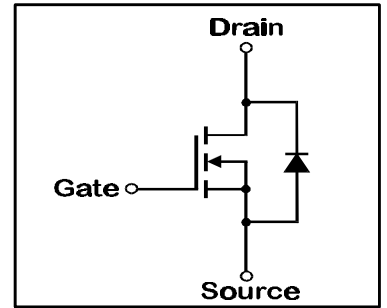


**> Maximum Ratings and Characteristics**

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

| Item   | Symbol        | Rating     | Unit       |
|--|---------------|------------|------------|
| Drain-Source-Voltage                                       | $V_{DS}$      | 450        | V          |
| Continous Drain Current                                    | $I_D$         | 10         | A          |
| Pulsed Drain Current                                       | $I_{D(puls)}$ | 40         | A          |
| Gate-Source-Voltage  | $V_{GS}$      | $\pm 35$   | V          |
| Repetitive or Non-Repetitive ( $T_{ic} \leq 150^\circ C$ ) | $I_{AR}$      | 10         | A          |
| Avalanche Energy   | $E_{AS}$      | 255        | mJ         |
| Max. Power Dissipation                                     | $P_D$         | 100        | W          |
| Operating and Storage Temperature Range                    | $T_{ch}$      | 150        | $^\circ C$ |
|  | $T_{stg}$     | -55 ~ +150 | $^\circ C$ |

**> Equivalent Circuit**



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

| Item   | Symbol        | Test conditions                               | Min. | Typ. | Max. | Unit     |
|--|---------------|---|------|------|------|----------|
| Drain-Source Breakdown-Voltage                       | $V_{(BR)DSS}$ | $I_D=1mA$ $V_{GS}=0V$                         | 450  |      |      | V        |
| Gate Threshold Voltage                               | $V_{GS(th)}$  | $I_D=1mA$ $V_{DS}=V_{GS}$                     | 3,5  | 4,0  | 4,5  | V        |
| Zero Gate Voltage Drain Current                      | $I_{DSS}$     | $V_{DS}=450V$ $T_{ch}=25^\circ C$             |      | 10   | 500  | $\mu A$  |
|  |               | $V_{GS}=0V$ $T_{ch}=125^\circ C$              |      | 0,2  | 1,0  | mA       |
| Gate Source Leakage Current                          | $I_{GSS}$     | $V_{GS}=\pm 35V$ $V_{DS}=0V$                  |      | 10   | 100  | nA       |
| Drain Source On-State Resistance                     | $R_{DS(on)}$  | $I_D=5A$ $V_{GS}=10V$                         |      | 0,58 | 0,65 | $\Omega$ |
| Forward Transconductance                             | $g_{fs}$      | $I_D=5A$ $V_{DS}=25V$                         | 3    | 6    |      | S        |
| Input Capacitance                                    | $C_{iss}$     | $V_{DS}=25V$                                  |      | 950  | 1450 | pF       |
| Output Capacitance                                   | $C_{oss}$     | $V_{GS}=0V$                                   |      | 180  | 270  | pF       |
| Reverse Transfer Capacitance                         | $C_{rss}$     | $f=1MHz$                                      |      | 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       |
|  | $t_f$         | $R_{GS}=10 \Omega$                            |      | 50   | 80   | ns       |
| Avalanche Capability                                 | $I_{AV}$      | $L = 100\mu H$ $T_{ch}=25^\circ C$            | 10   |      |      | A        |
| Diode Forward On-Voltage                             | $V_{SD}$      | $I_F=2I_{DR}$ $V_{GS}=0V$ $T_{ch}=25^\circ C$ |      | 1,1  | 1,65 | V        |
| Reverse Recovery Time                                | $t_{rr}$      | $I_F=I_{DR}$ $V_{GS}=0V$                      |      | 400  |      | ns       |
| Reverse Recovery Charge                              | $Q_{rr}$      | $-di_F/dt=100A/\mu s$ $T_{ch}=25^\circ C$     |      | 5,0  |      | $\mu C$  |

- Thermal Characteristics

| Item               | Symbol         | Test conditions | Min. | Typ. | Max. | Unit         |
|--------------------|----------------|-----------------|------|------|------|--------------|
| Thermal Resistance | $R_{th(ch-a)}$ | channel to air  |      |      | 35   | $^\circ C/W$ |
|                    | $R_{th(ch-c)}$ | channel to case |      |      | 1,25 | $^\circ C/W$ |

|                   |       |     |      |
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# 2SK2639-01

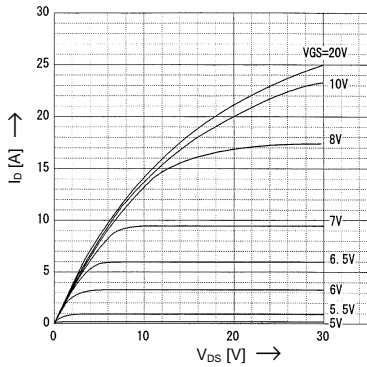
## FAP-IIS Series



### > Characteristics

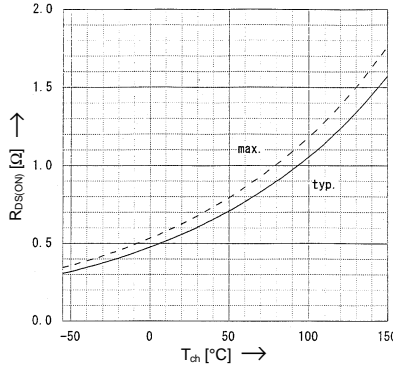
Typical Output Characteristics

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



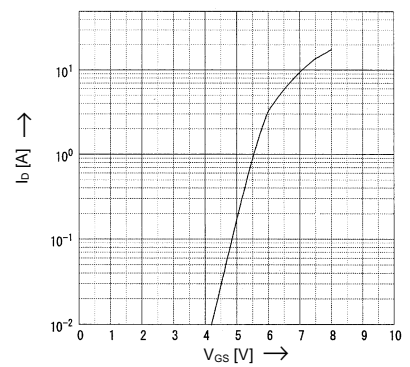
Drain-Source On-State Resistance vs.  $T_{ch}$

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



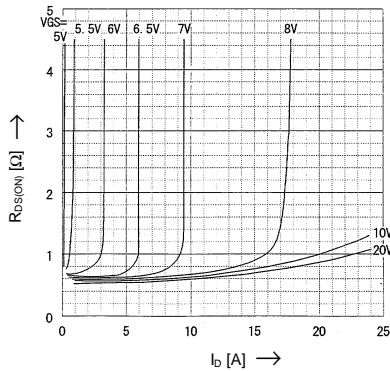
Typical Transfer Characteristics

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



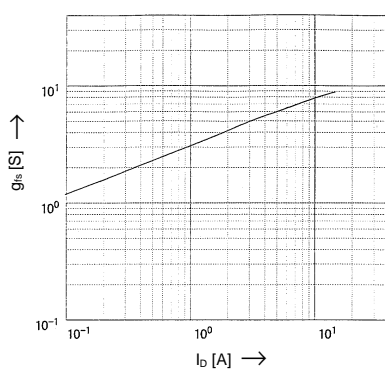
Typical Drain-Source On-State-Resistance vs.  $I_D$

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



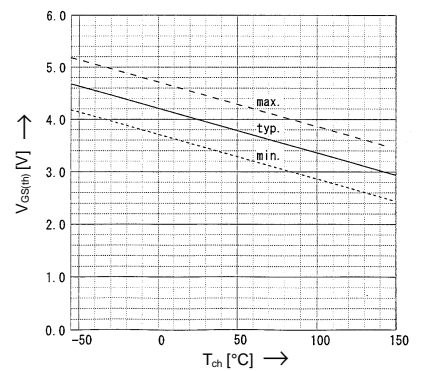
Typical Forward Transconductance vs.  $I_D$

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



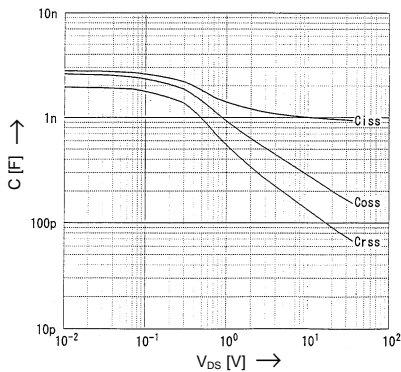
Gate Threshold Voltage vs.  $T_{ch}$

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



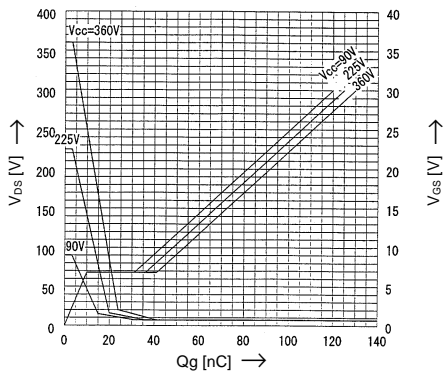
Typical Capacitances vs.  $V_{DS}$

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



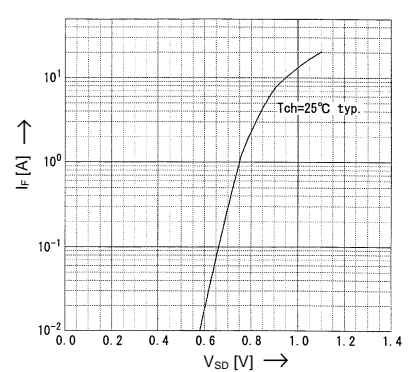
Typical Gate Charge Characteristic

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



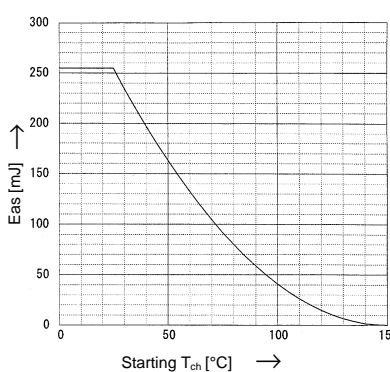
Forward Characteristics of Reverse Diode

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



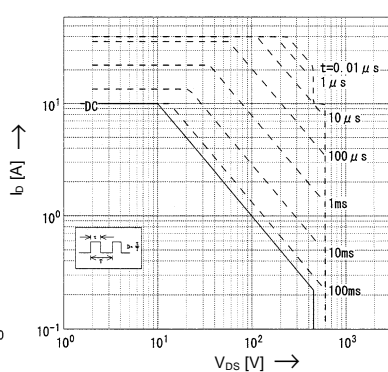
Avalanche Energy Derating

$E_{as} = f(\text{starting } T_{ch})$ ;  $V_{CC} = 45\text{V}$ ;  $I_{AV} = 10\text{A}$



Safe Operation Area

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



Transient Thermal impedance

Transient Thermal impedance

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

