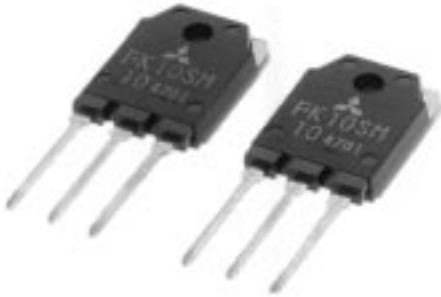


MITSUBISHI Nch POWER MOSFET

# FK10SM-10

HIGH-SPEED SWITCHING USE

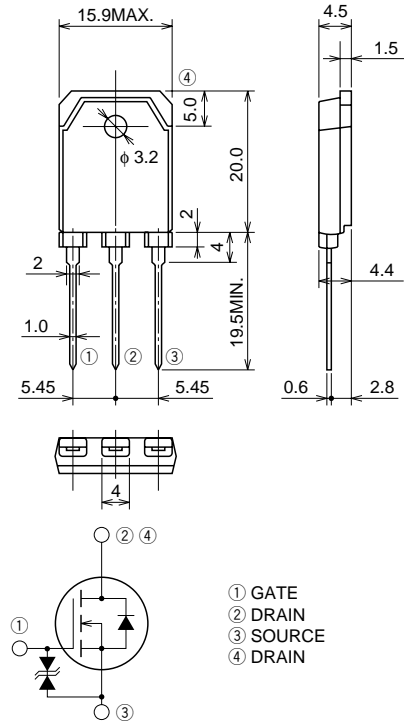
## FK10SM-10



- $V_{DSS}$  ..... 500V
- $r_{DS(ON)}$  (MAX) .....  $1.13\Omega$
- $I_D$  ..... 10A
- Integrated Fast Recovery Diode (MAX.) ..... 150ns

## OUTLINE DRAWING

Dimensions in mm



TO-3P

## APPLICATION

Servo motor drive, Robot, UPS, Inverter Fluorecent lamp, etc.

## MAXIMUM RATINGS (Tc = 25°C)

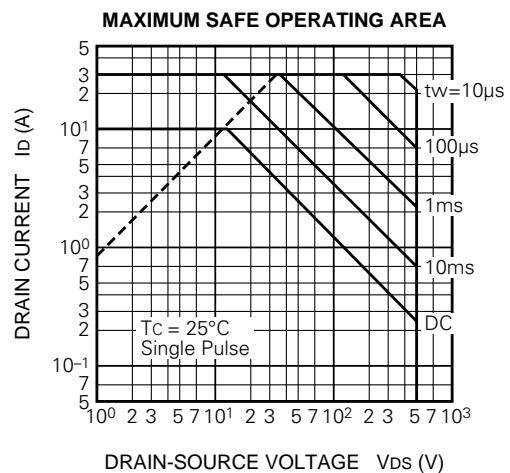
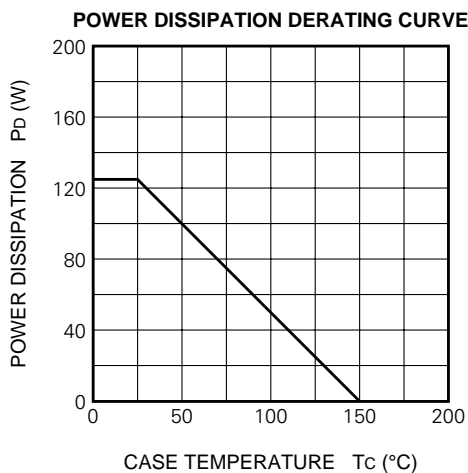
| Symbol    | Parameter                 | Conditions    | Ratings    | Unit |
|-----------|---------------------------|---------------|------------|------|
| $V_{DSS}$ | Drain-source voltage      | $V_{GS} = 0V$ | 500        | V    |
| $V_{GSS}$ | Gate-source voltage       | $V_{DS} = 0V$ | $\pm 30$   | V    |
| $I_D$     | Drain current             |               | 10         | A    |
| $I_{DM}$  | Drain current (Pulsed)    |               | 30         | A    |
| $I_S$     | Source current            |               | 10         | A    |
| $I_{SM}$  | Source current (Pulsed)   |               | 30         | A    |
| $P_D$     | Maximum power dissipation |               | 125        | W    |
| $T_{ch}$  | Channel temperature       |               | -55 ~ +150 | °C   |
| $T_{stg}$ | Storage temperature       |               | -55 ~ +150 | °C   |
| —         | Weight                    | Typical value | 4.8        | g    |

Feb.1999

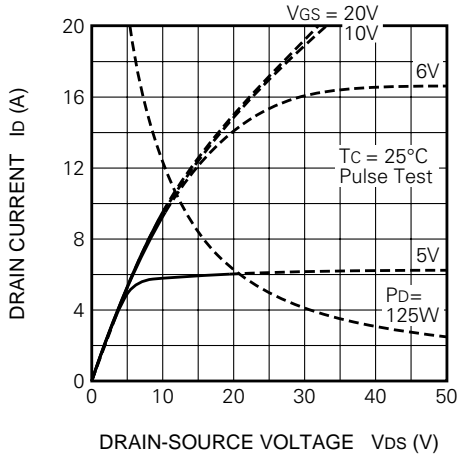
**ELECTRICAL CHARACTERISTICS** (T<sub>ch</sub> = 25°C)

| Symbol                 | Parameter                        | Test conditions  | Limits |      |      | Unit |
|------------------------|----------------------------------|--|--------|------|------|------|
|                        |                                  |  | Min.   | Typ. | Max. |      |
| V (BR) DSS             | Drain-source breakdown voltage   | I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V   | 500    | —    | —    | V    |
| V (BR) GSS             | Gate-source breakdown voltage    | I <sub>G</sub> = ±100μA, V <sub>DS</sub> = 0V  | ±30    | —    | —    | V    |
| I <sub>GSS</sub>       | Gate-source leakage current      | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V   | —      | —    | ±10  | μA   |
| I <sub>DSS</sub>       | Drain-source leakage current     | V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V   | —      | —    | 1    | mA   |
| V <sub>GS</sub> (th)   | Gate-source threshold voltage    | I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V  | 2      | 3    | 4    | V    |
| r <sub>DS</sub> (ON)   | Drain-source on-state resistance | I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V   | —      | 0.88 | 1.13 | Ω    |
| V <sub>DS</sub> (ON)   | Drain-source on-state voltage    | I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V   | —      | 4.40 | 5.65 | V    |
| y <sub>fs</sub>        | Forward transfer admittance      | I <sub>D</sub> = 5A, V <sub>DS</sub> = 10V   | 3.3    | 5.5  | —    | S    |
| C <sub>iss</sub>       | Input capacitance                | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz  | —      | 1100 | —    | pF   |
| C <sub>oss</sub>       | Output capacitance               |  | —      | 130  | —    | pF   |
| C <sub>rss</sub>       | Reverse transfer capacitance     |  | —      | 20   | —    | pF   |
| t <sub>d</sub> (on)    | Turn-on delay time               |  | —      | 20   | —    | ns   |
| t <sub>r</sub>         | Rise time                        | V <sub>DD</sub> = 200V, I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω | —      | 30   | —    | ns   |
| t <sub>d</sub> (off)   | Turn-off delay time              |  | —      | 95   | —    | ns   |
| t <sub>f</sub>         | Fall time                        |  | —      | 35   | —    | ns   |
| V <sub>SD</sub>        | Source-drain voltage             | I <sub>S</sub> = 5A, V <sub>GS</sub> = 0V  | —      | 1.5  | 2.0  | V    |
| R <sub>th</sub> (ch-c) | Thermal resistance               | Channel to case  | —      | —    | 1.00 | °C/W |
| t <sub>rr</sub>        | Reverse recovery time            | I <sub>S</sub> = 10A, di <sub>s</sub> /dt = -100A/μs   | —      | —    | 150  | ns   |

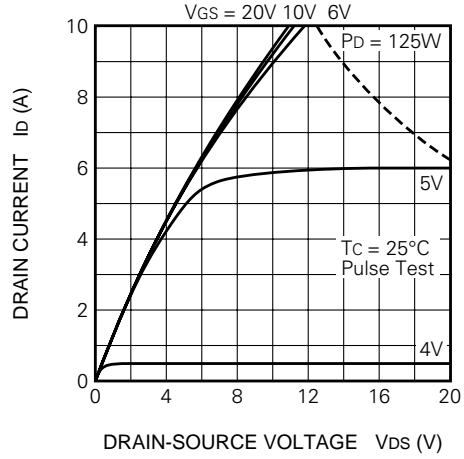
**PERFORMANCE CURVES**



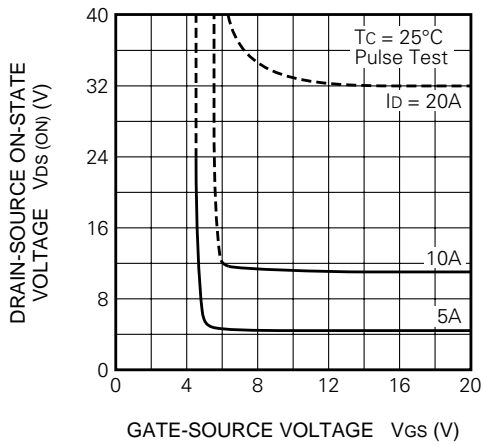
OUTPUT CHARACTERISTICS (TYPICAL)



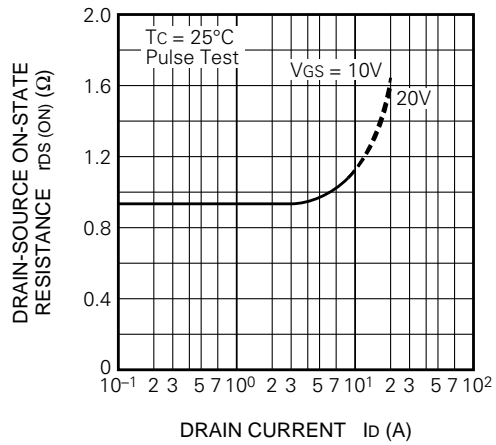
OUTPUT CHARACTERISTICS (TYPICAL)



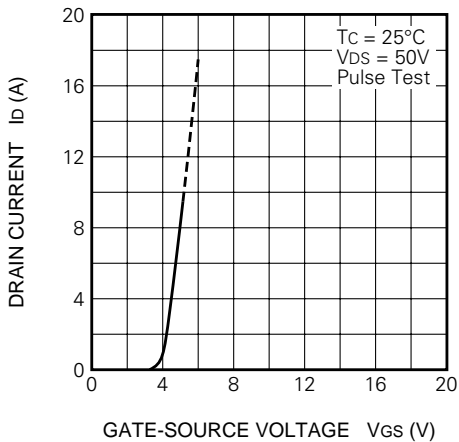
ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)



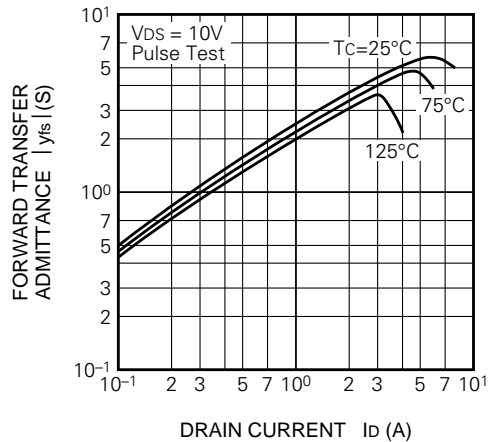
ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)



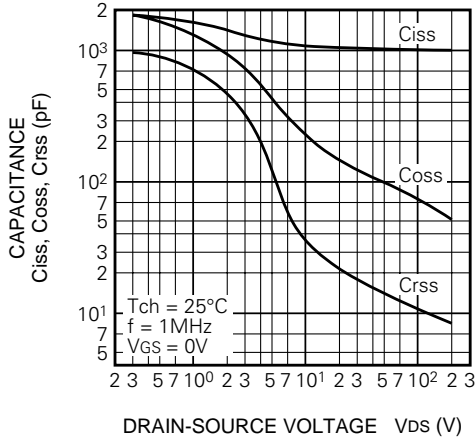
TRANSFER CHARACTERISTICS (TYPICAL)



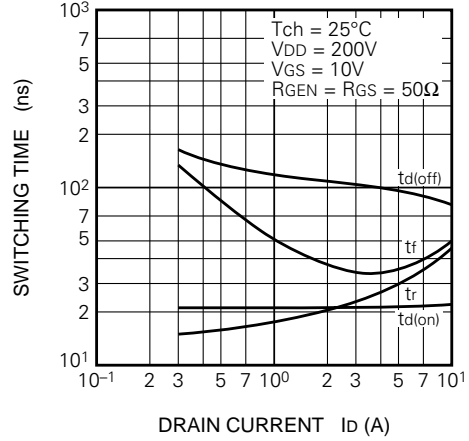
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT (TYPICAL)



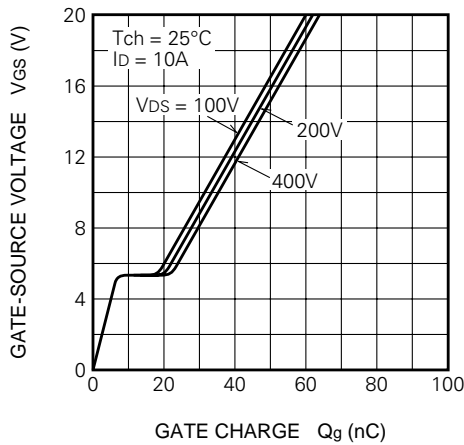
**CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)**



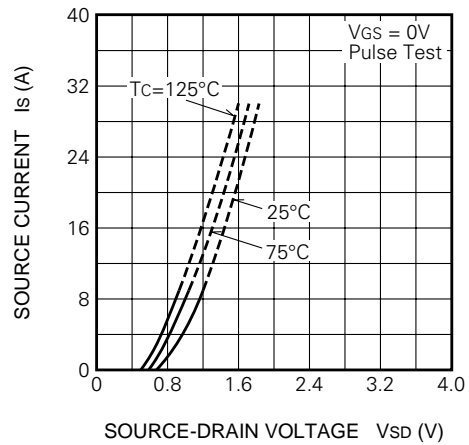
**SWITCHING CHARACTERISTICS (TYPICAL)**



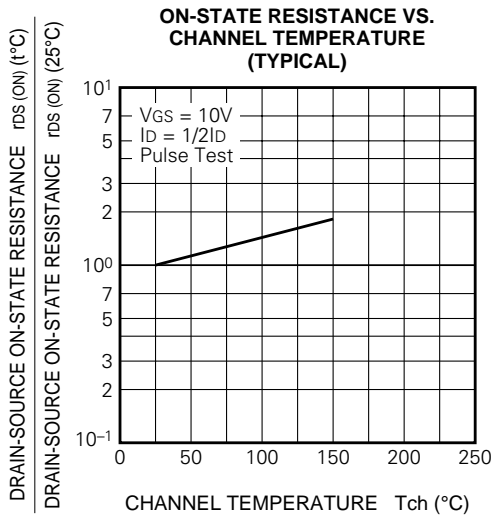
**GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)**



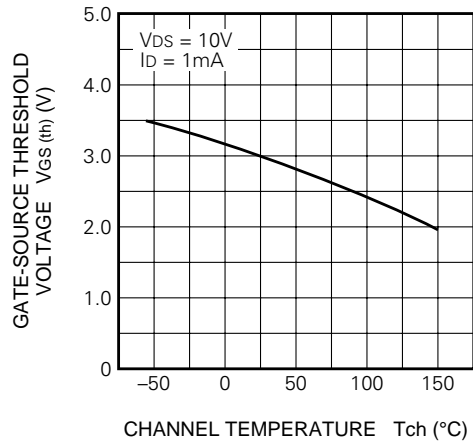
**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**

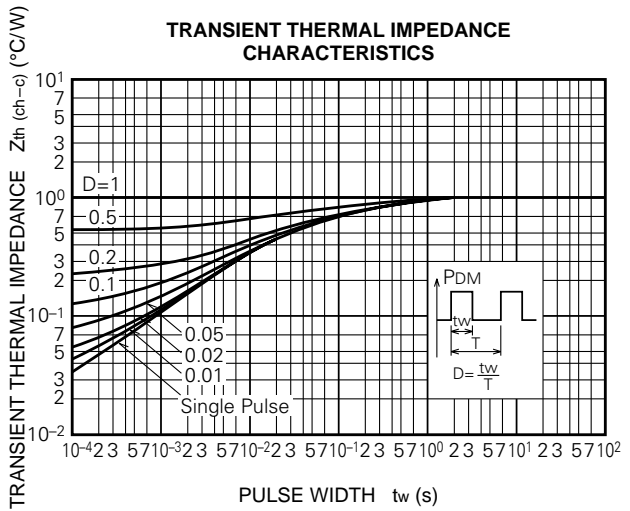
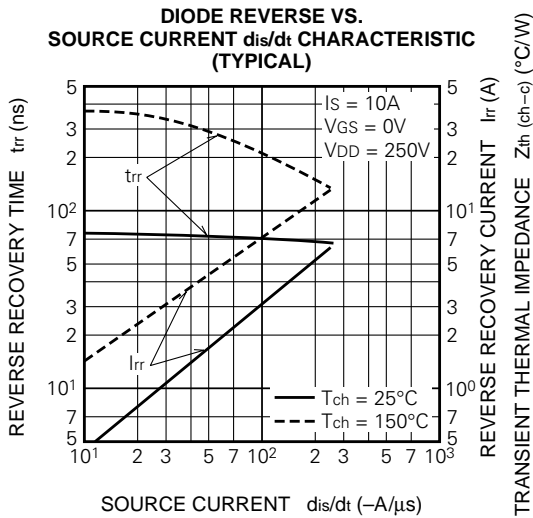
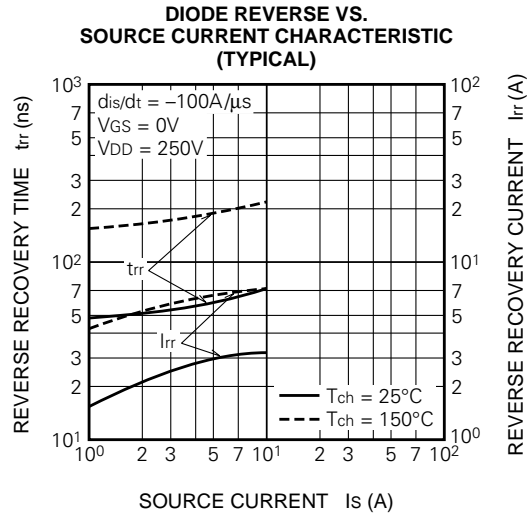
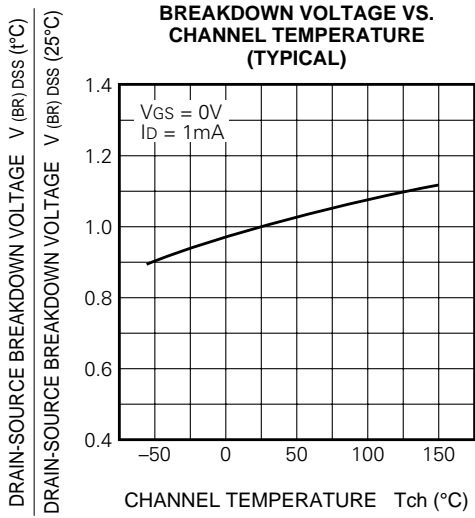


**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**



**THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**





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