

MITSUBISHI Nch POWER MOSFET

# FS10KMJ-06

HIGH-SPEED SWITCHING USE

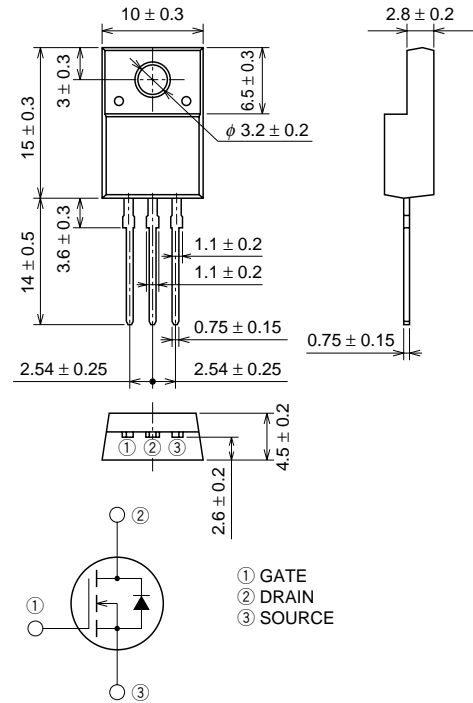
## FS10KMJ-06



- 4V DRIVE
- $V_{DSS}$  ..... 60V
- $r_{DS(ON)}$  (MAX) ..... 70m $\Omega$
- $I_D$  ..... 10A
- Integrated Fast Recovery Diode (TYP.) ..... 55ns
- $V_{iso}$  ..... 2000V

## OUTLINE DRAWING

Dimensions in mm



TO-220FN

## APPLICATION

Motor control, Lamp control, Solenoid control  
DC-DC converter, etc.

## MAXIMUM RATINGS (Tc = 25°C)

| Symbol    | Parameter                        | Conditions                       | Ratings    | Unit |
|-----------|----------------------------------|----------------------------------|------------|------|
| $V_{DSS}$ | Drain-source voltage             | $V_{GS} = 0V$                    | 60         | V    |
| $V_{GSS}$ | Gate-source voltage              | $V_{DS} = 0V$                    | $\pm 20$   | V    |
| $I_D$     | Drain current                    |                                  | 10         | A    |
| $I_{DM}$  | Drain current (Pulsed)           |                                  | 40         | A    |
| $I_{DA}$  | Avalanche drain current (Pulsed) | $L = 100\mu H$                   | 10         | A    |
| $I_S$     | Source current                   |                                  | 10         | A    |
| $I_{SM}$  | Source current (Pulsed)          |                                  | 40         | A    |
| $P_D$     | Maximum power dissipation        |                                  | 20         | W    |
| $T_{ch}$  | Channel temperature              |                                  | -55 ~ +150 | °C   |
| $T_{stg}$ | Storage temperature              |                                  | -55 ~ +150 | °C   |
| $V_{iso}$ | Isolation voltage                | AC for 1minute, Terminal to case | 2000       | V    |
| —         | Weight                           | Typical value                    | 2.0        | g    |

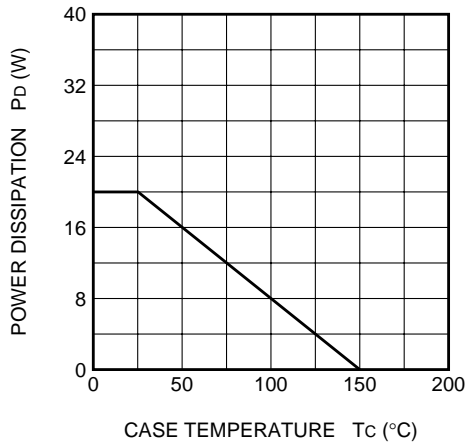
Feb.1999

**ELECTRICAL CHARACTERISTICS** (Tch = 25°C)

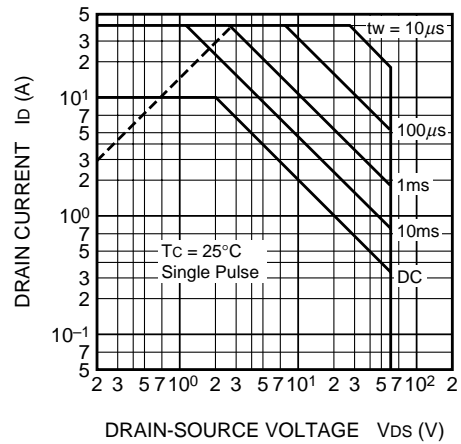
| Symbol     | Parameter                        | Test conditions                                 | Limits |       |      | Unit |
|------------|----------------------------------|---|--------|-------|------|------|
|            |                                  |   | Min.   | Typ.  | Max. |      |
| V (BR) DSS | Drain-source breakdown voltage   | Id = 1mA, VGS = 0V                              | 60     | —     | —    | V    |
| IGSS       | Gate-source leakage current      | VGS = ±20V, VDS = 0V                            | —      | —     | ±0.1 | μA   |
| IDSS       | Drain-source leakage current     | VDS = 60V, VGS = 0V                             | —      | —     | 0.1  | mA   |
| VGS (th)   | Gate-source threshold voltage    | Id = 1mA, VDS = 10V                             | 1.0    | 1.5   | 2.0  | V    |
| rDS (ON)   | Drain-source on-state resistance | Id = 5A, VGS = 10V                              | —      | 53    | 70   | mΩ   |
| rDS (ON)   | Drain-source on-state resistance | Id = 5A, VGS = 4V                               | —      | 66    | 91   | mΩ   |
| VDS (ON)   | Drain-source on-state voltage    | Id = 5A, VGS = 10V                              | —      | 0.265 | 0.35 | V    |
| yfs        | Forward transfer admittance      | Id = 5A, VDS = 5V                               | —      | 13    | —    | S    |
| Ciss       | Input capacitance                | VDS = 10V, VGS = 0V, f = 1MHz                   | —      | 800   | —    | pF   |
| Coss       | Output capacitance               |   | —      | 190   | —    | pF   |
| Crss       | Reverse transfer capacitance     |   | —      | 80    | —    | pF   |
| td (on)    | Turn-on delay time               | VDD = 30V, Id = 5A, VGS = 10V, RGEN = RGS = 50Ω | —      | 14    | —    | ns   |
| tr         | Rise time                        |   | —      | 17    | —    | ns   |
| td (off)   | Turn-off delay time              |   | —      | 65    | —    | ns   |
| tf         | Fall time                        |   | —      | 40    | —    | ns   |
| VSD        | Source-drain voltage             | IS = 5A, VGS = 0V                               | —      | 1.0   | 1.5  | V    |
| Rth (ch-c) | Thermal resistance               | Channel to case                                 | —      | —     | 6.25 | °C/W |
| trr        | Reverse recovery time            | IS = 10A, dis/dt = -100A/μs                     | —      | 55    | —    | ns   |

**PERFORMANCE CURVES**

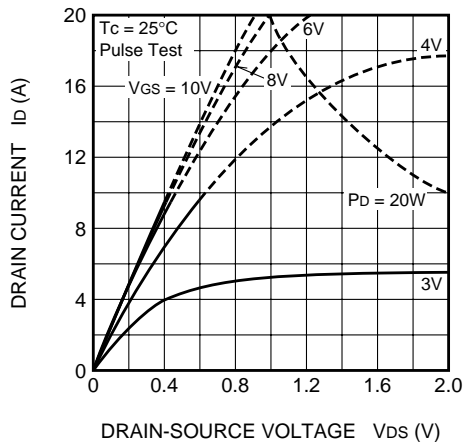
**POWER DISSIPATION DERATING CURVE**



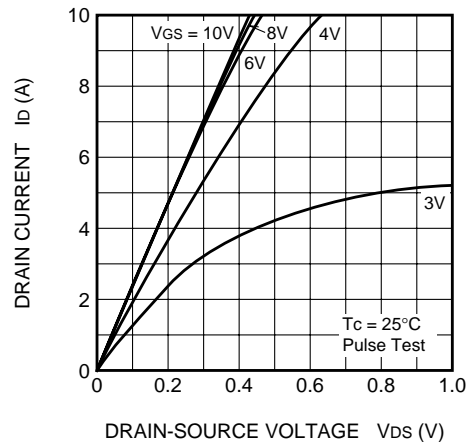
**MAXIMUM SAFE OPERATING AREA**



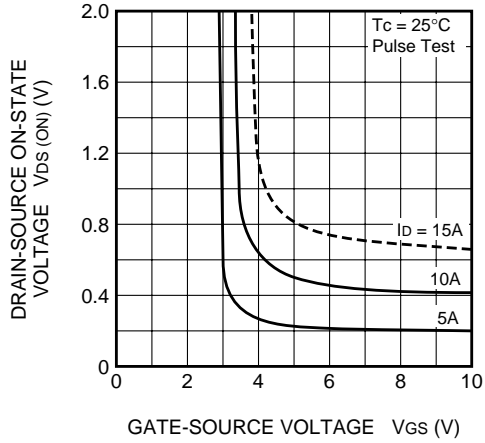
**OUTPUT CHARACTERISTICS (TYPICAL)**



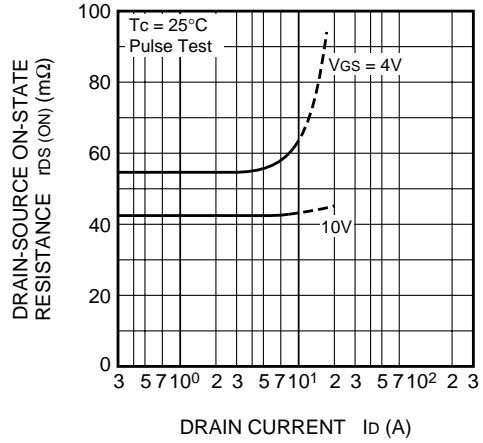
**OUTPUT CHARACTERISTICS (TYPICAL)**



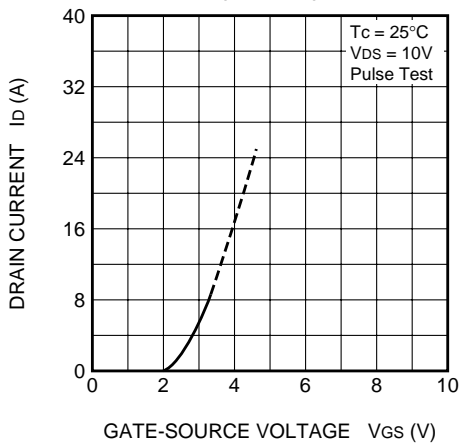
ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)



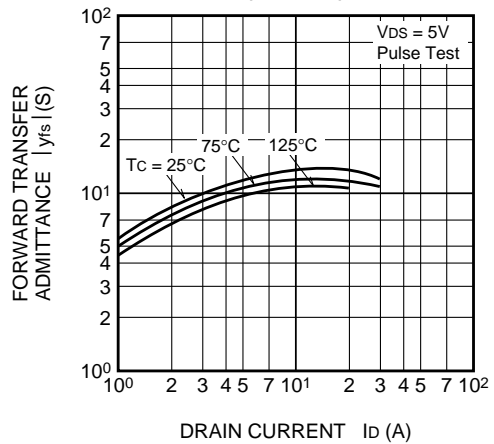
ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)



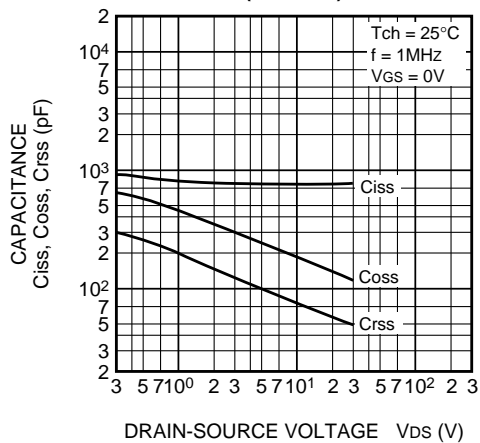
TRANSFER CHARACTERISTICS (TYPICAL)



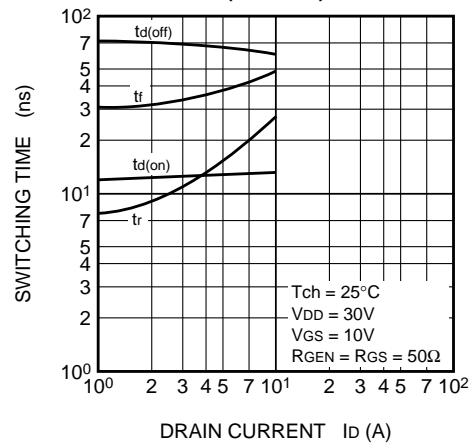
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT (TYPICAL)



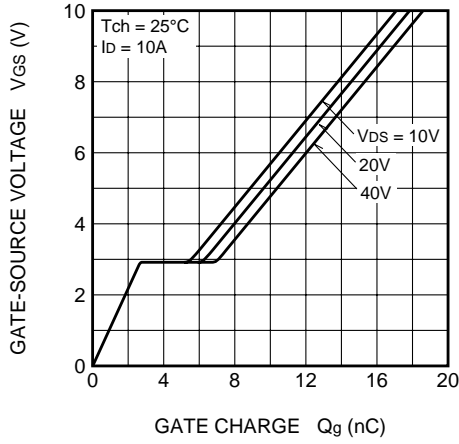
CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)



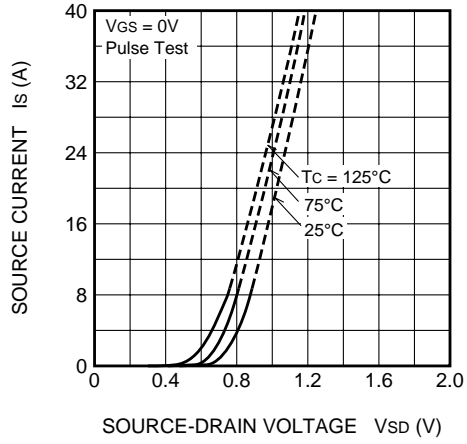
SWITCHING CHARACTERISTICS (TYPICAL)



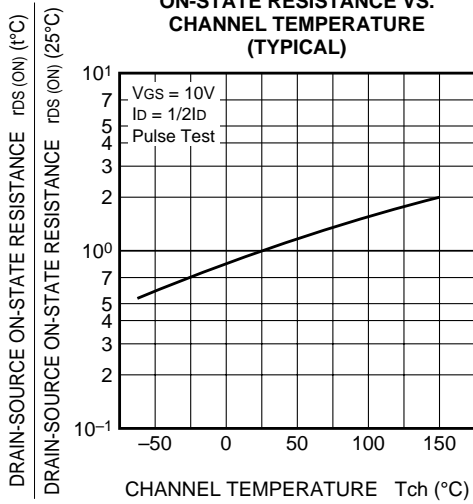
**GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)**



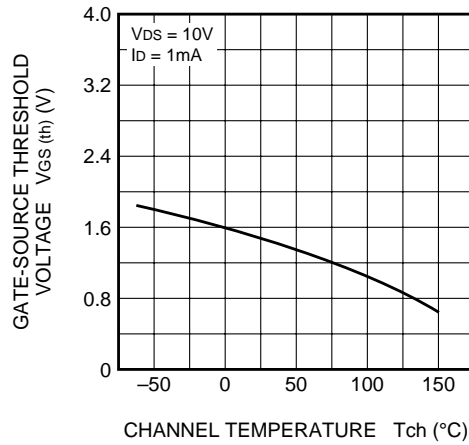
**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**



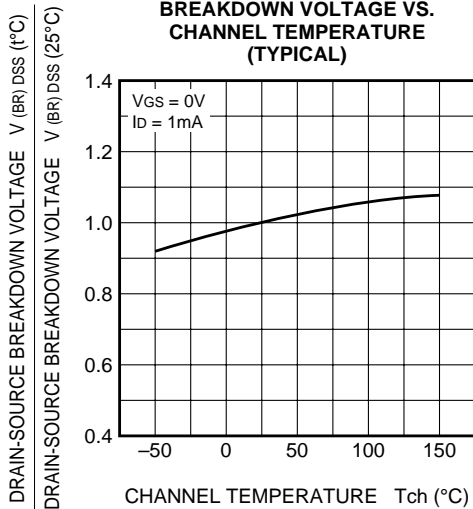
**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

