

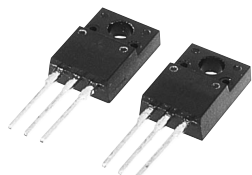
**PRELIMINARY**  
 Notice: This is not a final specification.  
 Some parametric limits are subject to change.

MITSUBISHI Pch POWER MOSFET

# FX70KMJ-03

HIGH-SPEED SWITCHING USE

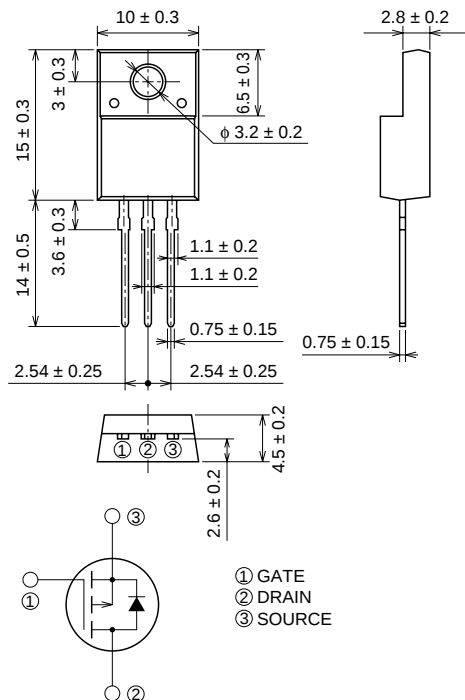
## FX70KMJ-03



- 4V DRIVE
- $V_{DS}$  ..... -30V
- $r_{DS(ON)}(MAX)$  ..... 12.3m $\Omega$
- $I_D$  ..... -70A
- Integrated Fast Recovery Diode (TYP.) ..... 70ns
- $V_{iso}$  ..... 2000V

## OUTLINE DRAWING

Dimensions in mm



TO-220FN

## APPLICATION

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

## MAXIMUM RATINGS (Tc = 25°C)

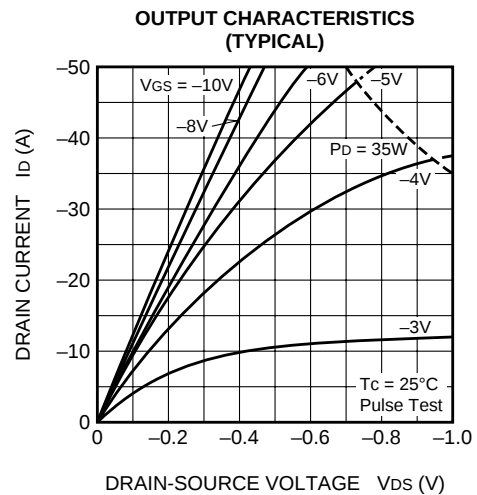
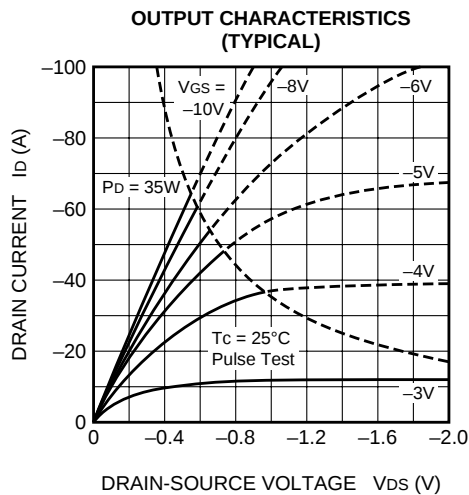
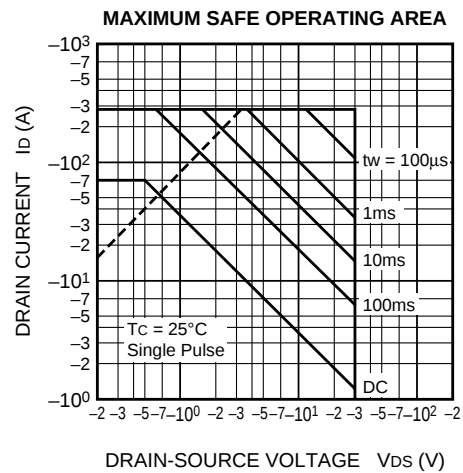
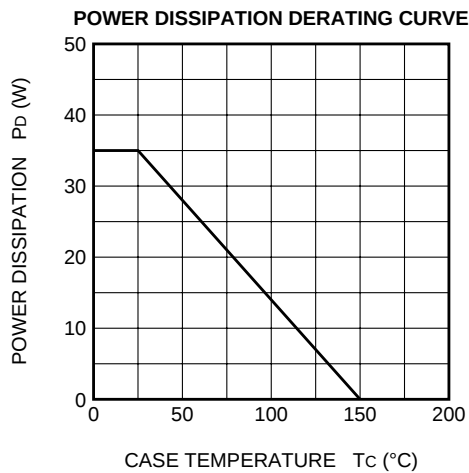
| Symbol    | Parameter                        | Conditions                       | Ratings    | Unit |
|-----------|----------------------------------|----------------------------------|------------|------|
| $V_{DS}$  | Drain-source voltage             | $V_{GS} = 0V$                    | -30        | V    |
| $V_{GSS}$ | Gate-source voltage              | $V_{DS} = 0V$                    | ±20        | V    |
| $I_D$     | Drain current                    |                                  | -70        | A    |
| $I_{DM}$  | Drain current (Pulsed)           |                                  | -280       | A    |
| $I_{DA}$  | Avalanche drain current (Pulsed) | $L = 10\mu H$                    | -70        | A    |
| $I_S$     | Source current                   |                                  | -70        | A    |
| $I_{SM}$  | Source current (Pulsed)          |                                  | -280       | A    |
| $P_D$     | Maximum power dissipation        |                                  | 35         | 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    |

Jan.1999

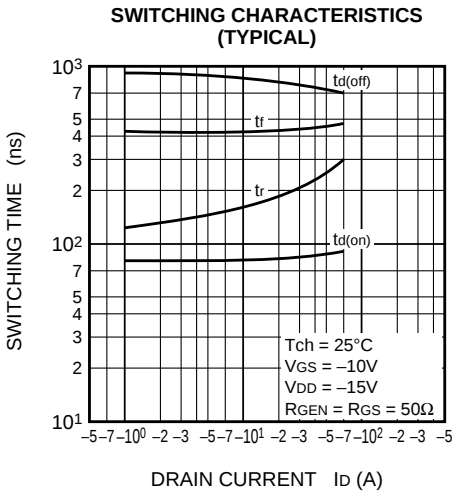
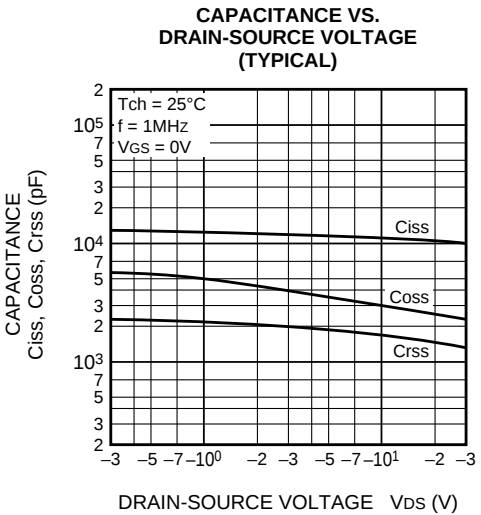
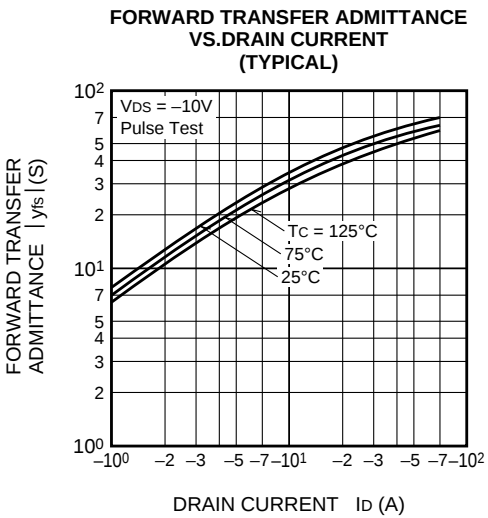
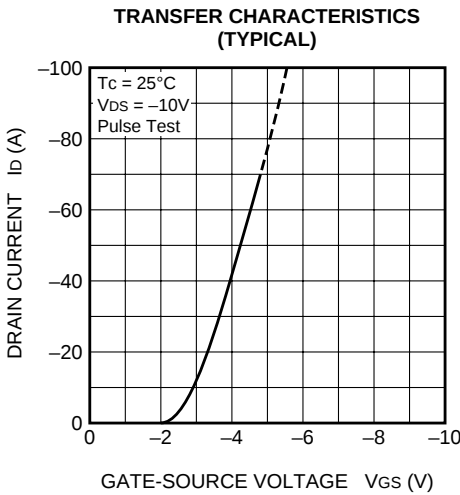
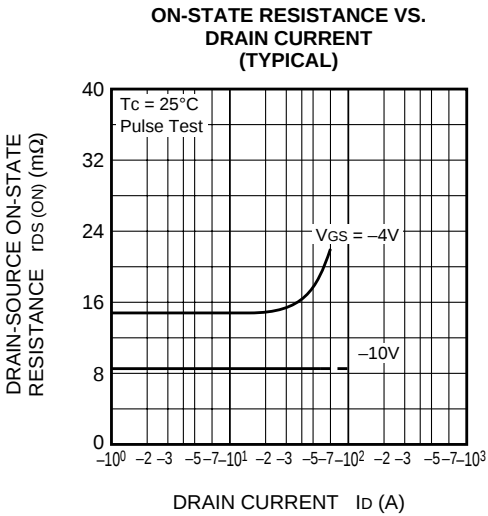
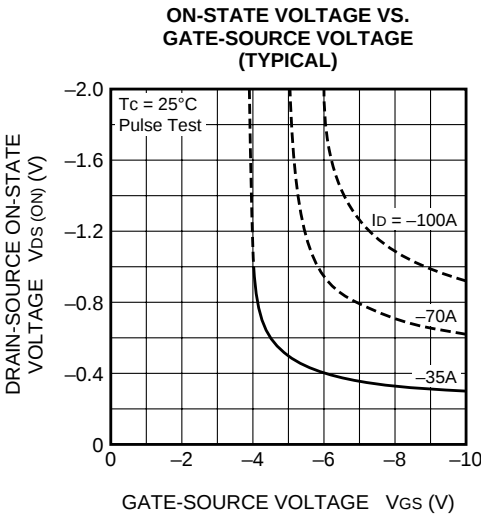
**ELECTRICAL CHARACTERISTICS** ( $T_{ch} = 25^{\circ}\text{C}$ )

| Symbol         | Parameter                        | Test conditions                                                                                       | Limits |       |           | Unit                 |
|----------------|----------------------------------|-------------------------------------------------------------------------------------------------------|--------|-------|-----------|----------------------|
|                |                                  |                                                                                                       | Min.   | Typ.  | Max.      |                      |
| $V_{(BR)DSS}$  | Drain-source breakdown voltage   | $I_D = -1\text{mA}$ , $V_{DS} = 0\text{V}$                                                            | -30    | —     | —         | V                    |
| $I_{GSS}$      | Gate-source leakage current      | $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$                                                      | —      | —     | $\pm 0.1$ | $\mu\text{A}$        |
| $I_{DSS}$      | Drain-source leakage current     | $V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$                                                         | —      | —     | -0.1      | mA                   |
| $V_{GS(th)}$   | Gate-source threshold voltage    | $I_D = -1\text{mA}$ , $V_{DS} = -10\text{V}$                                                          | -1.3   | -1.8  | -2.3      | V                    |
| $r_{DS(on)}$   | Drain-source on-state resistance | $I_D = -35\text{A}$ , $V_{GS} = -10\text{V}$                                                          | —      | 10.0  | 12.3      | $\text{m}\Omega$     |
| $r_{DS(on)}$   | Drain-source on-state resistance | $I_D = -26\text{A}$ , $V_{GS} = -4\text{V}$                                                           | —      | 19    | 25        | $\text{m}\Omega$     |
| $V_{DS(on)}$   | Drain-source on-state voltage    | $I_D = -35\text{A}$ , $V_{GS} = -10\text{V}$                                                          | —      | -0.35 | -0.43     | V                    |
| $ y_{fs} $     | Forward transfer admittance      | $I_D = -35\text{A}$ , $V_{DS} = -10\text{V}$                                                          | —      | 55.8  | —         | S                    |
| $C_{iss}$      | Input capacitance                | $V_{DS} = -10\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$                                     | —      | 11140 | —         | pF                   |
| $C_{oss}$      | Output capacitance               |                                                                                                       | —      | 2300  | —         | pF                   |
| $C_{rss}$      | Reverse transfer capacitance     |                                                                                                       | —      | 1000  | —         | pF                   |
| $t_d(on)$      | Turn-on delay time               | $V_{DD} = -15\text{V}$ , $I_D = -35\text{A}$ , $V_{GS} = -10\text{V}$ , $R_{GEN} = R_{GS} = 50\Omega$ | —      | 85    | —         | ns                   |
| $t_r$          | Rise time                        |                                                                                                       | —      | 228   | —         | ns                   |
| $t_d(off)$     | Turn-off delay time              |                                                                                                       | —      | 751   | —         | ns                   |
| $t_f$          | Fall time                        |                                                                                                       | —      | 360   | —         | ns                   |
| $V_{SD}$       | Source-drain voltage             | $I_S = -35\text{A}$ , $V_{GS} = 0\text{V}$                                                            | —      | -1.0  | -1.5      | V                    |
| $R_{th(ch-c)}$ | Thermal resistance               | Channel to case                                                                                       | —      | —     | 3.57      | $^{\circ}\text{C/W}$ |
| $t_{rr}$       | Reverse recovery time            | $I_S = -35\text{A}$ , $di/dt = 50\text{A}/\mu\text{s}$                                                | —      | 70    | —         | ns                   |

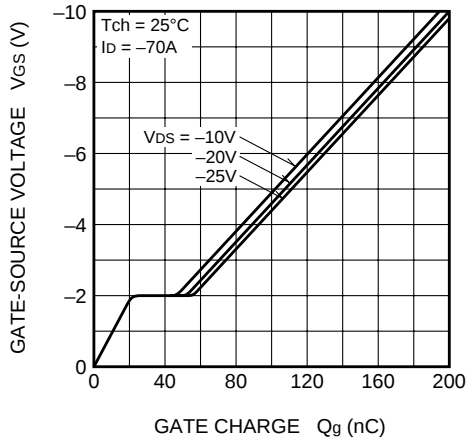
**PERFORMANCE CURVES**



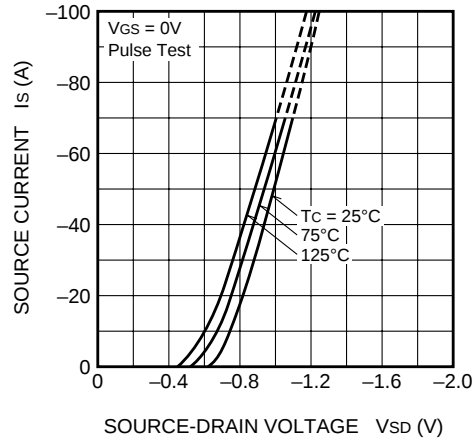
**PRELIMINARY**  
 Notice: This is not a final specification.  
 Some parametric limits are subject to change.



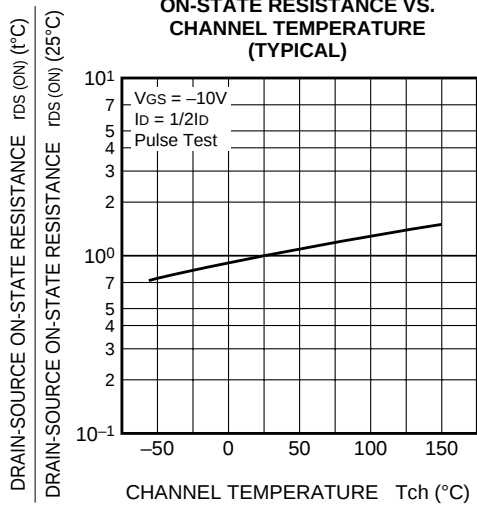
**GATE-SOURCE VOLTAGE  
 VS. GATE CHARGE  
 (TYPICAL)**



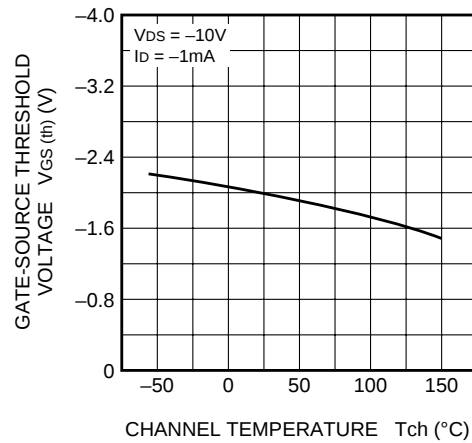
**SOURCE-DRAIN DIODE  
 FORWARD CHARACTERISTICS  
 (TYPICAL)**



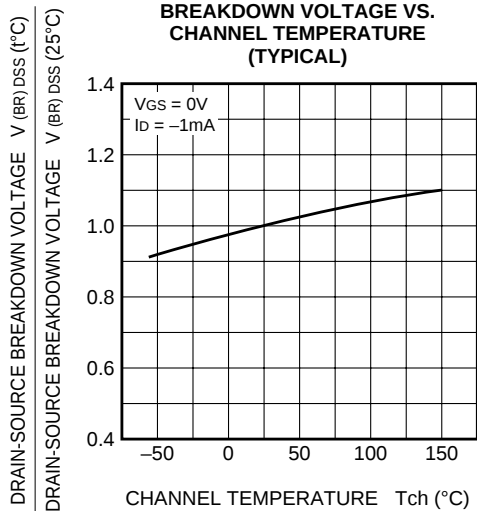
**ON-STATE RESISTANCE VS.  
 CHANNEL TEMPERATURE  
 (TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE  
 CHARACTERISTICS**

