

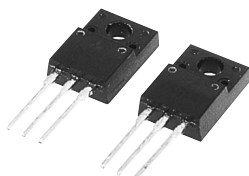
PRELIMINARY
 Notice: This is not a final specification.
 Some parametric limits are subject to change.

MITSUBISHI Pch POWER MOSFET

FX50KMJ-06

HIGH-SPEED SWITCHING USE

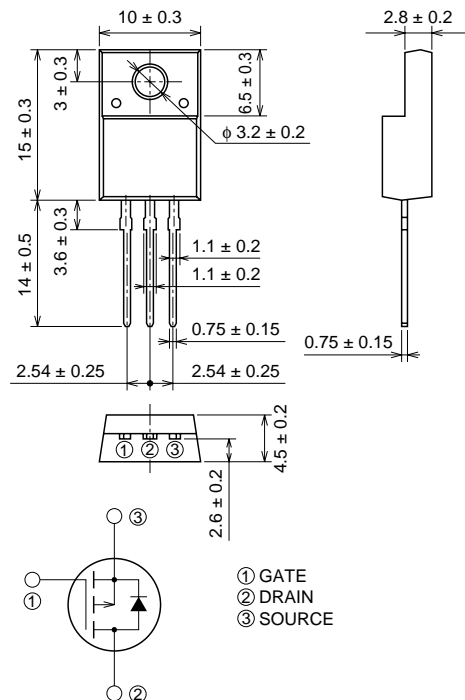
FX50KMJ-06



- 4V DRIVE
- V_{DS} -60V
- $r_{DS(ON)}(MAX)$ 18.9m Ω
- I_D -50A
- 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 | $V_{GS} = 0V$ | -60 | V |
| V_{GSS} | Gate-source voltage | $V_{DS} = 0V$ | ±20 | V |
| I_D | Drain current | | -50 | A |
| I_{DM} | Drain current (Pulsed) | | -200 | A |
| I_{DA} | Avalanche drain current (Pulsed) | $L = 50\mu H$ | -50 | A |
| I_S | Source current | | -50 | A |
| I_{SM} | Source current (Pulsed) | | -200 | 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 |

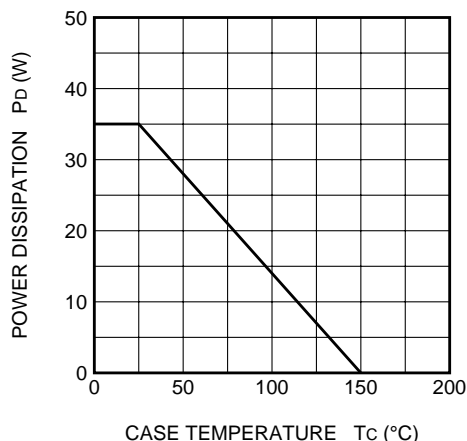
Jan.1999

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

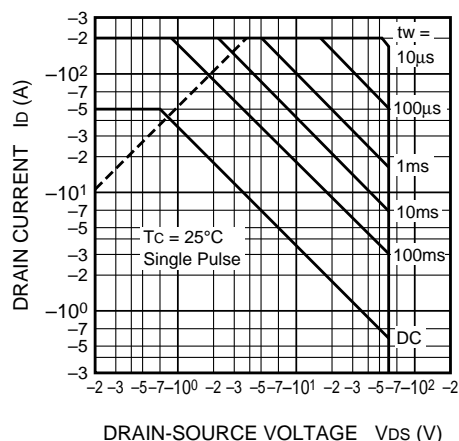
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|----------------|----------------------------------|---|--------|-------|-----------|----------------------|
| | | | Min. | Typ. | Max. | |
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | $I_D = -1\text{mA}$, $V_{GS} = 0\text{V}$ | -60 | — | — | V |
| I_{GSS} | Gate-source leakage current | $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$ | — | — | ± 0.1 | μA |
| I_{DSS} | Drain-source leakage current | $V_{DS} = -60\text{V}$, $V_{GS} = 0\text{V}$ | — | — | -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 | $I_D = -25\text{A}$, $V_{GS} = -10\text{V}$ | — | 15.0 | 18.9 | $\text{m}\Omega$ |
| $r_{DS(on)}$ | Drain-source on-state resistance | $I_D = -25\text{A}$, $V_{GS} = -4\text{V}$ | — | 23 | 32 | $\text{m}\Omega$ |
| $V_{DS(on)}$ | Drain-source on-state voltage | $I_D = -25\text{A}$, $V_{GS} = -10\text{V}$ | — | -0.38 | -0.47 | V |
| $ y_{fs} $ | Forward transfer admittance | $I_D = -25\text{A}$, $V_{DS} = -10\text{V}$ | — | 49 | — | S |
| C_{iss} | Input capacitance | $V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$ | — | 11610 | — | pF |
| C_{oss} | Output capacitance | | — | 1355 | — | pF |
| C_{rss} | Reverse transfer capacitance | | — | 687 | — | pF |
| $t_d(on)$ | Turn-on delay time | $V_{DD} = -30\text{V}$, $I_D = -25\text{A}$, $V_{GS} = -10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$ | — | 73 | — | ns |
| t_r | Rise time | | — | 137 | — | ns |
| $t_d(off)$ | Turn-off delay time | | — | 822 | — | ns |
| t_f | Fall time | | — | 320 | — | ns |
| V_{SD} | Source-drain voltage | $I_S = -25\text{A}$, $V_{GS} = 0\text{V}$ | — | -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 | $I_S = -50\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ | — | 70 | — | ns |

PERFORMANCE CURVES

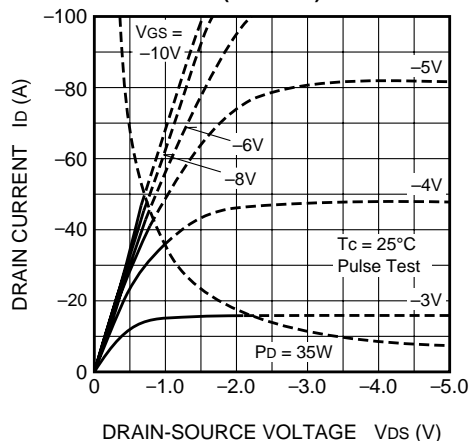
POWER DISSIPATION DERATING CURVE



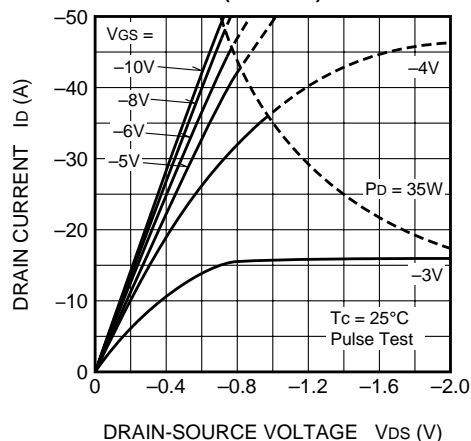
MAXIMUM SAFE OPERATING AREA



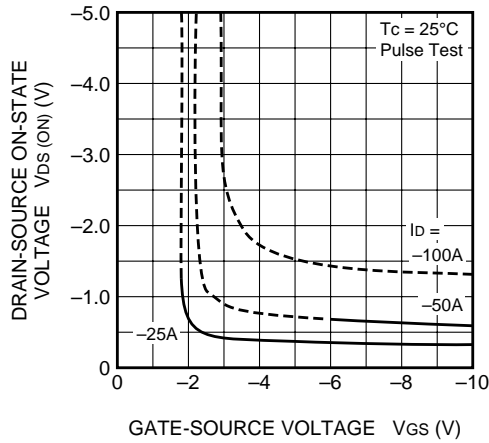
OUTPUT CHARACTERISTICS (TYPICAL)



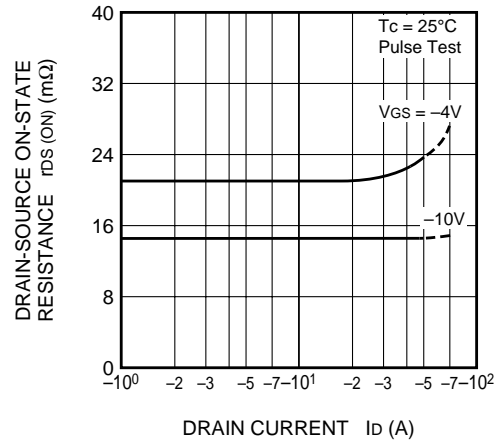
OUTPUT CHARACTERISTICS (TYPICAL)



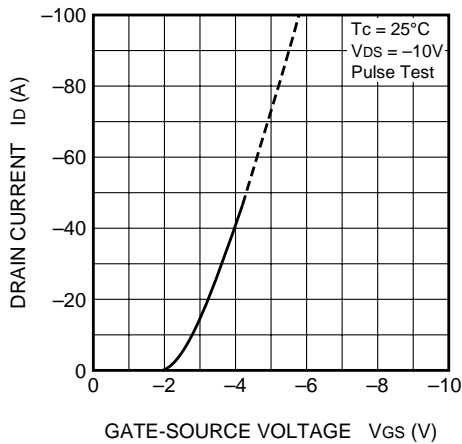
**ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)**



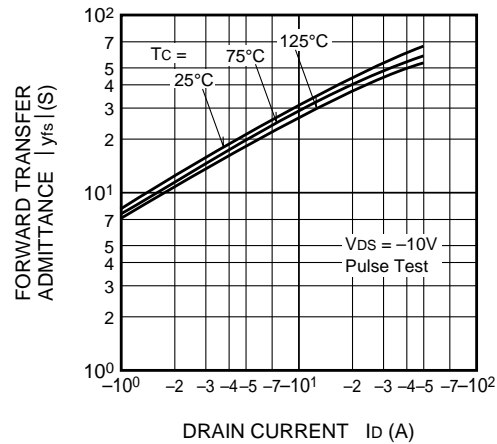
**ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)**



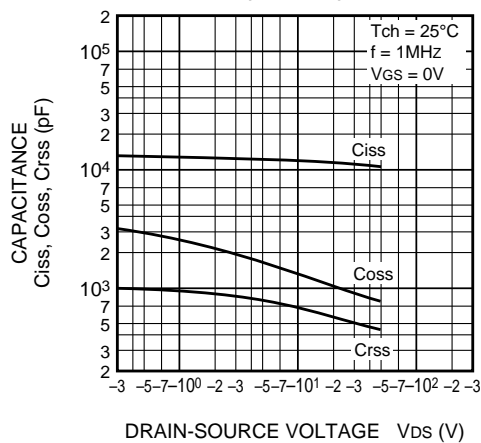
**TRANSFER CHARACTERISTICS
(TYPICAL)**



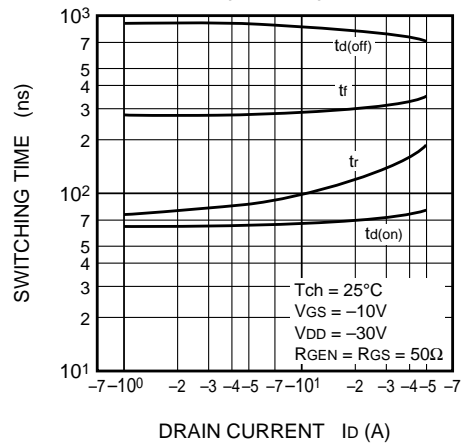
**FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)**



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



**SWITCHING CHARACTERISTICS
(TYPICAL)**



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