MITSUBISHI Nch POWER MOSFET

# FK10KM-9

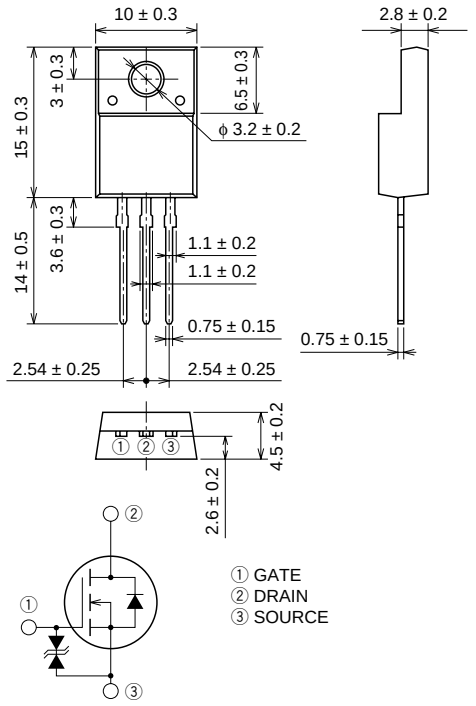
HIGH-SPEED SWITCHING USE

**FK10KM-9**



- $V_{DSS}$ ..... 450V
- $r_{DS\ (ON)}$ (MAX) ..... 0.92Ω
- $I_D$ ..... 10A
- $V_{iso}$ ..... 2000V
- Integrated Fast Recovery Diode (MAX.) ..... 150ns

**OUTLINE DRAWING** Dimensions in mm




**TO-220FN**

## APPLICATION

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

**MAXIMUM RATINGS** ($T_c$ = 25°C)

| Symbol | Parameter | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-source voltage | $V_{GS}$ = 0V | 450 | V |
| $V_{GSS}$ | Gate-source voltage | $V_{DS}$ = 0V | ±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 | | 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 | $V_{rms}$ |
| — | Weight | Typical value | 2.0 | g |



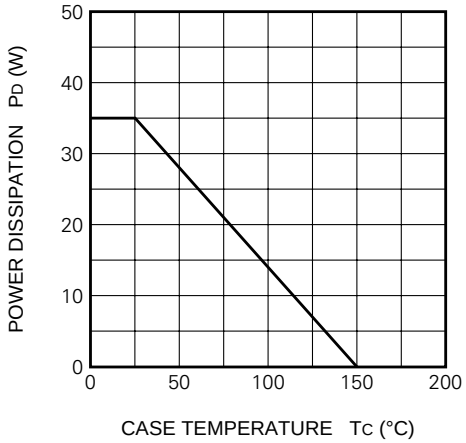
MITSUBISHI ELECTRIC

## ELECTRICAL CHARACTERISTICS (Tch = 25°C)

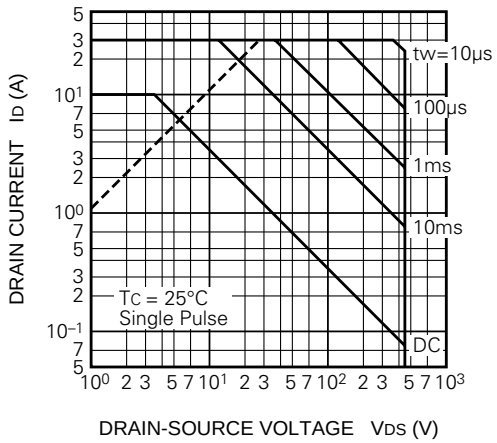
| Symbol | Parameter | Test conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{(BR)\ DSS}$ | Drain-source breakdown voltage | $I_D$ = 1mA, $V_{GS}$ = 0V | 450 | — | — | V |
| $V_{(BR)\ GSS}$ | Gate-source breakdown voltage | $I_G$ = ±100µA, $V_{DS}$ = 0V | ±30 | — | — | V |
| $I_{GSS}$ | Gate-source leakage current | $V_{GS}$ = ±25V, $V_{DS}$ = 0V | — | — | ±10 | µA |
| $I_{DSS}$ | Drain-source leakage current | $V_{DS}$ = 450V, $V_{GS}$ = 0V | — | — | 1 | mA |
| $V_{GS\ (th)}$ | Gate-source threshold voltage | $I_D$ = 1mA, $V_{DS}$ = 10V | 2 | 3 | 4 | V |
| $r_{DS\ (ON)}$ | Drain-source on-state resistance | $I_D$ = 5A, $V_{GS}$ = 10V | — | 0.70 | 0.92 | Ω |
| $V_{DS\ (ON)}$ | Drain-source on-state voltage | $I_D$ = 5A, $V_{GS}$ = 10V | — | 3.50 | 4.60 | V |
| $\lvert y_{fs} \rvert$ | Forward transfer admittance | $I_D$ = 5A, $V_{DS}$ = 10V | 3.3 | 5.5 | — | S |
| $C_{iss}$ | Input capacitance | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1MHz | — | 1100 | — | pF |
| $C_{oss}$ | Output capacitance | | — | 130 | — | pF |
| $C_{rss}$ | Reverse transfer capacitance | | — | 20 | — | pF |
| $t_{d\ (on)}$ | Turn-on delay time | $V_{DD}$ = 200V, $I_D$ = 5A, $V_{GS}$ = 10V, $R_{GEN}$ = $R_{GS}$ = 50Ω | — | 20 | — | ns |
| $t_r$ | Rise time | | — | 30 | — | ns |
| $t_{d\ (off)}$ | Turn-off delay time | | — | 95 | — | ns |
| $t_f$ | Fall time | | — | 35 | — | ns |
| $V_{SD}$ | Source-drain voltage | $I_S$ = 5A, $V_{GS}$ = 0V | — | 1.5 | 2.0 | V |
| $R_{th\ (ch-c)}$ | Thermal resistance | Channel to case | — | — | 3.57 | °C/W |
| $t_{rr}$ | Reverse recovery time | $I_S$ = 10A, $di_S/dt$ = –100A/µs | — | — | 150 | ns |

## PERFORMANCE CURVES

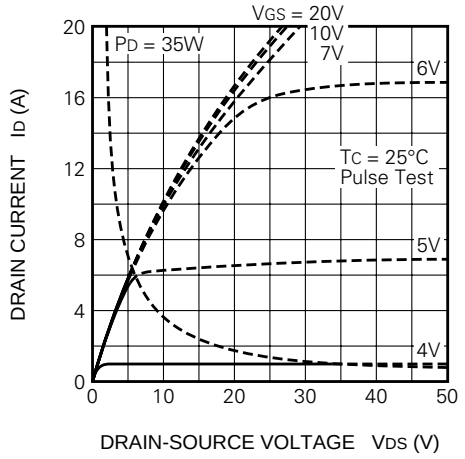
**POWER DISSIPATION DERATING CURVE**



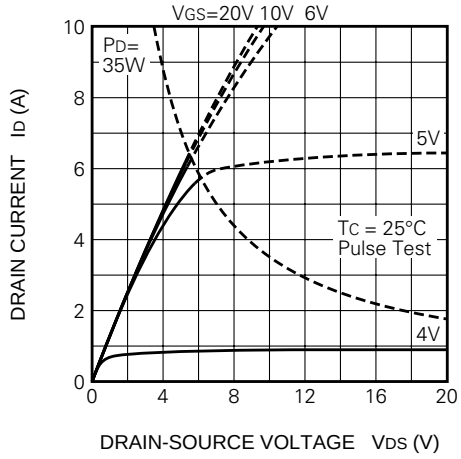

**MAXIMUM SAFE OPERATING AREA**



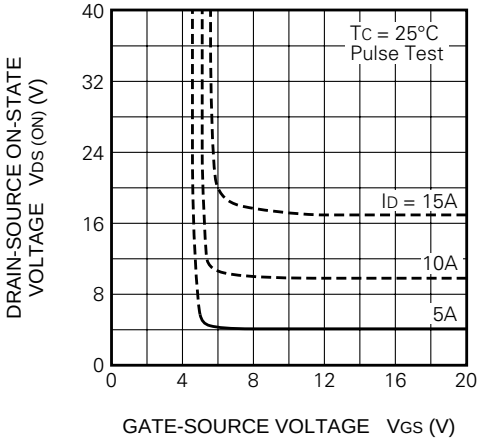
**OUTPUT CHARACTERISTICS (TYPICAL)**



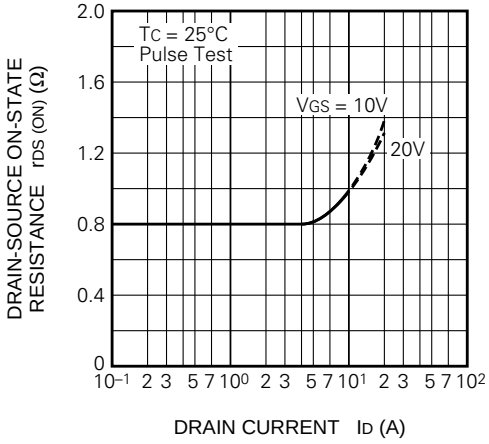

**OUTPUT CHARACTERISTICS (TYPICAL)**



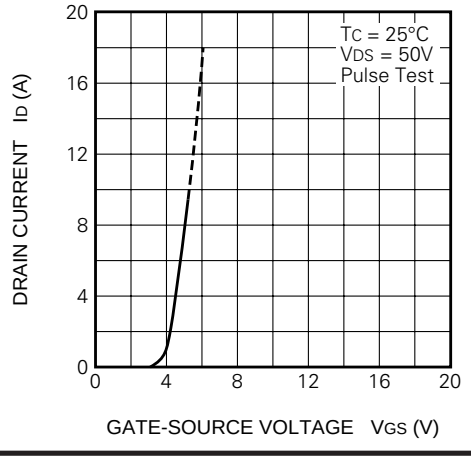

**ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)**



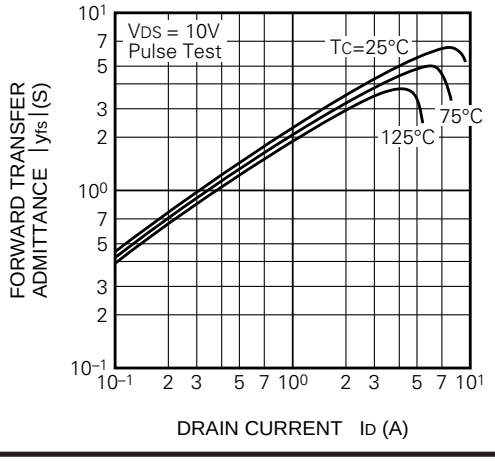

**ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)**



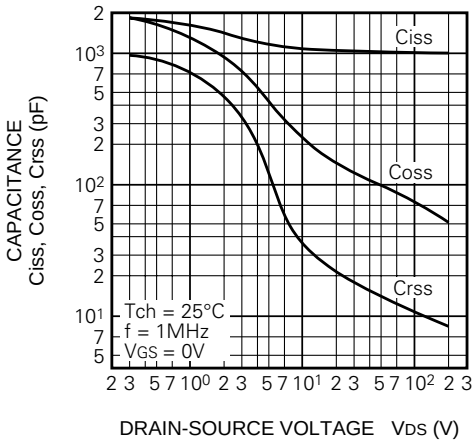

**TRANSFER CHARACTERISTICS (TYPICAL)**



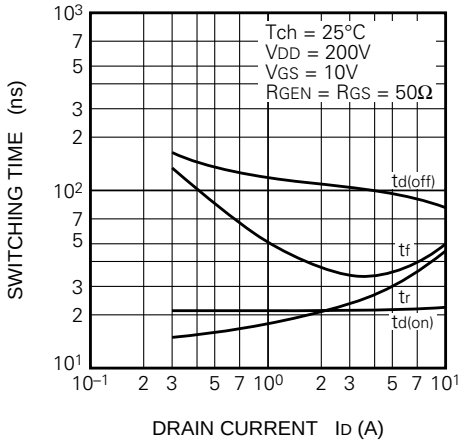

**FORWARD TRANSFER ADMITTANCE VS.DRAIN CURRENT (TYPICAL)**



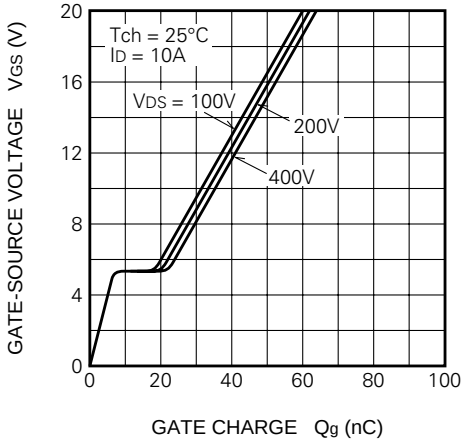
**CAPACITANCE VS. DRAIN-SOURCE VOLTAGE (TYPICAL)**



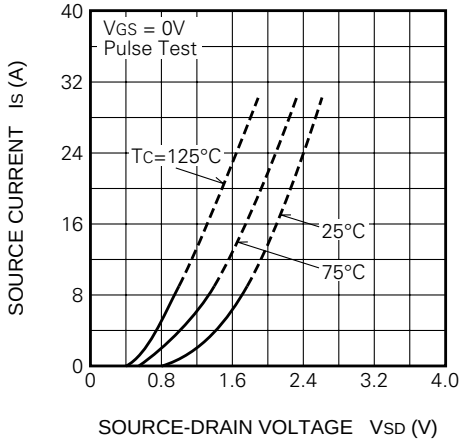

**SWITCHING CHARACTERISTICS (TYPICAL)**



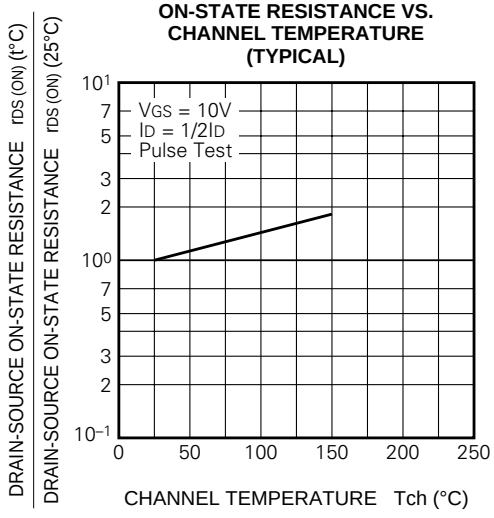

**GATE-SOURCE VOLTAGE VS.GATE CHARGE (TYPICAL)**



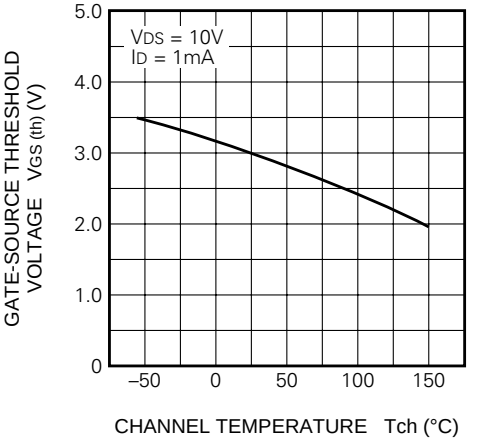

**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**



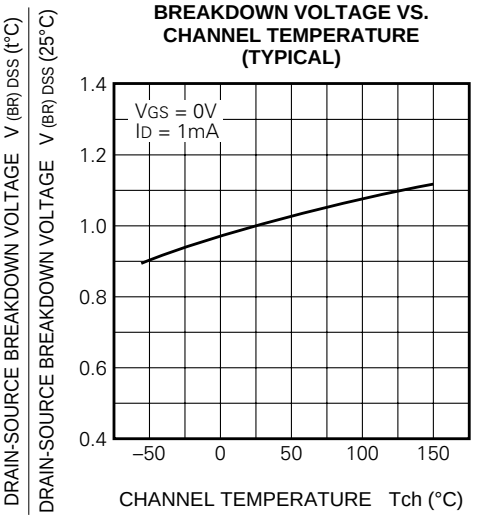

**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**



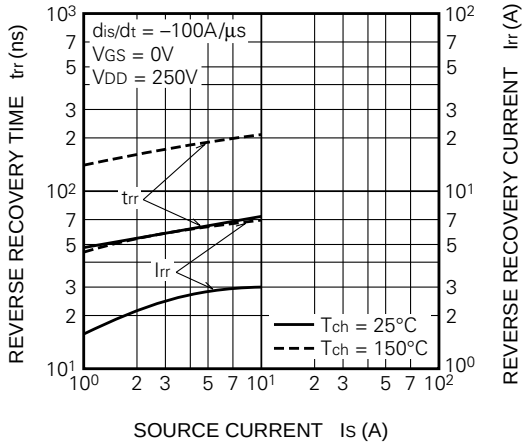

**THRESHOLD VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**



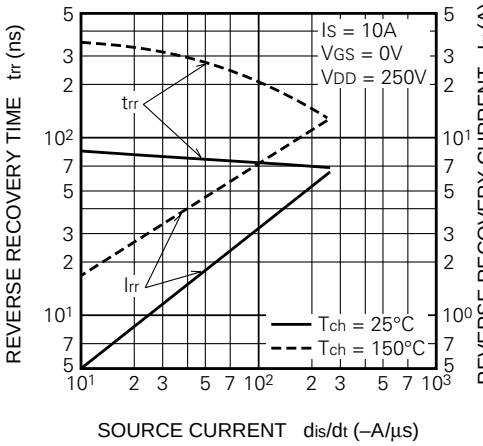
**BREAKDOWN VOLTAGE VS. CHANNEL TEMPERATURE (TYPICAL)**




**DIODE REVERSE VS. SOURCE CURRENT CHARACTERISTIC (TYPICAL)**




**DIODE REVERSE VS. SOURCE CURRENT dis/dt CHARACTERISTIC (TYPICAL)**




**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

