

# FS10KMJ-2

HIGH-SPEED SWITCHING USE

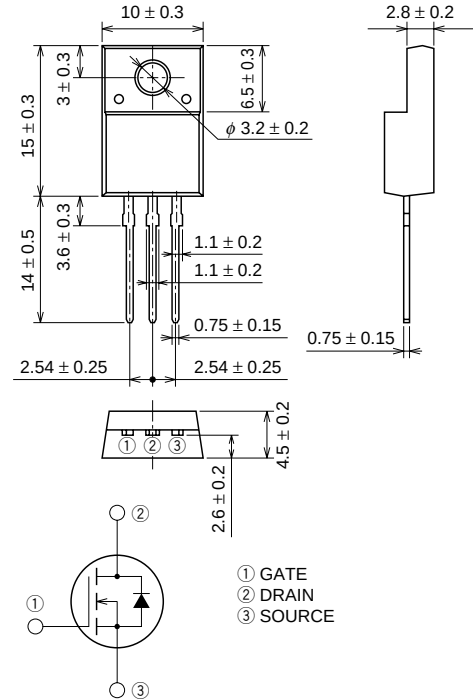
## FS10KMJ-2



- 4V DRIVE
- $V_{DS}$  ..... 100V
- $r_{DS(ON)}$  (MAX) .....  $0.19\Omega$
- $I_D$  ..... 10A
- Integrated Fast Recovery Diode (TYP.) ..... 95ns
- $V_{iso}$  ..... 2000V

## OUTLINE DRAWING

Dimensions in mm



TO-220FN

## APPLICATION

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

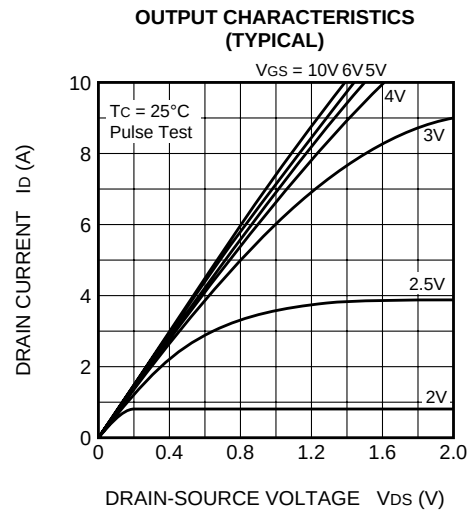
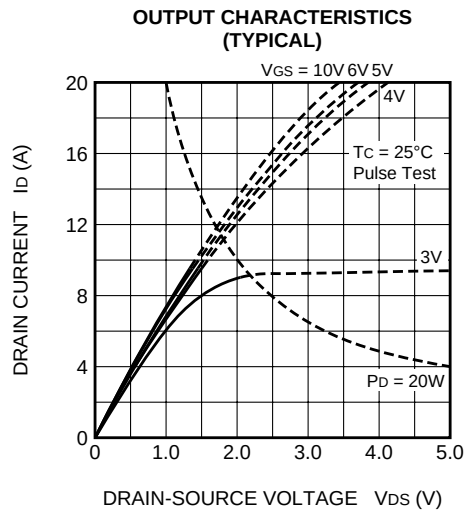
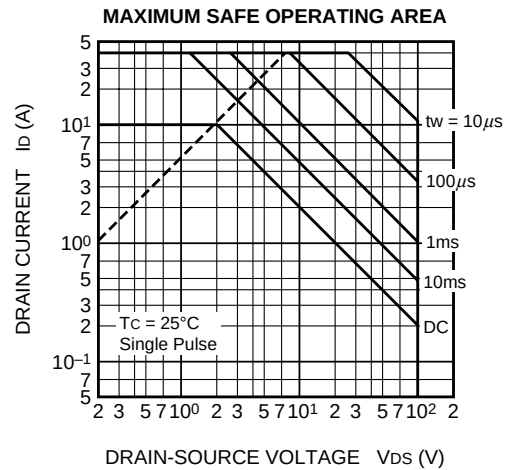
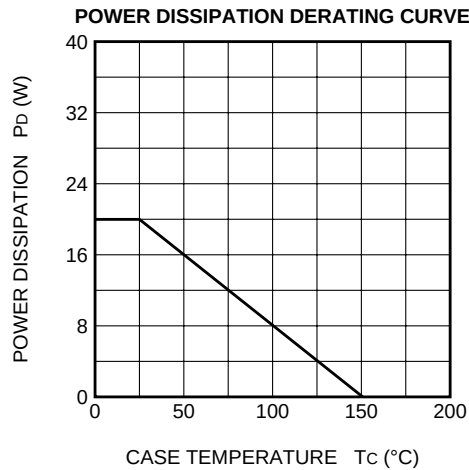
## MAXIMUM RATINGS (Tc = 25°C)

| Symbol    | Parameter                        | Conditions                       | Ratings         | Unit |
|-----------|----------------------------------|----------------------------------|-----------------|------|
| $V_{DS}$  | Drain-source voltage             | $V_{GS} = 0V$                    | 100             | V    |
| $V_{GS}$  | 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              |                                  | $-55 \sim +150$ | °C   |
| $T_{stg}$ | Storage temperature              |                                  | $-55 \sim +150$ | °C   |
| $V_{iso}$ | Isolation voltage                | AC for 1minute, Terminal to case | 2000            | V    |
| —         | Weight                           | Typical value                    | 2.0             | g    |

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

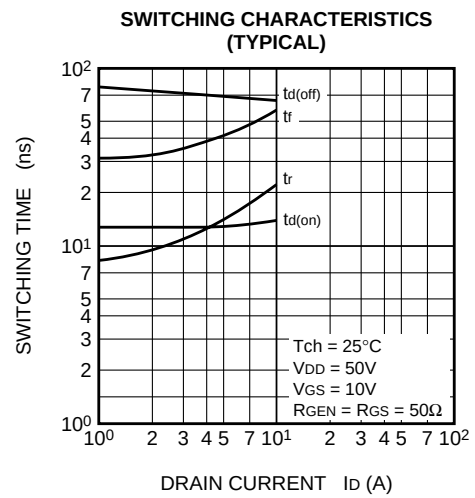
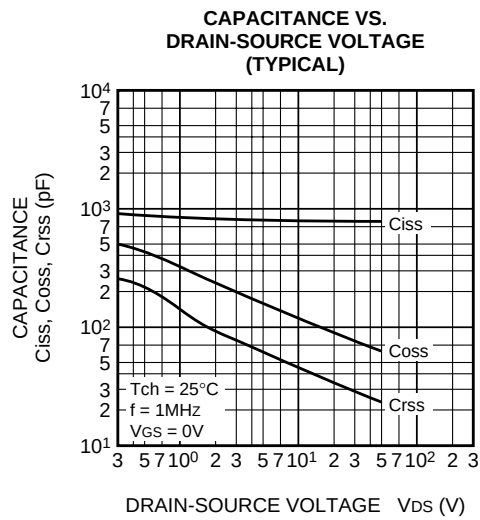
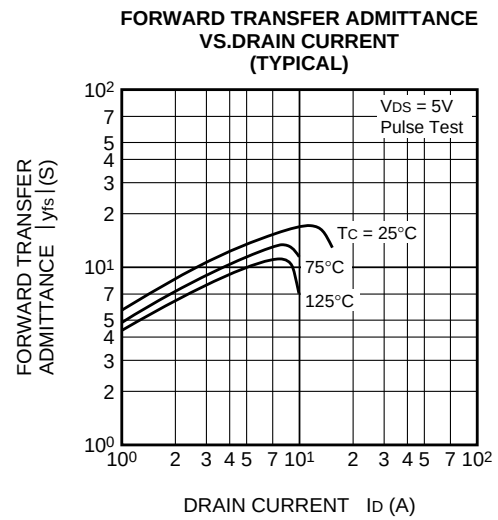
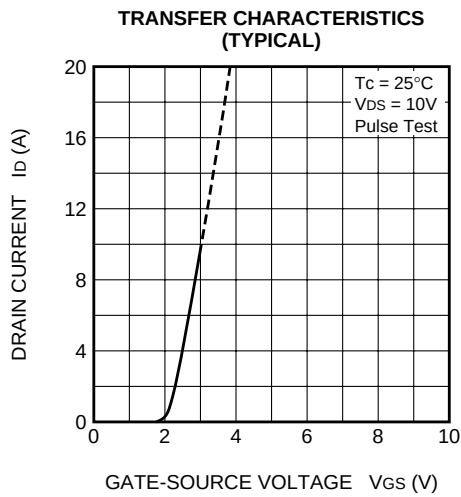
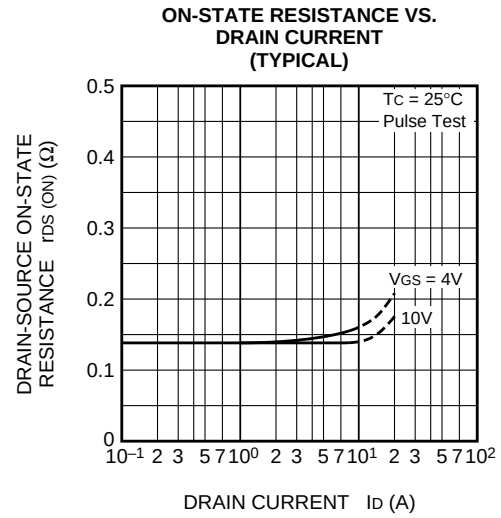
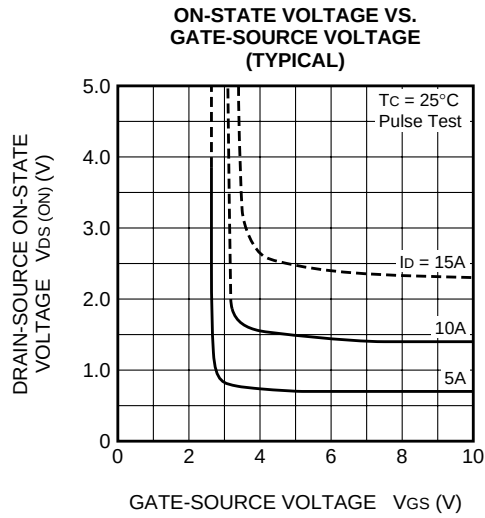
| Symbol                | Parameter                        | Test conditions                                                                                             | Limits |      |      | Unit |
|-----------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|--------|------|------|------|
|                       |                                  |                                                                                                             | Min.   | Typ. | Max. |      |
| V <sub>(BR)DSS</sub>  | Drain-source breakdown voltage   | I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V                                                                  | 100    | —    | —    | V    |
| I <sub>GSS</sub>      | Gate-source leakage current      | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                | —      | —    | ±0.1 | μA   |
| I <sub>DSS</sub>      | Drain-source leakage current     | V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V                                                                | —      | —    | 0.1  | mA   |
| V <sub>GS(th)</sub>   | Gate-source threshold voltage    | I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V                                                                 | 1.0    | 1.5  | 2.0  | V    |
| r <sub>DS(on)</sub>   | Drain-source on-state resistance | I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V                                                                  | —      | 0.14 | 0.19 | Ω    |
| r <sub>DS(on)</sub>   | Drain-source on-state resistance | I <sub>D</sub> = 5A, V <sub>GS</sub> = 4V                                                                   | —      | 0.16 | 0.21 | Ω    |
| V <sub>DS(on)</sub>   | Drain-source on-state voltage    | I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V                                                                  | —      | 0.70 | 0.95 | V    |
| y <sub>fs</sub>       | Forward transfer admittance      | I <sub>D</sub> = 5A, V <sub>DS</sub> = 5V                                                                   | —      | 13   | —    | S    |
| C <sub>iss</sub>      | Input capacitance                | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz                                                       | —      | 800  | —    | pF   |
| C <sub>oss</sub>      | Output capacitance               |                                                                                                             | —      | 125  | —    | pF   |
| C <sub>rss</sub>      | Reverse transfer capacitance     |                                                                                                             | —      | 45   | —    | pF   |
| t <sub>d(on)</sub>    | Turn-on delay time               | V <sub>DD</sub> = 50V, I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω | —      | 14   | —    | ns   |
| t <sub>r</sub>        | Rise time                        |                                                                                                             | —      | 15   | —    | ns   |
| t <sub>d(off)</sub>   | Turn-off delay time              |                                                                                                             | —      | 65   | —    | ns   |
| t <sub>f</sub>        | Fall time                        |                                                                                                             | —      | 40   | —    | ns   |
| V <sub>SD</sub>       | Source-drain voltage             | I <sub>S</sub> = 5A, V <sub>GS</sub> = 0V                                                                   | —      | 1.0  | 1.5  | V    |
| R <sub>th(ch-c)</sub> | Thermal resistance               | Channel to case                                                                                             | —      | —    | 6.25 | °C/W |
| t <sub>rr</sub>       | Reverse recovery time            | I <sub>S</sub> = 10A, di <sub>S</sub> /dt = -100A/μs                                                        | —      | 95   | —    | ns   |

PERFORMANCE CURVES

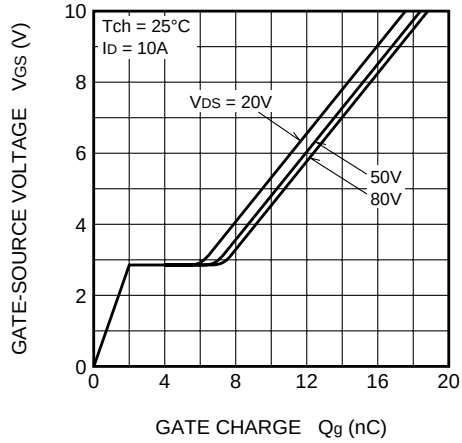


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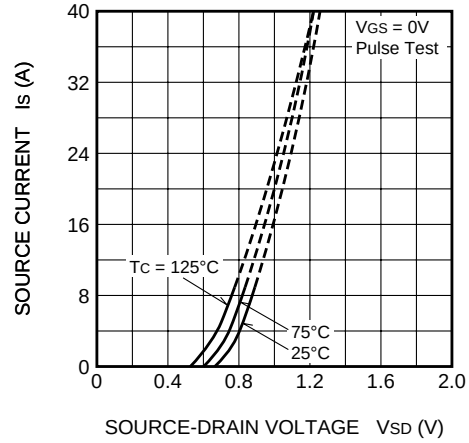
## HIGH-SPEED SWITCHING USE



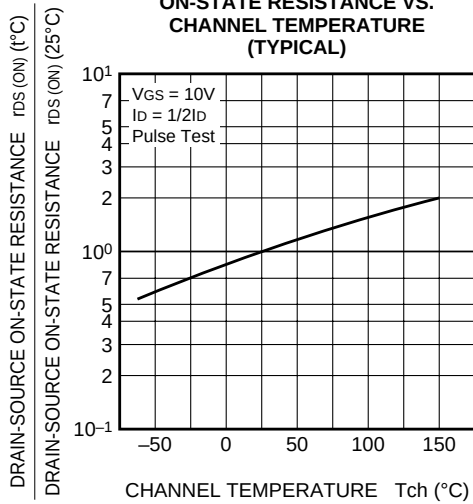
GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)



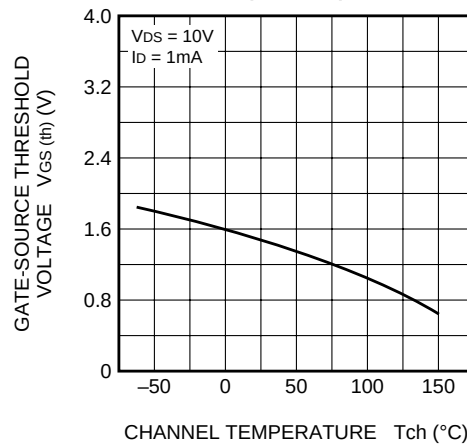
SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



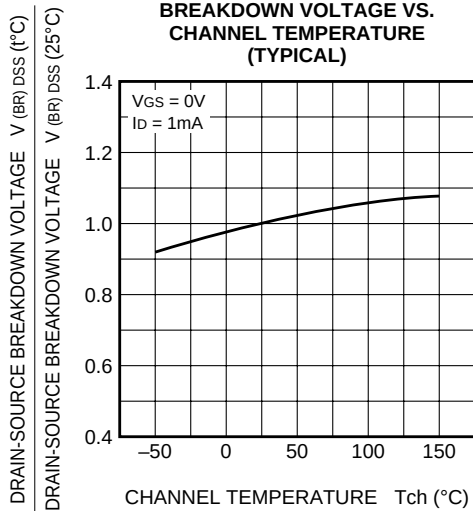
ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



THRESHOLD VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



BREAKDOWN VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS

