


# FS5UM-10

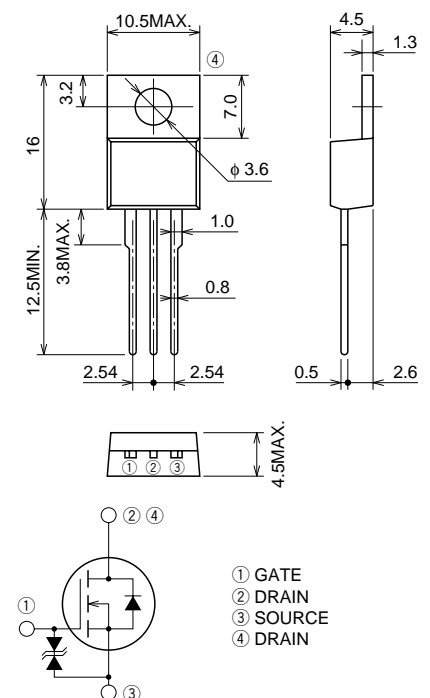
HIGH-SPEED SWITCHING USE

**FS5UM-10**



- $V_{DSS}$  ..... 500V
- $r_{DS(ON)}$  (MAX) .....  $1.8\Omega$
- $I_D$  ..... 5A

**OUTLINE DRAWING** Dimensions in mm



① GATE  
② DRAIN  
③ SOURCE  
④ DRAIN

**TO-220**

**APPLICATION**

SMPS, DC-DC Converter, battery charger, power supply of printer, copier, HDD, FDD, TV, VCR, personal computer etc.

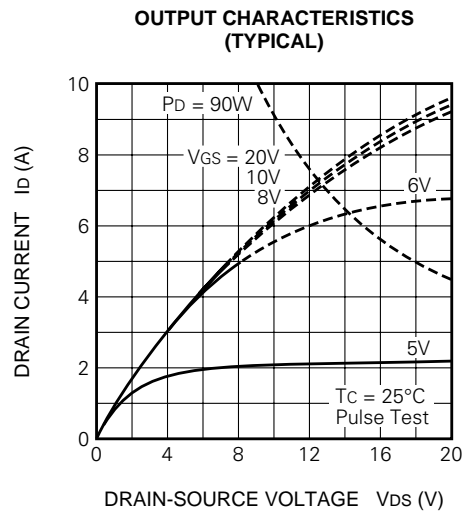
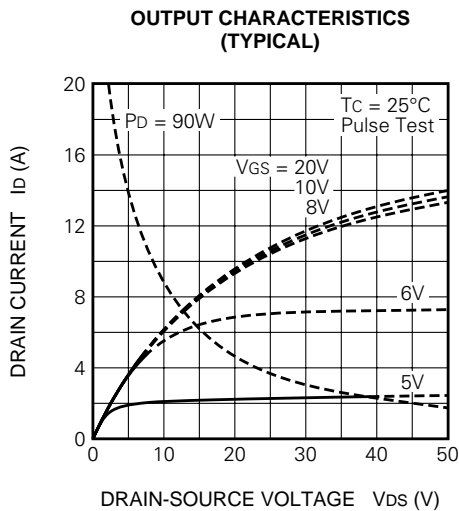
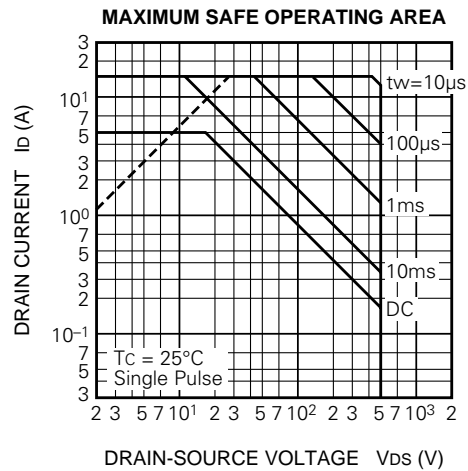
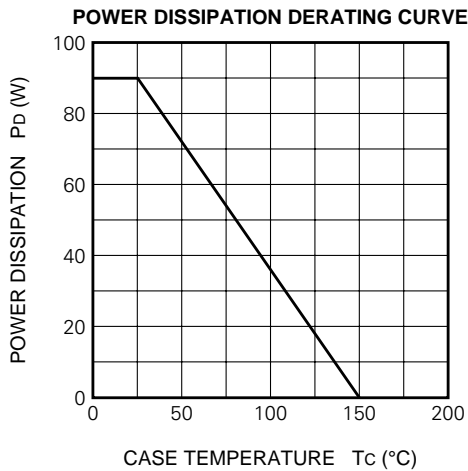
**MAXIMUM RATINGS** ( $T_c = 25^\circ\text{C}$ )

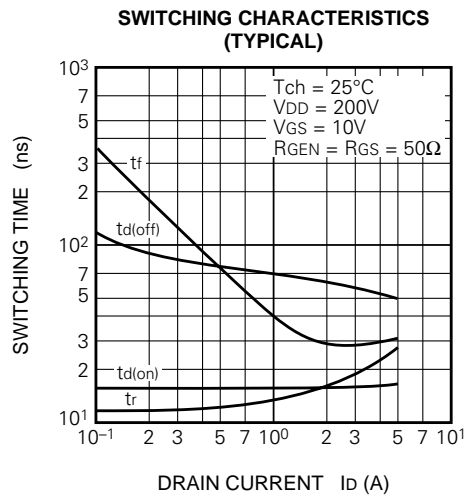
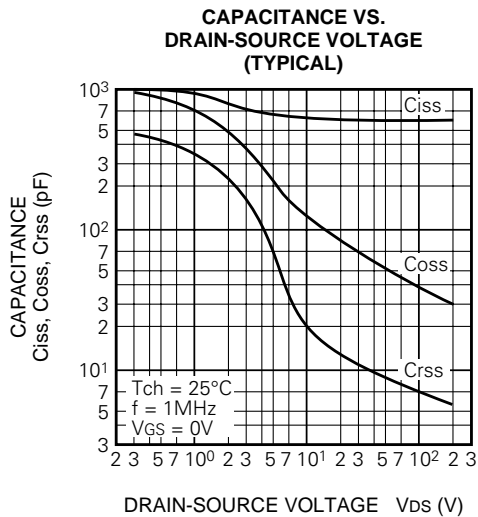
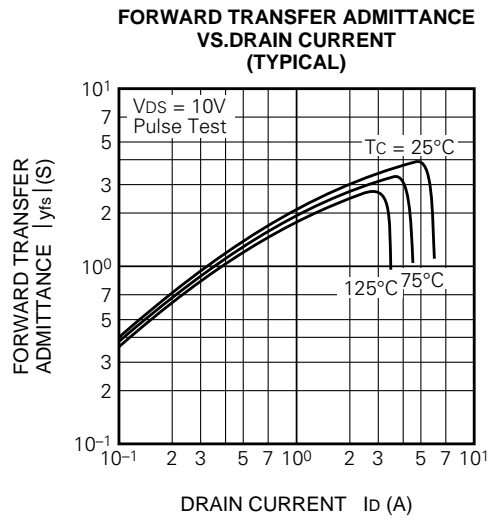
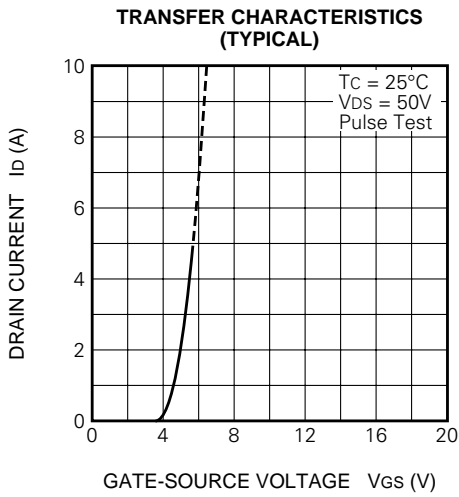
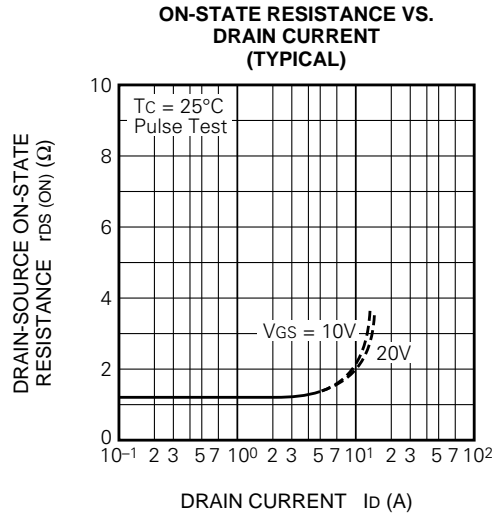
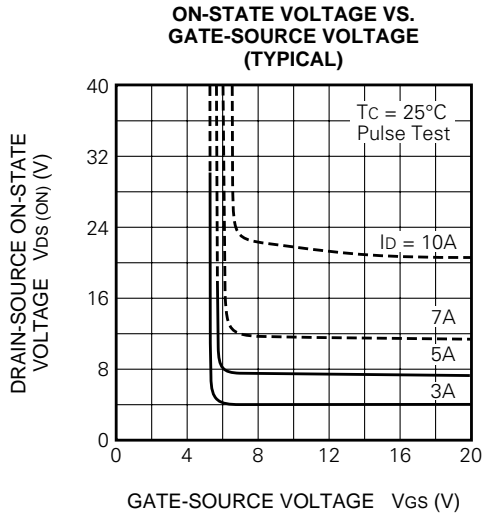
| Symbol    | Parameter                 | Conditions    | Ratings         | Unit             |
|-----------|---------------------------|---------------|-----------------|------------------|
| $V_{DSS}$ | Drain-source voltage      | $V_{GS} = 0V$ | 500             | V                |
| $V_{GSS}$ | Gate-source voltage       | $V_{DS} = 0V$ | $\pm 30$        | V                |
| $I_D$     | Drain current             |               | 5               | A                |
| $I_{DM}$  | Drain current (Pulsed)    |               | 15              | A                |
| $P_D$     | Maximum power dissipation |               | 90              | W                |
| $T_{ch}$  | Channel temperature       |               | $-55 \sim +150$ | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature       |               | $-55 \sim +150$ | $^\circ\text{C}$ |
| —         | Weight                    | Typical value | 2.0             | g                |

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

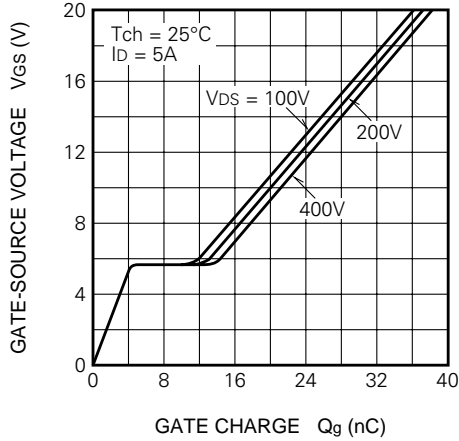
| Symbol                 | Parameter                        | Test conditions  | Limits |      |      | Unit |
|------------------------|----------------------------------|--|--------|------|------|------|
|                        |                                  |  | Min.   | Typ. | Max. |      |
| V (BR) DSS             | Drain-source breakdown voltage   | I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V   | 500    | —    | —    | V    |
| V (BR) GSS             | Gate-source breakdown voltage    | I <sub>G</sub> = ±100μA, V <sub>DS</sub> = 0V  | ±30    | —    | —    | V    |
| I <sub>GSS</sub>       | Gate-source leakage current      | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V   | —      | —    | ±10  | μA   |
| I <sub>DSS</sub>       | Drain-source leakage current     | V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V   | —      | —    | 1    | mA   |
| V <sub>GS</sub> (th)   | Gate-source threshold voltage    | I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V  | 2      | 3    | 4    | V    |
| r <sub>DS</sub> (ON)   | Drain-source on-state resistance | I <sub>D</sub> = 2A, V <sub>GS</sub> = 10V   | —      | 1.4  | 1.8  | Ω    |
| V <sub>DS</sub> (ON)   | Drain-source on-state voltage    | I <sub>D</sub> = 2A, V <sub>GS</sub> = 10V   | —      | 2.8  | 3.6  | V    |
| y <sub>fs</sub>        | Forward transfer admittance      | I <sub>D</sub> = 2A, V <sub>DS</sub> = 10V   | 1.8    | 3.0  | —    | S    |
| C <sub>iss</sub>       | Input capacitance                | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz  | —      | 600  | —    | pF   |
| C <sub>oss</sub>       | Output capacitance               |  | —      | 80   | —    | pF   |
| C <sub>rss</sub>       | Reverse transfer capacitance     |  | —      | 12   | —    | pF   |
| t <sub>d</sub> (on)    | Turn-on delay time               | V <sub>DD</sub> = 200V, I <sub>D</sub> = 2A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω | —      | 15   | —    | ns   |
| t <sub>r</sub>         | Rise time                        |  | —      | 15   | —    | ns   |
| t <sub>d</sub> (off)   | Turn-off delay time              |  | —      | 60   | —    | ns   |
| t <sub>f</sub>         | Fall time                        |  | —      | 30   | —    | ns   |
| V <sub>SD</sub>        | Source-drain voltage             | I <sub>S</sub> = 2A, V <sub>GS</sub> = 0V  | —      | 1.5  | 2.0  | V    |
| R <sub>th</sub> (ch-c) | Thermal resistance               | Channel to case  | —      | —    | 1.39 | °C/W |

**PERFORMANCE CURVES**

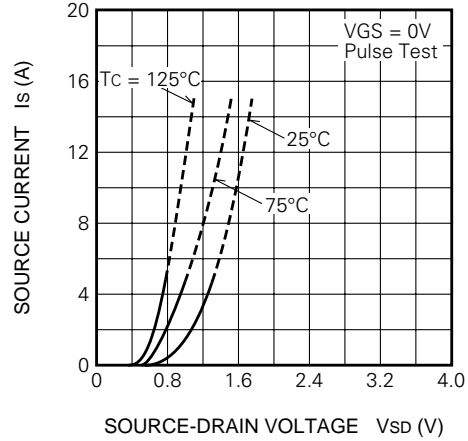




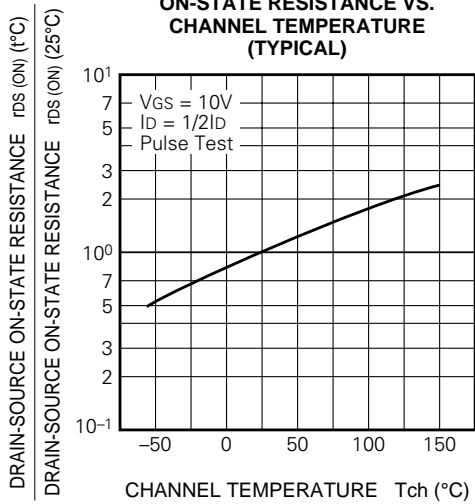
**GATE-SOURCE VOLTAGE VS. GATE CHARGE (TYPICAL)**



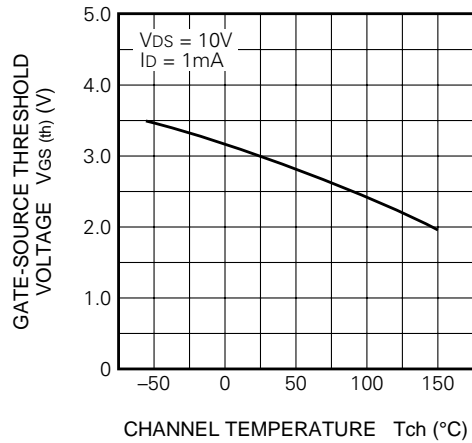
**SOURCE-DRAIN DIODE FORWARD CHARACTERISTICS (TYPICAL)**



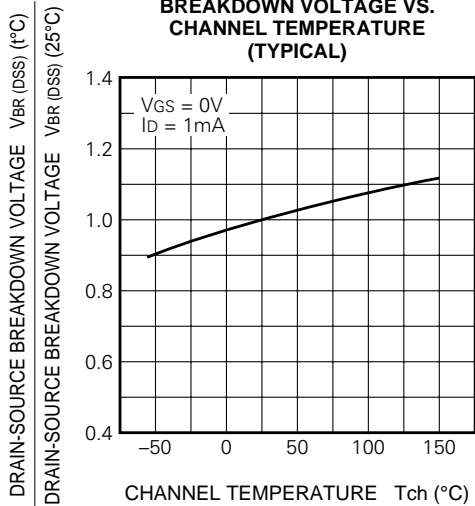
**ON-STATE RESISTANCE VS. CHANNEL TEMPERATURE (TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

