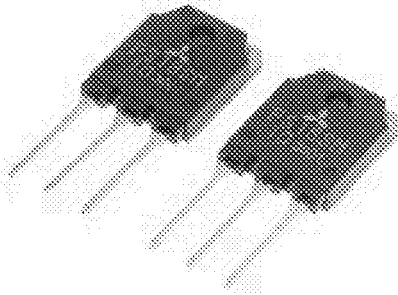


# FS18SM-10

HIGH-SPEED SWITCHING USE

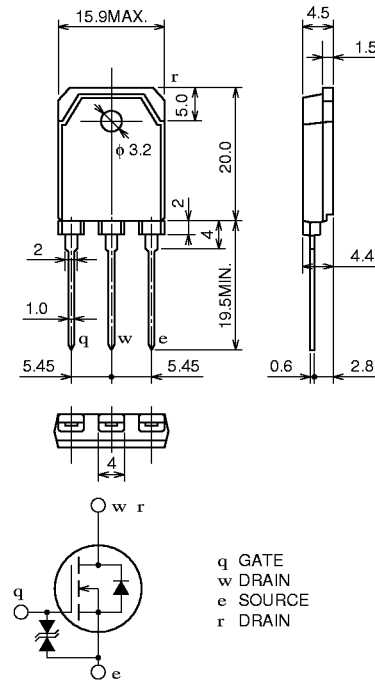
## FS18SM-10



|                            |               |
|----------------------------|---------------|
| • $V_{DS}$ .....           | 500V          |
| • $r_{DS(ON)}$ (MAX) ..... | 0.40 $\Omega$ |
| • $I_D$ .....              | 18A           |

## OUTLINE DRAWING

Dimensions in mm



TO-3P

## 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             |
|-----------|---------------------------|---------------|-----------------|------------------|
| $V_{DS}$  | Drain-source voltage      | $V_{GS} = 0V$ | 500             | V                |
| $V_{GS}$  | Gate-source voltage       | $V_{DS} = 0V$ | $\pm 30$        | V                |
| $I_D$     | Drain current             |               | 18              | A                |
| $I_{DM}$  | Drain current (Pulsed)    |               | 54              | A                |
| $P_D$     | Maximum power dissipation |               | 250             | W                |
| $T_{ch}$  | Channel temperature       |               | $-55 \sim +150$ | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature       |               | $-55 \sim +150$ | $^\circ\text{C}$ |
| —         | Weight                    | Typical value | 4.8             | g                |

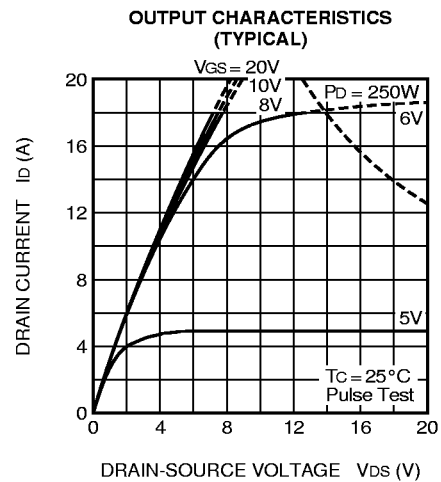
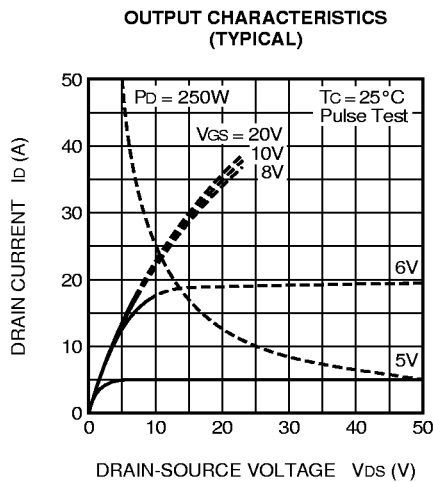
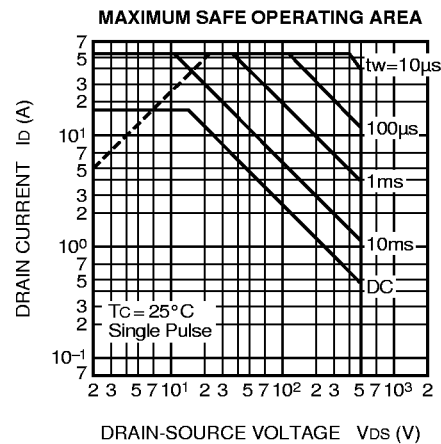
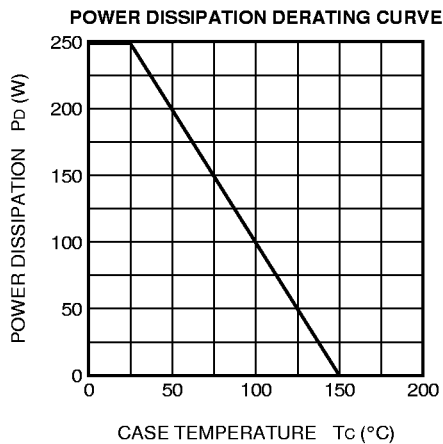
## FS18SM-10

## HIGH-SPEED SWITCHING USE

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> = 1 mA, V <sub>GS</sub> = 0 V                                                                     | 500    | —    | —    | V    |
| V <sub>(BR) GSS</sub> | Gate-source breakdown voltage    | I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0 V                                                                  | ±30    | —    | —    | V    |
| I <sub>GSS</sub>      | Gate-source leakage current      | V <sub>GS</sub> = ±25 V, V <sub>DS</sub> = 0 V                                                                   | —      | —    | ±10  | μA   |
| I <sub>DSS</sub>      | Drain-source leakage current     | V <sub>DS</sub> = 500 V, V <sub>GS</sub> = 0 V                                                                   | —      | —    | 1    | mA   |
| V <sub>GS(th)</sub>   | Gate-source threshold voltage    | I <sub>D</sub> = 1 mA, V <sub>DS</sub> = 10 V                                                                    | 2      | 3    | 4    | V    |
| r <sub>DS(on)</sub>   | Drain-source on-state resistance | I <sub>D</sub> = 9 A, V <sub>GS</sub> = 10 V                                                                     | —      | 0.30 | 0.40 | Ω    |
| V <sub>DS(on)</sub>   | Drain-source on-state voltage    | I <sub>D</sub> = 9 A, V <sub>GS</sub> = 10 V                                                                     | —      | 2.7  | 3.6  | V    |
| y <sub>fs</sub>       | Forward transfer admittance      | I <sub>D</sub> = 9 A, V <sub>DS</sub> = 10 V                                                                     | 7.0    | 10.0 | —    | S    |
| C <sub>iss</sub>      | Input capacitance                | V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz                                                         | —      | 2200 | —    | pF   |
| C <sub>oss</sub>      | Output capacitance               |                                                                                                                  | —      | 300  | —    | pF   |
| C <sub>rss</sub>      | Reverse transfer capacitance     |                                                                                                                  | —      | 45   | —    | pF   |
| t <sub>d(on)</sub>    | Turn-on delay time               | V <sub>DD</sub> = 200 V, I <sub>D</sub> = 9 A, V <sub>GS</sub> = 10 V, R <sub>GEN</sub> = R <sub>GS</sub> = 50 Ω | —      | 40   | —    | ns   |
| t <sub>r</sub>        | Rise time                        |                                                                                                                  | —      | 80   | —    | ns   |
| t <sub>d(off)</sub>   | Turn-off delay time              |                                                                                                                  | —      | 200  | —    | ns   |
| t <sub>f</sub>        | Fall time                        |                                                                                                                  | —      | 80   | —    | ns   |
| V <sub>SD</sub>       | Source-drain voltage             | I <sub>S</sub> = 9 A, V <sub>GS</sub> = 0 V                                                                      | —      | 1.5  | 2.0  | V    |
| R <sub>th(ch-c)</sub> | Thermal resistance               | Channel to case                                                                                                  | —      | —    | 0.50 | °C/W |

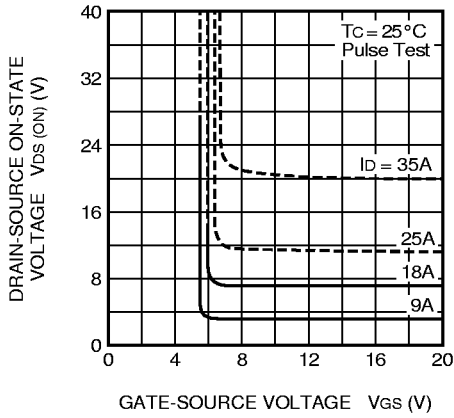
## PERFORMANCE CURVES



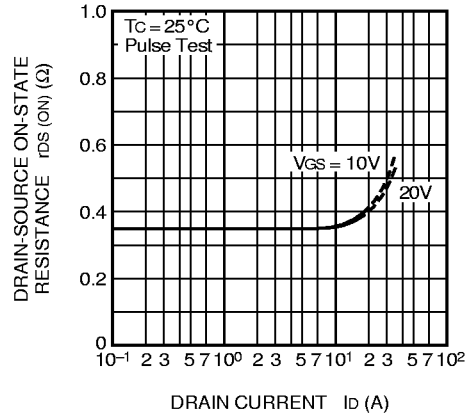
# FS18SM-10

## HIGH-SPEED SWITCHING USE

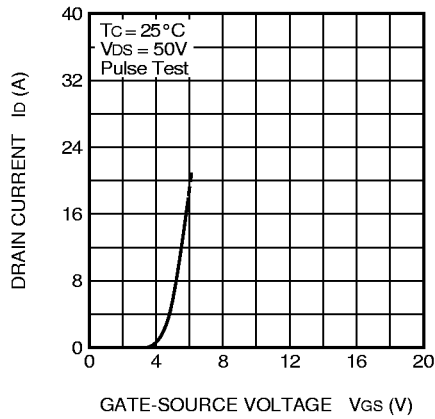
ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)



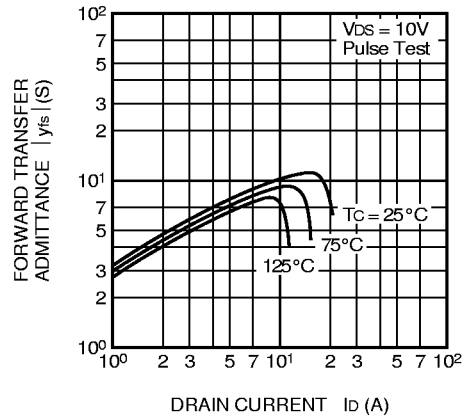
ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)



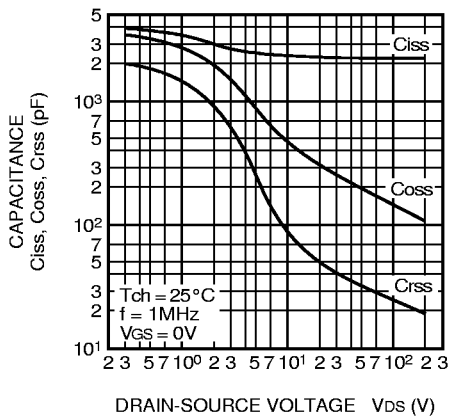
TRANSFER CHARACTERISTICS  
(TYPICAL)



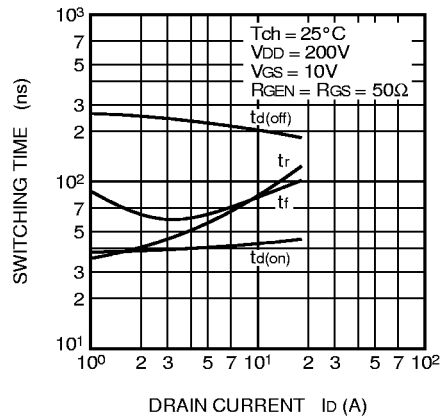
FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)



CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)



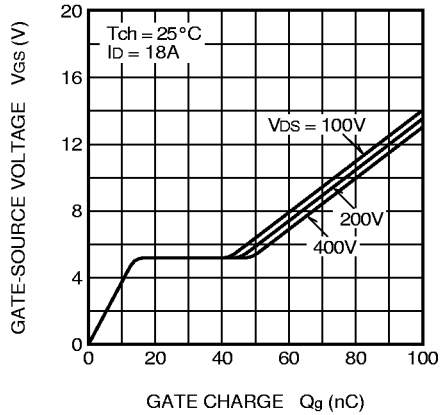
SWITCHING CHARACTERISTICS  
(TYPICAL)



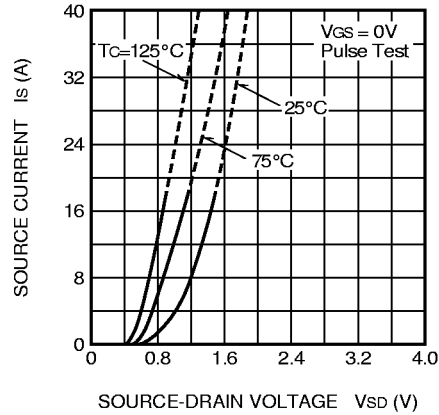
# FS18SM-10

## HIGH-SPEED SWITCHING USE

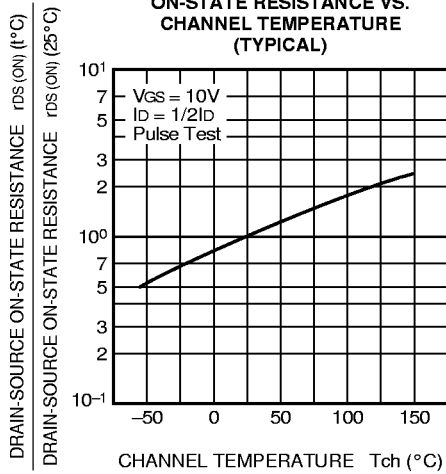
**GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)**



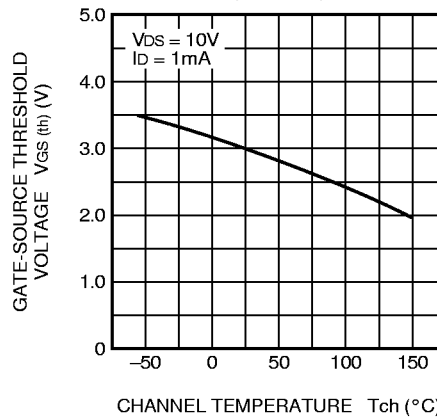
**SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)**



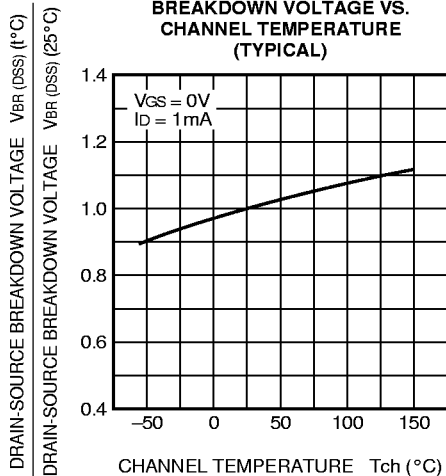
**ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS**

