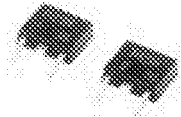


# FS5ASH-2

HIGH-SPEED SWITCHING USE

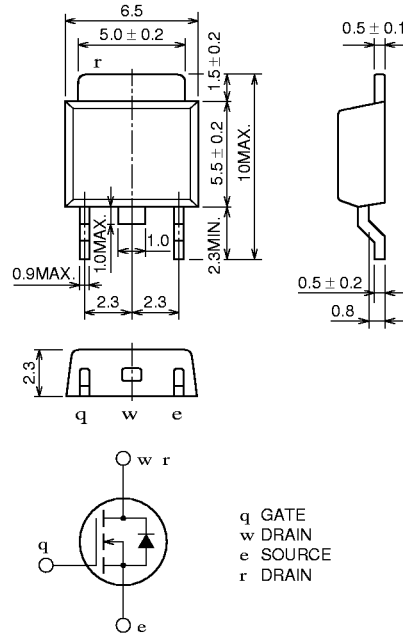
## FS5ASH-2



- ˆ 2.5V DRIVE
- ˆ  $V_{DS}$  ..... 100V
- ˆ  $r_{DS(ON)}$  (MAX) .....  $0.44\Omega$
- ˆ  $I_D$  ..... 5A
- ˆ Integrated Fast Recovery Diode (TYP.) ..... 80ns

## OUTLINE DRAWING

Dimensions in mm



MP-3

## APPLICATION

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

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

| Symbol    | Parameter                        | Conditions     | Ratings         | Unit             |
|-----------|----------------------------------|----------------|-----------------|------------------|
| $V_{DS}$  | Drain-source voltage             | $V_{GS} = 0V$  | 100             | V                |
| $V_{GSS}$ | Gate-source voltage              | $V_{DS} = 0V$  | $\pm 10$        | V                |
| $I_D$     | Drain current                    |                | 5               | A                |
| $I_{DM}$  | Drain current (Pulsed)           |                | 20              | A                |
| $I_{DA}$  | Avalanche drain current (Pulsed) | $L = 100\mu H$ | 5               | A                |
| $I_S$     | Source current                   |                | 5               | A                |
| $I_{SM}$  | Source current (Pulsed)          |                | 20              | A                |
| $P_D$     | Maximum power dissipation        |                | 20              | W                |
| $T_{ch}$  | Channel temperature              |                | $-55 \sim +150$ | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature              |                | $-55 \sim +150$ | $^\circ\text{C}$ |
| —         | Weight                           | Typical value  | 0.26            | g                |

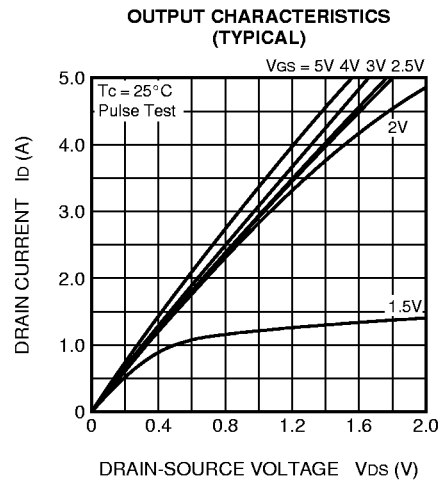
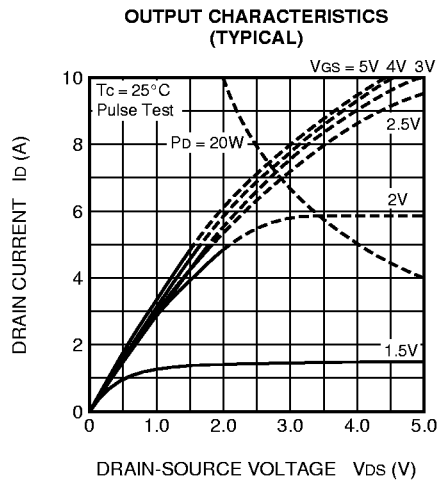
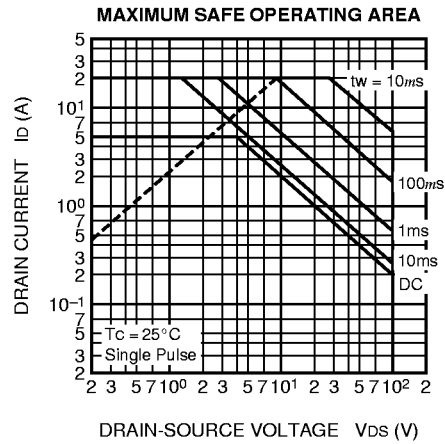
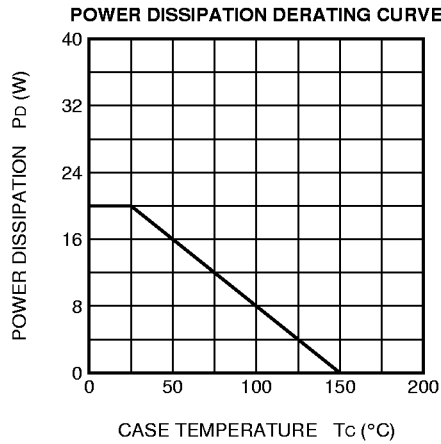
# FS5ASH-2

## 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> = 1mA, V <sub>GS</sub> = 0V                                                                 | 100    | —    | —    | V    |
| I <sub>GSS</sub>      | Gate-source leakage current      | V <sub>GS</sub> = ±10V, 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                                                                | 0.6    | 0.9  | 1.2  | V    |
| r <sub>DS(ON)</sub>   | Drain-source on-state resistance | I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V                                                                  | —      | 0.32 | 0.44 | Ω    |
| r <sub>DS(ON)</sub>   | Drain-source on-state resistance | I <sub>D</sub> = 2A, V <sub>GS</sub> = 2.5V                                                                | —      | 0.34 | 0.47 | Ω    |
| V <sub>DS(ON)</sub>   | Drain-source on-state voltage    | I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V                                                                  | —      | 0.64 | 0.88 | V    |
| y <sub>fs</sub>       | Forward transfer admittance      | I <sub>D</sub> = 2A, V <sub>DS</sub> = 5V                                                                  | —      | 10   | —    | S    |
| C <sub>iss</sub>      | Input capacitance                | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz                                                      | —      | 540  | —    | pF   |
| C <sub>oss</sub>      | Output capacitance               |                                                                                                            | —      | 75   | —    | pF   |
| C <sub>rss</sub>      | Reverse transfer capacitance     |                                                                                                            | —      | 20   | —    | pF   |
| t <sub>d(on)</sub>    | Turn-on delay time               | V <sub>DD</sub> = 50V, I <sub>D</sub> = 2A, V <sub>GS</sub> = 4V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω | —      | 12   | —    | ns   |
| t <sub>r</sub>        | Rise time                        |                                                                                                            | —      | 18   | —    | ns   |
| t <sub>d(off)</sub>   | Turn-off delay time              |                                                                                                            | —      | 45   | —    | ns   |
| t <sub>f</sub>        | Fall time                        |                                                                                                            | —      | 26   | —    | ns   |
| V <sub>SD</sub>       | Source-drain voltage             | I <sub>S</sub> = 2A, 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> = 5A, di <sub>s</sub> /dt = -100A/μs                                                        | —      | 80   | —    | ns   |

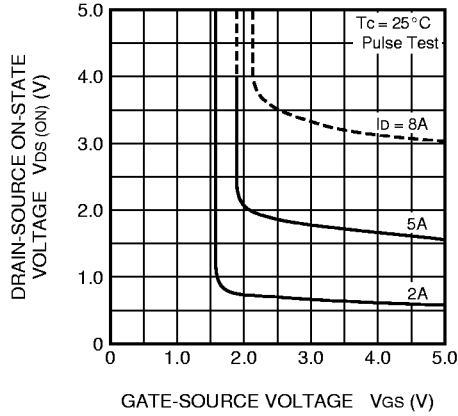
### PERFORMANCE CURVES



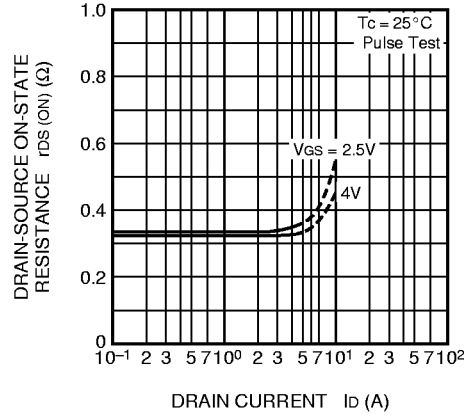
# FS5ASH-2

## HIGH-SPEED SWITCHING USE

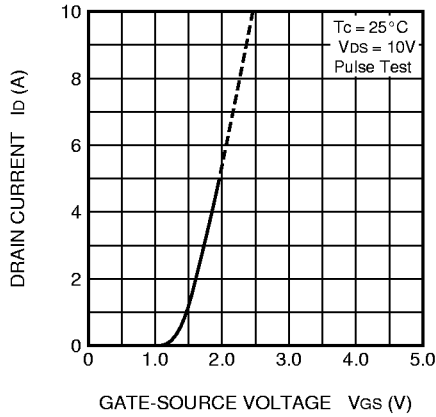
ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)



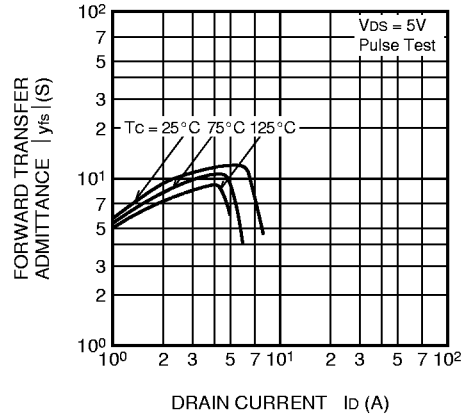
ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)



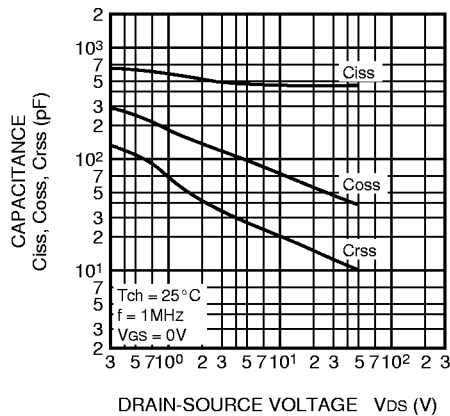
TRANSFER CHARACTERISTICS  
(TYPICAL)



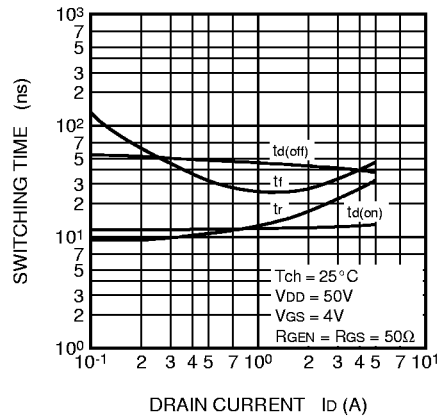
FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)



CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)



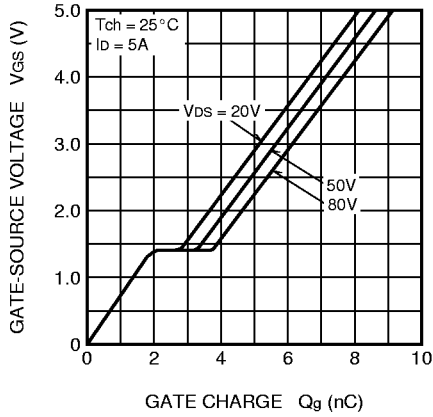
SWITCHING CHARACTERISTICS  
(TYPICAL)



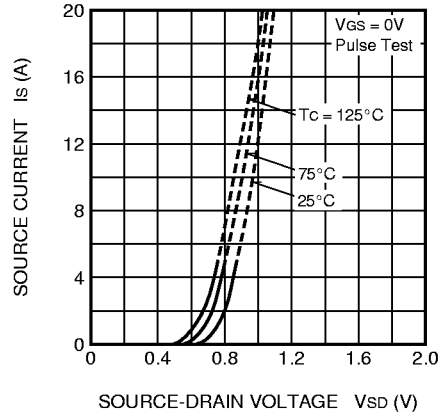
# FS5ASH-2

## HIGH-SPEED SWITCHING USE

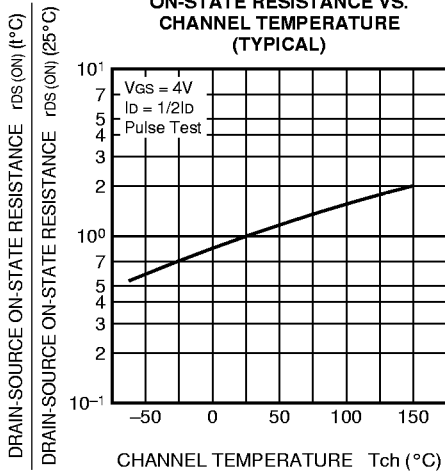
**GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)**



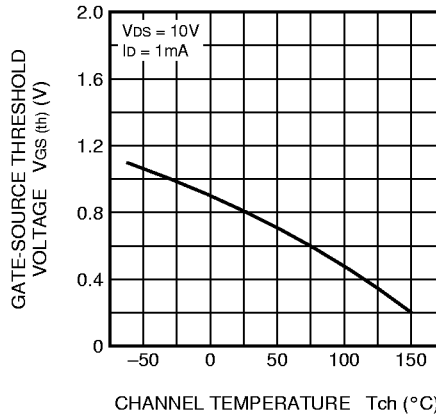
**SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)**



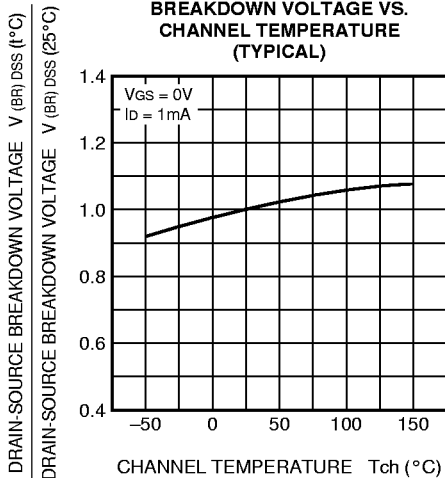
**ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS**

