

**PRELIMINARY**  
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MITSUBISHI Nch POWER MOSFET

# FS3KMA-5A

HIGH-SPEED SWITCHING USE

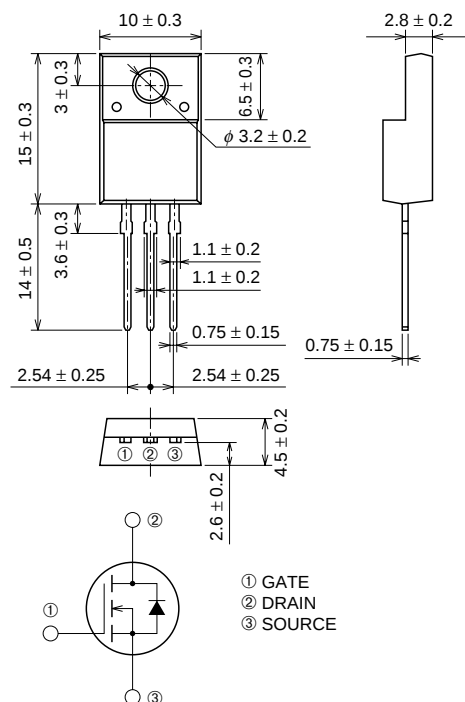
## FS3KMA-5A



- 10V DRIVE
- $V_{DS}$  ..... 250V
- $r_{DS(ON)}$  (MAX) .....  $2.0\Omega$
- $I_D$  ..... 3A

## OUTLINE DRAWING

Dimensions in mm



TO-220FN

## APPLICATION

SMPS, High speed switching use

## MAXIMUM RATINGS (Tc = 25°C)

| Symbol    | Parameter                  | Conditions                       | Ratings         | Unit |
|-----------|----------------------------|----------------------------------|-----------------|------|
| $V_{DS}$  | Drain-source voltage       | $V_{GS} = 0V$                    | 250             | V    |
| $V_{GSS}$ | Gate-source voltage        | $V_{DS} = 0V$                    | $\pm 20$        | V    |
| $I_D$     | Drain current              |                                  | 3               | A    |
| $I_{DM}$  | Drain current (Pulsed)     |                                  | 9               | A    |
| $I_{DA}$  | Avalanche current (Pulsed) | $L = 200\mu H$                   | 3               | A    |
| $P_D$     | Maximum power dissipation  |                                  | 25              | 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    |

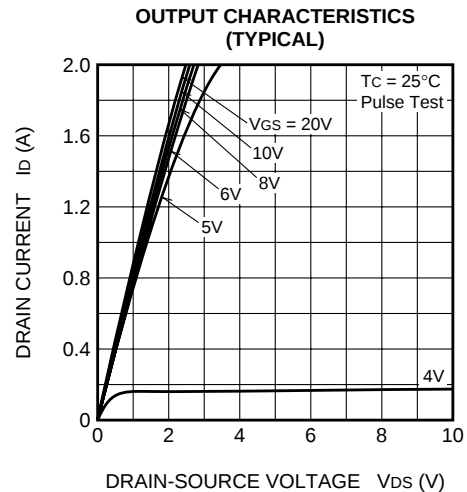
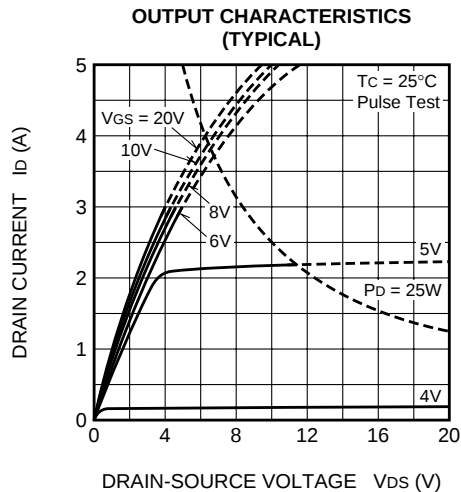
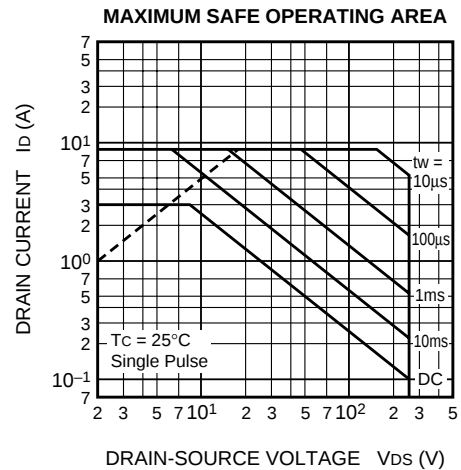
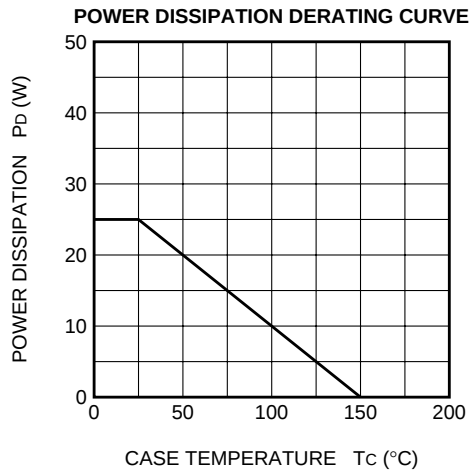
Jan. 2000

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**ELECTRICAL CHARACTERISTICS** ( $T_{ch} = 25^{\circ}\text{C}$ )

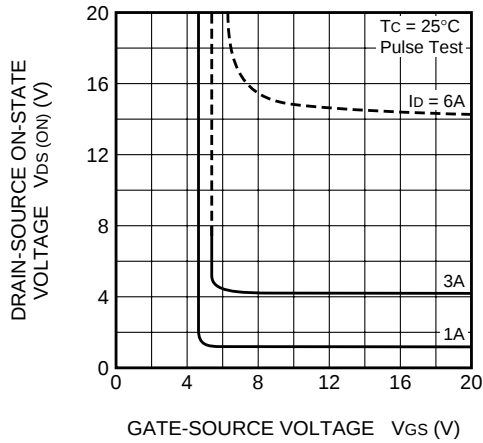
| Symbol         | Parameter                        | Test conditions                                                                                      | Limits |      |           | Unit                 |
|----------------|----------------------------------|------------------------------------------------------------------------------------------------------|--------|------|-----------|----------------------|
|                |                                  |                                                                                                      | Min.   | Typ. | Max.      |                      |
| $V_{(BR)DSS}$  | Drain-source breakdown voltage   | $I_D = 1\text{mA}$ , $V_{GS} = 0\text{V}$                                                            | 250    | —    | —         | V                    |
| $I_{GSS}$      | Gate-source leakage current      | $V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$                                                     | —      | —    | $\pm 0.1$ | $\mu\text{A}$        |
| $I_{DSS}$      | Drain-source leakage current     | $V_{DS} = 250\text{V}$ , $V_{GS} = 0\text{V}$                                                        | —      | —    | 1         | mA                   |
| $V_{GS(th)}$   | Gate-source threshold voltage    | $I_D = 1\text{mA}$ , $V_{DS} = 10\text{V}$                                                           | 2.0    | 3.0  | 4.0       | V                    |
| $r_{DS(on)}$   | Drain-source on-state resistance | $I_D = 1.5\text{A}$ , $V_{GS} = 10\text{V}$                                                          | —      | 1.5  | 2.0       | $\Omega$             |
| $V_{DS(on)}$   | Drain-source on-state voltage    | $I_D = 1.5\text{A}$ , $V_{GS} = 10\text{V}$                                                          | —      | 2.25 | 3.0       | V                    |
| $ y_{fs} $     | Forward transfer admittance      | $I_D = 1.5\text{A}$ , $V_{DS} = 10\text{V}$                                                          | —      | 2.5  | —         | S                    |
| $C_{iss}$      | Input capacitance                | $V_{DS} = 25\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$                                     | —      | 300  | —         | pF                   |
| $C_{oss}$      | Output capacitance               |                                                                                                      | —      | 35   | —         | pF                   |
| $C_{rss}$      | Reverse transfer capacitance     |                                                                                                      | —      | 8    | —         | pF                   |
| $t_d(on)$      | Turn-on delay time               | $V_{DD} = 150\text{V}$ , $I_D = 1.5\text{A}$ , $V_{GS} = 10\text{V}$ , $R_{GEN} = R_{GS} = 50\Omega$ | —      | 15   | —         | ns                   |
| $t_r$          | Rise time                        |                                                                                                      | —      | 10   | —         | ns                   |
| $t_d(off)$     | Turn-off delay time              |                                                                                                      | —      | 45   | —         | ns                   |
| $t_f$          | Fall time                        |                                                                                                      | —      | 20   | —         | ns                   |
| $V_{SD}$       | Source-drain voltage             | $I_S = 1.5\text{A}$ , $V_{GS} = 0\text{V}$                                                           | —      | 1.5  | 2.0       | V                    |
| $R_{th(ch-c)}$ | Thermal resistance               | Channel to case                                                                                      | —      | —    | 5.0       | $^{\circ}\text{C/W}$ |

**PERFORMANCE CURVES**

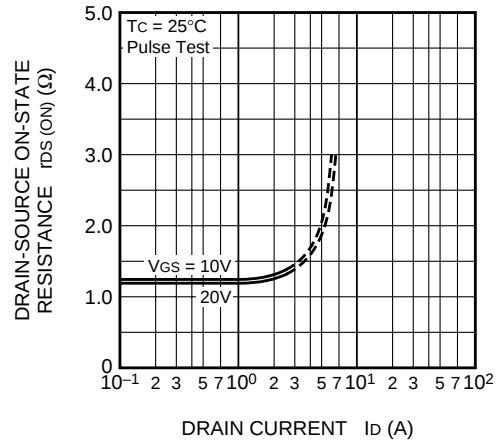


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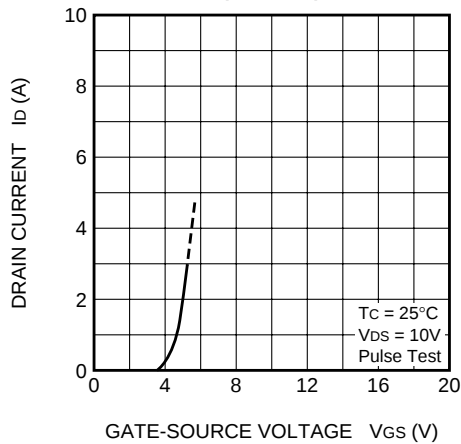
**ON-STATE VOLTAGE VS. GATE-SOURCE VOLTAGE (TYPICAL)**



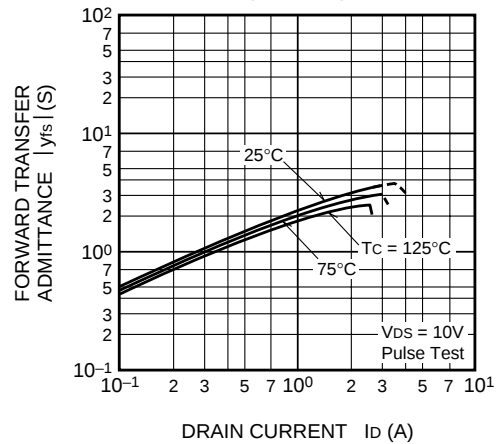
**ON-STATE RESISTANCE VS. DRAIN CURRENT (TYPICAL)**



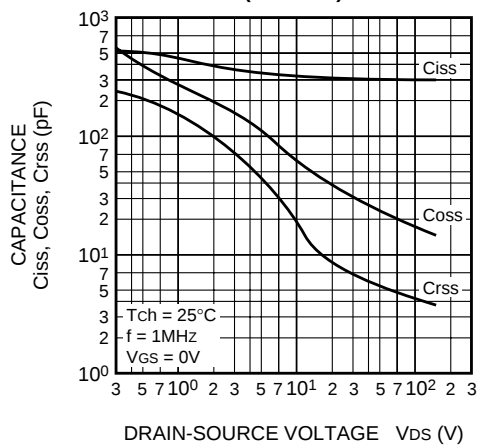
**TRANSFER CHARACTERISTICS (TYPICAL)**



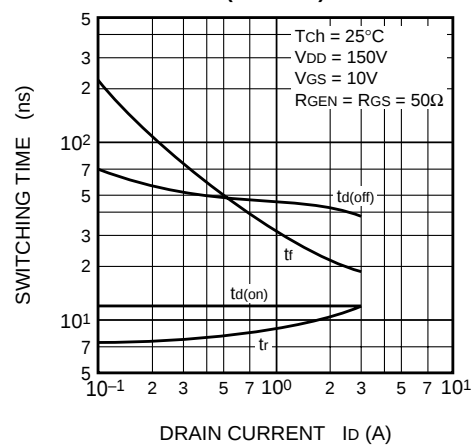
**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT (TYPICAL)**



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

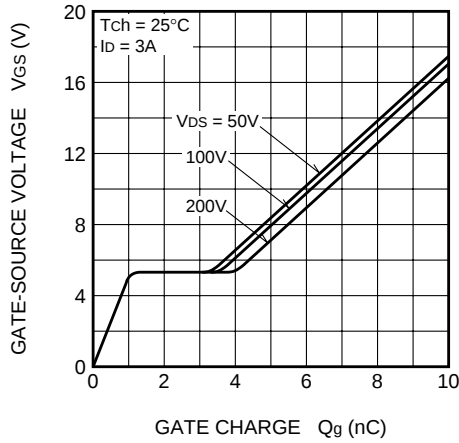


**SWITCHING CHARACTERISTICS (TYPICAL)**

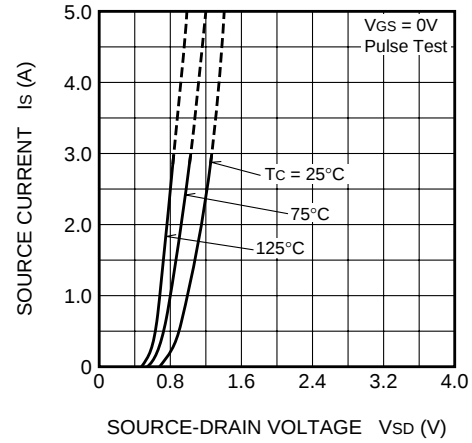


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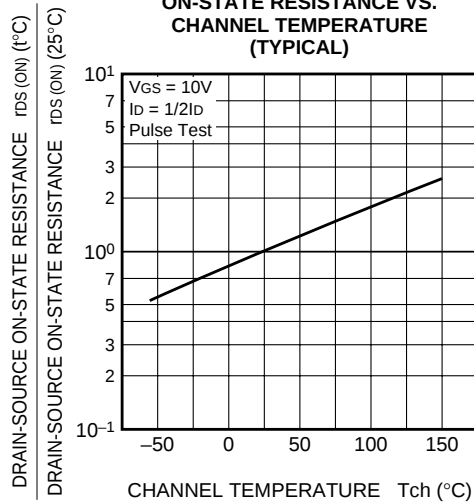
**GATE-SOURCE VOLTAGE  
 VS. GATE CHARGE  
 (TYPICAL)**



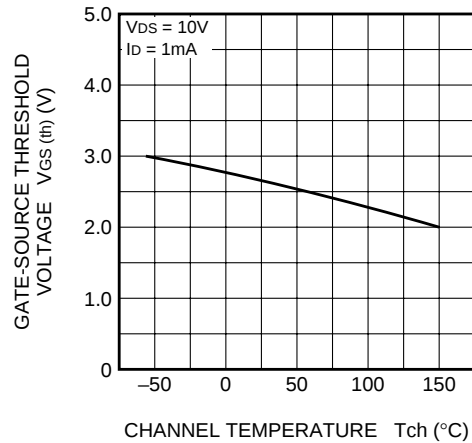
**SOURCE-DRAIN DIODE  
 FORWARD CHARACTERISTICS  
 (TYPICAL)**



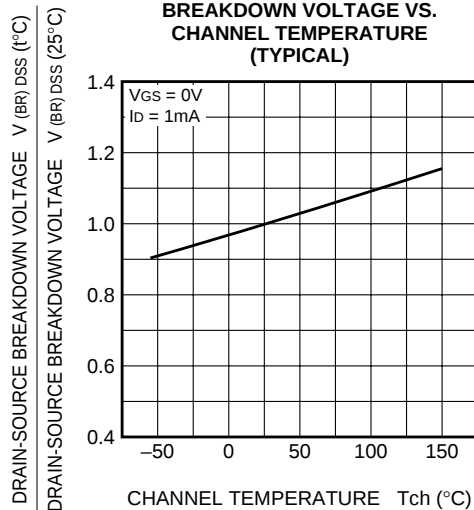
**ON-STATE RESISTANCE VS.  
 CHANNEL TEMPERATURE  
 (TYPICAL)**



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



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



**TRANSIENT THERMAL IMPEDANCE  
 CHARACTERISTICS**

