

# FS10AS-2

High-Speed Switching Use  
Nch Power MOS FET

REJ03G0244-0200

Rev.2.00

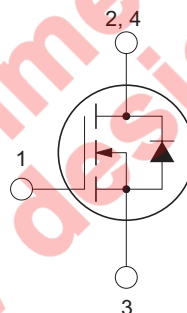
Nov 21, 2006

## Features

- Drive voltage : 10 V
- $V_{DSS}$  : 100 V
- $r_{DS(ON)} (max)$  : 0.23  $\Omega$
- $I_D$  : 10 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 100 ns

## Outline

RENESAS Package code: PRSS0004ZA-A  
(Package name: MP-3A)



1. Gate
2. Drain
3. Source
4. Drain

## Applications

Motor control, lamp control, solenoid control, DC-DC converters, etc.

## Maximum Ratings

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

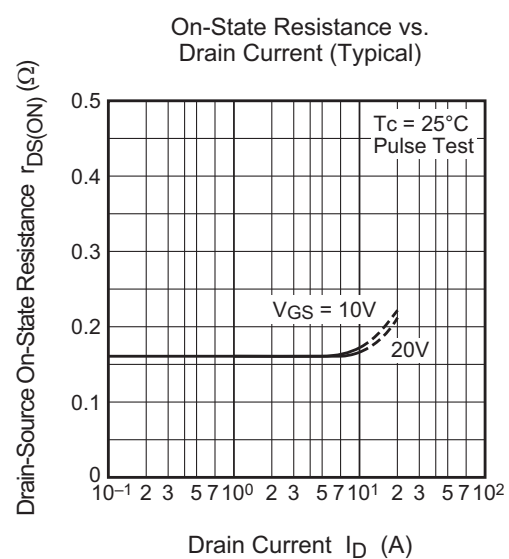
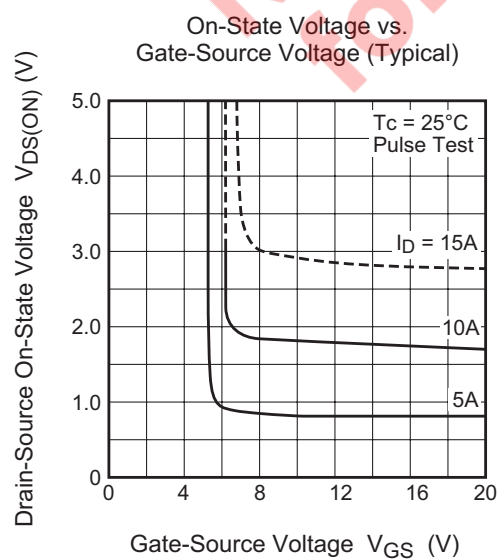
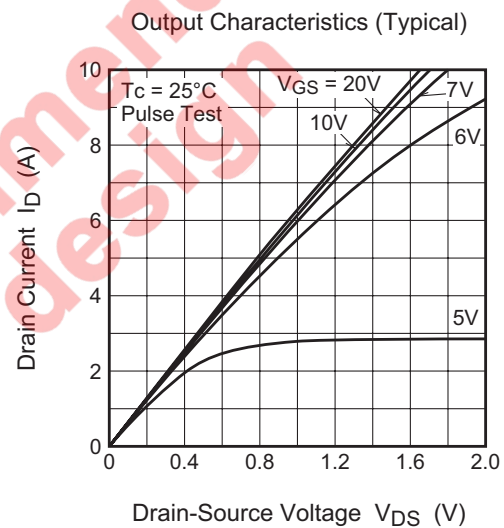
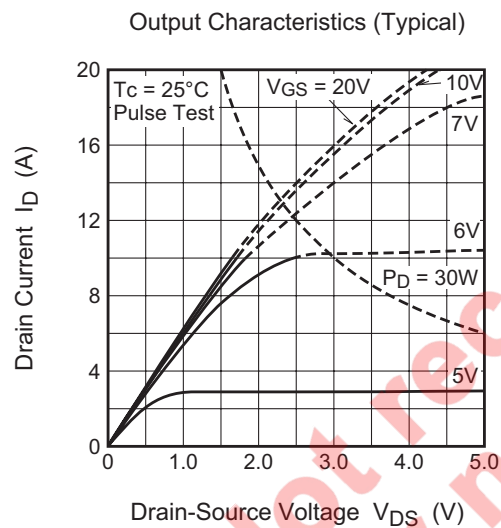
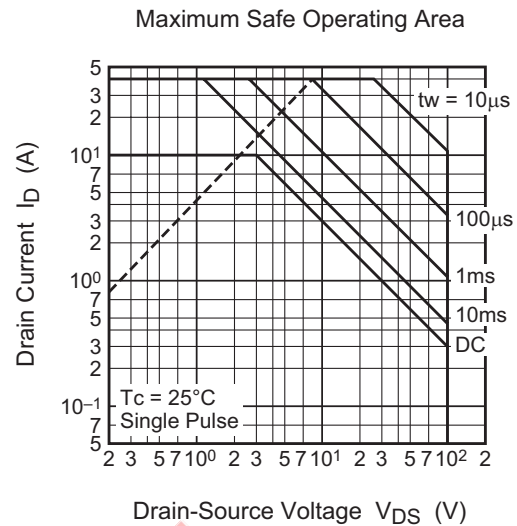
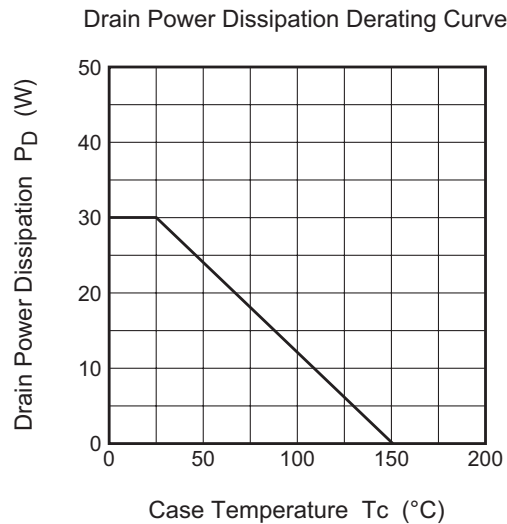
| Parameter                  | Symbol    | Ratings         | Unit             | Conditions                   |
|----------------------------|-----------|-----------------|------------------|------------------------------|
| Drain-source voltage       | $V_{DSS}$ | 100             | V                | $V_{GS} = 0\text{ V}$        |
| Gate-source voltage        | $V_{GSS}$ | $\pm 20$        | V                | $V_{DS} = 0\text{ V}$        |
| Drain current              | $I_D$     | 10              | A                |                              |
| Drain current (Pulsed)     | $I_{DM}$  | 40              | A                |                              |
| Avalanche current (Pulsed) | $I_{DA}$  | 10              | A                | $L = 100\text{ }\mu\text{H}$ |
| Source current             | $I_S$     | 10              | A                |                              |
| Source current (Pulsed)    | $I_{SM}$  | 40              | A                |                              |
| Maximum power dissipation  | $P_D$     | 30              | W                |                              |
| Channel temperature        | $T_{ch}$  | $-55$ to $+150$ | $^\circ\text{C}$ |                              |
| Storage temperature        | $T_{stg}$ | $-55$ to $+150$ | $^\circ\text{C}$ |                              |
| Mass                       | —         | 0.32            | g                | Typical value                |

## Electrical Characteristics

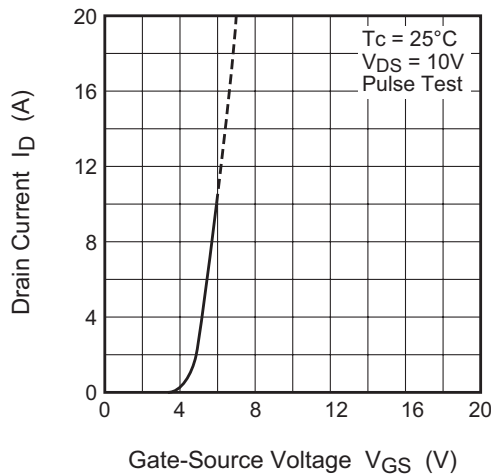
(Tch = 25°C)

| Parameter                        | Symbol         | Min. | Typ. | Max.      | Unit                 | Test conditions                                                                                                |
|----------------------------------|----------------|------|------|-----------|----------------------|----------------------------------------------------------------------------------------------------------------|
| Drain-source breakdown voltage   | $V_{(BR)DSS}$  | 100  | —    | —         | V                    | $I_D = 1 \text{ mA}$ , $V_{GS} = 0 \text{ V}$                                                                  |
| Gate-source leakage current      | $I_{GSS}$      | —    | —    | $\pm 0.1$ | $\mu\text{A}$        | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$                                                           |
| Drain-source leakage current     | $I_{DSS}$      | —    | —    | 0.1       | mA                   | $V_{DS} = 100 \text{ V}$ , $V_{GS} = 0 \text{ V}$                                                              |
| Gate-source threshold voltage    | $V_{GS(th)}$   | 2.0  | 3.0  | 4.0       | V                    | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                                                                 |
| Drain-source on-state resistance | $r_{DS(ON)}$   | —    | 0.16 | 0.23      | $\Omega$             | $I_D = 5 \text{ A}$ , $V_{GS} = 10 \text{ V}$                                                                  |
| Drain-source on-state voltage    | $V_{DS(ON)}$   | —    | 0.80 | 1.15      | V                    | $I_D = 5 \text{ A}$ , $V_{GS} = 10 \text{ V}$                                                                  |
| Forward transfer admittance      | $ y_{fs} $     | —    | 9.0  | —         | S                    | $I_D = 5 \text{ A}$ , $V_{DS} = 5 \text{ V}$                                                                   |
| Input capacitance                | $C_{iss}$      | —    | 600  | —         | pF                   | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0 \text{ V}$ ,<br>$f = 1 \text{ MHz}$                                      |
| Output capacitance               | $C_{oss}$      | —    | 125  | —         | pF                   |                                                                                                                |
| Reverse transfer capacitance     | $C_{rss}$      | —    | 40   | —         | pF                   |                                                                                                                |
| Turn-on delay time               | $t_{d(on)}$    | —    | 18   | —         | ns                   | $V_{DD} = 50 \text{ V}$ , $I_D = 5 \text{ A}$ ,<br>$V_{GS} = 10 \text{ V}$ ,<br>$R_{GEN} = R_{GS} = 50 \Omega$ |
| Rise time                        | $t_r$          | —    | 20   | —         | ns                   |                                                                                                                |
| Turn-off delay time              | $t_{d(off)}$   | —    | 30   | —         | ns                   |                                                                                                                |
| Fall time                        | $t_f$          | —    | 18   | —         | ns                   |                                                                                                                |
| Source-drain voltage             | $V_{SD}$       | —    | 1.0  | 1.5       | V                    | $I_S = 5 \text{ A}$ , $V_{GS} = 0 \text{ V}$                                                                   |
| Thermal resistance               | $R_{th(ch-c)}$ | —    | —    | 4.17      | $^{\circ}\text{C/W}$ | Channel to case                                                                                                |
| Reverse recovery time            | $t_{rr}$       | —    | 100  | —         | ns                   | $I_S = 10 \text{ A}$ , $dis/dt = -100 \text{ A}/\mu\text{s}$                                                   |

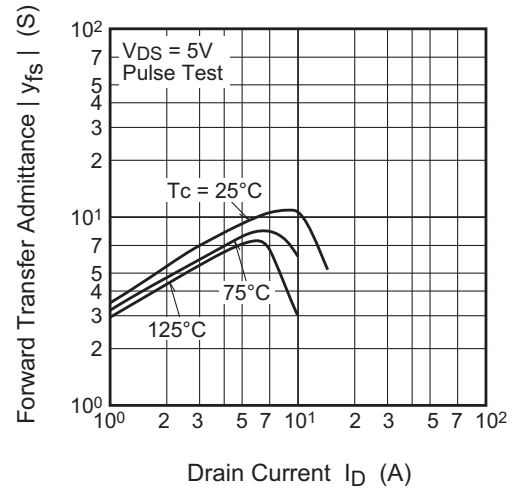
## Performance Curves



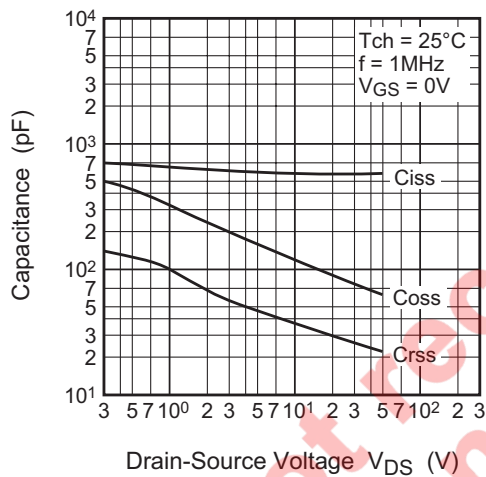
Transfer Characteristics (Typical)



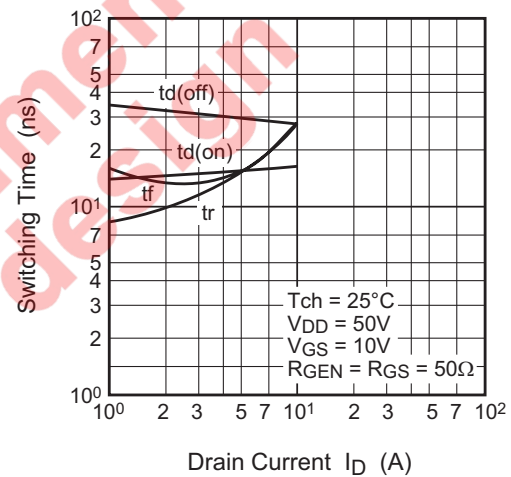
Forward Transfer Admittance vs. Drain Current (Typical)



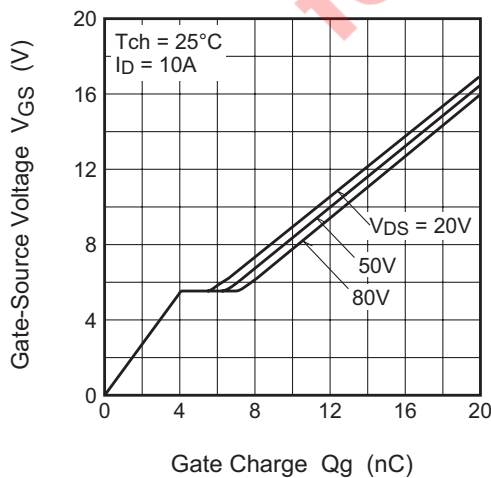
Capacitance vs. Drain-Source Voltage (Typical)



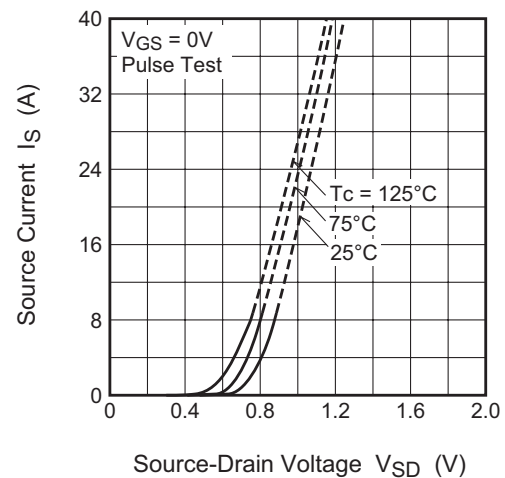
Switching Characteristics (Typical)

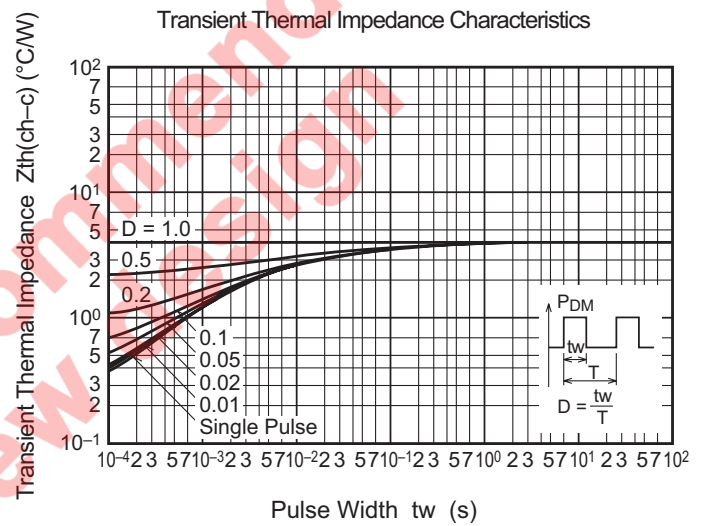
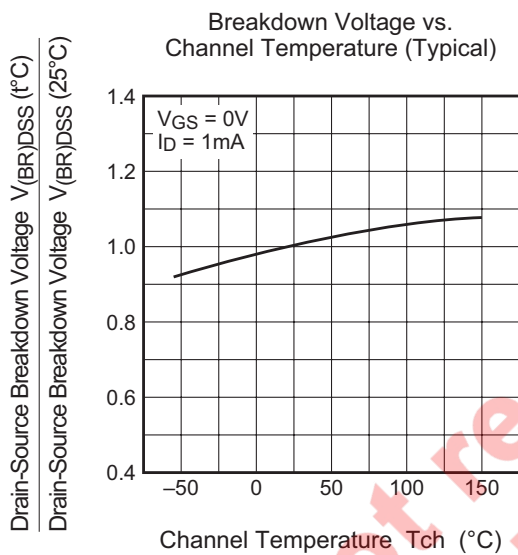
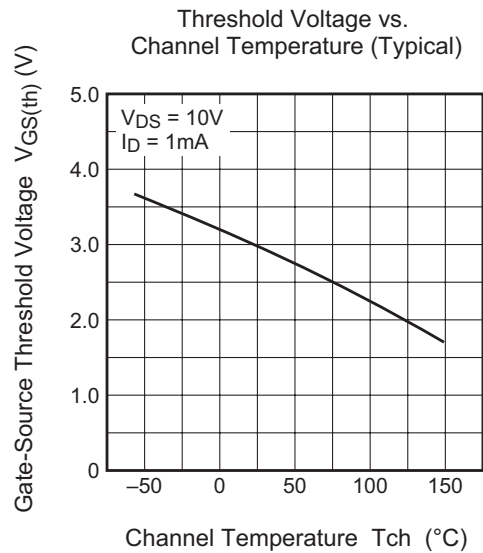
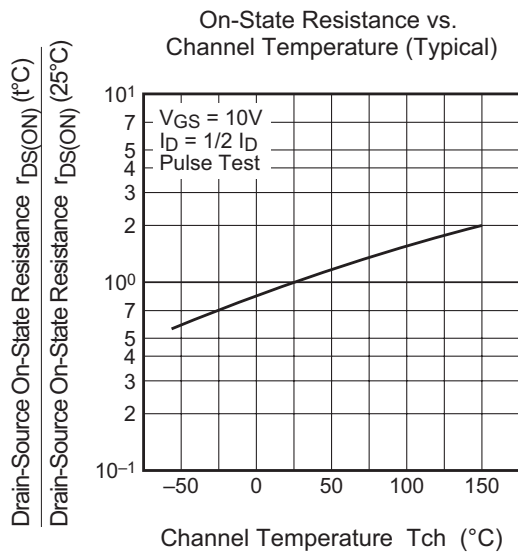


Gate-Source Voltage vs. Gate Charge (Typical)

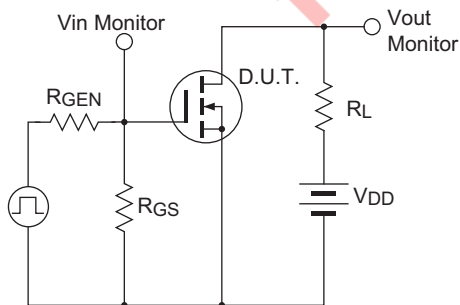


Source-Drain Diode Forward Characteristics (Typical)

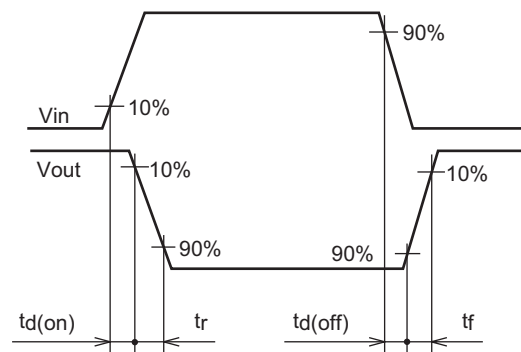




Switching Time Measurement Circuit



Switching Waveform



## Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] | Unit: mm |
|--------------|--------------------|--------------|---------------|------------|----------|
| MP-3A        | SC-63              | PRSS0004ZA-A | —             | 0.32g      |          |

The drawing shows three views of the FS10AS-2 package:

- Top View:** Dimensions include a total width of 6.6 mm, a central width of  $5.3 \pm 0.2$  mm, a lead width of  $1 \pm 0.2$  mm, a lead height of  $6.1 \pm 0.2$  mm, and a maximum total height of 10.4 mm. The lead pitch is 2.5 mm (Min).
- Side View:** Dimensions include a lead width of 2.3 mm, a lead height of  $0.5 \pm 0.2$  mm, a body height of  $0.1 \pm 0.1$  mm, a lead length of  $1.4 \pm 0.2$  mm, and a base width of  $0.5 \pm 0.2$  mm.
- Bottom View:** Dimensions include a total width of  $0.76 \pm 0.2$  mm, a central width of 0.76 mm, a lead width of  $2.3 \pm 0.2$  mm, a lead height of 2.3 mm, and a base height of 1 mm.

## Order Code

| Lead form            | Standard packing        | Quantity | Standard order code                  | Standard order code example |
|----------------------|-------------------------|----------|--------------------------------------|-----------------------------|
| Surface-mounted type | Taping                  | 3000     | Type name – T +Direction (1 or 2) +3 | FS10AS-2-T13                |
| Surface-mounted type | Plastic Magazine (Tube) | 75       | Type name                            | FS10AS-2                    |

Note : Please confirm the specification about the shipping in detail.

Notes:

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