RENESAS

# FS5AS-2

## High-Speed Switching Use
## Nch Power MOS FET

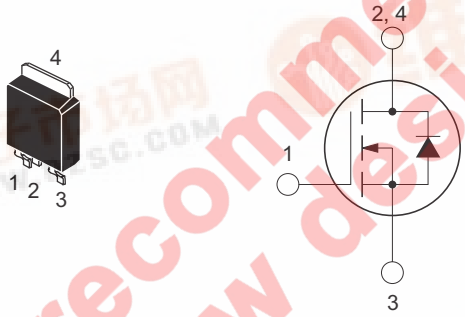
REJ03G0243-0200
Rev.2.00
Nov 21, 2006

### Features

- Drive voltage : 10 V
- $V_{DSS}$ : 100 V
- $r_{DS(ON)\ (max)}$ : 0.47 Ω
- $I_D$ : 5 A
- Recovery Time of the Integrated Fast Recovery Diode (TYP.) : 80 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

(Tc = 25°C)

| Parameter | Symbol | Ratings | Unit | Conditions |
|---|---|---|---|---|
| Drain-source voltage | $V_{DSS}$ | 100 | V | $V_{GS}$ = 0 V |
| Gate-source voltage | $V_{GSS}$ | ±20 | V | $V_{DS}$ = 0 V |
| Drain current | $I_D$ | 5 | A | |
| Drain current (Pulsed) | $I_{DM}$ | 20 | A | |
| Avalanche current (Pulsed) | $I_{DA}$ | 5 | A | L = 100 µH |
| Source current | $I_S$ | 5 | A | |
| Source current (Pulsed) | $I_{SM}$ | 20 | A | |
| Maximum power dissipation | $P_D$ | 20 | W | |
| Channel temperature | Tch | – 55 to +150 | °C | |
| Storage temperature | Tstg | – 55 to +150 | °C | |
| Mass | — | 0.32 | g | Typical value |

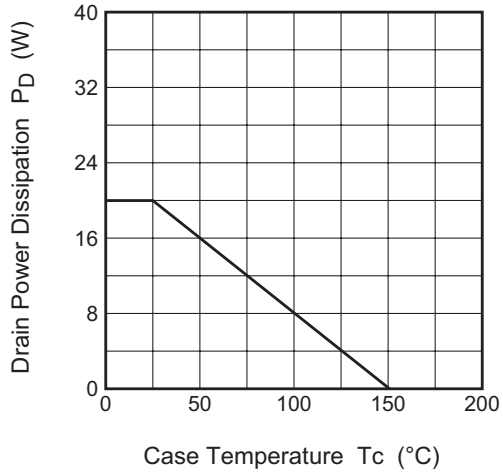
## Electrical Characteristics

(Tch = 25°C)

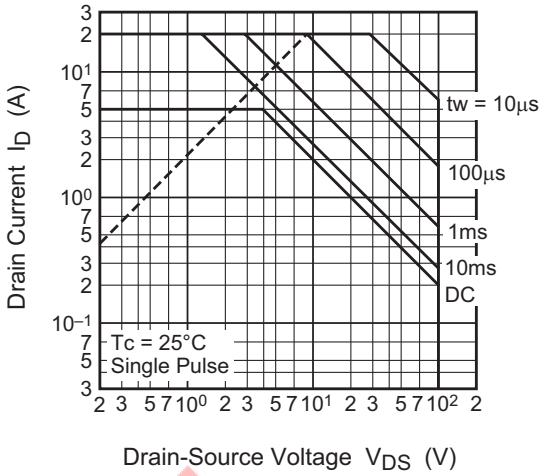
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 100 | — | — | V | $I_D$ = 1 mA, $V_{GS}$ = 0 V |
| Gate-source leakage current | $I_{GSS}$ | — | — | ±0.1 | µA | $V_{GS}$ = ±20 V, $V_{DS}$ = 0 V |
| Drain-source leakage current | $I_{DSS}$ | — | — | 0.1 | mA | $V_{DS}$ = 100 V, $V_{GS}$ = 0 V |
| Gate-source threshold voltage | $V_{GS(th)}$ | 2.0 | 3.0 | 4.0 | V | $I_D$ = 1 mA, $V_{DS}$ = 10 V |
| Drain-source on-state resistance | $r_{DS(ON)}$ | — | 0.33 | 0.47 | Ω | $I_D$ = 2 A, $V_{GS}$ = 10 V |
| Drain-source on-state voltage | $V_{DS(ON)}$ | — | 0.66 | 0.94 | V | $I_D$ = 2 A, $V_{GS}$ = 10 V |
| Forward transfer admittance | $\lvert y_{fs} \rvert$ | — | 4.0 | — | S | $I_D$ = 2 A, $V_{DS}$ = 5 V |
| Input capacitance | Ciss | — | 280 | — | pF | $V_{DS}$ = 10 V, $V_{GS}$ = 0 V, f = 1MHz |
| Output capacitance | Coss | — | 75 | — | pF | |
| Reverse transfer capacitance | Crss | — | 18 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 15 | — | ns | $V_{DD}$ = 50 V, $I_D$ = 2 A, $V_{GS}$ = 10 V, $R_{GEN}$ = $R_{GS}$ = 50 Ω |
| Rise time | $t_r$ | — | 8 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 17 | — | ns | |
| Fall time | $t_f$ | — | 7 | — | ns | |
| Source-drain voltage | $V_{SD}$ | — | 1.0 | 1.5 | V | $I_S$ = 2 A, $V_{GS}$ = 0 V |
| Thermal resistance | Rth(ch-c) | — | — | 6.25 | °C/W | Channel to case |
| Reverse recovery time | $t_{rr}$ | — | 80 | — | ns | $I_S$ = 5 A, dis/dt = –100 A/µs |

## Performance Curves

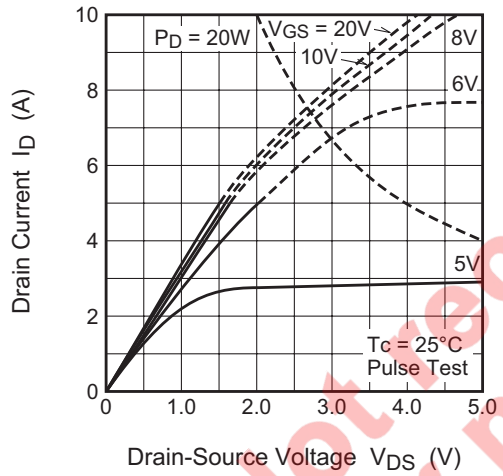
Drain Power Dissipation Derating Curve



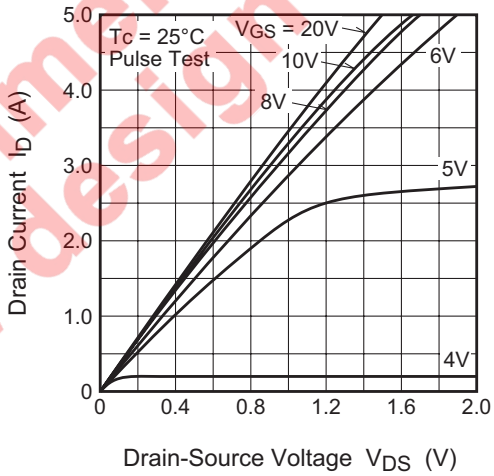

Maximum Safe Operating Area



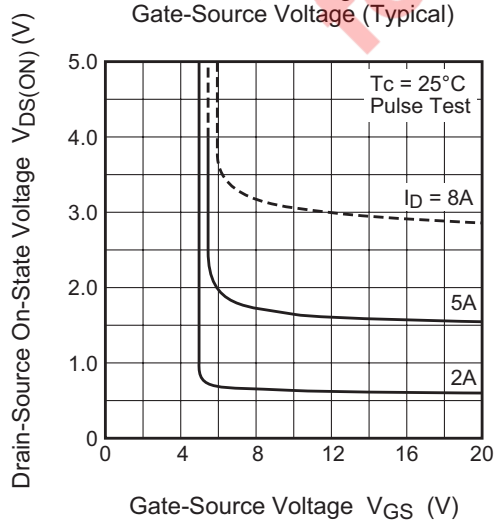

Output Characteristics (Typical)



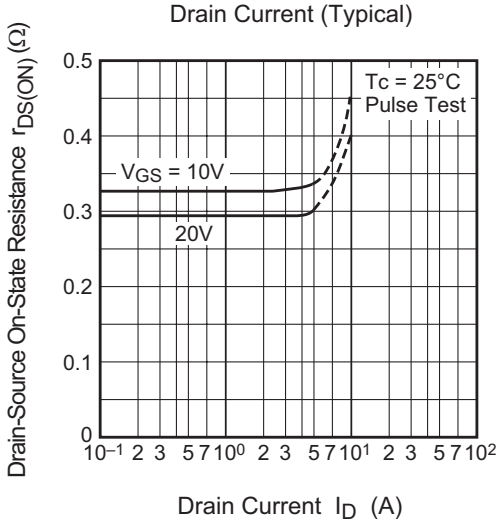

Output Characteristics (Typical)



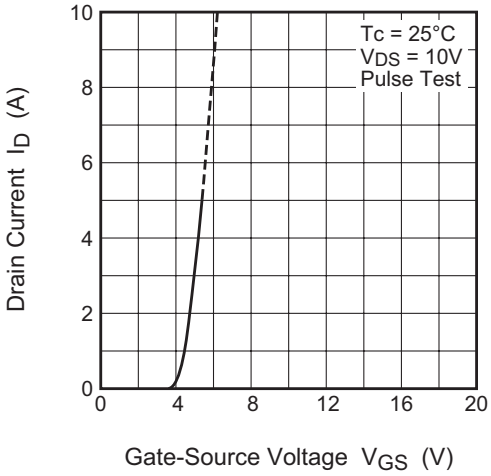

On-State Voltage vs.
Gate-Source Voltage (Typical)



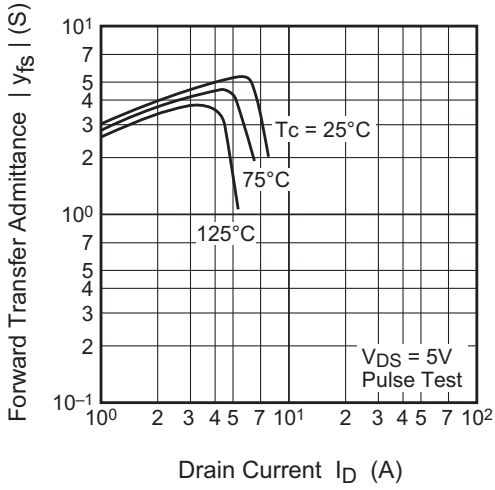

On-State Resistance vs.
Drain Current (Typical)



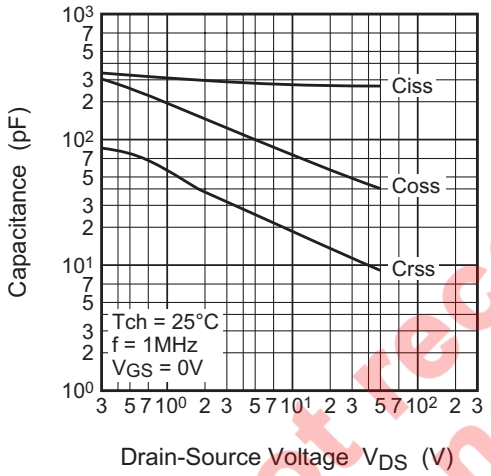
Transfer Characteristics (Typical)



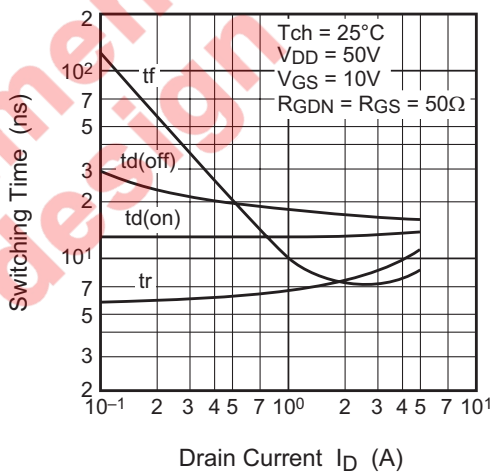

Forward Transfer Admittance vs. Drain Current (Typical)



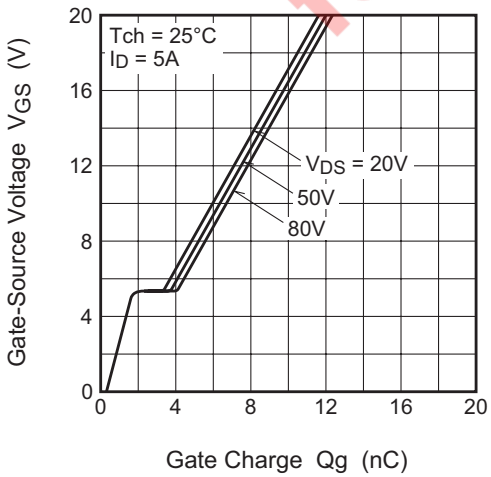

Capacitance vs. Drain-Source Voltage (Typical)



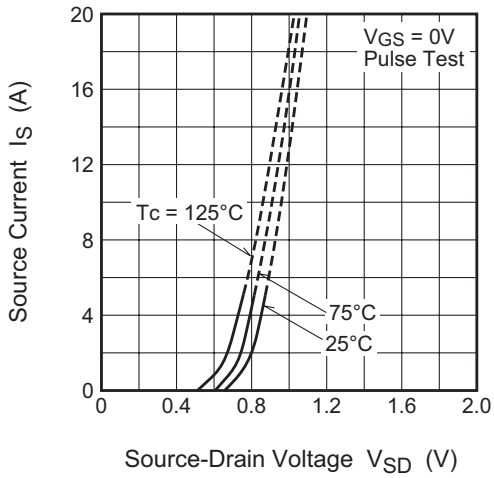

Switching Characteristics (Typical)



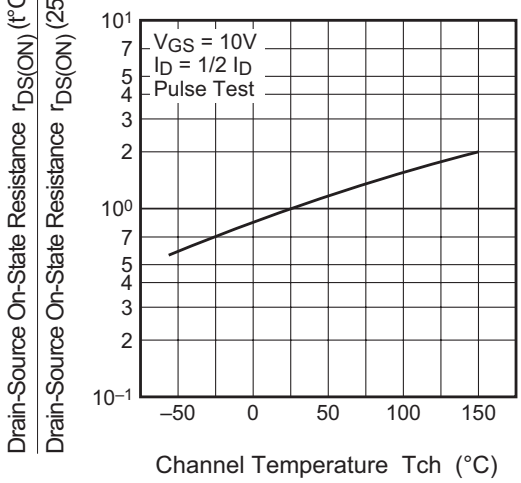

Gate-Source Voltage vs. Gate Charge (Typical)



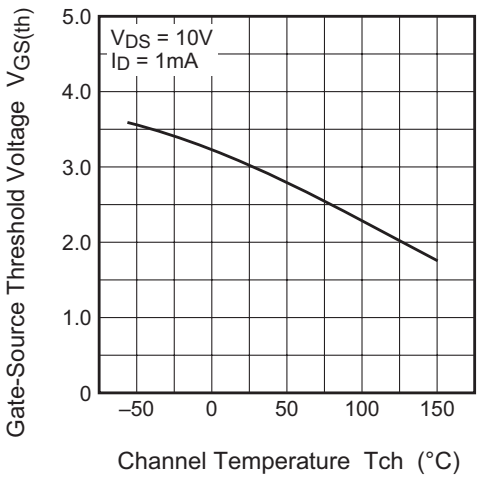

Source-Drain Diode Forward Characteristics (Typical)



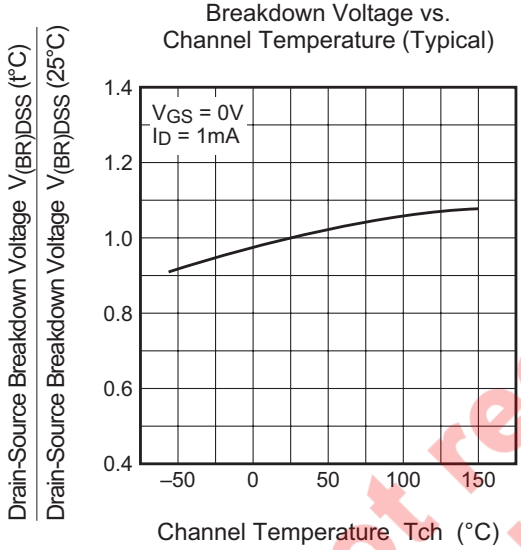
On-State Resistance vs.
Channel Temperature (Typical)



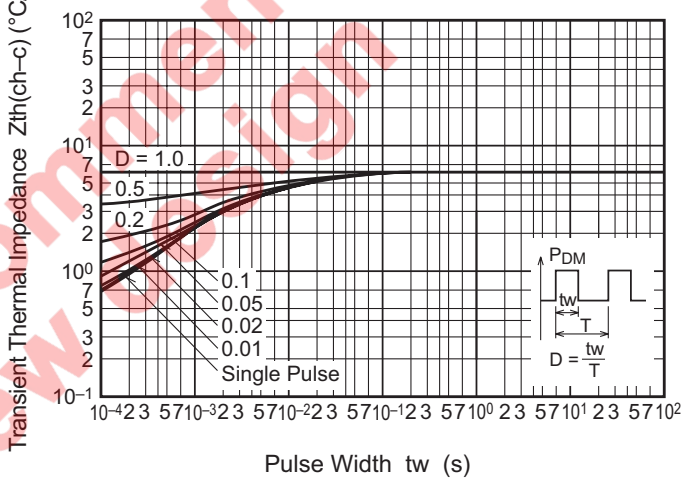

Threshold Voltage vs.
Channel Temperature (Typical)



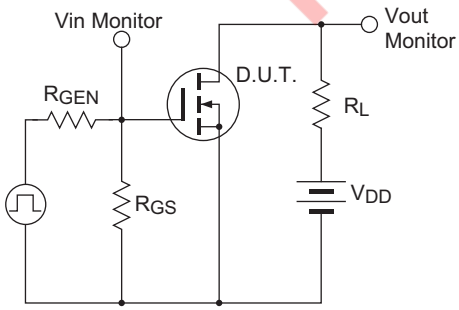

Breakdown Voltage vs.
Channel Temperature (Typical)



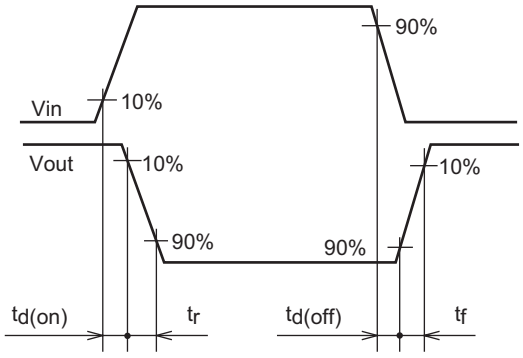

Transient Thermal Impedance Characteristics




Switching Time Measurement Circuit



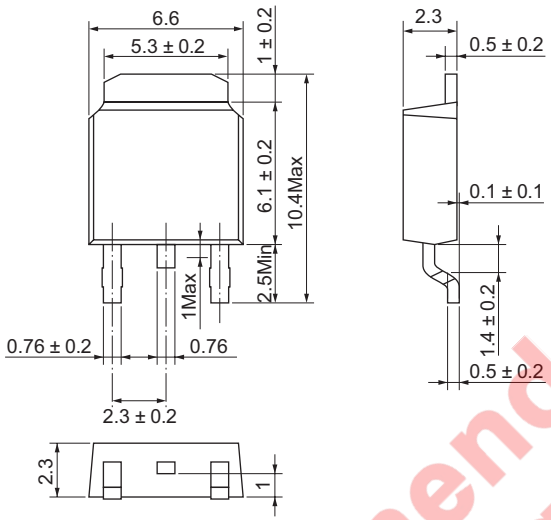

Switching Waveform



## Package Dimensions

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

Unit: 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 | FS5AS-2-T13 |
| Surface-mounted type | Plastic Magazine (Tube) | 75 | Type name | FS5AS-2 |

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

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