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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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FS5AS-06

High-Speed Switching Use
Nch Power MOS FET

REJ03G1404-0300

Rev.3.00

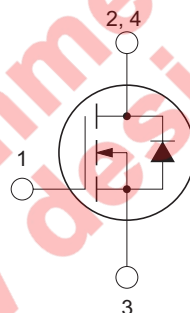
Dec 19, 2008

Features

- Drive voltage : 10 V
- V_{DSS} : 60 V
- $r_{DS(ON) (max)}$: 0.16 Ω
- I_D : 5 A
- Integrated Fast Recovery Diode (TYP.) : 45 ns

Outline

RENESAS Package code: PRSS0004ZG-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} | 60 | V | $V_{GS} = 0\text{ V}$ |
| Gate-source voltage | V_{GSS} | ± 20 | V | $V_{DS} = 0\text{ V}$ |
| Drain current | I_D | 5 | A | |
| Drain current (Pulsed) | I_{DM} | 20 | A | |
| Avalanche drain current (Pulsed) | I_{DA} | 5 | A | $L = 100\ \mu\text{H}$ |
| Source current | I_S | 5 | A | |
| Source current (Pulsed) | I_{SM} | 20 | A | |
| Maximum power dissipation | P_D | 20 | 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 |

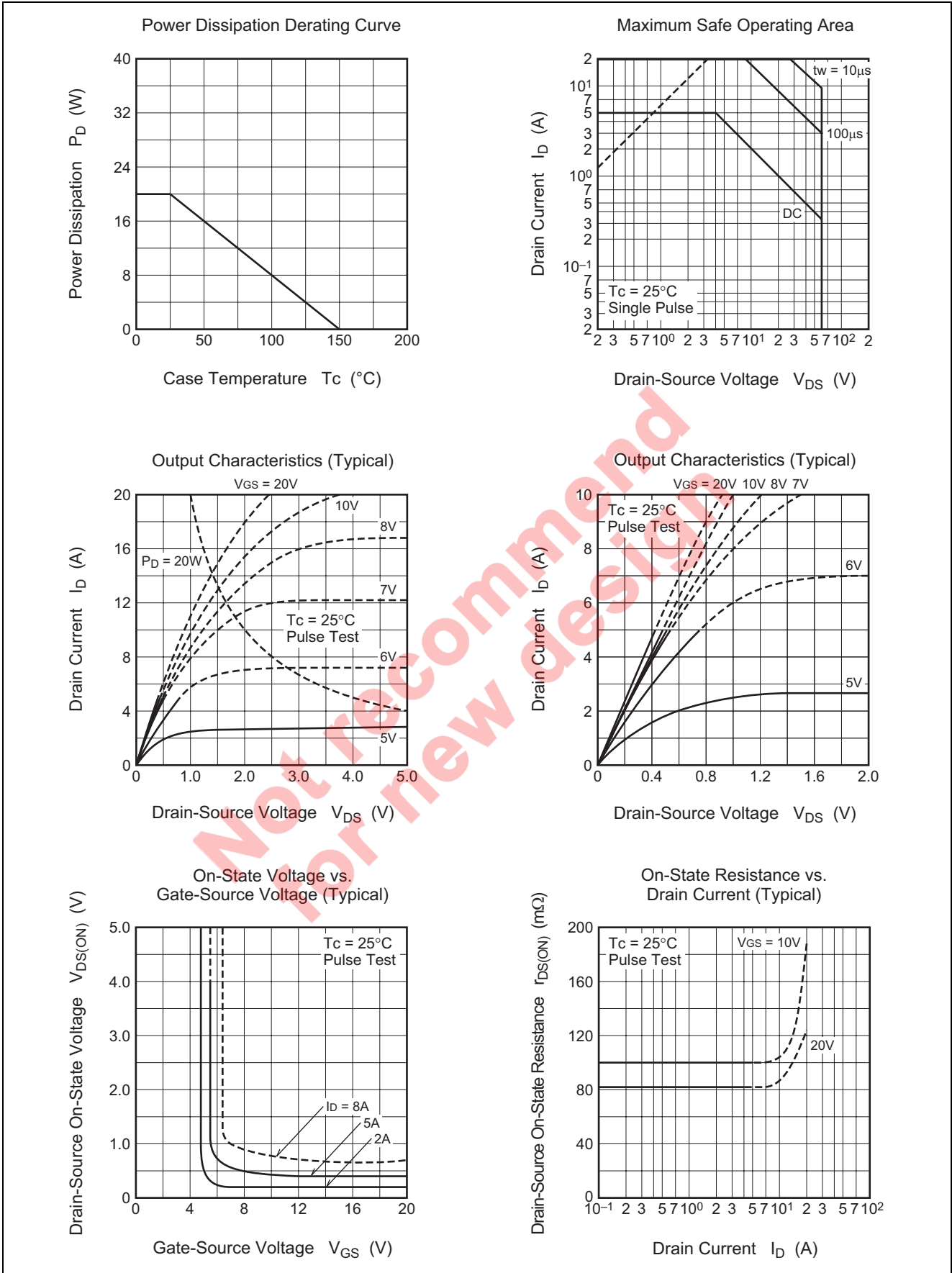
Electrical Characteristics

(T_{ch} = 25°C)

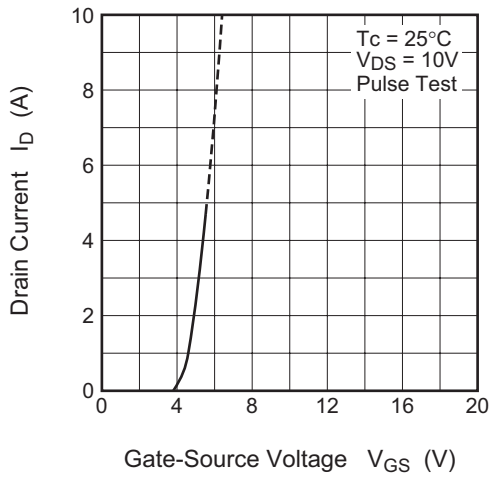
| Parameter | Symbol | Min | Typ | Max | Unit | Test Conditions |
|----------------------------------|----------------|-----|------|-----------|----------------------|--|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 60 | — | — | V | $I_D = 1 \text{ mA}$, $V_{GS} = 0 \text{ V}$ |
| Gate-source leakage current | I_{GSS} | — | — | ± 0.1 | μA | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$ |
| Drain-source leakage current | I_{DSS} | — | — | 0.1 | mA | $V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$ |
| 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 | $r_{DS(ON)}$ | — | 0.12 | 0.16 | Ω | $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$ |
| Drain-source on-state voltage | $V_{DS(ON)}$ | — | 0.24 | 0.32 | V | $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$ |
| Forward transfer admittance | $ y_{fs} $ | — | 4.0 | — | S | $I_D = 2 \text{ A}$, $V_{DS} = 5 \text{ V}$ |
| Input capacitance | C_{iss} | — | 280 | — | pF | $V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 120 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 35 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 15 | — | ns | $V_{DD} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_{GEN} = R_{GS} = 50 \Omega$ |
| Rise time | t_r | — | 8 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 18 | — | ns | |
| Fall time | t_f | — | 9 | — | ns | |
| Source-drain voltage | V_{SD} | — | 1.0 | 1.5 | V | $I_S = 2 \text{ A}$, $V_{GS} = 0 \text{ V}$ |
| Thermal resistance | $R_{th(ch-c)}$ | — | — | 6.25 | $^{\circ}\text{C/W}$ | Channel to case |
| Reverse recovery time | t_{rr} | — | 45 | — | ns | $I_S = 5 \text{ A}$, $d_i/d_t = -100 \text{ A}/\mu\text{s}$ |

Not recommended
for new design

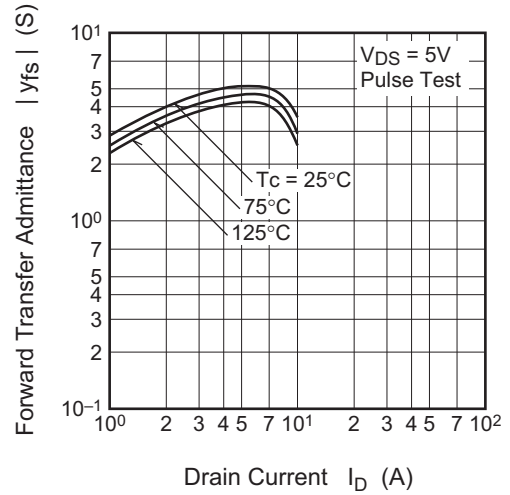
Performance Curves



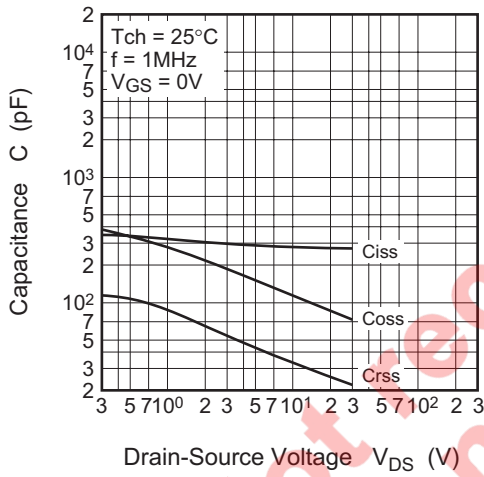
Transfer Characteristics (Typical)



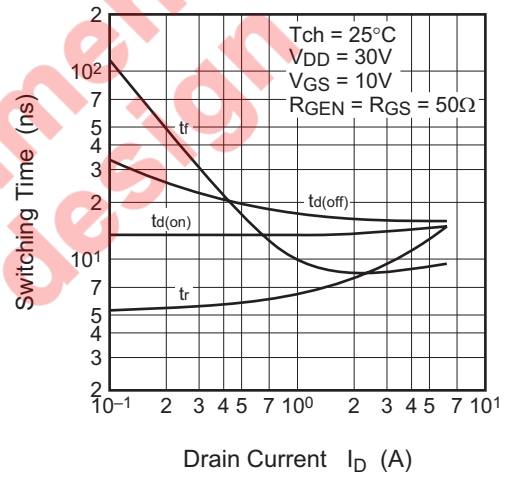
Forward Transfer Admittance vs. Drain Current (Typical)



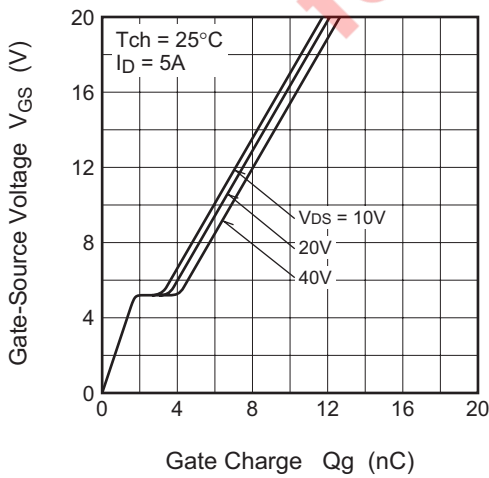
Capacitance vs. Drain-Source Voltage (Typical)



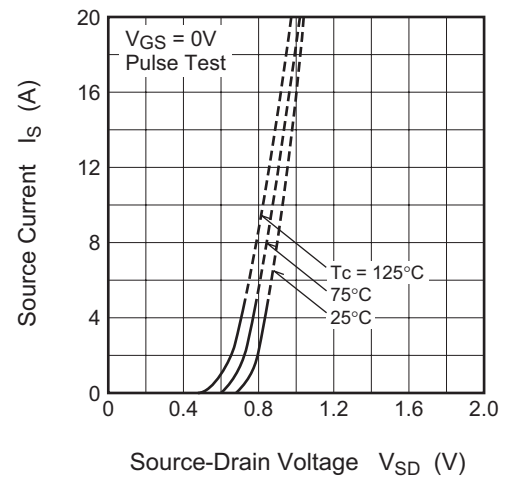
Switching Characteristics (Typical)

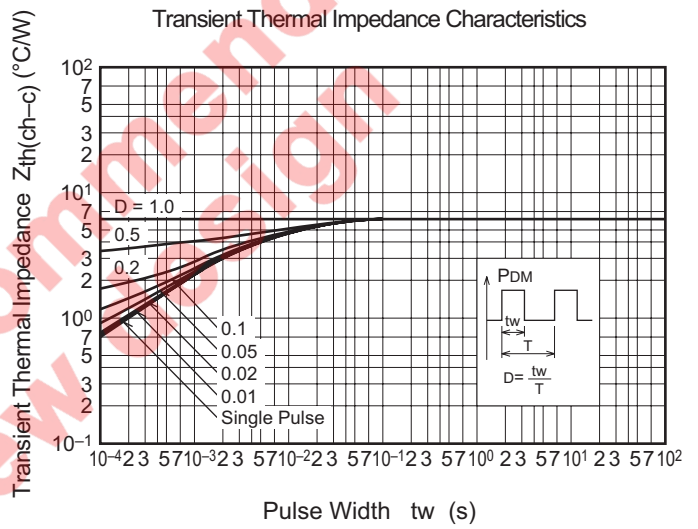
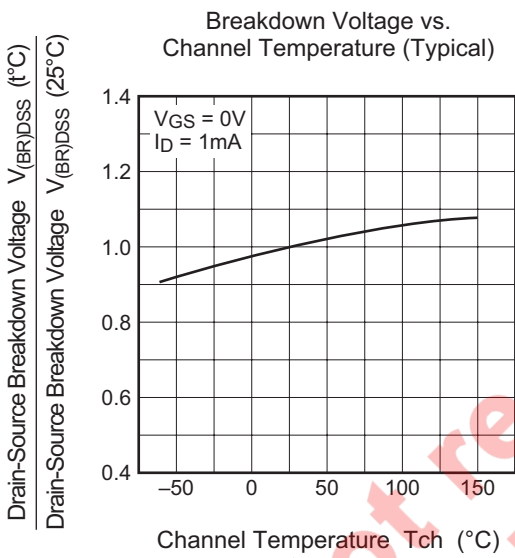
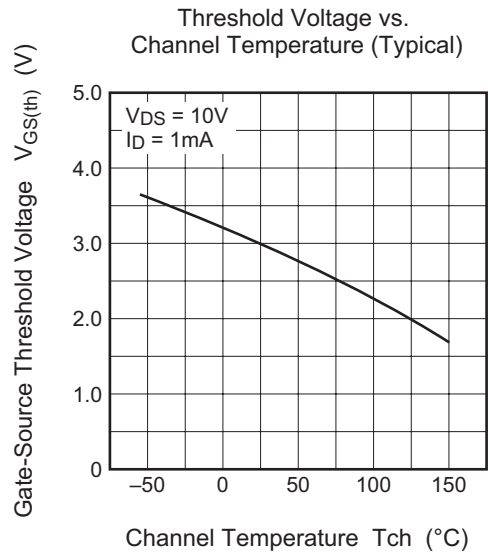
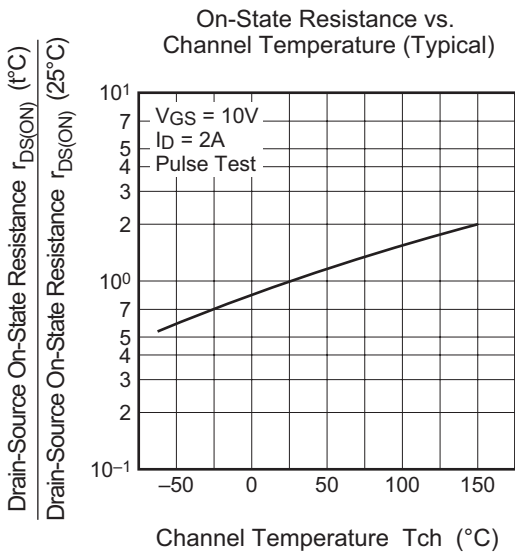


Gate-Source Voltage vs. Gate Charge (Typical)

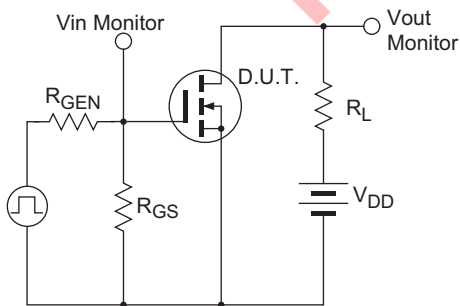


Source-Drain Diode Forward Characteristics (Typical)

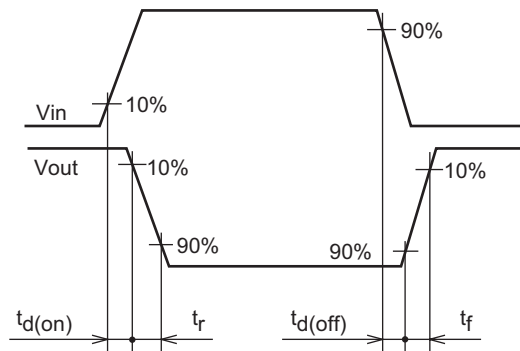




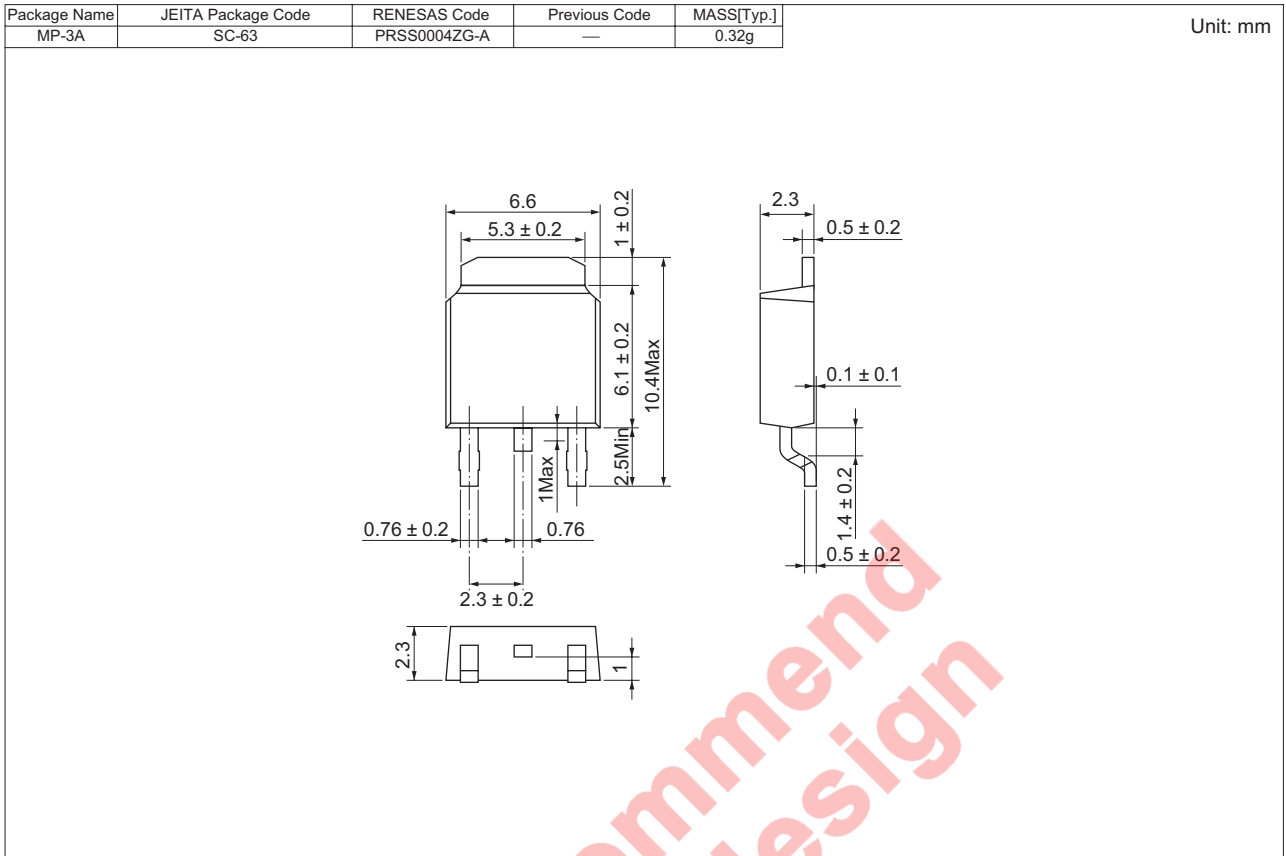
Switching Time Measurement Circuit



Switching Waveform



Package Dimensions



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-06-T13 |
| Surface-mounted type | Plastic Magazine (Tube) | 75 | Type name | FS5AS-06 |

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