

FS50KM-06

High-Speed Switching Use
Nch Power MOS FET

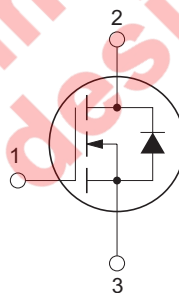
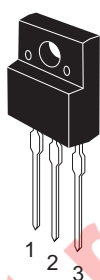
REJ03G1417-0200
(Previous: MEJ02G0092-0101)
Rev.2.00
Aug 07, 2006

Features

- Drive voltage : 10 V
- V_{DSS} : 60 V
- $r_{DS(ON)(max)}$: 22 m Ω
- I_D : 50 A
- Integrated Fast Recovery Diode (TYP.) : 65 ns
- Viso : 2000 V

Outline

RENESAS Package code: PRSS0003AB-A
(Package name: TO-220FN)



1. Gate
2. Drain
3. Source

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 | 50 | A | |
| Drain current (Pulsed) | I_{DM} | 200 | A | |
| Avalanche drain current (Pulsed) | I_{DA} | 50 | A | $L = 100\ \mu\text{H}$ |
| Source current | I_S | 50 | A | |
| Source current (Pulsed) | I_{SM} | 200 | 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 | $^\circ\text{C}$ | |
| Isolation voltage | Viso | 2000 | V | AC for 1 minute, Terminal to case |
| Mass | — | 2.0 | g | Typical value |

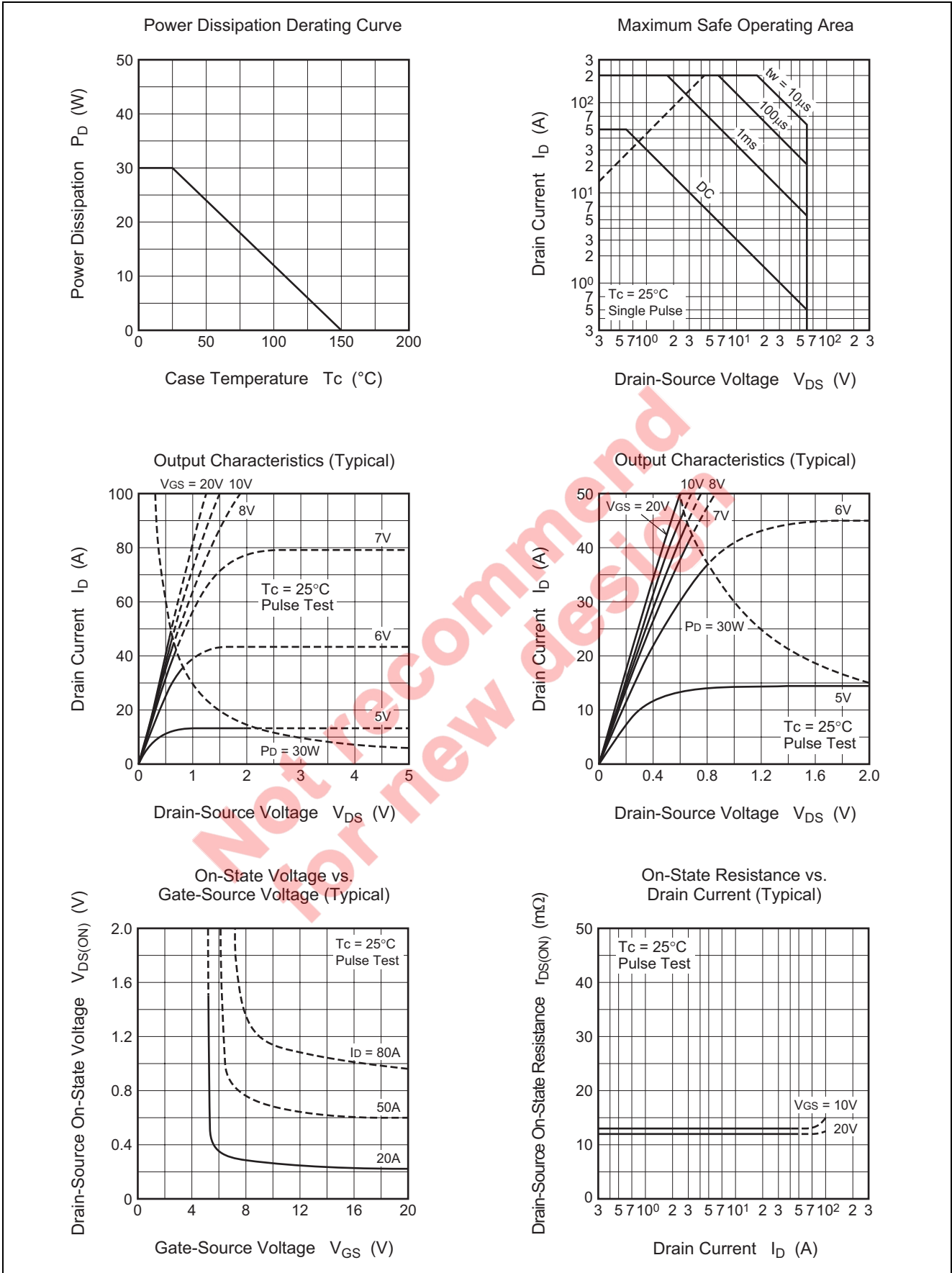
Electrical Characteristics

(T_{ch} = 25°C)

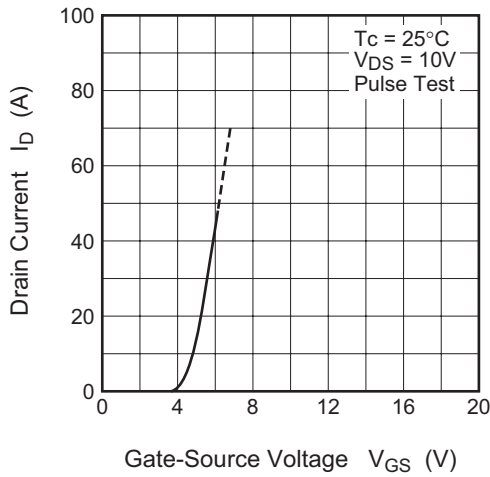
| Parameter | Symbol | Min | Typ | Max | Unit | Test Conditions |
|----------------------------------|----------------|-----|------|------|------|--|
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 60 | — | — | V | $I_D = 1 \text{ mA}, V_{GS} = 0 \text{ V}$ |
| Gate-source leakage current | I_{GSS} | — | — | ±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 | $r_{DS(ON)}$ | — | 17 | 22 | mΩ | $I_D = 25 \text{ A}, V_{GS} = 10 \text{ V}$ |
| Drain-source on-state voltage | $V_{DS(ON)}$ | — | 0.43 | 0.55 | V | $I_D = 25 \text{ A}, V_{GS} = 10 \text{ V}$ |
| Forward transfer admittance | $ y_{fs} $ | — | 32 | — | S | $I_D = 25 \text{ A}, V_{DS} = 10 \text{ V}$ |
| Input capacitance | C_{iss} | — | 2300 | — | pF | $V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 570 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 280 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 35 | — | ns | $V_{DD} = 30 \text{ V}, I_D = 25 \text{ A},$ $V_{GS} = 10 \text{ V},$ $R_{GEN} = R_{GS} = 50 \Omega$ |
| Rise time | t_r | — | 95 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 95 | — | ns | |
| Fall time | t_f | — | 80 | — | ns | |
| Source-drain voltage | V_{SD} | — | 1.0 | 1.5 | V | $I_S = 25 \text{ A}, V_{GS} = 0 \text{ V}$ |
| Thermal resistance | $R_{th(ch-c)}$ | — | — | 4.17 | °C/W | Channel to case |
| Reverse recovery time | t_{rr} | — | 65 | — | ns | $I_S = 50 \text{ A}, d_i/d_t = -100 \text{ A}/\mu\text{s}$ |

Not recommended
for new design

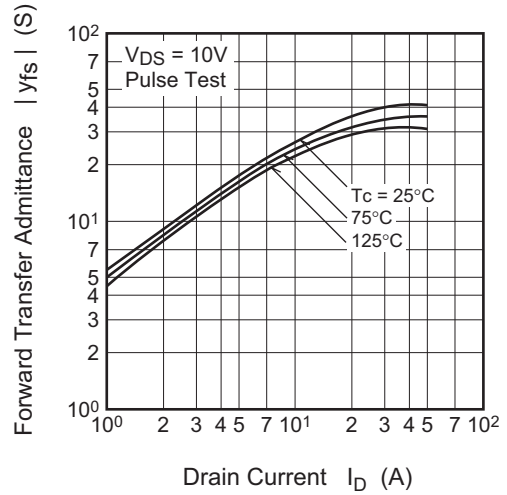
Performance Curves



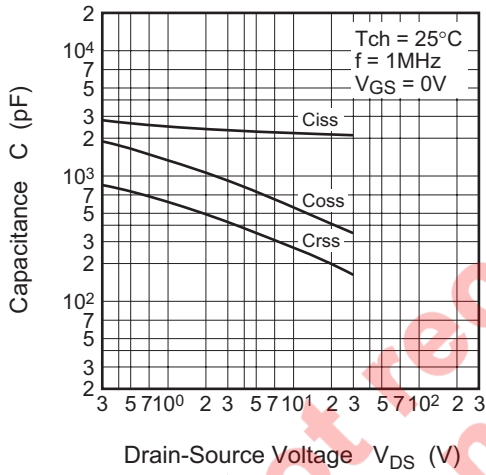
Transfer Characteristics (Typical)



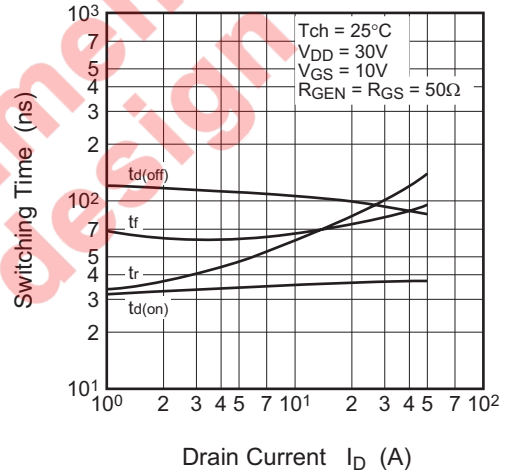
Forward Transfer Admittance vs. Drain Current (Typical)



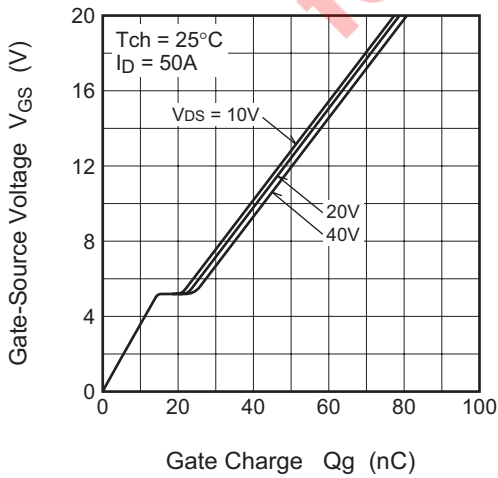
Capacitance vs. Drain-Source Voltage (Typical)



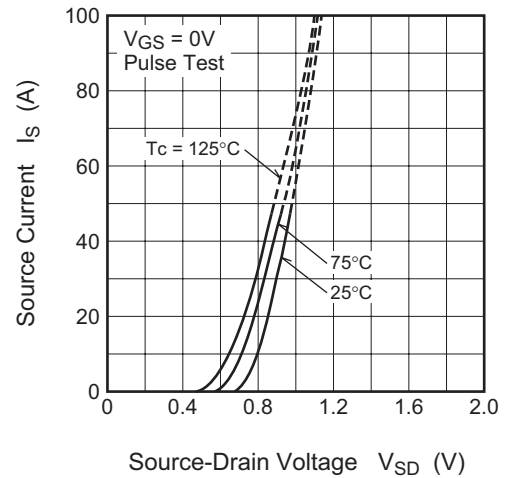
Switching Characteristics (Typical)

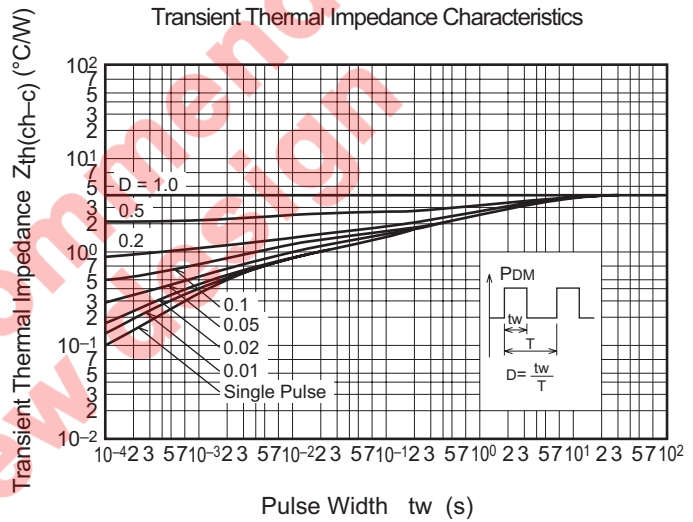
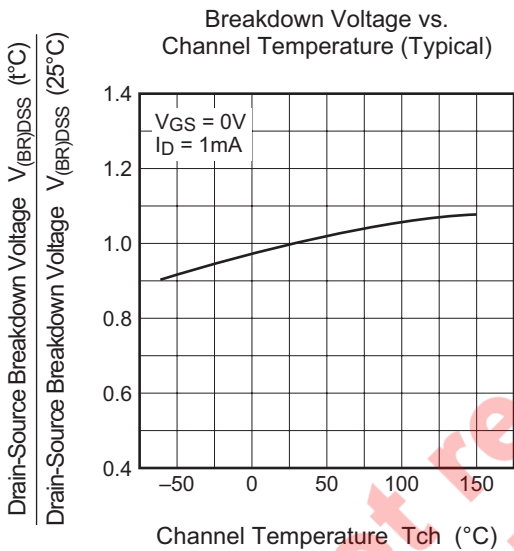
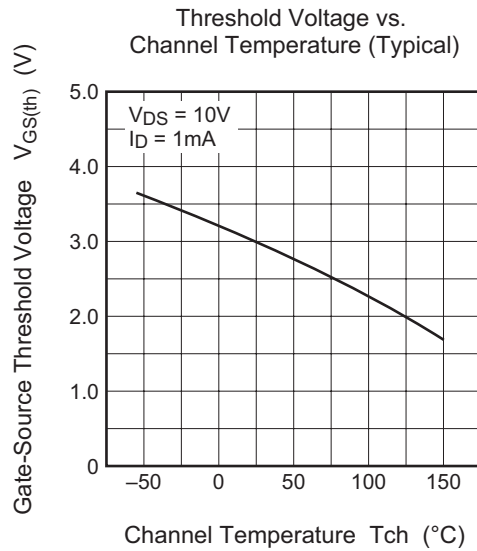
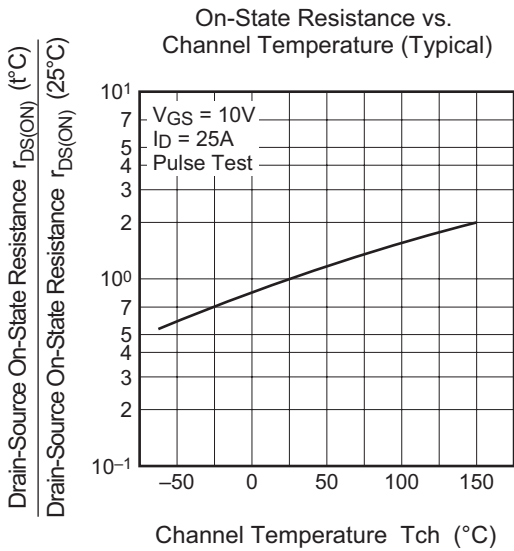


Gate-Source Voltage vs. Gate Charge (Typical)

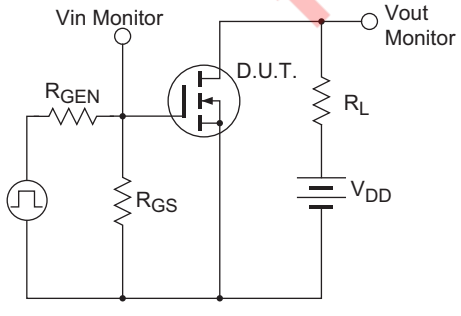


Source-Drain Diode Forward Characteristics (Typical)

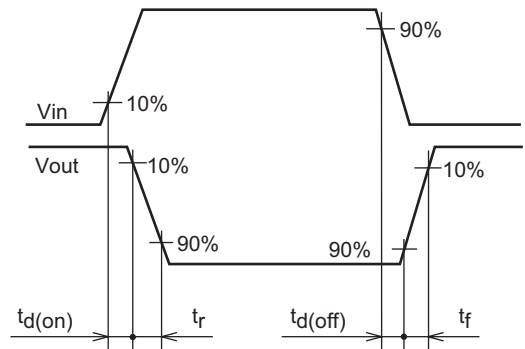




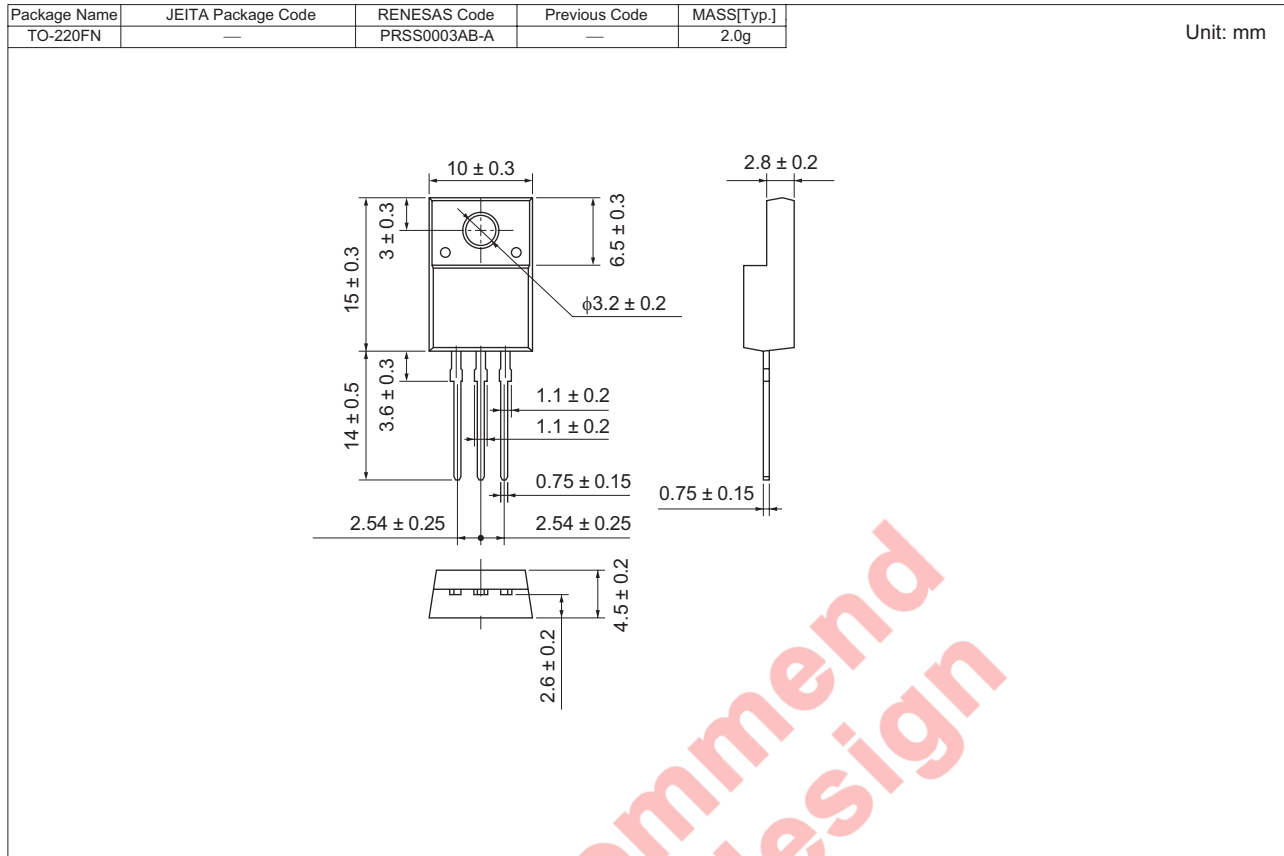
Switching Time Measurement Circuit



Switching Waveform



Package Dimensions



Order Code

| Lead form | Standard packing | Quantity | Standard order code | Standard order code example |
|---------------|-------------------------|----------|-------------------------------|-----------------------------|
| Straight type | Plastic Magazine (Tube) | 50 | Type name | FS50KM-06 |
| Lead form | Plastic Magazine (Tube) | 50 | Type name – Lead forming code | FS50KM-06-A8 |

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

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