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# 2SJ175

Silicon P-Channel MOS FET

## HITACHI

November 1996

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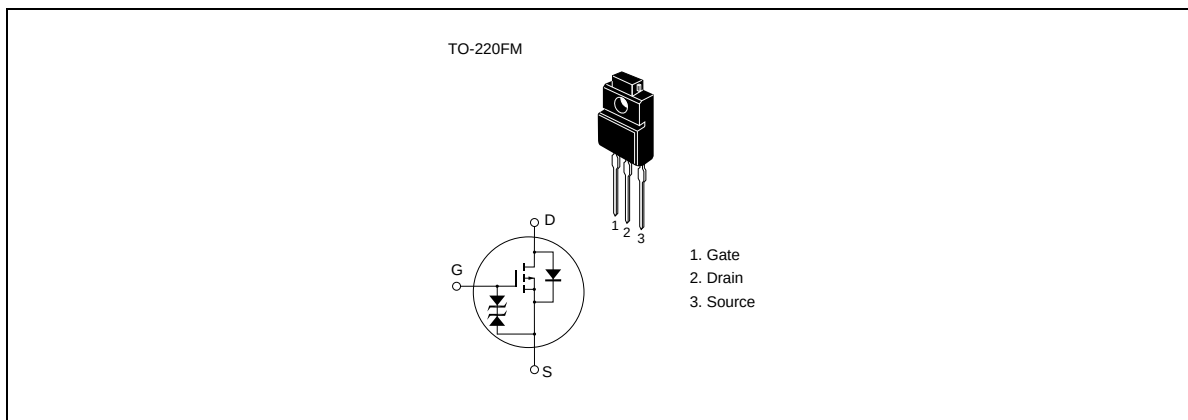
### Application

High speed power switching

### Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device
  - Can be driven from 5 V source
- Suitable for motor drive, DC-DC converter, power switch and solenoid drive

### Outline



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## 2SJ175

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### Absolute Maximum Ratings (Ta = 25°C)

| Item                                      | Symbol              | Ratings     | Unit |
|-------------------------------------------|---------------------|-------------|------|
| Drain to source voltage                   | $V_{DS}$            | −60         | V    |
| Gate to source voltage                    | $V_{GS}$            | ±20         | V    |
| Drain current                             | $I_D$               | −10         | A    |
| Drain peak current                        | $I_{D(pulse)}^{*1}$ | −40         | A    |
| Body to drain diode reverse drain current | $I_{DR}$            | −10         | A    |
| Channel dissipation                       | $Pch^{*2}$          | 25          | W    |
| Channel temperature                       | Tch                 | 150         | °C   |
| Storage temperature                       | Tstg                | −55 to +150 | °C   |

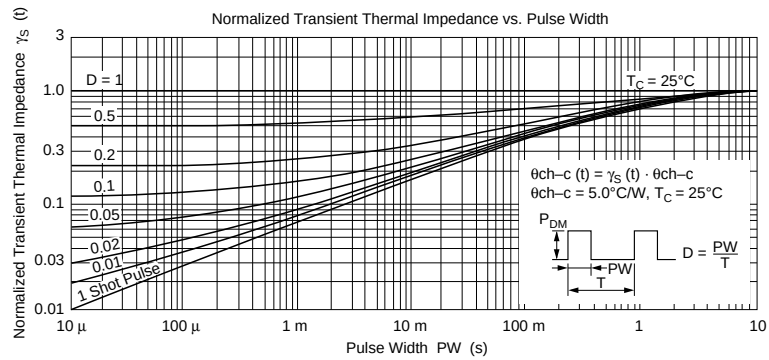
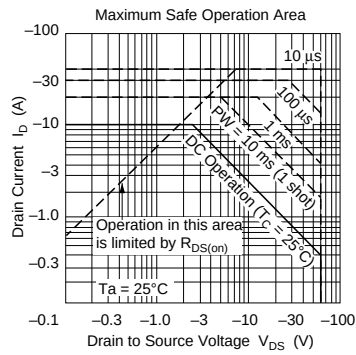
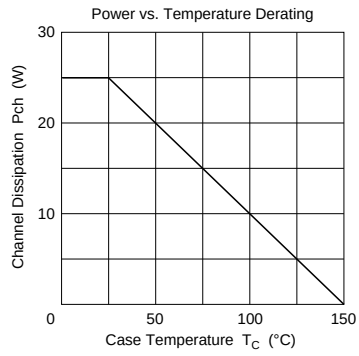
Notes 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$   
2. Value at  $T_c = 25^\circ C$

**Electrical Characteristics (Ta = 25°C)**

| Item                                       | Symbol        | Min      | Typ  | Max      | Unit          | Test conditions                                                                |
|--------------------------------------------|---------------|----------|------|----------|---------------|--------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | -60      | —    | —        | V             | $I_D = -10 \text{ mA}$ , $V_{GS} = 0$                                          |
| Gate to source breakdown voltage           | $V_{(BR)GSS}$ | $\pm 20$ | —    | —        | V             | $I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$                             |
| Gate to source leak current                | $I_{GSS}$     | —        | —    | $\pm 10$ | $\mu\text{A}$ | $V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$                                     |
| Zero gate voltage drain current            | $I_{DSS}$     | —        | —    | -250     | $\mu\text{A}$ | $V_{DS} = -50 \text{ V}$ , $V_{GS} = 0$                                        |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | -1.0     | —    | -2.0     | V             | $I_D = -1 \text{ mA}$ , $V_{DS} = -10 \text{ V}$                               |
| Static drain to source on state resistance | $R_{DS(on)}$  | —        | 0.13 | 0.18     | $\Omega$      | $I_D = -5 \text{ A}$ , $V_{GS} = -10 \text{ V}^{*1}$                           |
|                                            |               | —        | 0.18 | 0.25     |               | $I_D = -5 \text{ A}$ , $V_{GS} = -4 \text{ V}^{*1}$                            |
| Forward transfer admittance                | $ y_{fs} $    | 4.0      | 6.5  | —        | S             | $I_D = -5 \text{ A}$ , $V_{DS} = -10 \text{ V}^{*1}$                           |
| Input capacitance                          | $C_{iss}$     | —        | 900  | —        | pF            | $V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$               |
| Output capacitance                         | $C_{oss}$     | —        | 460  | —        | pF            |                                                                                |
| Reverse transfer capacitance               | $C_{rss}$     | —        | 130  | —        | pF            |                                                                                |
| Turn-on delay time                         | $t_{d(on)}$   | —        | 8    | —        | ns            | $I_D = -5 \text{ A}$ , $V_{GS} = -10 \text{ V}$ ,<br>$R_L = 6 \text{ }\Omega$  |
| Rise time                                  | $t_r$         | —        | 65   | —        | ns            |                                                                                |
| Turn-off delay time                        | $t_{d(off)}$  | —        | 170  | —        | ns            |                                                                                |
| Fall time                                  | $t_f$         | —        | 105  | —        | ns            |                                                                                |
| Body to drain diode forward voltage        | $V_{DF}$      | —        | -1.1 | —        | V             | $I_F = -10 \text{ A}$ , $V_{GS} = 0$                                           |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —        | 200  | —        | ns            | $I_F = -10 \text{ A}$ , $V_{GS} = 0$ ,<br>$di_F/dt = 50 \text{ A}/\mu\text{s}$ |

Note 1. Pulse test

See characteristic curves of 2SJ172



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