
2SJ174

Silicon P-Channel MOS FET

HITACHI

November 1996

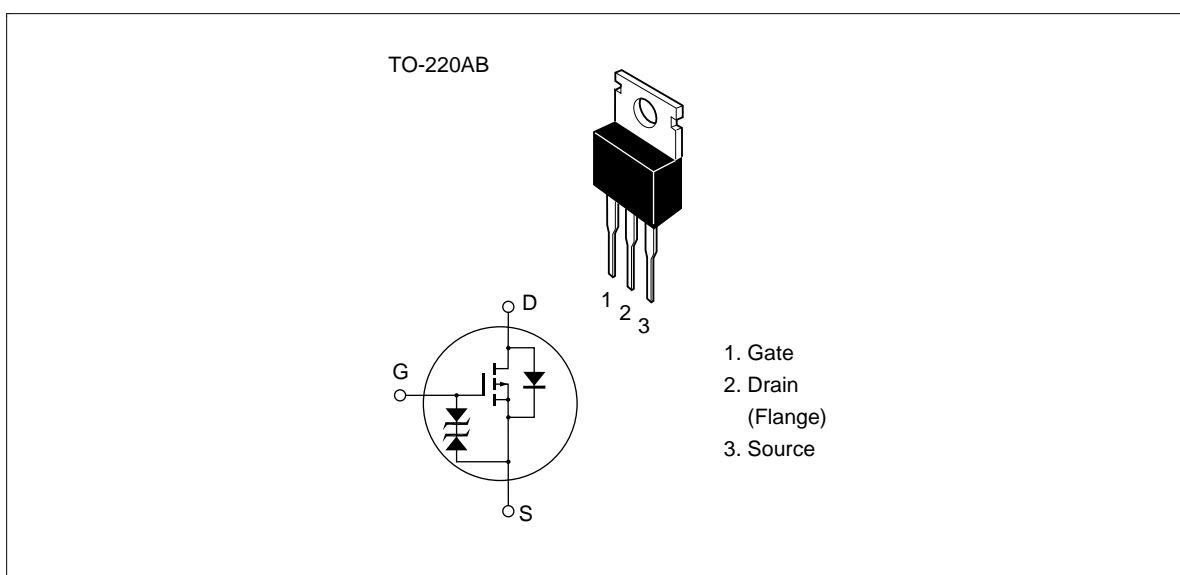
Application

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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Absolute Maximum Ratings (Ta = 25°C)

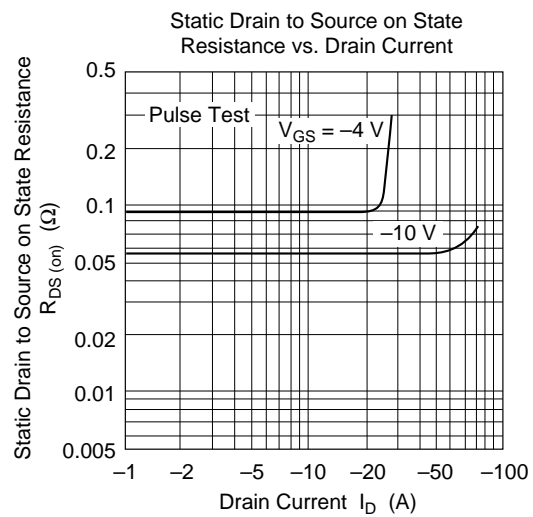
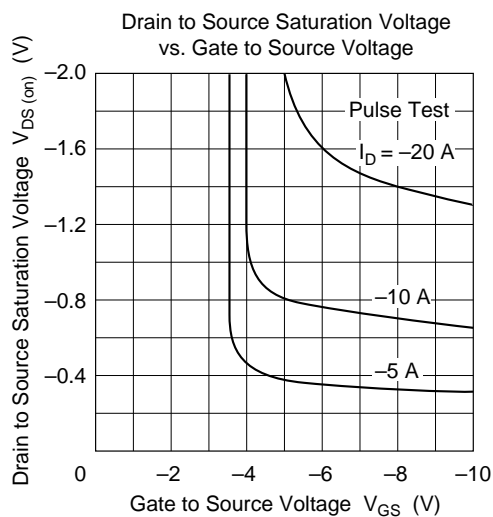
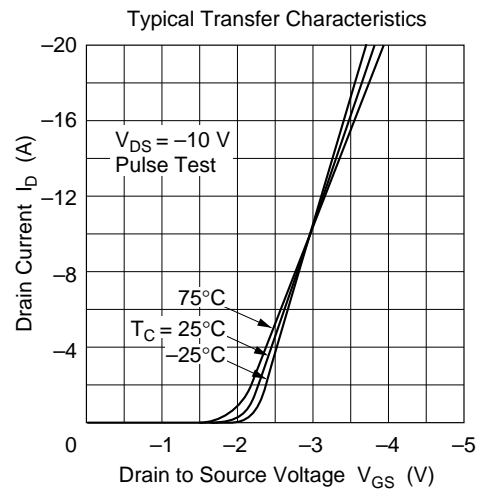
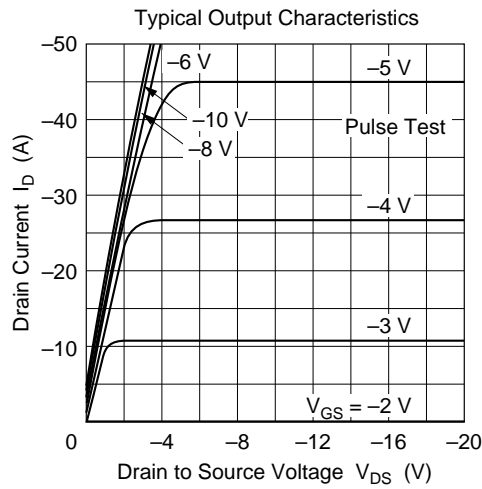
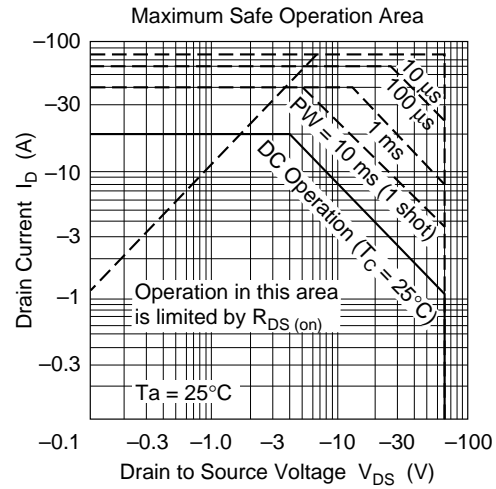
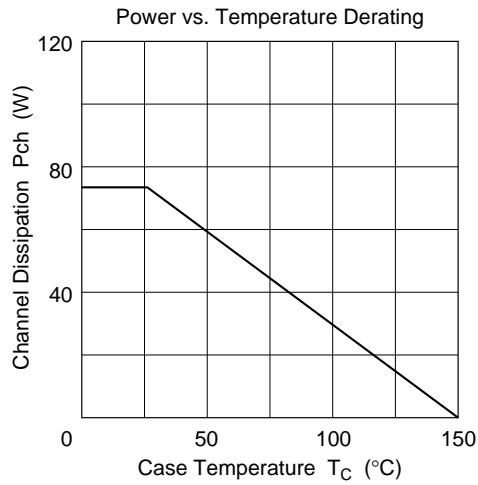
| Item | Symbol | Ratings | Unit |
|---|---------------------|-------------|------|
| Drain to source voltage | V_{DS} | -60 | V |
| Gate to source voltage | V_{GS} | ±20 | V |
| Drain current | I_D | -20 | A |
| Drain peak current | $I_{D(pulse)}^{*1}$ | -80 | A |
| Body to drain diode reverse drain current | I_{DR} | -20 | A |
| Channel dissipation | P_{ch}^{*2} | 75 | W |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature | T_{stg} | -55 to +150 | °C |

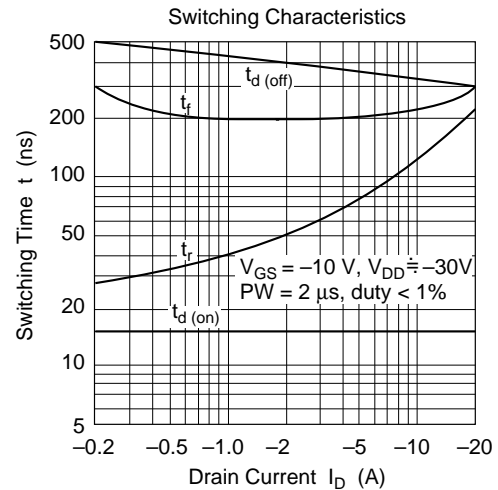
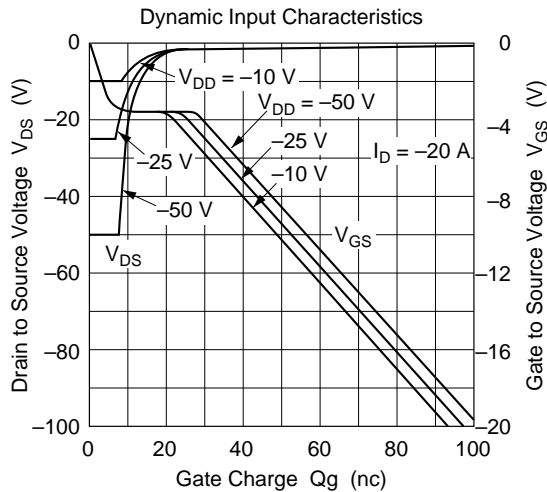
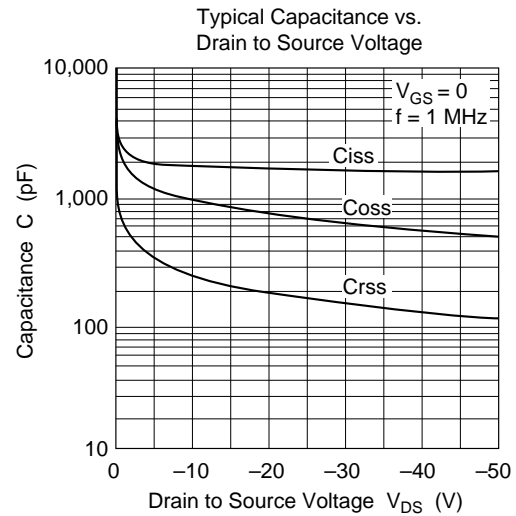
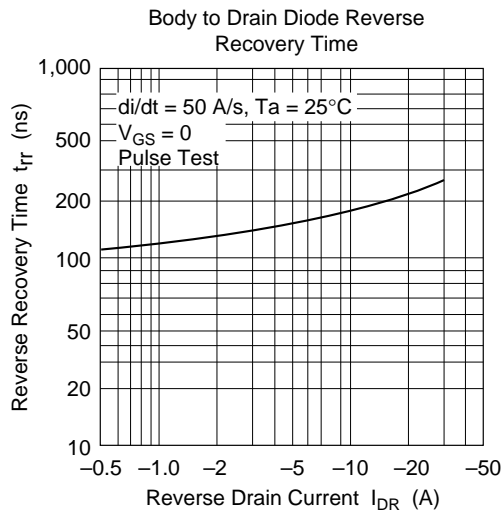
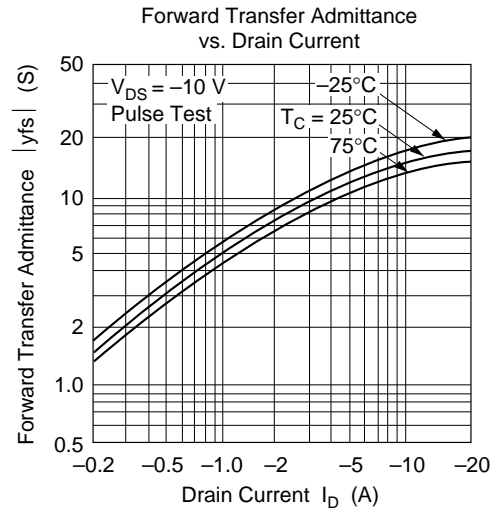
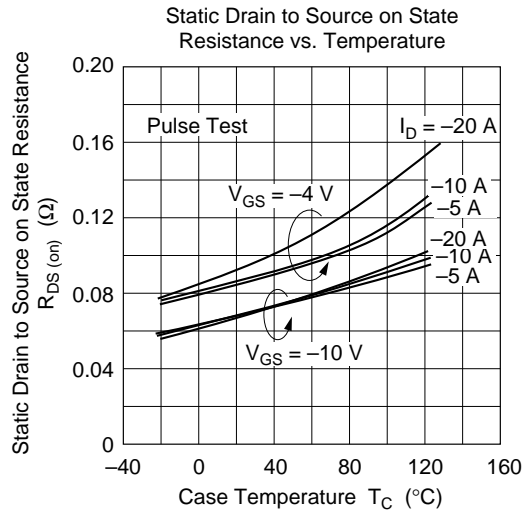
Notes 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$

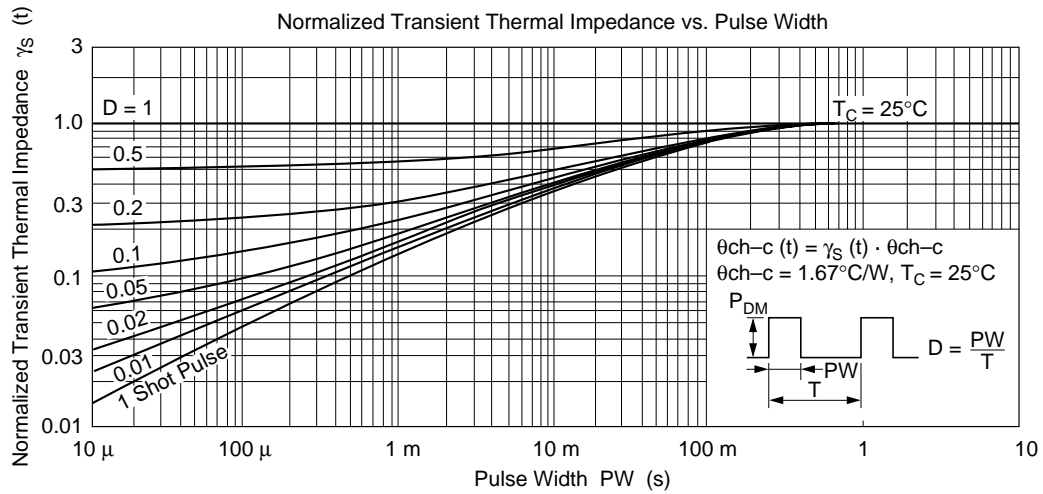
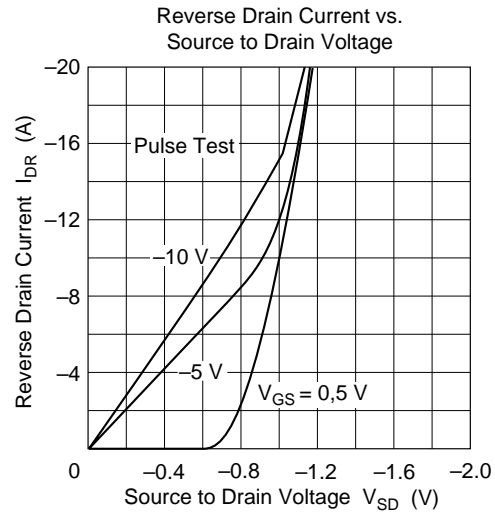
Electrical Characteristics (Ta = 25°C)

| 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 | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G = \pm 100 \mu A$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ±10 | μA | $V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | -250 | μA | $V_{DS} = -50 \text{ V}$, $V_{GS} = 0$ |
| 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 | $R_{DS(on)}$ | — | 0.065 | 0.085 | Ω | $I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}^{*1}$ |
| | | — | 0.09 | 0.13 | | $I_D = -10 \text{ A}$, $V_{GS} = -4 \text{ V}^{*1}$ |
| Forward transfer admittance | $ y_{fs} $ | 8 | 13 | — | S | $I_D = -10 \text{ A}$, $V_{DS} = -10 \text{ V}^{*1}$ |
| Input capacitance | C_{iss} | — | 1850 | — | pF | $V_{DS} = -10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 990 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 265 | — | pF | |
| Turn-on delay time | $t_{d(on)}$ | — | 15 | — | ns | $I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_L = 3 \Omega$ |
| Rise time | t_r | — | 125 | — | ns | |
| Turn-off delay time | $t_{d(off)}$ | — | 345 | — | ns | |
| Fall time | t_f | — | 235 | — | ns | |
| Body to drain diode forward voltage | V_{DF} | — | -1.2 | — | V | $I_F = -20 \text{ A}$, $V_{GS} = 0$ |
| Body to drain diode reverse recovery time | t_{rr} | — | 230 | — | ns | $I_F = -20 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 50 \text{ A}/\mu s$ |

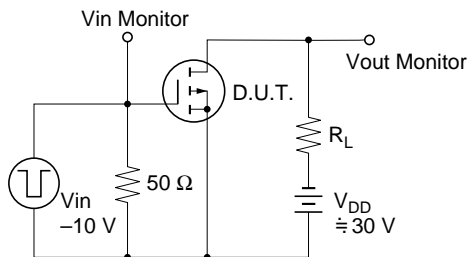
Note 1. Pulse test



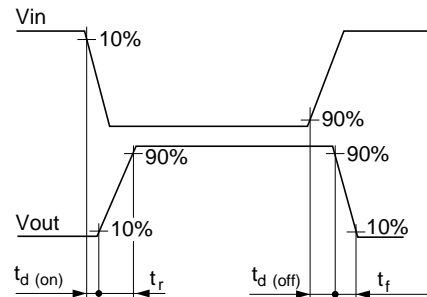




Switching Time Test Circuit



Waveforms



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