

# 2SJ518

Silicon P Channel MOS FET  
High Speed Power Switching

# HITACHI

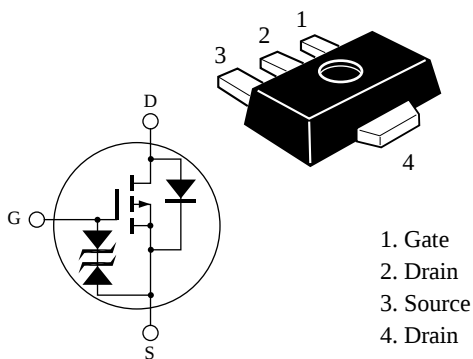
ADE-208-580B (Z)  
3rd. Edition  
Jul. 1998

## Features

- Low on-resistance  
 $R_{DS(on)} = 0.35 \Omega$  typ. at ( $V_{GS} = -10V$ ,  $I_D = -1A$ )
- Low drive current
- 4 V gate drive devices
- High speed switching

## Outline

UPAK



Absolute Maximum Ratings (Ta = 25°C)

| Item                                   | Symbol                 | Ratings     | Unit |
|----------------------------------------|------------------------|-------------|------|
| Drain to source voltage                | $V_{DSS}$              | −60         | V    |
| Gate to source voltage                 | $V_{GSS}$              | ±20         | V    |
| Drain current                          | $I_D$                  | −2          | A    |
| Drain peak current                     | $I_{D(pulse)}^{Note1}$ | −4          | A    |
| Body-drain diode reverse drain current | $I_{DR}$               | −2          | A    |
| Avalenche current                      | $I_{AP}^{Note2}$       | −2          | A    |
| Avalenche energy                       | $E_{AR}$               | 0.34        | mJ   |
| Channel dissipation                    | $P_{ch}^{Note3}$       | 1           | W    |
| Channel temperature                    | Tch                    | 150         | °C   |
| Storage temperature                    | Tstg                   | −55 to +150 | °C   |

Note: 1.  $PW \leq 10\mu s$ , duty cycle  $\leq 1\%$   
2. value at Tch = 25°C,  $R_g \geq 50\ \Omega$   
3. Value at when using the aluminaceramic board (12.5x20x0.7mm)

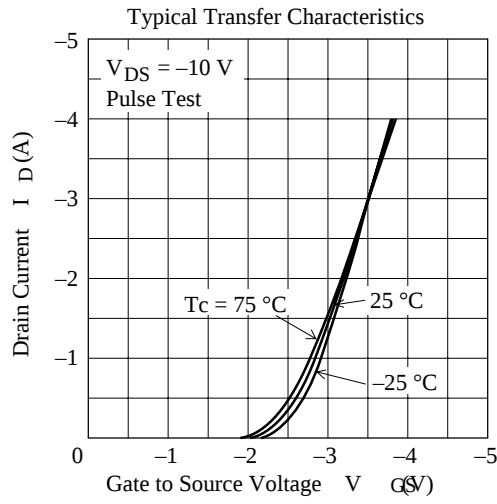
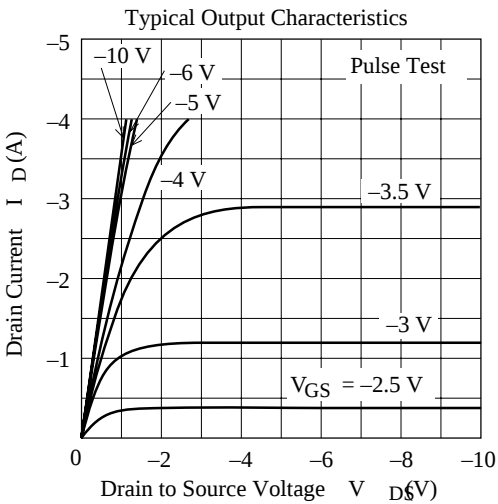
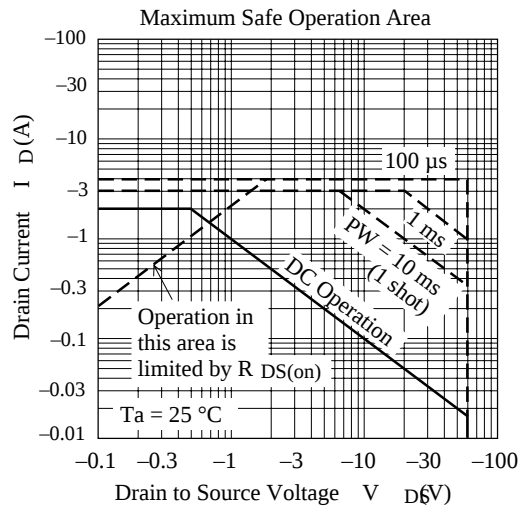
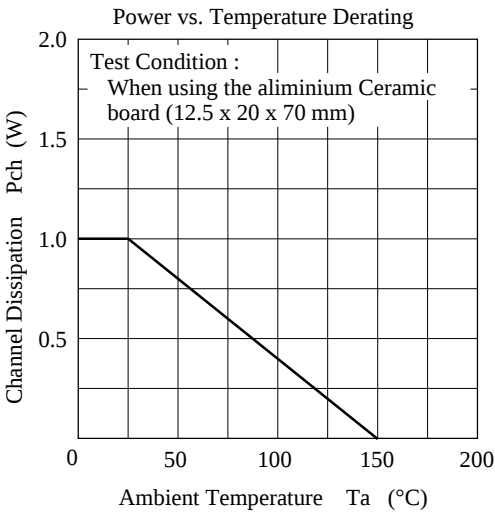
## Electrical Characteristics (Ta = 25°C)

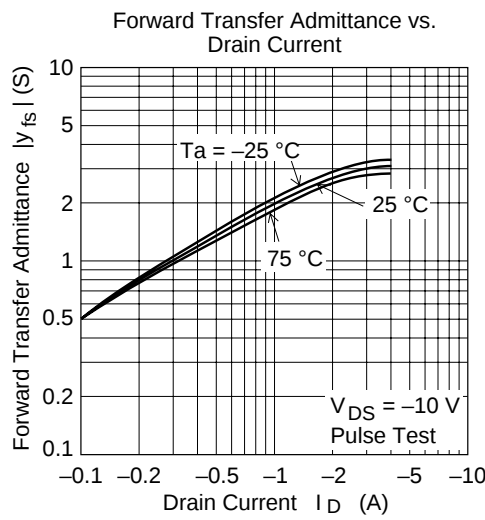
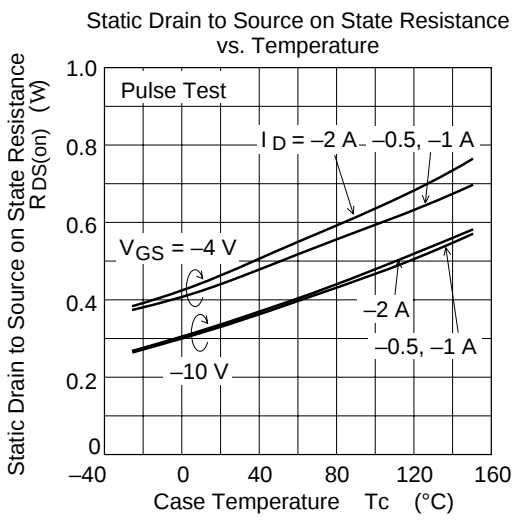
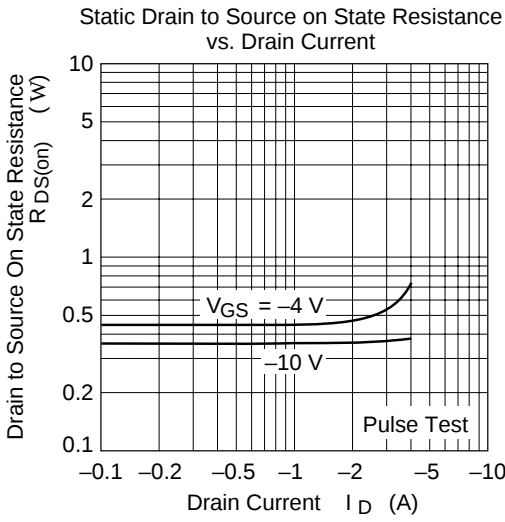
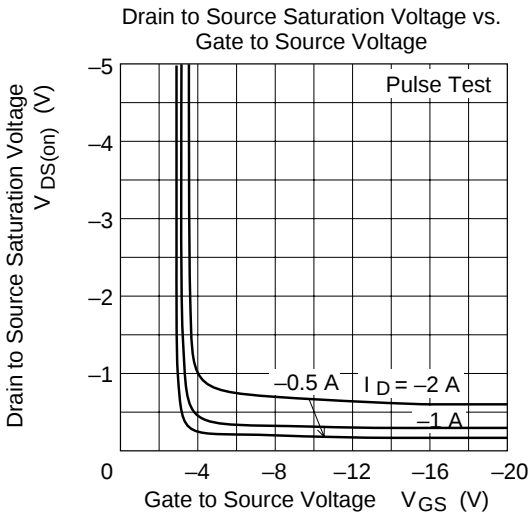
| Item                                       | Symbol        | Min      | Typ   | Max      | Unit          | Test Conditions                                                         |
|--------------------------------------------|---------------|----------|-------|----------|---------------|-------------------------------------------------------------------------|
| 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             | $I_G = \pm 100\mu\text{A}$ , $V_{DS} = 0$                               |
| Zero gate voltage drain current            | $I_{DSS}$     | —        | —     | -10      | $\mu\text{A}$ | $V_{DS} = -60\text{V}$ , $V_{GS} = 0$                                   |
| Gate to source leak current                | $I_{GSS}$     | —        | —     | $\pm 10$ | $\mu\text{A}$ | $V_{GS} = \pm 16\text{V}$ , $V_{DS} = 0$                                |
| 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 | $R_{DS(on)}$  | —        | 0.35  | 0.46     | $\Omega$      | $I_D = -1\text{A}$ , $V_{GS} = -10\text{V}$ <sup>Note4</sup>            |
|                                            | $R_{DS(on)}$  | —        | 0.45  | 0.63     | $\Omega$      | $I_D = -1\text{A}$ , $V_{GS} = -4\text{V}$ <sup>Note4</sup>             |
| Forward transfer admittance                | $ y_{fs} $    | 1.2      | 2.0   | —        | S             | $I_D = -1\text{A}$ , $V_{DS} = -10\text{V}$ <sup>Note4</sup>            |
| Input capacitance                          | $C_{iss}$     | —        | 220   | —        | pF            | $V_{DS} = -10\text{V}$                                                  |
| Output capacitance                         | $C_{oss}$     | —        | 110   | —        | pF            | $V_{GS} = 0$                                                            |
| Reverse transfer capacitance               | $C_{rss}$     | —        | 35    | —        | pF            | $f = 1\text{MHz}$                                                       |
| Turn-on delay time                         | $t_{d(on)}$   | —        | 10    | —        | ns            | $V_{GS} = -10\text{V}$ , $I_D = -1\text{A}$                             |
| Rise time                                  | $t_r$         | —        | 11    | —        | ns            | $R_L = 30\Omega$                                                        |
| Turn-off delay time                        | $t_{d(off)}$  | —        | 45    | —        | ns            |                                                                         |
| Fall time                                  | $t_f$         | —        | 30    | —        | ns            |                                                                         |
| Body-drain diode forward voltage           | $V_{DF}$      | —        | -1.05 | —        | V             | $I_D = -2\text{A}$ , $V_{GS} = 0$                                       |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —        | 50    | —        | ns            | $I_F = -2\text{A}$ , $V_{GS} = 0$<br>$di_F/dt = 50\text{A}/\mu\text{s}$ |

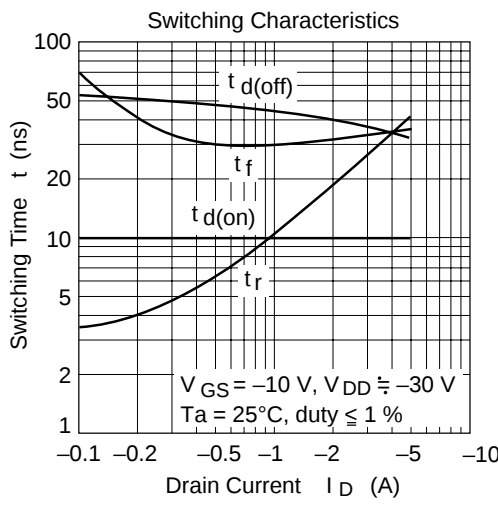
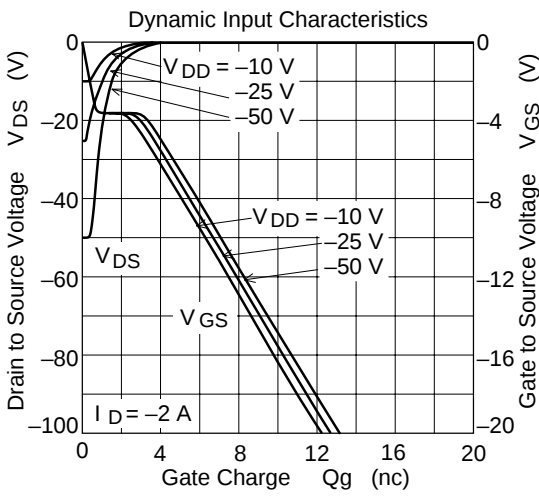
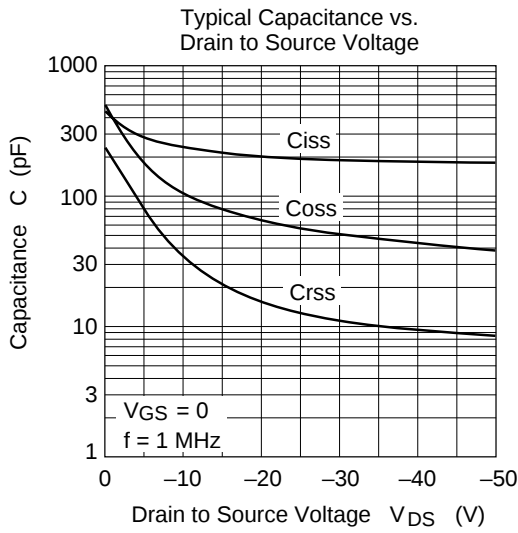
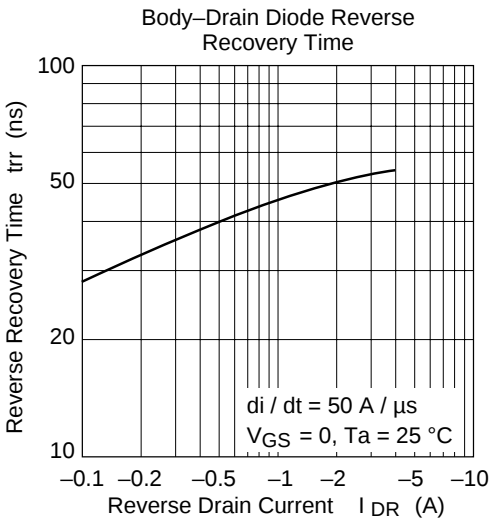
Note: 4. Pulse test

5. Marking is "AZ"

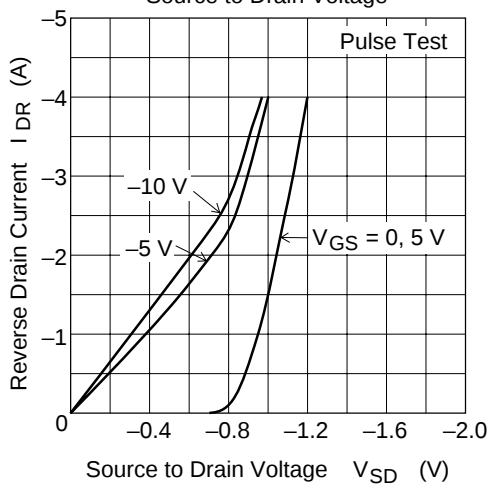
Main Characteristics



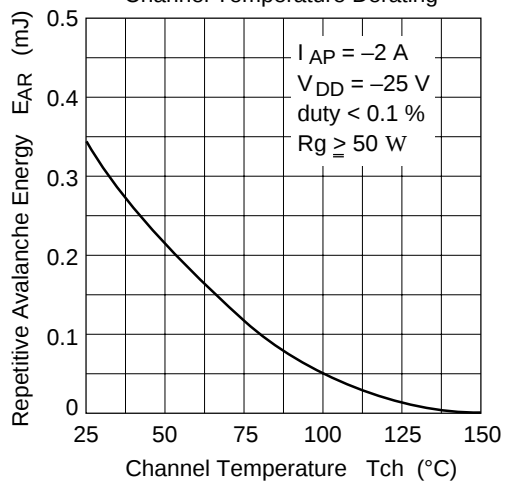




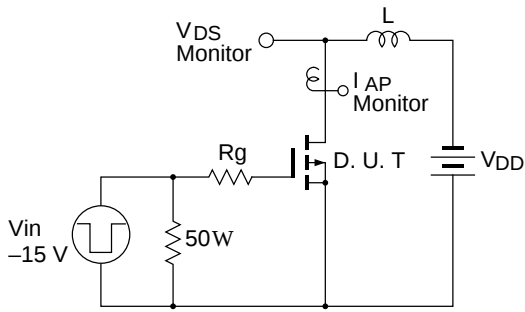
Reverse Drain Current vs.  
Source to Drain Voltage



Maximum Avalanche Energy vs.  
Channel Temperature Derating

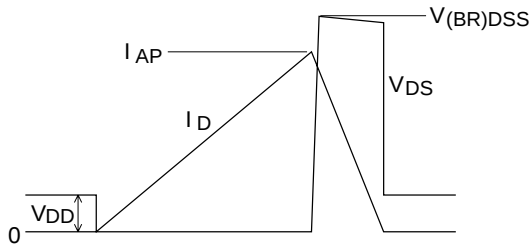


Avalanche Test Circuit

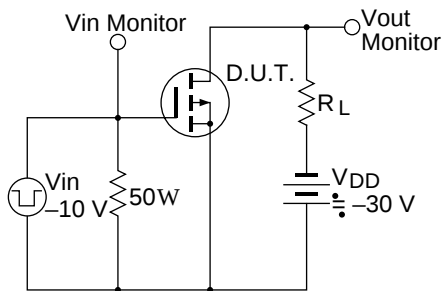


Avalanche Waveform

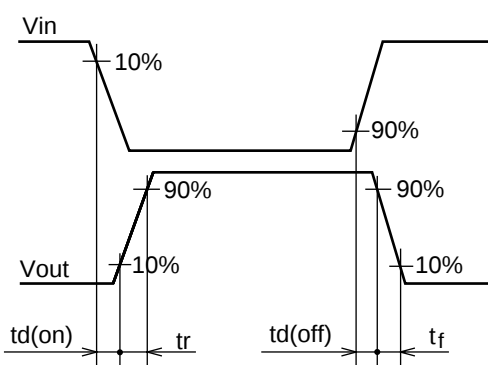
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

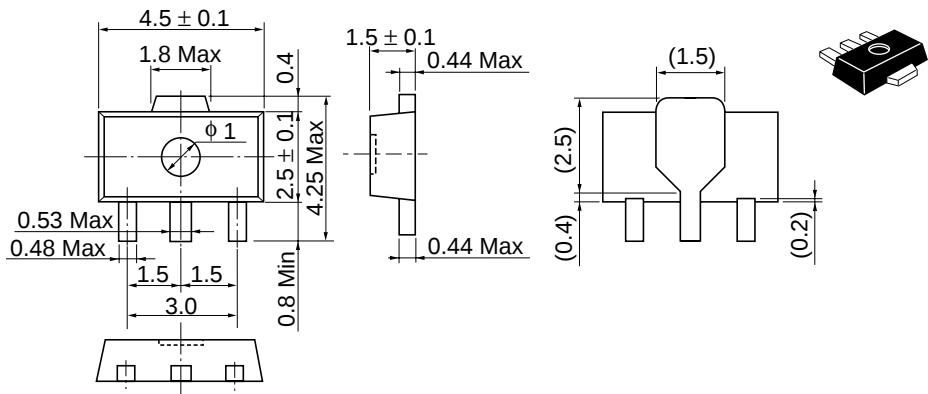


Waveform



Package Dimensions

As of January, 2001  
Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | UPAK     |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.050 g  |

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