

# 2SK1519, 2SK1520

Silicon N-Channel MOS FET

# HITACHI

ADE-208-1288 (Z)  
1st. Edition  
Mar. 2001

## Application

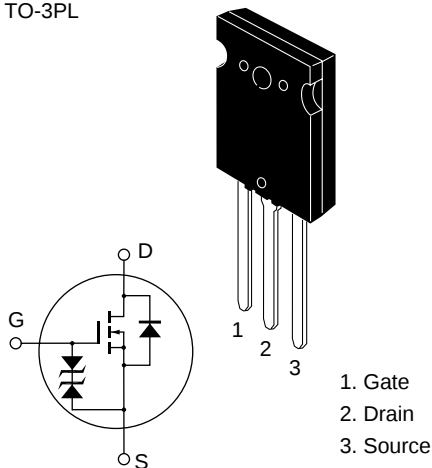
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- Built-in fast recovery diode ( $t_{rr} = 120 \text{ ns}$ )
- Suitable for motor control, switching regulator, DC-DC converter

## Outline

TO-3PL



2SK1519, 2SK1520

Absolute Maximum Ratings (Ta = 25°C)

| Item                                      |         | Symbol              | Ratings     | Unit |
|-------------------------------------------|---------|---------------------|-------------|------|
| Drain to source voltage                   | 2SK1519 | $V_{DSS}$           | 450         | V    |
|                                           | 2SK1520 |                     | 500         |      |
| Gate to source voltage                    |         | $V_{GSS}$           | ±30         | V    |
| Drain current                             |         | $I_D$               | 30          | A    |
| Drain peak current                        |         | $I_{D(pulse)}^{*1}$ | 120         | A    |
| Body to drain diode reverse drain current |         | $I_{DR}$            | 30          | A    |
| Channel dissipation                       |         | $Pch^{*2}$          | 200         | W    |
| Channel temperature                       |         | Tch                 | 150         | °C   |
| Storage temperature                       |         | Tstg                | −55 to +150 | °C   |

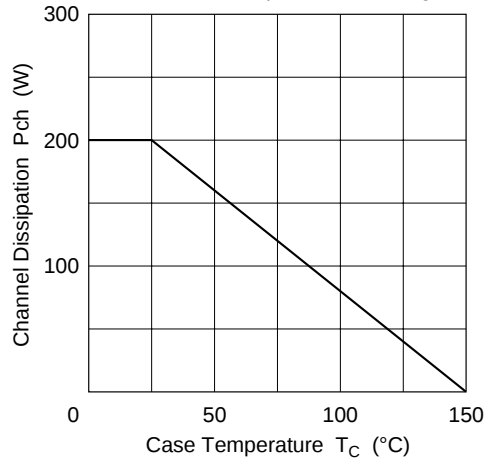
Notes: 1. PW 10 μs, duty cycle 1%  
2. Value at Tc = 25°C

**Electrical Characteristics** ( $T_a = 25^\circ\text{C}$ )

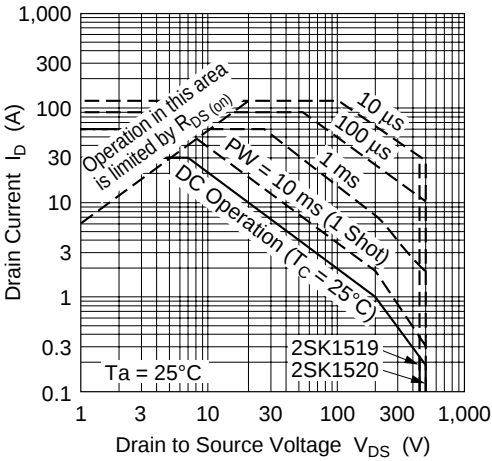
| Item                                       |                    | Symbol        | Min        | Typ          | Max          | Unit          | Test conditions                                                                  |
|--------------------------------------------|--------------------|---------------|------------|--------------|--------------|---------------|----------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | 2SK1519<br>2SK1520 | $V_{(BR)DSS}$ | 450<br>500 | —            | —            | V             | $I_D = 10\text{ mA}$ , $V_{GS} = 0$                                              |
| Gate to source breakdown voltage           |                    | $V_{(BR)GSS}$ | $\pm 30$   | —            | —            | V             | $I_G = \pm 100\text{ }\mu\text{A}$ , $V_{DS} = 0$                                |
| Gate to source leak current                |                    | $I_{GSS}$     | —          | —            | $\pm 10$     | $\mu\text{A}$ | $V_{GS} = \pm 25\text{ V}$ , $V_{DS} = 0$                                        |
| Zero gate voltage drain current            | 2SK1519<br>2SK1520 | $I_{DSS}$     | —          | —            | 250          | $\mu\text{A}$ | $V_{DS} = 360\text{ V}$ , $V_{GS} = 0$<br>$V_{DS} = 400\text{ V}$ , $V_{GS} = 0$ |
| Gate to source cutoff voltage              |                    | $V_{GS(off)}$ | 2.0        | —            | 3.0          | V             | $I_D = 1\text{ mA}$ , $V_{DS} = 10\text{ V}$                                     |
| Static Drain to source on state resistance | 2SK1519<br>2SK1520 | $R_{DS(on)}$  | —<br>—     | 0.11<br>0.12 | 0.15<br>0.16 |               | $I_D = 15\text{ A}$ , $V_{GS} = 10\text{ V}^{*1}$                                |
| Forward transfer admittance                |                    | $ y_{fs} $    | 15         | 25           | —            | S             | $I_D = 15\text{ A}$ , $V_{DS} = 10\text{ V}^{*1}$                                |
| Input capacitance                          |                    | $C_{iss}$     | —          | 5800         | —            | pF            | $V_{DS} = 10\text{ V}$ , $V_{GS} = 0$ ,                                          |
| Output capacitance                         |                    | $C_{oss}$     | —          | 1550         | —            | pF            | $f = 1\text{ MHz}$                                                               |
| Reverse transfer capacitance               |                    | $C_{rss}$     | —          | 170          | —            | pF            |                                                                                  |
| Turn-on delay time                         |                    | $t_{d(on)}$   | —          | 65           | —            | ns            | $I_D = 15\text{ A}$ , $V_{GS} = 10\text{ V}$ ,                                   |
| Rise time                                  |                    | $t_r$         | —          | 170          | —            | ns            | $R_L = 2$                                                                        |
| Turn-off delay time                        |                    | $t_{d(off)}$  | —          | 415          | —            | ns            |                                                                                  |
| Fall time                                  |                    | $t_f$         | —          | 200          | —            | ns            |                                                                                  |
| Body to drain diode forward voltage        |                    | $V_{DF}$      | —          | 1.1          | —            | V             | $I_F = 30\text{ A}$ , $V_{GS} = 0$                                               |
| Body to drain diode reverse recovery time  |                    | $t_{rr}$      | —          | 120          | —            | ns            | $I_F = 30\text{ A}$ , $V_{GS} = 0$ ,<br>$di_F/dt = 100\text{ A}/\mu\text{s}$     |

Note: 1. Pulse test

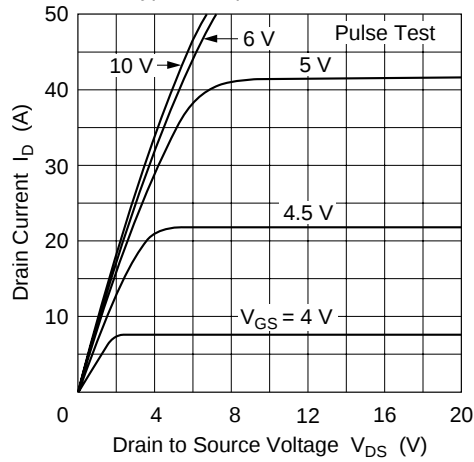
Power vs. Temperature Derating



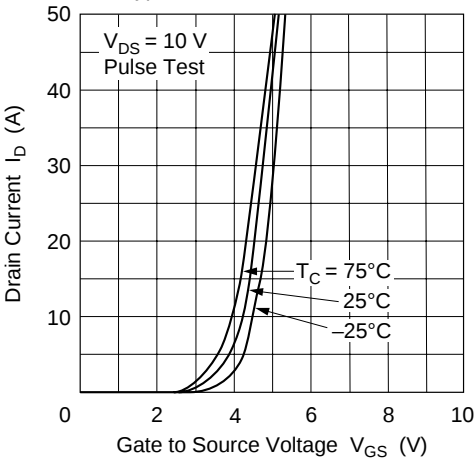
Maximum Safe Operation Area

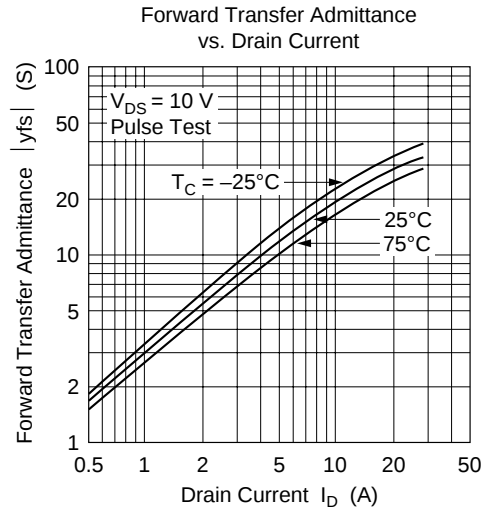
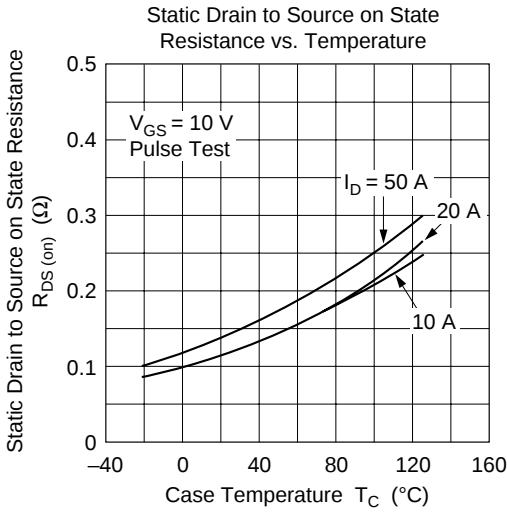
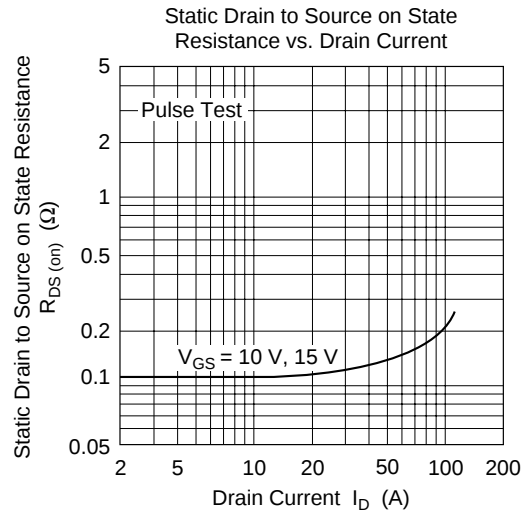
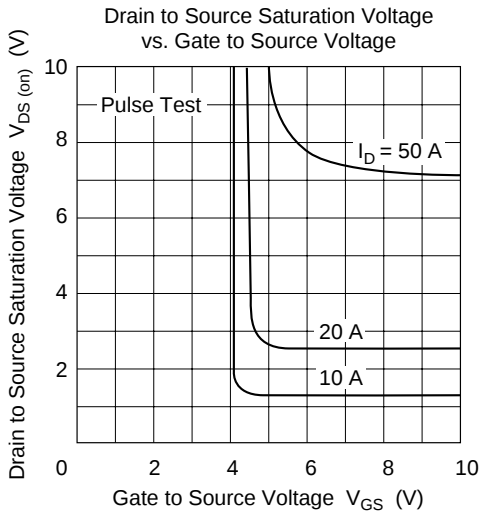


Typical Output Characteristics

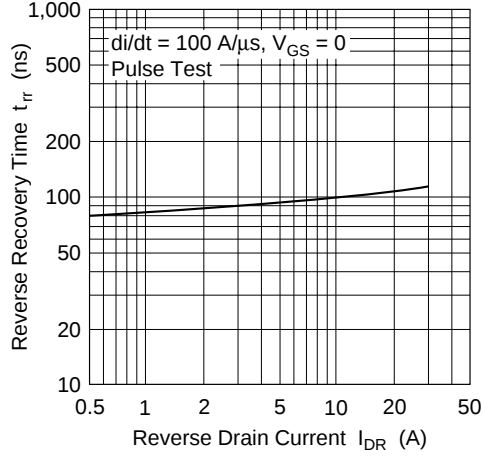


Typical Transfer Characteristics

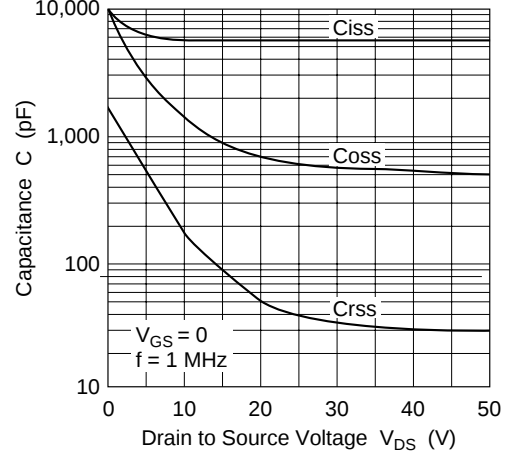




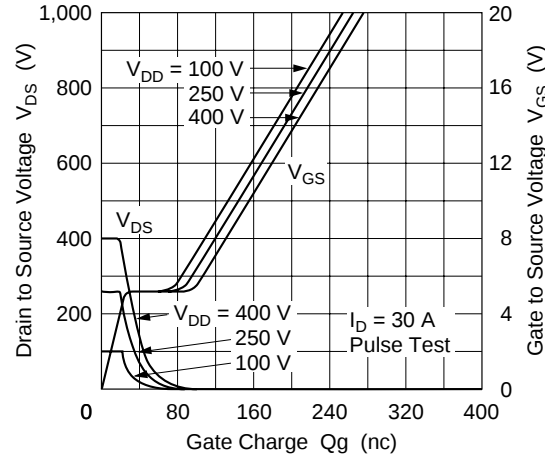
Body to Drain Diode Reverse Recovery Time



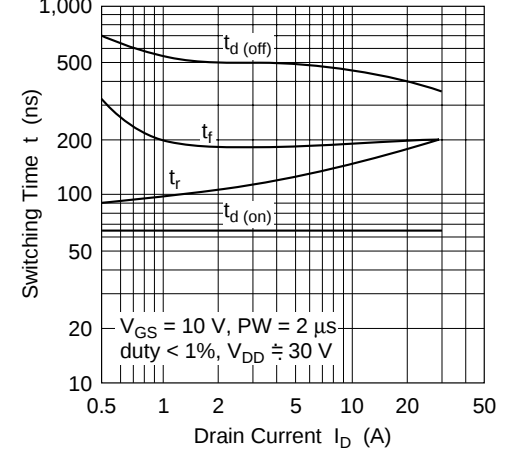
Typical Capacitance vs. Drain to Source Voltage

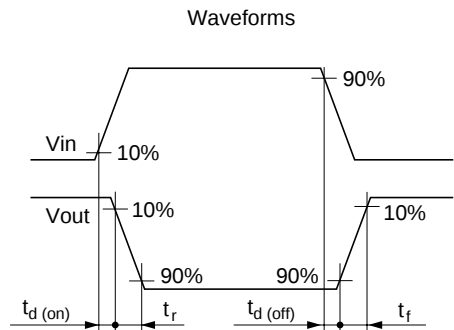
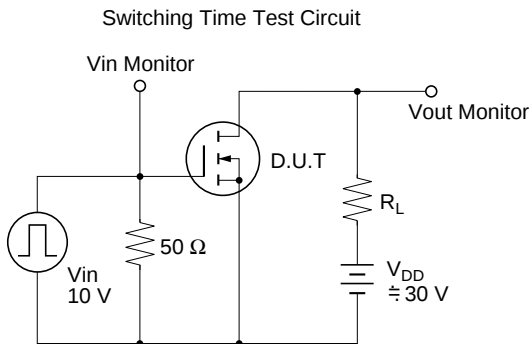
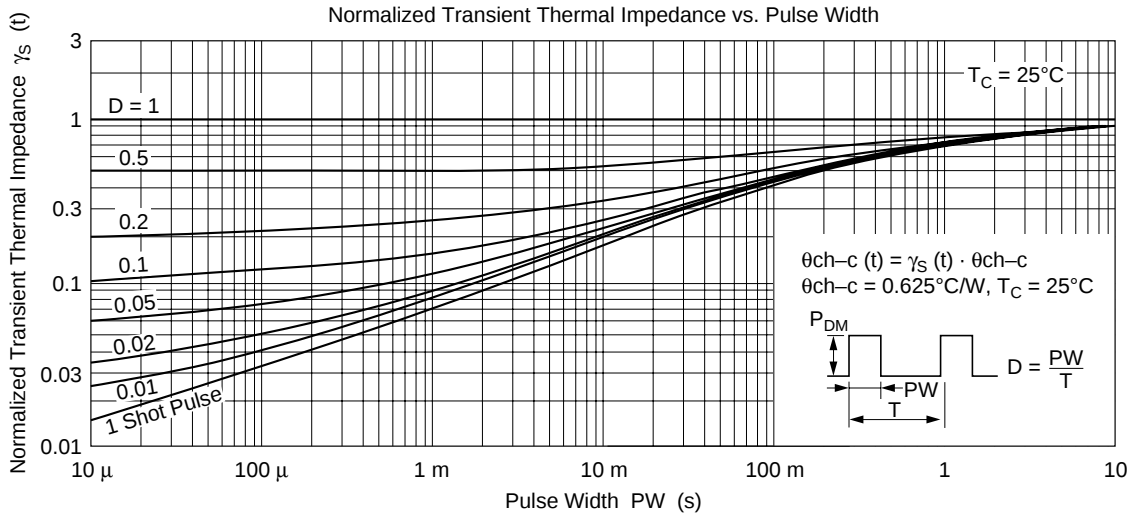
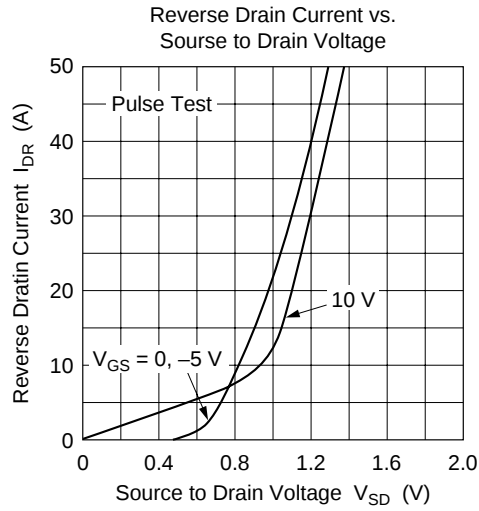


Dynamic Input Characteristics



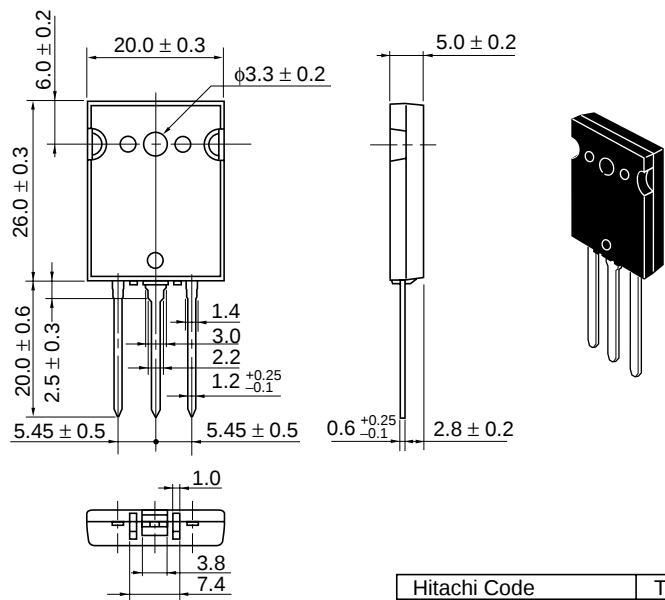
Switching Characteristics





Package Dimensions

As of January, 2001  
Unit: mm



|                        |        |
|------------------------|--------|
| Hitachi Code           | TO-3PL |
| JEDEC                  | —      |
| EIAJ                   | —      |
| Mass (reference value) | 9.9 g  |

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