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# 2SK2393

Silicon N-Channel MOS FET

## HITACHI

November 1996

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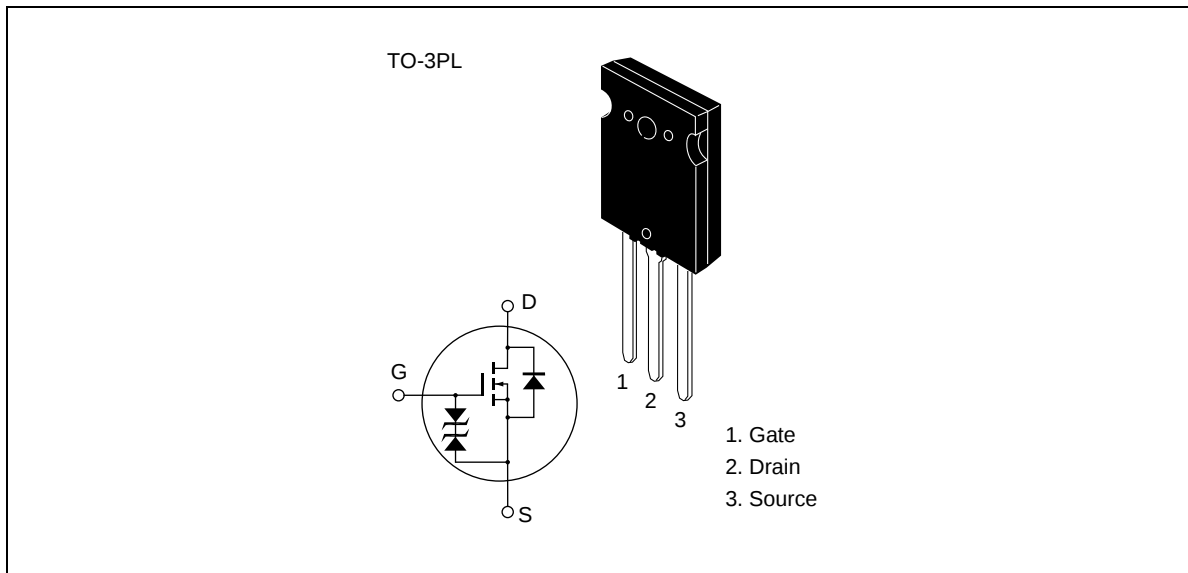
### Application

High voltage / High speed power switching

### Features

- Low on-resistance, High breakdown voltage
- High speed switching
- Low Drive Current
- No Secondary Breakdown
- Suitable for Switching regulator, Motor Control

### Outline



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## 2SK2393

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

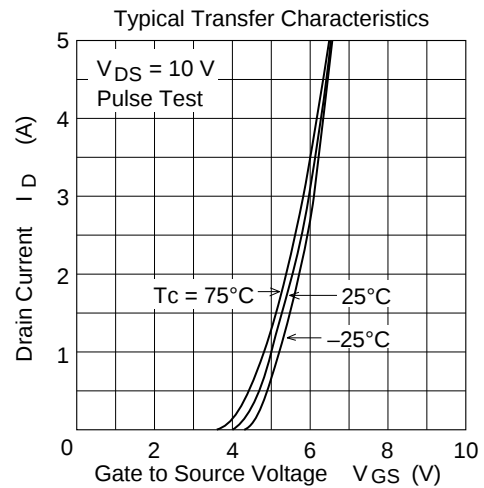
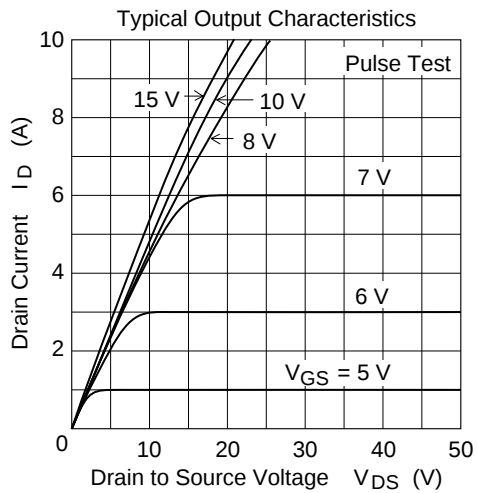
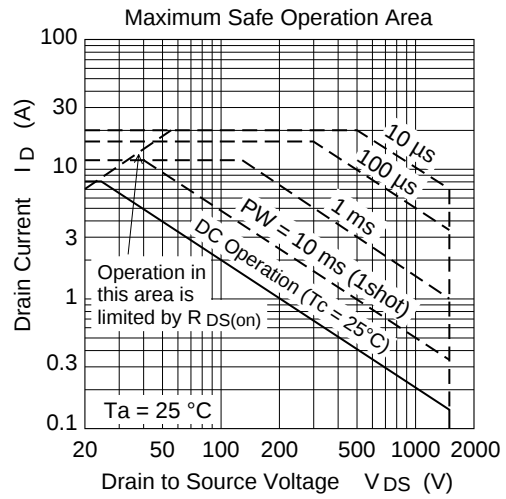
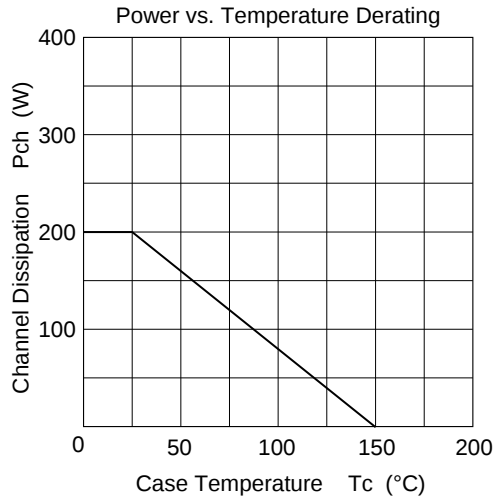
| Item                                      | Symbol              | Ratings     | Unit |
|-------------------------------------------|---------------------|-------------|------|
| Drain to source voltage                   | $V_{DSS}$           | 1500        | V    |
| Gate to source voltage                    | $V_{GSS}$           | $\pm 20$    | V    |
| Drain current                             | $I_D$               | 8           | A    |
| Drain peak current                        | $I_{D(pulse)}^{*1}$ | 20          | A    |
| Body to drain diode reverse drain current | $I_{DR}$            | 8           | A    |
| Channel dissipation                       | $P_{ch}^{*2}$       | 200         | W    |
| Channel temperature                       | Tch                 | 150         | °C   |
| Storage temperature                       | Tstg                | -55 to +150 | °C   |

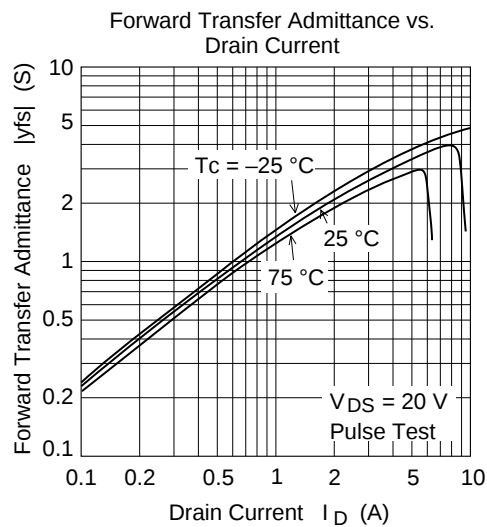
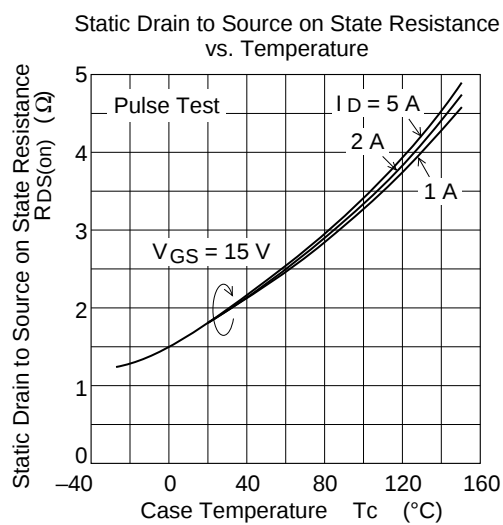
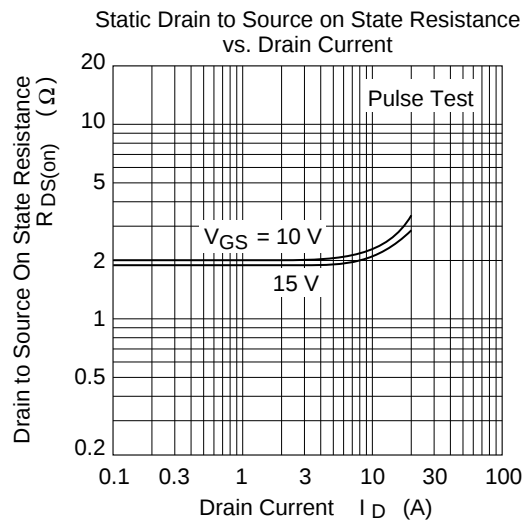
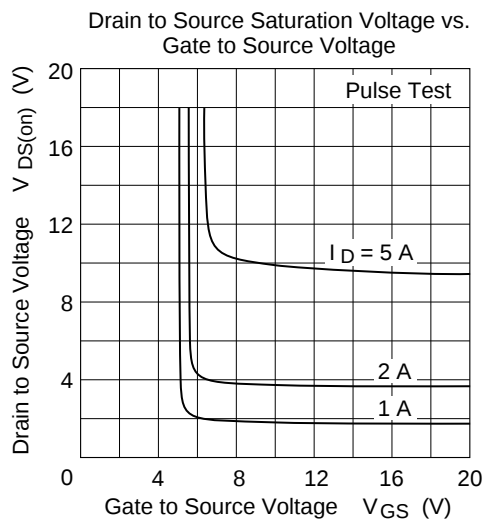
Notes 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1 \%$   
2. Value at Tc = 25 °C

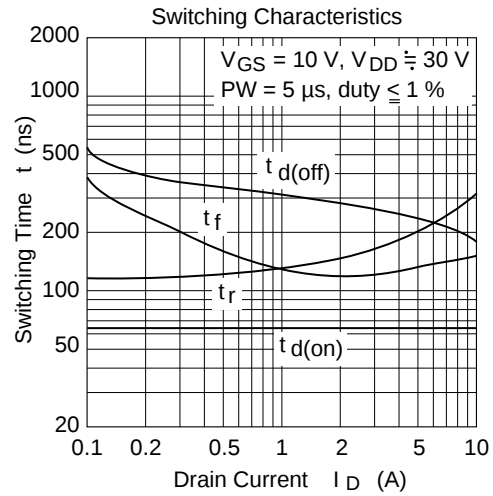
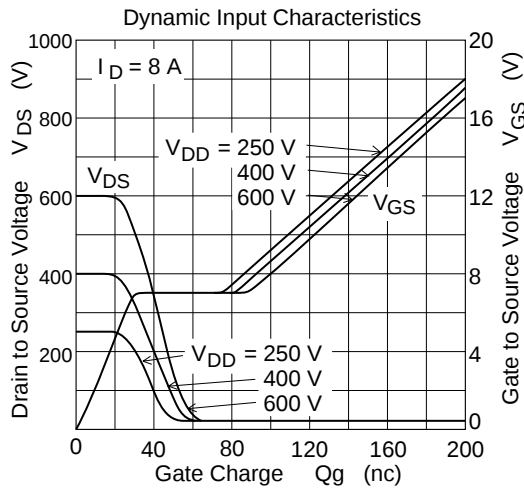
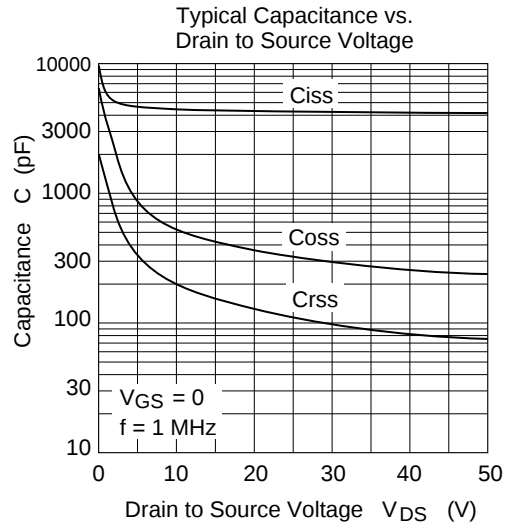
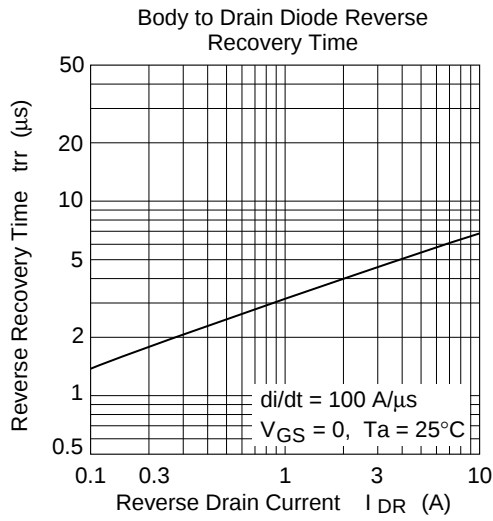
**Electrical Characteristics (Ta = 25°C)**

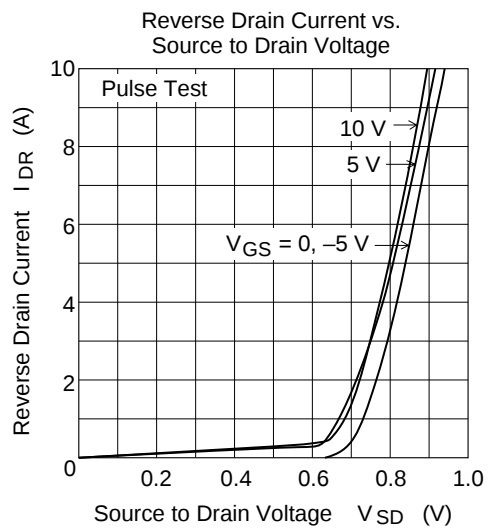
| Item                                       | Symbol        | Min  | Typ  | Max     | Unit          | Test Conditions                                                                  |
|--------------------------------------------|---------------|------|------|---------|---------------|----------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 1500 | —    | —       | V             | $I_D = 10 \text{ mA}$ , $V_{GS} = 0^{*1}$                                        |
| Gate to source leak current                | $I_{GSS}$     | —    | —    | $\pm 1$ | $\mu\text{A}$ | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$                                       |
| Zero gate voltage drain current            | $I_{DSS}$     | —    | —    | 500     | $\mu\text{A}$ | $V_{DS} = 1200 \text{ V}$ , $V_{GS} = 0$                                         |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 2.0  | —    | 4.0     | V             | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                                   |
| Static drain to source on state resistance | $R_{DS(on)}$  | —    | 1.9  | 2.8     | $\Omega$      | $I_D = 4 \text{ A}$<br>$V_{GS} = 15 \text{ V}^{*1}$                              |
| Forward transfer admittance                | $ y_{fs} $    | 1.8  | 3.0  | —       | S             | $I_D = 4 \text{ A}$<br>$V_{DS} = 20 \text{ V}^{*1}$                              |
| Input capacitance                          | $C_{iss}$     | —    | 4370 | —       | pF            | $V_{DS} = 10 \text{ V}$<br>$V_{GS} = 0$<br>$f = 1 \text{ MHz}$                   |
| Output capacitance                         | $C_{oss}$     | —    | 560  | —       | pF            |                                                                                  |
| Reverse transfer capacitance               | $C_{rss}$     | —    | 200  | —       | pF            |                                                                                  |
| Turn-on delay time                         | $t_{d(on)}$   | —    | 75   | —       | ns            | $I_D = 4 \text{ A}$<br>$V_{GS} = 10 \text{ V}$<br>$R_L = 7.5 \Omega$             |
| Rise time                                  | $t_r$         | —    | 180  | —       | ns            |                                                                                  |
| Turn-off delay time                        | $t_{d(off)}$  | —    | 260  | —       | ns            |                                                                                  |
| Fall time                                  | $t_f$         | —    | 125  | —       | ns            |                                                                                  |
| Body to drain diode forward voltage        | $V_{DF}$      | —    | 0.9  | —       | V             | $I_F = 8 \text{ A}$ , $V_{GS} = 0$                                               |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —    | 6.5  | —       | $\mu\text{s}$ | $I_F = 8 \text{ A}$ , $V_{GS} = 0$ ,<br>$diF / dt = 100 \text{ A} / \mu\text{s}$ |

Note 1. Pulse Test

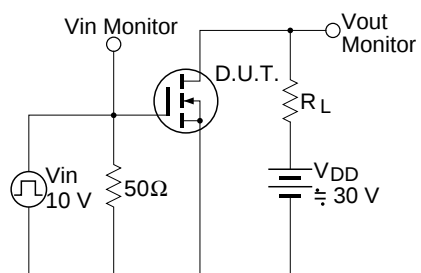




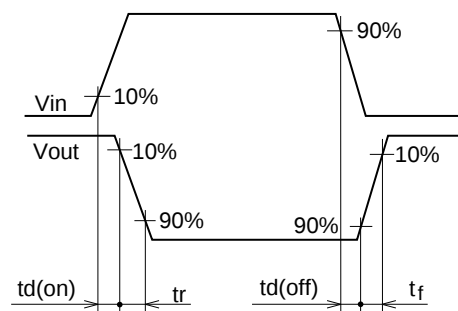




Switching Time Test Circuit



Waveform



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