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# 2SK2096

Silicon N-Channel MOS FET

# HITACHI

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## Application

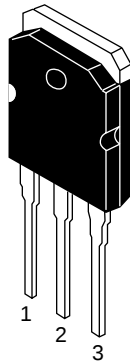
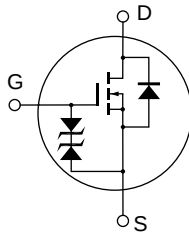
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device can be driven from 5 V source
- Suitable for switching regulator, DC-DC converter
- Avalanche ratings

## Outline

TO-3P



1. Gate
2. Drain  
(Flange)
3. Source

Absolute Maximum Ratings (Ta = 25°C)

| Item                                      | Symbol                              | Ratings     | Unit |
|-------------------------------------------|-------------------------------------|-------------|------|
| Drain to source voltage                   | V <sub>DSS</sub>                    | 60          | V    |
| Gate to source voltage                    | V <sub>GSS</sub>                    | ±20         | V    |
| Drain current                             | I <sub>D</sub>                      | 45          | A    |
| Drain peak current                        | I <sub>D(pulse)</sub> <sup>*1</sup> | 180         | A    |
| Body to drain diode reverse drain current | I <sub>DR</sub>                     | 45          | A    |
| Avalanche current                         | I <sub>AP</sub> <sup>*3</sup>       | 45          | A    |
| Avalanche energy                          | E <sub>AR</sub> <sup>*3</sup>       | 173         | mJ   |
| Channel dissipation                       | Pch <sup>*2</sup>                   | 100         | W    |
| Channel temperature                       | Tch                                 | 150         | °C   |
| Storage temperature                       | Tstg                                | −55 to +150 | °C   |

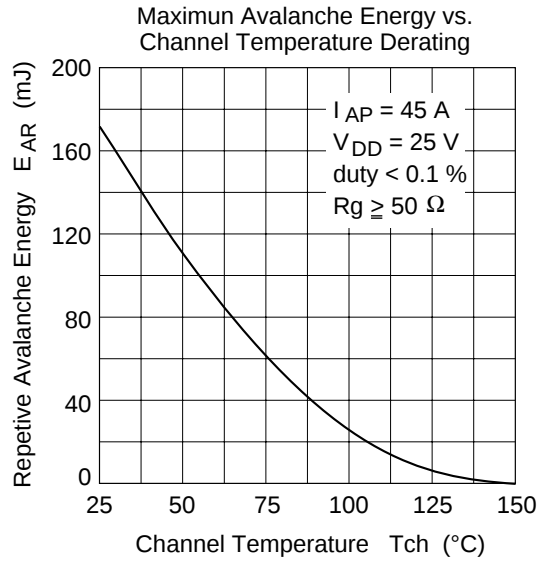
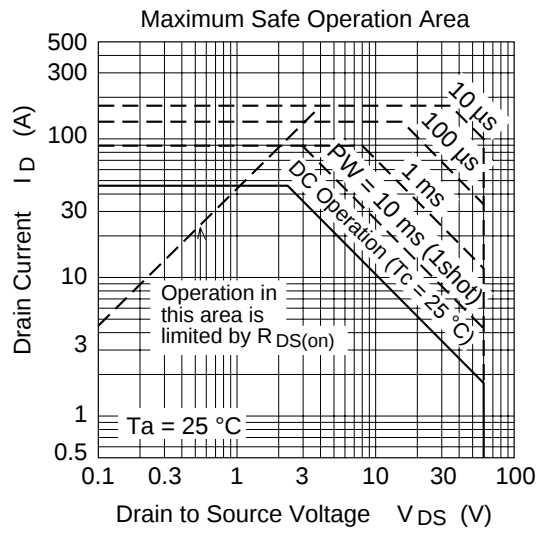
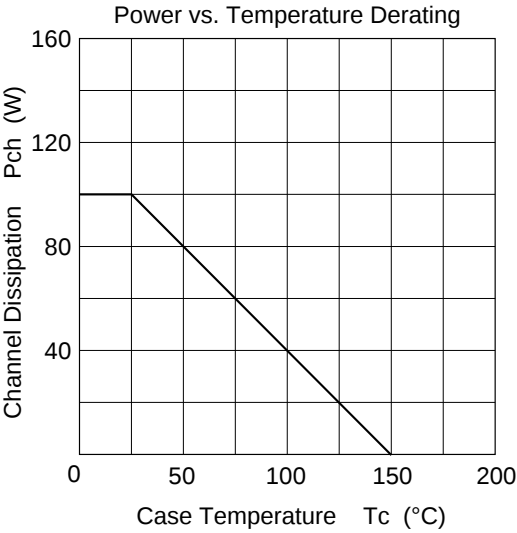
- Notes
- 1. PW ≤ 10 μs, duty cycle ≤ 1 %
  - 2. Value at Tc = 25°C
  - 3. Value at Tch = 25°C, Rg ≥ 50 Ω

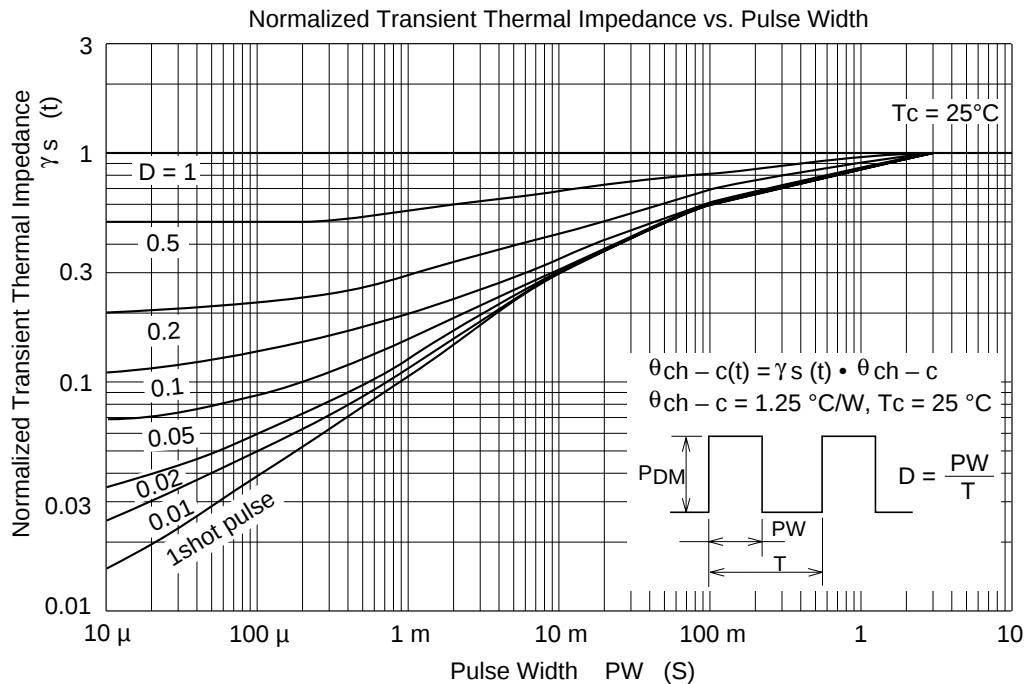
## Electrical Characteristics (Ta = 25°C)

| 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      | —     | 2.25     | V             | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                                    |
| Static drain to source on state resistance | $R_{DS(on)}$  | —        | 0.018 | 0.022    | $\Omega$      | $I_D = 25 \text{ A}$<br>$V_{GS} = 10 \text{ V}^{*1}$                              |
|                                            |               | —        | 0.023 | 0.028    | $\Omega$      | $I_D = 25 \text{ A}$<br>$V_{GS} = 4 \text{ V}^{*1}$                               |
| Forward transfer admittance                | $ y_{fs} $    | 25       | 37    | —        | S             | $I_D = 25 \text{ A}$<br>$V_{DS} = 10 \text{ V}^{*1}$                              |
| Input capacitance                          | $C_{iss}$     | —        | 3530  | —        | pF            | $V_{DS} = 10 \text{ V}$                                                           |
| Output capacitance                         | $C_{oss}$     | —        | 1480  | —        | pF            | $V_{GS} = 0$                                                                      |
| Reverse transfer capacitance               | $C_{rss}$     | —        | 300   | —        | pF            | $f = 1 \text{ MHz}$                                                               |
| Turn-on delay time                         | $t_{d(on)}$   | —        | 33    | —        | ns            | $I_D = 25 \text{ A}$                                                              |
| Rise time                                  | $t_r$         | —        | 160   | —        | ns            | $V_{GS} = 10 \text{ V}$                                                           |
| Turn-off delay time                        | $t_{d(off)}$  | —        | 450   | —        | ns            | $R_L = 1.5 \text{ }\Omega$                                                        |
| Fall time                                  | $t_f$         | —        | 230   | —        | ns            |                                                                                   |
| Body to drain diode forward voltage        | $V_{DF}$      | —        | 1.3   | —        | V             | $I_F = 45 \text{ A}$ , $V_{GS} = 0$                                               |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —        | 130   | —        | ns            | $I_F = 45 \text{ A}$ , $V_{GS} = 0$ ,<br>$di_F / dt = 50 \text{ A} / \mu\text{s}$ |

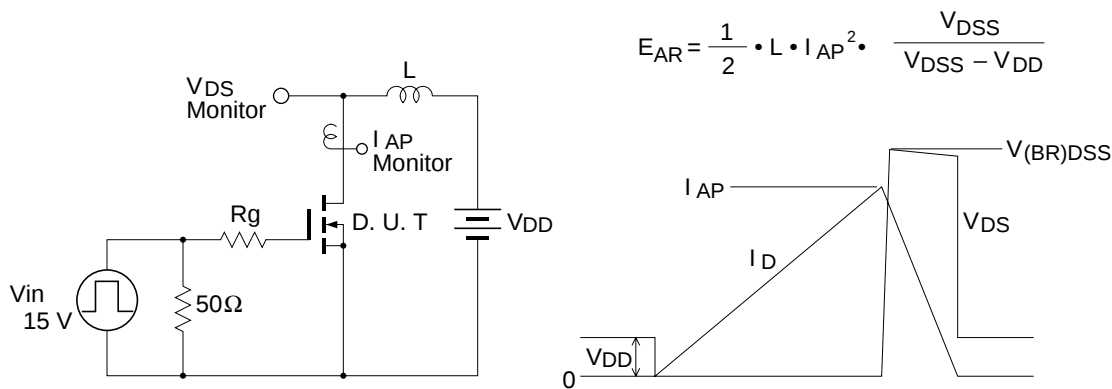
Note 1. Pulse Test

See characteristic curve of 2SK1911.

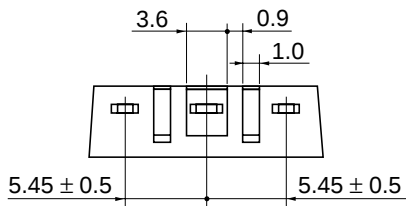
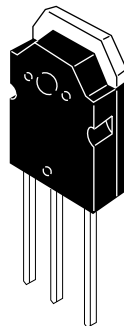
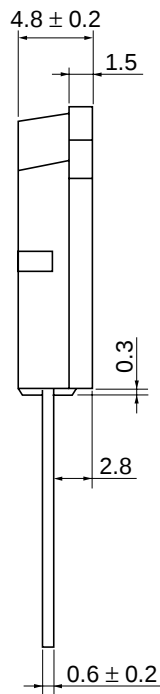
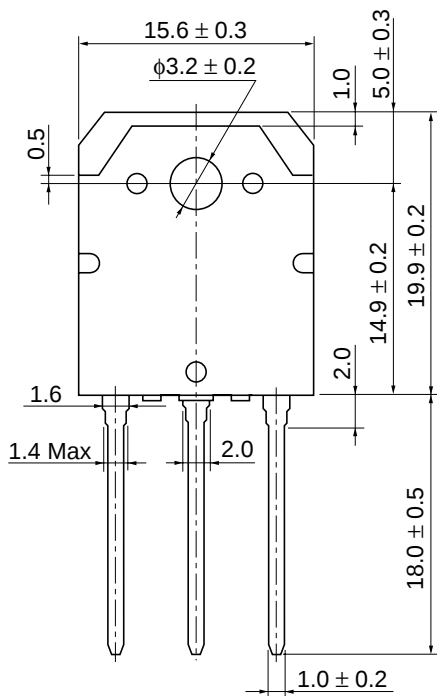




Avalanche Test Circuit and Waveform



Unit: mm



|                          |          |
|--------------------------|----------|
| Hitachi Code             | TO-3P    |
| JEDEC                    | —        |
| EIAJ                     | Conforms |
| Weight (reference value) | 5.0 g    |

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