

# 2SK3159

Silicon N Channel MOS FET  
High Speed Power Switching

# HITACHI

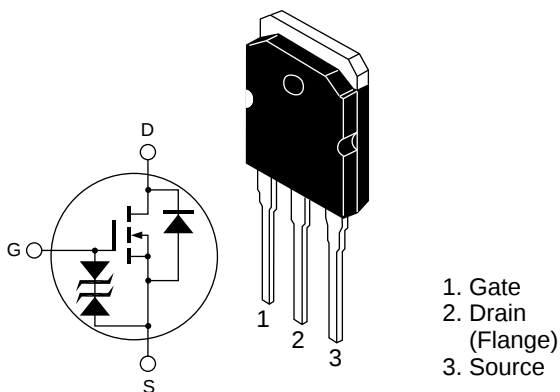
ADE-208-774 (Z)  
Target Specification  
1st. Edition  
February 1999

## Features

- Low on-resistance  
 $R_{DS} = 23 \text{ m}\Omega$  typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

## Outline

TO-3P



Absolute Maximum Ratings (Ta = 25°C)

| Item                                   | Symbol                                 | Ratings     | Unit |
|----------------------------------------|----------------------------------------|-------------|------|
| Drain to source voltage                | V <sub>DSS</sub>                       | 150         | V    |
| Gate to source voltage                 | V <sub>GSS</sub>                       | ±20         | V    |
| Drain current                          | I <sub>D</sub>                         | 50          | A    |
| Drain peak current                     | I <sub>D(pulse)</sub> <sup>Note1</sup> | 200         | A    |
| Body-drain diode reverse drain current | I <sub>DR</sub>                        | 50          | A    |
| Avalanche current                      | I <sub>AP</sub> <sup>Note3</sup>       | 50          | A    |
| Avalanche energy                       | E <sub>AR</sub> <sup>Note3</sup>       | 187         | mJ   |
| Channel dissipation                    | P <sub>ch</sub> <sup>Note2</sup>       | 125         | W    |
| Channel temperature                    | T <sub>ch</sub>                        | 150         | °C   |
| Storage temperature                    | T <sub>stg</sub>                       | −55 to +150 | °C   |

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

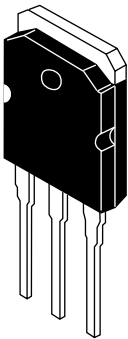
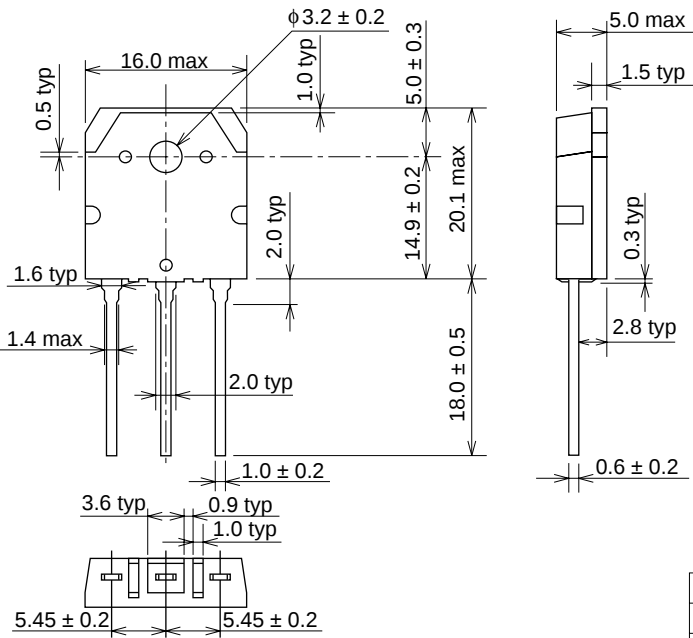
Electrical Characteristics (Ta = 25°C)

| Item                                       | Symbol               | Min | Typ  | Max | Unit | Test Conditions                                                  |
|--------------------------------------------|----------------------|-----|------|-----|------|------------------------------------------------------------------|
| Drain to source breakdown voltage          | V <sub>(BR)DSS</sub> | 150 | —    | —   | V    | I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0                      |
| Gate to source breakdown voltage           | V <sub>(BR)GSS</sub> | ±20 | —    | —   | V    | I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0                    |
| Gate to source leak current                | I <sub>GSS</sub>     | —   | —    | ±10 | μA   | V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0                     |
| Zero gate voltage drain current            | I <sub>DSS</sub>     | —   | —    | 10  | μA   | V <sub>DS</sub> = 150 V, V <sub>GS</sub> = 0                     |
| Gate to source cutoff voltage              | V <sub>GS(off)</sub> | 1.0 | —    | 2.5 | V    | I <sub>D</sub> = 1 mA, V <sub>DS</sub> = 10 V                    |
| Static drain to source on state resistance | R <sub>DS(on)</sub>  | —   | 23   | 30  | mΩ   | I <sub>D</sub> = 25 A, V <sub>GS</sub> = 10 V <sup>Note4</sup>   |
|                                            | R <sub>DS(on)</sub>  | —   | 28   | 48  | mΩ   | I <sub>D</sub> = 25 A, V <sub>GS</sub> = 4 V <sup>Note4</sup>    |
| Forward transfer admittance                | y <sub>fs</sub>      | 27  | 45   | —   | S    | I <sub>D</sub> = 25 A, V <sub>DS</sub> = 10 V <sup>Note4</sup>   |
| Input capacitance                          | Ciss                 | —   | 4000 | —   | pF   | V <sub>DS</sub> = 10 V                                           |
| Output capacitance                         | Coss                 | —   | 1650 | —   | pF   | V <sub>GS</sub> = 0                                              |
| Reverse transfer capacitance               | Crss                 | —   | 590  | —   | pF   | f = 1 MHz                                                        |
| Turn-on delay time                         | t <sub>d(on)</sub>   | —   | 30   | —   | ns   | I <sub>D</sub> = 25 A, V <sub>GS</sub> = 10 V                    |
| Rise time                                  | t <sub>r</sub>       | —   | 280  | —   | ns   | R <sub>L</sub> = 1.2 Ω                                           |
| Turn-off delay time                        | t <sub>d(off)</sub>  | —   | 830  | —   | ns   |                                                                  |
| Fall time                                  | t <sub>f</sub>       | —   | 450  | —   | ns   |                                                                  |
| Body–drain diode forward voltage           | V <sub>DF</sub>      | —   | 0.95 | —   | V    | I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0                       |
| Body–drain diode reverse recovery time     | t <sub>rr</sub>      | —   | 200  | —   | ns   | I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0<br>diF/ dt = 50 A/ μs |

Note: 4. Pulse test

Package Dimensions

Unit: mm



|              |       |
|--------------|-------|
| Hitachi Code | TO-3P |
| EIAJ         | SC-65 |
| JEDEC        | —     |

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