

# 2SK2959

Silicon N Channel MOS FET  
High Speed Power Switching

# HITACHI

ADE-208-569C (Z)

4th. Edition

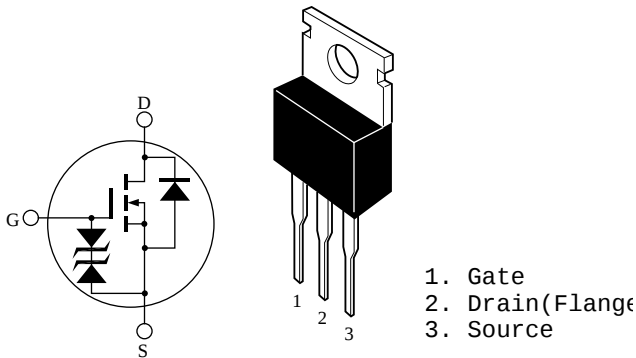
Aug 1998

## Features

- Low on-resistance  
 $R_{DS(on)} = 7m\Omega$  typ.
- 4V gate drive devices.
- High speed switching

## Outline

TO-220AB



Absolute Maximum Ratings (Ta = 25°C)

| Item                                   | Symbol                          | Ratings     | Unit |
|----------------------------------------|---------------------------------|-------------|------|
| Drain to source voltage                | $V_{DSS}$                       | 30          | V    |
| Gate to source voltage                 | $V_{GSS}$                       | $\pm 20$    | V    |
| Drain current                          | $I_D$                           | 50          | A    |
| Drain peak current                     | $I_{D(pulse)}$ <sup>Note1</sup> | 200         | A    |
| Body-drain diode reverse drain current | $I_{DR}$                        | 50          | A    |
| Channel dissipation                    | Pch <sup>Note2</sup>            | 75          | W    |
| Channel temperature                    | Tch                             | 150         | °C   |
| Storage temperature                    | Tstg                            | -55 to +150 | °C   |

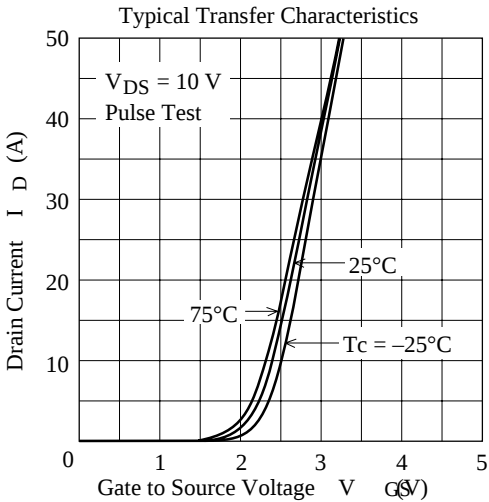
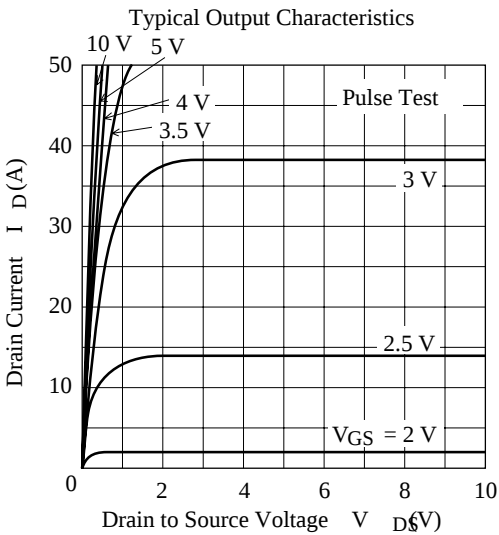
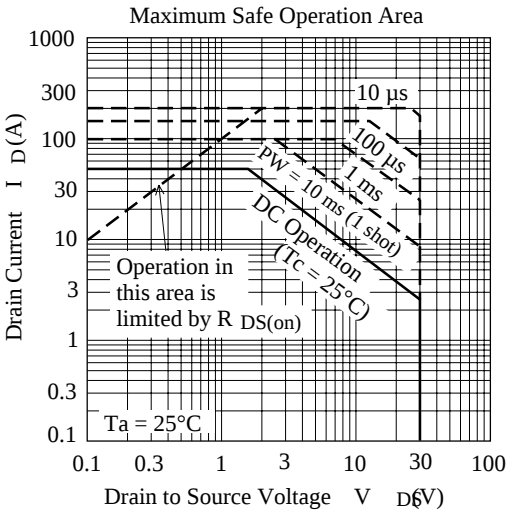
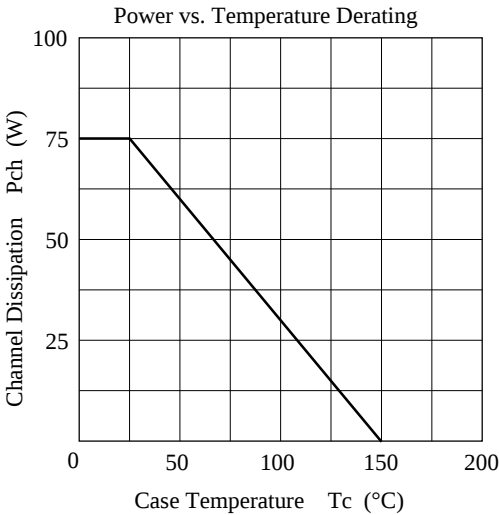
Note: 1.  $PW \leq 10\mu s$ , duty cycle  $\leq 1\%$   
2. Value at  $T_c = 25^\circ C$

Electrical Characteristics (Ta = 25°C)

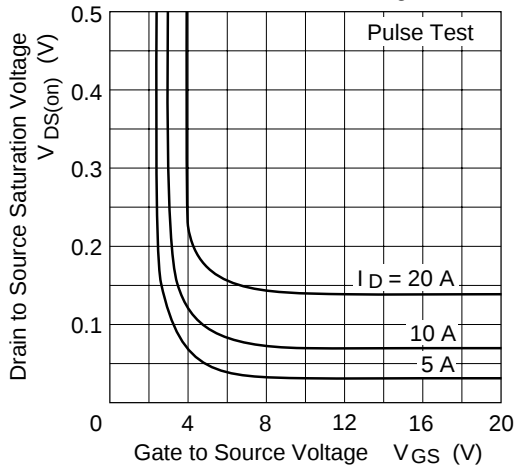
| Item                                       | Symbol        | Min      | Typ  | Max      | Unit       | Test Conditions                                 |
|--------------------------------------------|---------------|----------|------|----------|------------|-------------------------------------------------|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 30       | —    | —        | V          | $I_D = 10mA, V_{GS} = 0$                        |
| Gate to source breakdown voltage           | $V_{(BR)GSS}$ | $\pm 20$ | —    | —        | V          | $I_G = \pm 100\mu A, V_{DS} = 0$                |
| Zero gate voltage drain current            | $I_{DSS}$     | —        | —    | 10       | $\mu A$    | $V_{DS} = 30V, V_{GS} = 0$                      |
| Gate to source leak current                | $I_{GSS}$     | —        | —    | $\pm 10$ | $\mu A$    | $V_{GS} = \pm 16V, V_{DS} = 0$                  |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.0      | —    | 2.0      | V          | $I_D = 1mA, V_{DS} = 10V$                       |
| Static drain to source on state resistance | $R_{DS(on)}$  | —        | 7.0  | 10       | m $\Omega$ | $I_D = 25A, V_{GS} = 10V$ <sup>Note3</sup>      |
| Static drain to source on state resistance | $R_{DS(on)}$  | —        | 12   | 18       | m $\Omega$ | $I_D = 25A, V_{GS} = 4V$ <sup>Note3</sup>       |
| Forward transfer admittance                | $ y_{fs} $    | 25       | 45   | —        | S          | $I_D = 25A, V_{DS} = 10V$ <sup>Note3</sup>      |
| Input capacitance                          | Ciss          | —        | 2000 | —        | pF         | $V_{DS} = 10V$                                  |
| Output capacitance                         | Coss          | —        | 1500 | —        | pF         | $V_{GS} = 0$                                    |
| Reverse transfer capacitance               | Crss          | —        | 350  | —        | pF         | $f = 1MHz$                                      |
| Turn-on delay time                         | $t_{d(on)}$   | —        | 20   | —        | ns         | $V_{GS} = 10V, I_D = 25A$                       |
| Rise time                                  | $t_r$         | —        | 330  | —        | ns         | $R_L = 0.4\Omega$                               |
| Turn-off delay time                        | $t_{d(off)}$  | —        | 190  | —        | ns         |                                                 |
| Fall time                                  | $t_f$         | —        | 190  | —        | ns         |                                                 |
| Body-drain diode forward voltage           | $V_{DF}$      | —        | 0.95 | —        | V          | $I_F = 50A, V_{GS} = 0$                         |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —        | 60   | —        | ns         | $I_F = 50A, V_{GS} = 0$<br>$diF/dt = 50A/\mu s$ |

Note: 3. Pulse test

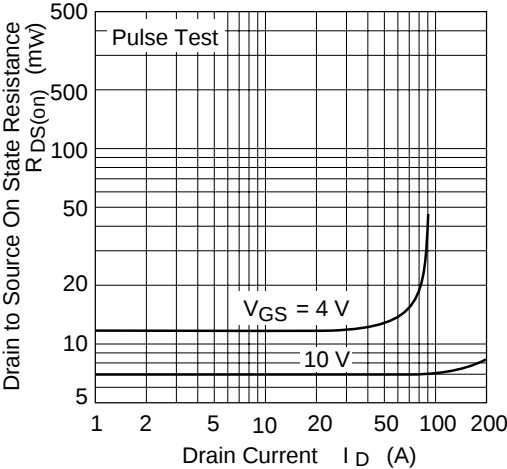
Main Characteristics



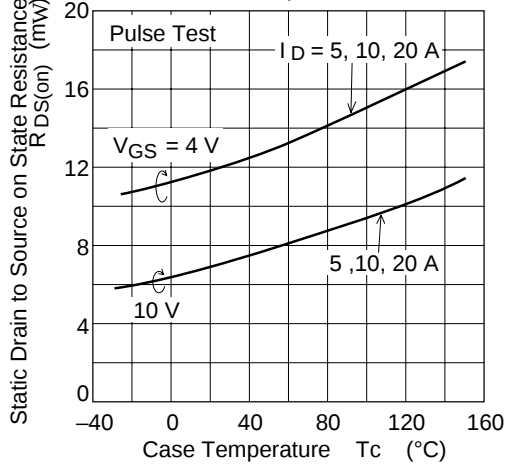
Drain to Source Saturation Voltage vs. Gate to Source Voltage



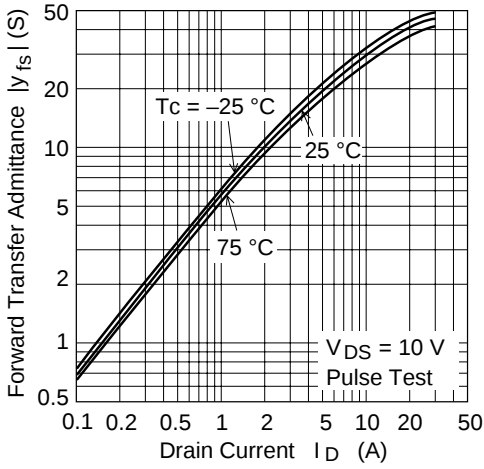
Static Drain to Source on State Resistance vs. Drain Current

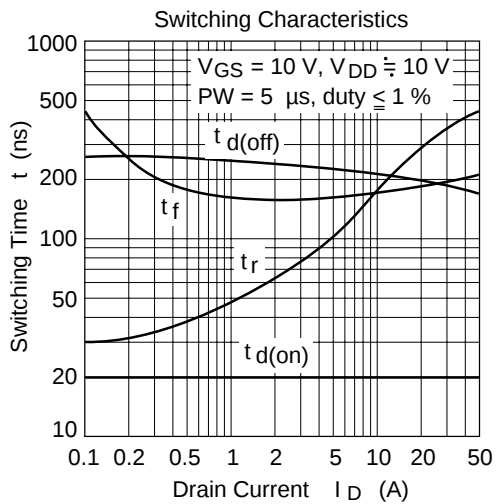
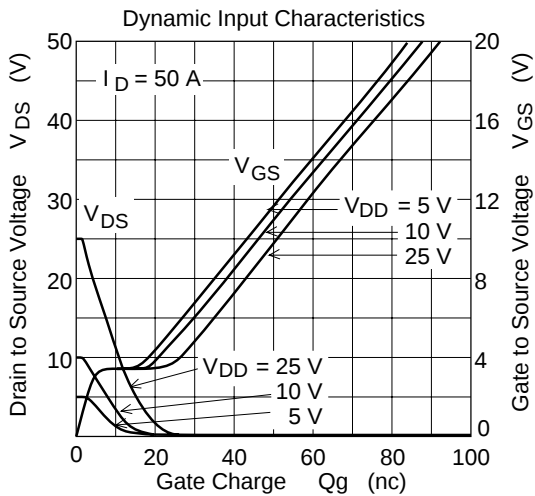
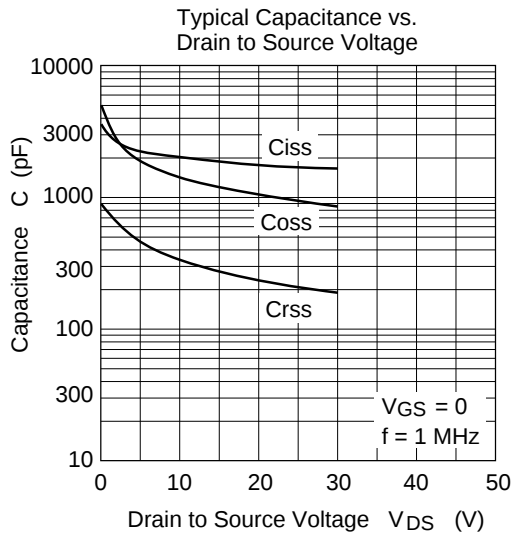
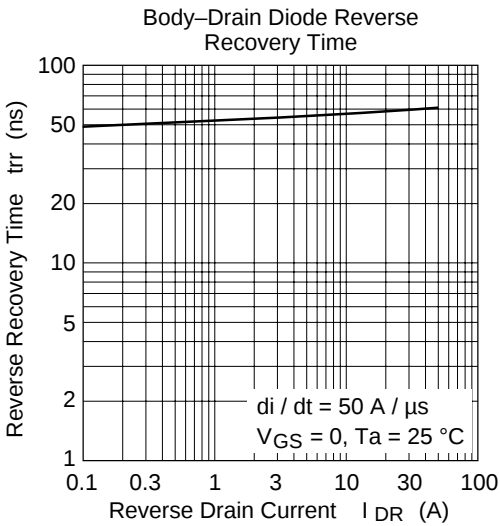


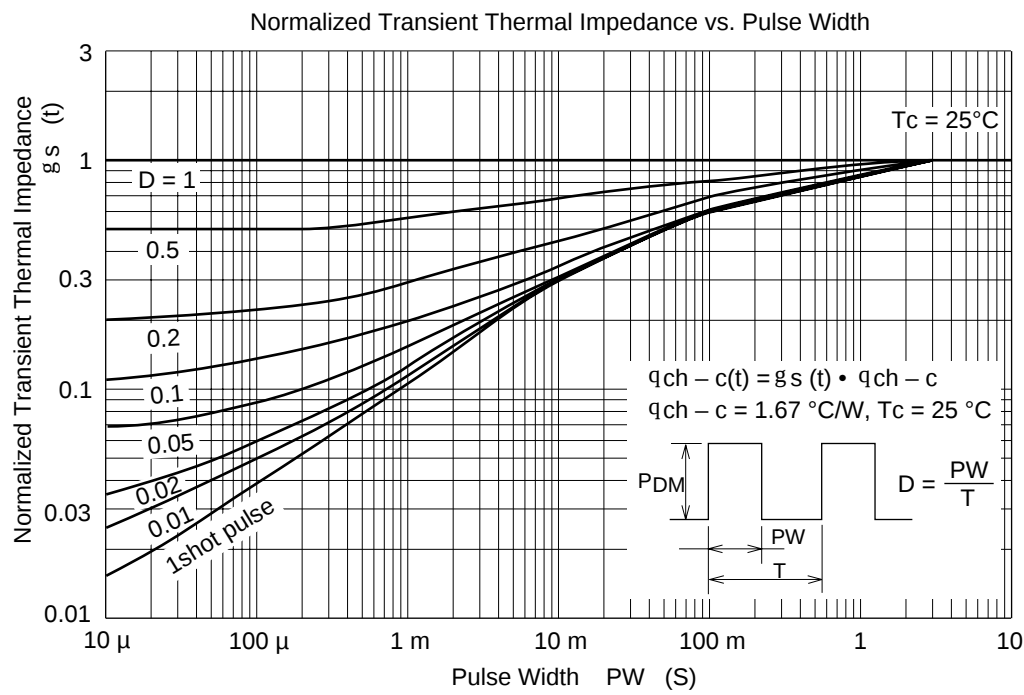
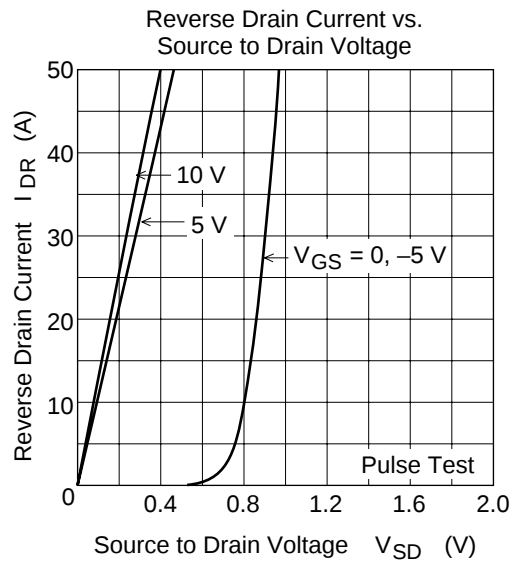
Static Drain to Source on State Resistance vs. Temperature



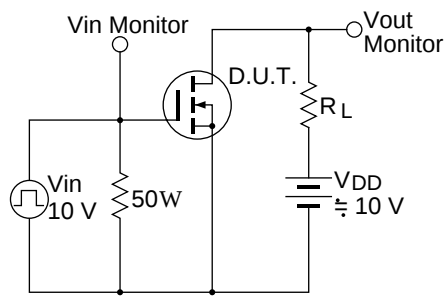
Forward Transfer Admittance vs. Drain Current



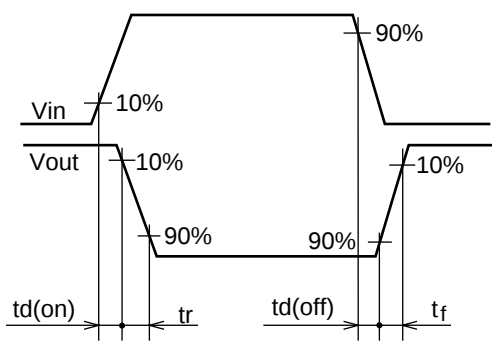




Switching Time Test Circuit

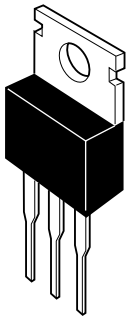
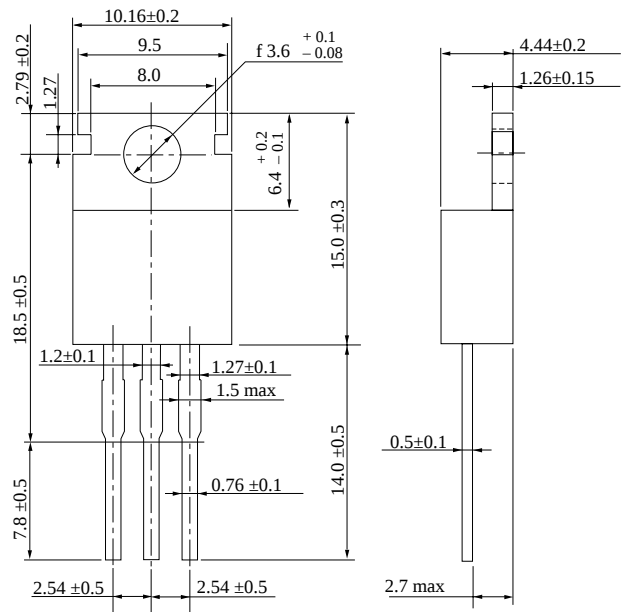


Waveform



Package Dimensions

Unit: mm



|              |          |
|--------------|----------|
| Hitachi Code | FO-220AB |
| EIAJ         | SC-46    |
| JEDEC        | —        |

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