To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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# 2SK2727

## Silicon N Channel MOS FET
## High Speed Power Switching

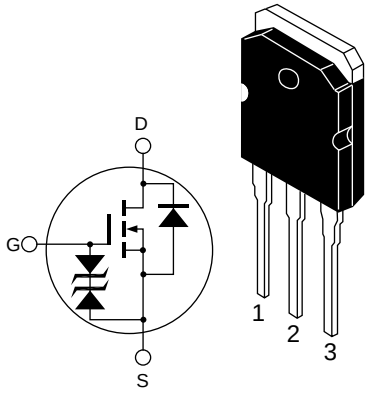
ADE-208-526A (Z)
2nd. Edition
Jul. 1997

### Features

- Low on-resistance
- High speed switching
- Low drive current
- 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 | $V_{DSS}$ | 500 | V |
| Gate to source voltage | $V_{GSS}$ | ±30 | V |
| Drain current | $I_D$ | 10 | A |
| Drain peak current | $I_{D(pulse)}$*[1] | 40 | A |
| Body to drain diode reverse drain current | $I_{DR}$ | 10 | A |
| Avalanche current | $I_{AP}$*[3] | 10 | A |
| Avalanche energy | $E_{AR}$*[3] | 5.55 | mJ |
| Channel dissipation | Pch*[2] | 100 | W |
| Channel temperature | Tch | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

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

## Electrical Characteristics (Ta = 25°C)

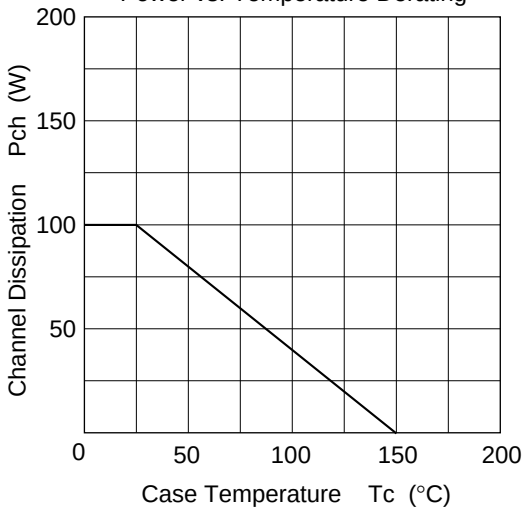
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 500 | — | — | V | $I_D$ = 10mA, $V_{GS}$ = 0 |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ±30 | — | — | V | $I_G$ = ±100µA, $V_{DS}$ = 0 |
| Gate to source leak current | $I_{GSS}$ | — | — | ±10 | µA | $V_{GS}$ = ±25V, $V_{DS}$ = 0 |
| Zero gate voltege drain current | $I_{DSS}$ | — | — | 10 | µA | $V_{DS}$ = 500 V, $V_{GS}$ = 0 |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 2.5 | — | 3.5 | V | $I_D$ = 1mA, $V_{DS}$ = 10V*[1] |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 0.75 | 0.95 | Ω | $I_D$ = 5A, $V_{GS}$ = 10V*[1] |
| Forward transfer admittance | $\|y_{fs}\|$ | 4.2 | 7.0 | — | S | $I_D$ = 5A, $V_{DS}$ = 10V*[1] |
| Input capacitance | Ciss | — | 1100 | — | pF | $V_{DS}$ = 10V |
| Output capacitance | Coss | — | 330 | — | pF | $V_{GS}$ = 0 |
| Reverse transfer capacitance | Crss | — | 65 | — | pF | f = 1MHz |
| Total gate charge | Qg | — | 21 | — | nc | $V_{DD}$ = 400V |
| Gate to source charge | Qgs | — | 5 | — | nc | $V_{GS}$ = 10V |
| Gate to drain charge | Qgd | — | 8 | — | nc | $I_D$ = 10A |
| Turn-on delay time | $t_{d(on)}$ | — | 20 | — | ns | $V_{GS}$ = 10V, $I_D$ = 5A |
| Rise time | $t_r$ | — | 70 | — | ns | $R_L$ = 6Ω |
| Turn-off delay time | $t_{d(off)}$ | — | 55 | — | ns | |
| Fall time | $t_f$ | — | 50 | — | ns | |
| Body to drain diode forward voltage | $V_{DF}$ | — | 1.0 | — | V | $I_D$ = 10A, $V_{GS}$ = 0 |
| Body to drain diode reverse recovery time | $t_{rr}$ | — | 300 | — | ns | $I_F$ = 10A, $V_{GS}$ = 0<br>diF/ dt = 100A/µs |

Note: 1. Pulse test

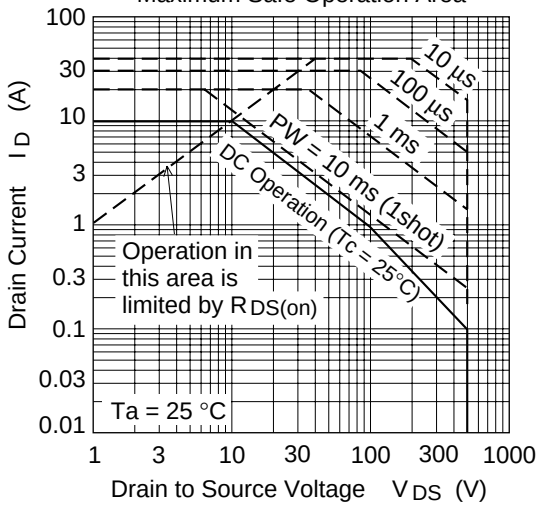
See characteristics curves of 2SK2726

## Main Characteristics

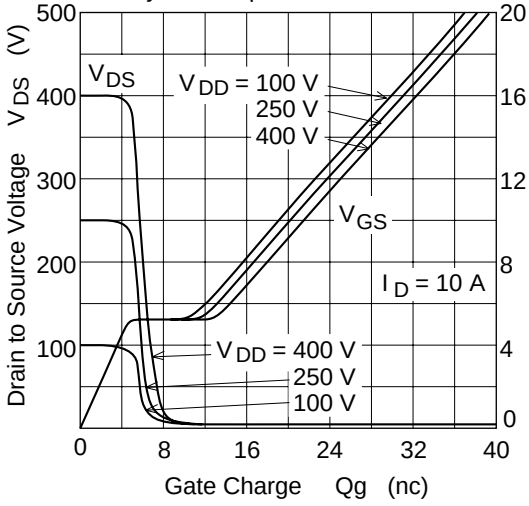
Power vs. Temperature Derating



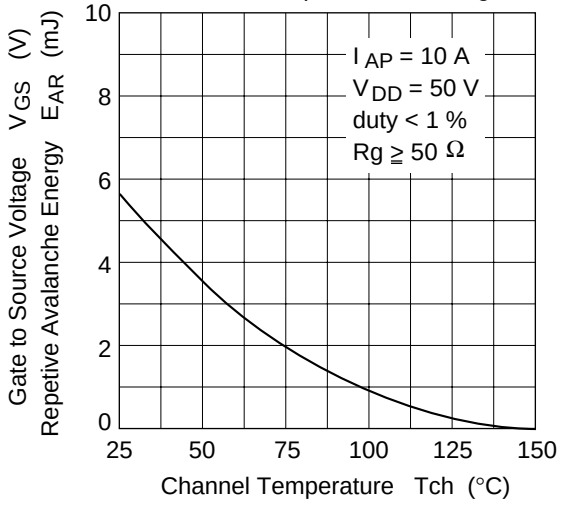

Maximum Safe Operation Area



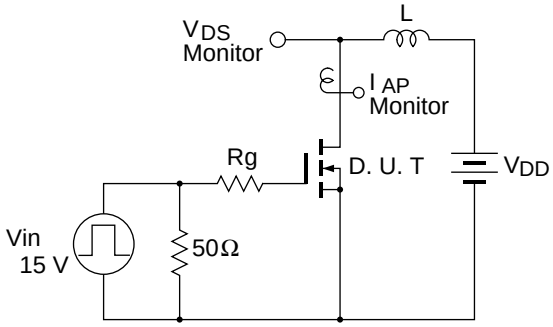

Dynamic Input Characteristics




Maximum Avalanche Energy vs. Channel Temperature Derating

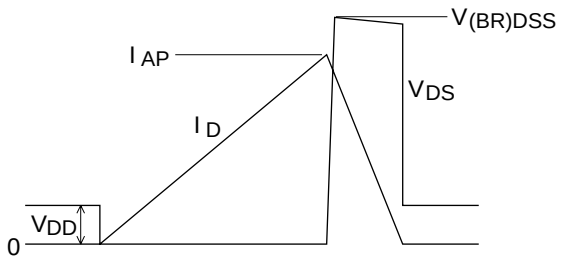


Avalanche Test Circuit

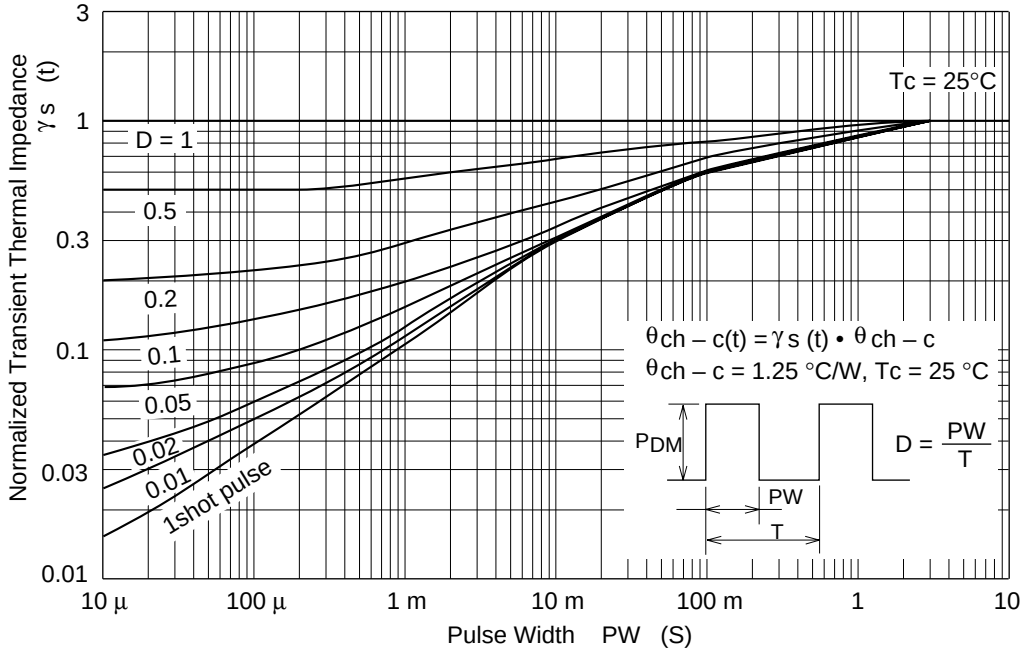



Avalanche Waveform

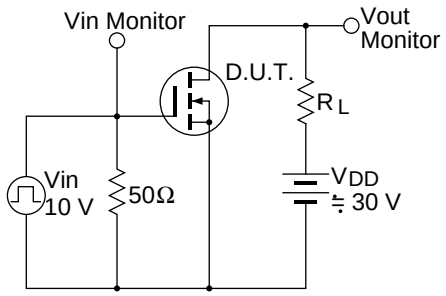
$$E_{AR} = \frac{1}{2} \bullet L \bullet I_{AP}^{2} \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



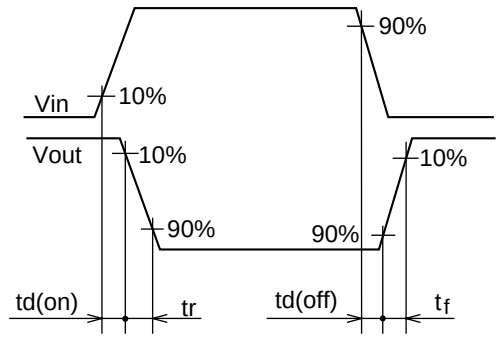

Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



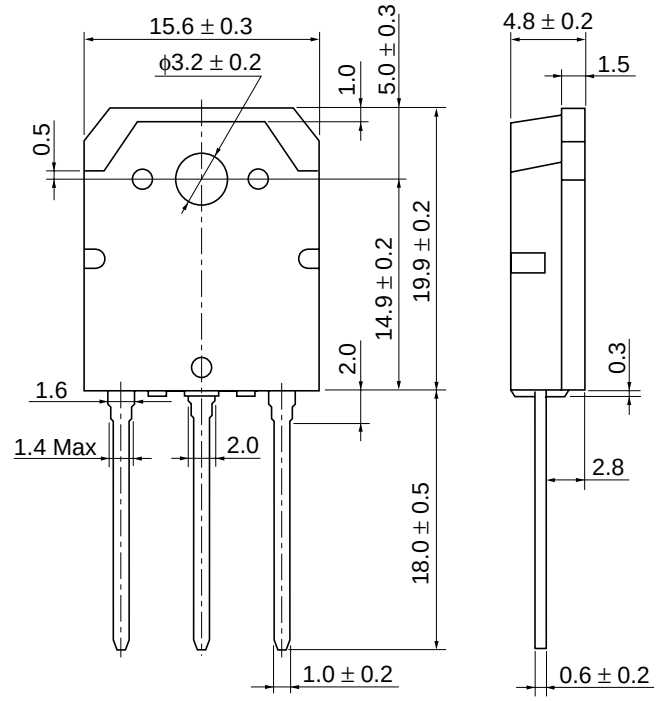

Switching Time Waveforms

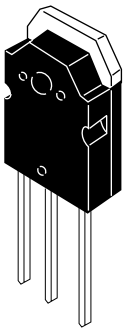


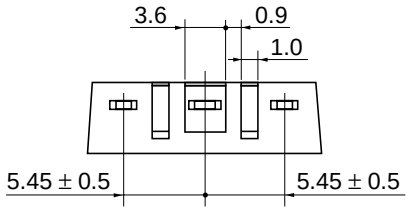
## Package Dimensions

As of January, 2001

Unit: mm






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

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