

2SK2553(L), 2SK2553(S)

Silicon N Channel MOS FET
High Speed Power Switching

HITACHI

ADE-208-357H (Z)
9th. Edition
February 1999

Application

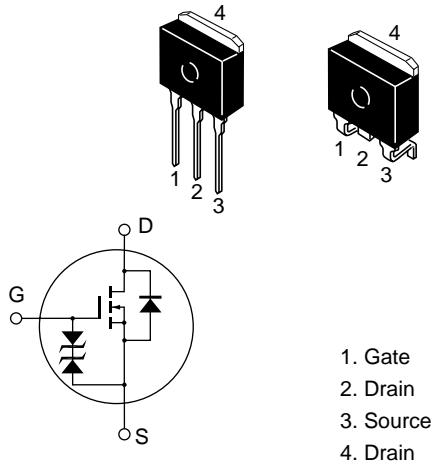
High speed power switching

Features

- Low on-resistance
- $R_{DS(on)} = 7 \text{ m}\Omega$ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline

LDPAK



2SK2553(L), 2SK2553(S)

Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Ratings | Unit |
|---|----------------------------------|-------------|------|
| Drain to source voltage | V_{DSS} | 60 | V |
| Gate to source voltage | V_{GSS} | ±20 | V |
| Drain current | I_D | 50 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note 1} | 200 | A |
| Body to drain diode reverse drain current | I_{DR} | 50 | A |
| Avalanche current | I_{AP} ^{Note 3} | 45 | A |
| Avalanche energy | E_{AR} ^{Note 3} | 174 | mJ |
| Channel dissipation | P_{ch} ^{Note 2} | 75 | W |
| Channel temperature | Tch | 150 | °C |
| Storage temperature | Tstg | -55 to +150 | °C |

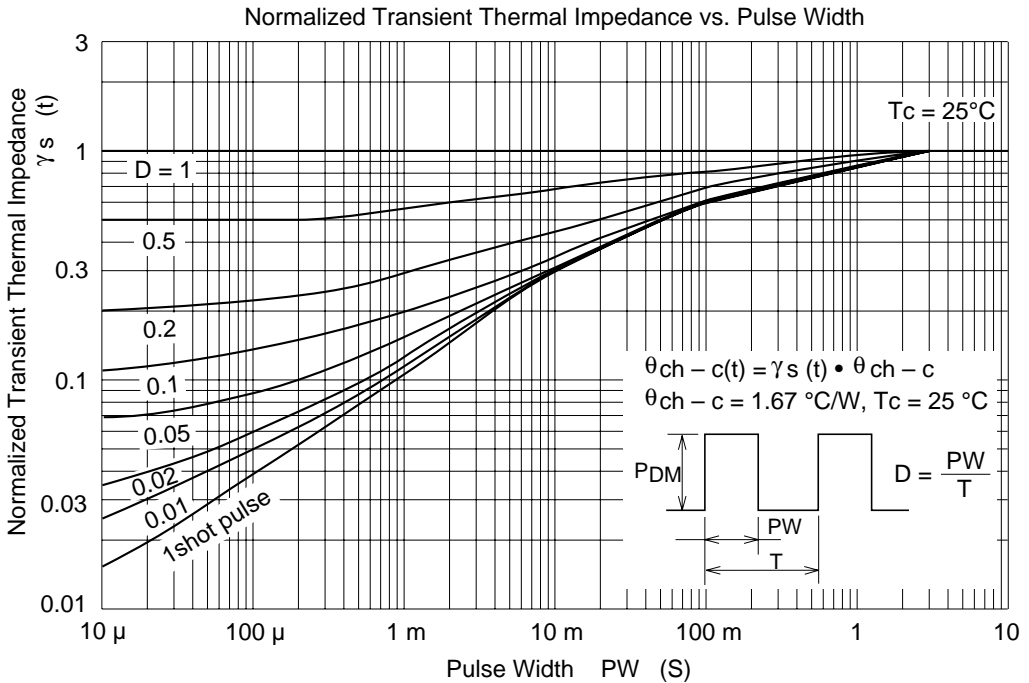
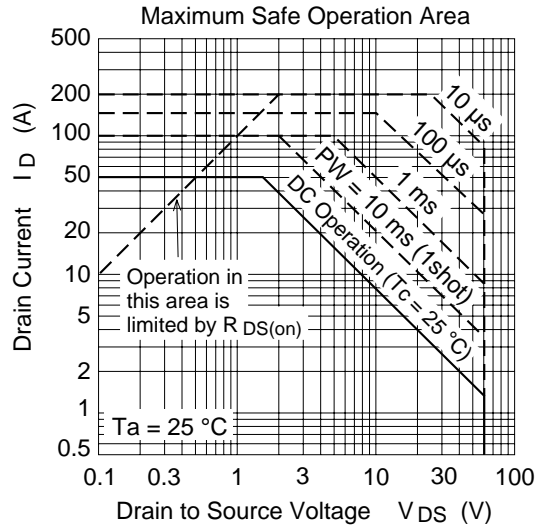
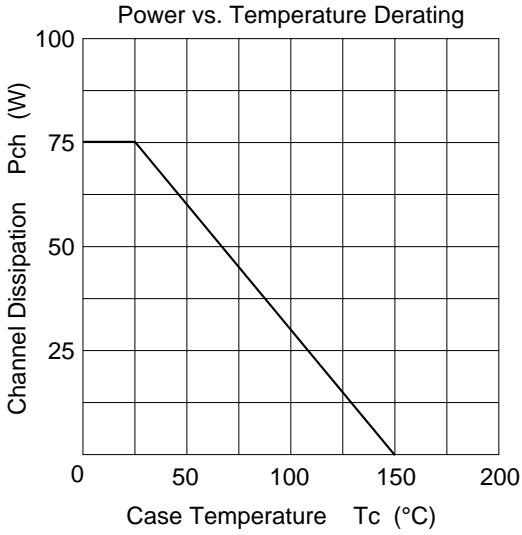
- Notes
1. $PW \leq 10 \mu s$, duty cycle $\leq 1 \%$
 2. Value at $T_c = 25 \text{ }^\circ\text{C}$
 3. Value at $T_{ch} = 25 \text{ }^\circ\text{C}$, $R_g \geq 50 \Omega$

Electrical Characteristics (Ta = 25°C)

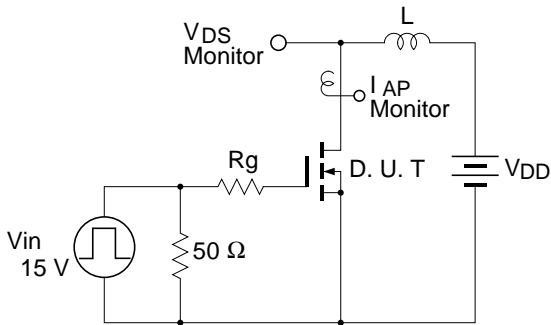
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|---------------|----------|------|----------|------------------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 60 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ± 20 | — | — | V | $I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$ |
| Zero gate voltage drain current | I_{DSS} | — | — | 10 | μA | $V_{DS} = 60 \text{ V}$, $V_{GS} = 0$ |
| Gate to source cutoff voltage | $V_{GS(off)}$ | 1.0 | — | 2.0 | V | $I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ |
| Static drain to source on state resistance | $R_{DS(on)}$ | — | 7 | 10 | $\text{m}\Omega$ | $I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}$ ^{Note 1} |
| | | — | 10 | 16 | $\text{m}\Omega$ | $I_D = 25 \text{ A}$ $V_{GS} = 4 \text{ V}$ ^{Note 1} |
| Forward transfer admittance | $ y_{fs} $ | 35 | 55 | — | S | $I_D = 25 \text{ A}$ $V_{DS} = 10 \text{ V}$ ^{Note 1} |
| Input capacitance | C_{iss} | — | 3550 | — | pF | $V_{DS} = 10 \text{ V}$ |
| Output capacitance | C_{oss} | — | 1760 | — | pF | $V_{GS} = 0$ |
| Reverse transfer capacitance | C_{rss} | — | 500 | — | pF | $f = 1 \text{ MHz}$ |
| Turn-on delay time | $t_{d(on)}$ | — | 35 | — | ns | $I_D = 25 \text{ A}$ |
| Rise time | t_r | — | 230 | — | ns | $V_{GS} = 10 \text{ V}$ |
| Turn-off delay time | $t_{d(off)}$ | — | 470 | — | ns | $R_L = 1.2 \text{ }\Omega$ |
| Fall time | t_f | — | 360 | — | ns | |
| Body to drain diode forward voltage | V_{DF} | — | 0.85 | — | V | $I_F = 50 \text{ A}$, $V_{GS} = 0$ |
| Body to drain diode reverse recovery time | t_{rr} | — | 135 | — | ns | $I_F = 50 \text{ A}$, $V_{GS} = 0$ $di_F / dt = 50 \text{ A} / \mu\text{s}$ |

Note 1. Pulse Test

See characteristic curves of 2SK2529.

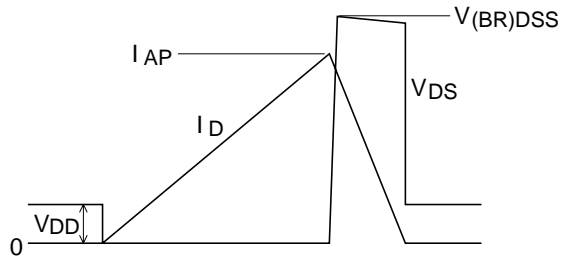


Avalanche Test Circuit

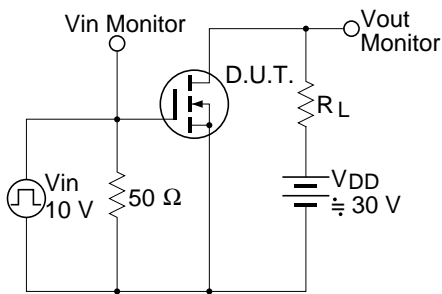


Avalanche Waveform

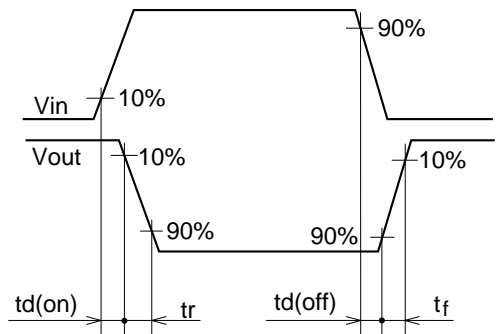
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit



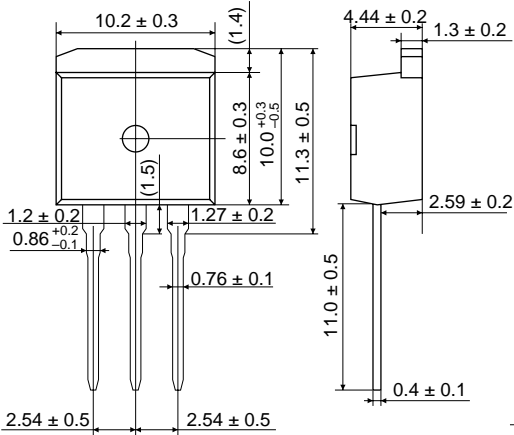
Waveform



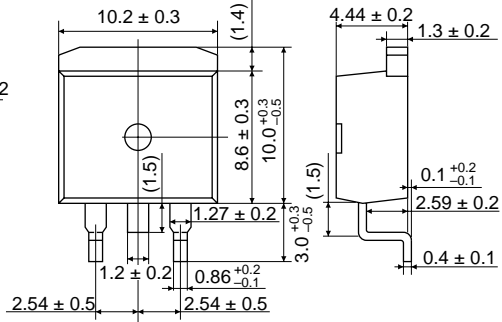
2SK2553(L), 2SK2553(S)

Package Dimensions

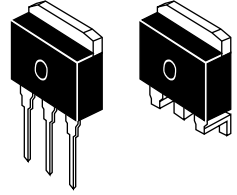
Unit: mm



Ⓛ type



Ⓢ type



| Hitachi Code | LDPAK |
|--------------|-------|
| EIAJ | — |
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