**2SK2225**

1500V - 2A - MOS FET
High Speed Power Switching

**Application**
High speed power switching

**Features**
- High breakdown voltage ($V_{DSS} = 1500$ V)
- High speed switching
- Low drive current
- No Secondary breakdown
- Suitable for switching regulator, DC-DC converter

**Outline**

RENESAS Package code: PRSS0003ZA-A
(Package name: TO-3PFM)

**Absolute Maximum Ratings**

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain to source voltage</td>
<td>$V_{DSS}$</td>
<td>1500</td>
<td>V</td>
</tr>
<tr>
<td>Gate to source voltage</td>
<td>$V_{GSS}$</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Drain current</td>
<td>$I_D$</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>Drain peak current</td>
<td>$I_D(\text{pulse})^{*1}$</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>Body to drain diode reverse drain current</td>
<td>$I_{DR}$</td>
<td>2</td>
<td>A</td>
</tr>
<tr>
<td>Channel dissipation</td>
<td>$P_{ch}^{*2}$</td>
<td>50</td>
<td>W</td>
</tr>
<tr>
<td>Channel temperature</td>
<td>$T_{ch}$</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{stg}$</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes:
1. PW ≤ 10 μs, duty cycle ≤ 1 %
2. Value at $T_c = 25$ °C
**Electrical Characteristics**

\((Ta = 25°C)\)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Test conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain to source breakdown voltage</td>
<td>(V_{BRDSS})</td>
<td>1500</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>(I_D = 10\ mA, V_{GS} = 0)</td>
</tr>
<tr>
<td>Gate to source leak current</td>
<td>(I_{DSS})</td>
<td>—</td>
<td>—</td>
<td>(±1)</td>
<td>(\mu A)</td>
<td>(V_{GS} = ±20\ V, V_{DS} = 0)</td>
</tr>
<tr>
<td>Zero gate voltage drain current</td>
<td>(I_{DSS})</td>
<td>—</td>
<td>—</td>
<td>500</td>
<td>(\mu A)</td>
<td>(V_{DS} = 1200\ V, V_{GS} = 0)</td>
</tr>
<tr>
<td>Gate to source cutoff voltage</td>
<td>(V_{GSOFF})</td>
<td>2.0</td>
<td>—</td>
<td>4.0</td>
<td>V</td>
<td>(I_D = 1\ mA, V_{DS} = 10\ V)</td>
</tr>
<tr>
<td>Static drain to source on state resistance</td>
<td>(R_{DSS(ON)})</td>
<td>—</td>
<td>9</td>
<td>12</td>
<td>(\Omega)</td>
<td>(I_D = 1\ A, V_{GS} = 15\ V)††</td>
</tr>
<tr>
<td>Forward transfer admittance</td>
<td>(</td>
<td>y_{fs}</td>
<td>)</td>
<td>0.45</td>
<td>0.75</td>
<td>—</td>
</tr>
<tr>
<td>Input capacitance</td>
<td>(C_{iss})</td>
<td>—</td>
<td>990</td>
<td>—</td>
<td>(\text{pF})</td>
<td>(V_{DS} = 10\ V, V_{GS} = 0, f = 1\ \text{MHz})</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>(C_{oss})</td>
<td>—</td>
<td>125</td>
<td>—</td>
<td>(\text{pF})</td>
<td></td>
</tr>
<tr>
<td>Reverse transfer capacitance</td>
<td>(C_{rss})</td>
<td>—</td>
<td>60</td>
<td>—</td>
<td>(\text{pF})</td>
<td></td>
</tr>
<tr>
<td>Turn-on delay time</td>
<td>(t_{d(ON)})</td>
<td>—</td>
<td>17</td>
<td>—</td>
<td>ns</td>
<td>(I_D = 1\ A, V_{GS} = 10\ V, R_L = 30\ \Omega)</td>
</tr>
<tr>
<td>Rise time</td>
<td>(t_r)</td>
<td>—</td>
<td>50</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Turn-off delay time</td>
<td>(t_{d(OFF)})</td>
<td>—</td>
<td>150</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Fall time</td>
<td>(t_f)</td>
<td>—</td>
<td>50</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Body to drain diode forward voltage</td>
<td>(V_{DF})</td>
<td>—</td>
<td>0.9</td>
<td>—</td>
<td>V</td>
<td>(I_F = 2\ A, V_{GS} = 0)</td>
</tr>
<tr>
<td>Body to drain diode reverse recovery time</td>
<td>(t_{rr})</td>
<td>—</td>
<td>1750</td>
<td>—</td>
<td>ns</td>
<td>(I_F = 2\ A, V_{GS} = 0, diF/dt = 100\ A/\mu S)</td>
</tr>
</tbody>
</table>

Note: 3. Pulse Test

\(†\) DC characteristics

\(††\) Pulse test
Main Characteristics

Power vs. Temperature Derating

Maximum Safe Operation Area

Typical Output Characteristics

Typical Transfer Characteristics

Drain to Source Saturation Voltage vs. Gate to Source Voltage

Static Drain to Source on State Resistance vs. Drain Current

Operation in this area is limited by $R_{DS(on)}$.
Case Temperature $T_C$ ($^\circ$C)

Static Drain to Source on State Resistance $R_{DS(on)}$ ($\Omega$)

Static Drain to Source on State Resistance vs. Temperature

Reverse Drain Current $I_{DR}$ (A)

Body to Drain Diode Reverse Recovery Time

Typical Capacitance vs. Drain to Source Voltage

Dynamic Input Characteristics

Gate to Source Voltage $V_{GS}$ (V)

Switching Characteristics

Gate Charge $Q_g$ (nc)

Switching Time $t_s$ (ns)

Capacitance $C$ (pF)

Drain Current $I_D$ (A)

Forward Transfer Admittance vs. Drain Current

Forward Transfer Admittance $\vert y_{FS} \vert$ ($S$)

Drain to Source Voltage $V_{DS}$ (V)

Typical Capacitance vs. Drain to Source Voltage

Gate to Source Voltage $V_{GS}$ (V)

Switching Time $t_s$ (ns)

Dynamic Input Characteristics

Gate Charge $Q_g$ (nc)

Switching Characteristics

Drain Current $I_D$ (A)
Source to Drain Voltage $V_{SD}$ (V)

Reverse Drain Current $I_{DR}$ (A)

Reverse Drain Current vs. Source to Drain Voltage

Pulse Width $PW$ (s)

Normalized Transient Thermal Impedance $\gamma_s$ (t)

Normalized Transient Thermal Impedance vs. Pulse Width

Switching Time Test Circuit

Waveforms

Vin Monitor

D.U.T.

Vout Monitor

RL

Vin 10 V

50 Ω

VDD ≅ 30 V

90%

10%

Vout

90%

10%

Vout

td(on)

tr

td(off)

tf

10%
### Package Dimensions

<table>
<thead>
<tr>
<th>Package Name</th>
<th>JEITA Package Code</th>
<th>RENESAS Code</th>
<th>Previous Code</th>
<th>MASS (Typ) [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-3PFM</td>
<td>SC-93</td>
<td>PRSS0003ZA-A</td>
<td>TO-3PFM / TO-3PFMV</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Unit: mm

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### Ordering Information

<table>
<thead>
<tr>
<th>Orderable Part No.</th>
<th>Quantity</th>
<th>Shipping Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SK2225-E</td>
<td>360 pcs</td>
<td>Box (Tube)</td>
</tr>
</tbody>
</table>

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