RJK0854DPB
80V, 25A, 13 mΩ max.
Silicon N Channel Power MOS FET
Power Switching

Features
- High speed switching
- Low drive current
- Low on-resistance
  \( R_{DS(on)} = 10 \, \text{mΩ} \, \text{typ.} \, \text{at} \, V_{GS} = 10 \, \text{V} \)
- Pb-free
- Halogen-free
- High density mounting

Outline
RENESAS Package code: PTZZ005DA-A
(Package name: LFPAK)

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_{\text{DSS}} )</td>
<td>80</td>
<td>V</td>
</tr>
<tr>
<td>Gate to source voltage</td>
<td>( V_{\text{GSS}} )</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Drain current</td>
<td>( I_D )</td>
<td>25</td>
<td>A</td>
</tr>
<tr>
<td>Drain peak current</td>
<td>( I_{D\text{(pulse)}} )</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>Body-drain diode reverse drain current</td>
<td>( I_{DR} )</td>
<td>25</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche current</td>
<td>( I_{AP} )</td>
<td>25</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche energy</td>
<td>( E_{AB} )</td>
<td>8.3</td>
<td>mJ</td>
</tr>
<tr>
<td>Channel dissipation</td>
<td>( P_{\text{ch}} )</td>
<td>55</td>
<td>W</td>
</tr>
<tr>
<td>Channel to Case Thermal Resistance</td>
<td>( \theta_{\text{ch-C}} )</td>
<td>2.27</td>
<td>°C/W</td>
</tr>
<tr>
<td>Channel temperature</td>
<td>( T_{\text{ch}} )</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>( T_{\text{stg}} )</td>
<td>–55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes:
1. \( PW \leq 10 \, \mu\text{s}, \, \text{duty cycle} \leq 1\%\)
2. Value at \( L=10\mu\text{H}, \, T_{\text{ch}} = 25^\circ\text{C}, \, R_g \geq 50 \, \Omega\)
3. \( T_c = 25^\circ\text{C}\)
## Electrical Characteristics

(\(Ta = 25^\circ C\))

<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>80</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>(I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V})</td>
</tr>
<tr>
<td>Gate to source leak current</td>
<td>(I_{GS})</td>
<td>—</td>
<td>—</td>
<td>±0.1</td>
<td>(\mu\text{A})</td>
<td>(V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V})</td>
</tr>
<tr>
<td>Zero gate voltage drain current</td>
<td>(I_{DSS})</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>(\mu\text{A})</td>
<td>(V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V})</td>
</tr>
<tr>
<td>Gate to source cutoff voltage</td>
<td>(V_{GS(\text{off})})</td>
<td>2.0</td>
<td>—</td>
<td>4.0</td>
<td>V</td>
<td>(V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA})</td>
</tr>
<tr>
<td>Static drain to source on state resistance</td>
<td>(R_{DS(\text{on})})</td>
<td>—</td>
<td>10</td>
<td>13</td>
<td>m(\Omega)</td>
<td>(I_D = 12.5 \text{ A}, V_{GS} = 10 \text{ V})(^\text{Note4})</td>
</tr>
<tr>
<td>Forward transfer admittance</td>
<td>(</td>
<td>Y_{hs}</td>
<td>)</td>
<td>—</td>
<td>36</td>
<td>—</td>
</tr>
<tr>
<td>Input capacitance</td>
<td>(C_{iss})</td>
<td>—</td>
<td>2000</td>
<td>—</td>
<td>pF</td>
<td>(V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz})</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>(C_{oss})</td>
<td>—</td>
<td>405</td>
<td>—</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Reverse transfer capacitance</td>
<td>(C_{rss})</td>
<td>—</td>
<td>100</td>
<td>—</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Gate Resistance</td>
<td>(R_g)</td>
<td>—</td>
<td>0.5</td>
<td>—</td>
<td>(\Omega)</td>
<td></td>
</tr>
<tr>
<td>Total gate charge</td>
<td>(Q_g)</td>
<td>—</td>
<td>27</td>
<td>—</td>
<td>nC</td>
<td>(V_{DD} = 25 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 25 \text{ A})</td>
</tr>
<tr>
<td>Gate to source charge</td>
<td>(Q_{gs})</td>
<td>—</td>
<td>9.0</td>
<td>—</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>Gate to drain charge</td>
<td>(Q_{gd})</td>
<td>—</td>
<td>4.5</td>
<td>—</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>Turn-on delay time</td>
<td>(t_{(on)})</td>
<td>—</td>
<td>12</td>
<td>—</td>
<td>ns</td>
<td>(V_{GS} = 10 \text{ V}, I_D = 12.5 \text{ A}, V_{DD} \approx 30 \text{ V}, R_L = 2.4 \text{ (\Omega)}, R_g = 4.7 \text{ (\Omega)})</td>
</tr>
<tr>
<td>Rise time</td>
<td>(t_r)</td>
<td>—</td>
<td>5.5</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Turn-off delay time</td>
<td>(t_{(off)})</td>
<td>—</td>
<td>32</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Fall time</td>
<td>(t_f)</td>
<td>—</td>
<td>6.9</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Body–drain diode forward voltage</td>
<td>(V_{DF})</td>
<td>—</td>
<td>0.8</td>
<td>1.1</td>
<td>V</td>
<td>(I_F = 25 \text{ A}, V_{GS} = 0 \text{ V})(^\text{Note4})</td>
</tr>
<tr>
<td>Body–drain diode reverse recovery time</td>
<td>(t_{rr})</td>
<td>—</td>
<td>42</td>
<td>—</td>
<td>ns</td>
<td>(\text{di}/\text{dt} = 100 \text{ A/(\mu\text{s})})</td>
</tr>
</tbody>
</table>

Notes: 4. Pulse test
Main Characteristics

### Power vs. Temperature Derating

![Power vs. Temperature Derating Graph]

### Maximum Safe Operation Area

![Maximum Safe Operation Area Graph]

### Typical Output Characteristics

![Typical Output Characteristics Graph]

### Typical Transfer Characteristics

![Typical Transfer Characteristics Graph]

### Drain to Source Saturation Voltage vs. Gate to Source Voltage

![Drain to Source Saturation Voltage Graph]

### Static Drain to Source on State Resistance vs. Drain Current

![Static Drain to Source on State Resistance Graph]
Avalanche Test Circuit

Avalanche Waveform

Switching Time Test Circuit

Switching Time Waveform

Normalized Transient Thermal Impedance vs. Pulse Width

\[
\gamma_s(t) = \frac{1}{\theta_{ch-c}} \cdot P_{DM}
\]

\[
D = \frac{PW}{T}
\]

\[
E_{AS} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_D}
\]

V_{DS} Monitor

I_{AP} Monitor

D. U. T.

Vin 15 V

Rg = 50 Ω

V_{DD}

Pulse Width PW (s)

Normalized Transient Thermal Impedance \( \gamma_s(t) \)

Vin Monitor

D. U. T.

Vout Monitor

Vin Monitor

D. U. T.

V_{DD} = 30 V

R_{C} = 30 V

Vin 10 V

Pulse Width PW (s)

Normalized Transient Thermal Impedance vs. Pulse Width

\[
\theta_{ch-c} = 0.025°C/W, T_c = 25°C
\]
**RJK0854DPB**

### 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.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFPAK</td>
<td>SC-100</td>
<td>PTZ2000GDA-A</td>
<td>LFPAKV</td>
<td>0.080g</td>
</tr>
</tbody>
</table>

**Unit: mm**

![Diagram of package dimensions]

(Ni/Pd/Au plating)

### Ordering Information

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Shipping Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJK0854DPB-00-J5</td>
<td>2500 pcs</td>
<td>Taping</td>
</tr>
</tbody>
</table>

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