RJK0353DPA
30V, 35A, 5.2mΩ max.
N Channel Power MOS FET
High Speed Power Switching

Features
- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
- Pb-free
- Halogen-free

Outline

RENESAS Package code: PWSN0008DE-A
(Package name: WPAK(3F))

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>VDSS</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>Gate to source voltage</td>
<td>VGSS</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Drain current</td>
<td>ID</td>
<td>35</td>
<td>A</td>
</tr>
<tr>
<td>Drain peak current</td>
<td>IDP脉冲</td>
<td>140</td>
<td>A</td>
</tr>
<tr>
<td>Body-drain diode reverse drain current</td>
<td>IDR</td>
<td>35</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche current</td>
<td>IAP</td>
<td>16</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche energy</td>
<td>EAR</td>
<td>25.6</td>
<td>mJ</td>
</tr>
<tr>
<td>Channel dissipation</td>
<td>Pch</td>
<td>40</td>
<td>W</td>
</tr>
<tr>
<td>Channel to Case Thermal Resistance</td>
<td>Tch-C</td>
<td>3.13</td>
<td>°C/W</td>
</tr>
<tr>
<td>Channel temperature</td>
<td>Tch</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

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

\( \text{Ta} = 25^\circ \text{C} \)

<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_{\text{BRDSS}} )</td>
<td>30</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>( I_D = 10 \text{ mA}, V_{GS} = 0 )</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 )</td>
</tr>
<tr>
<td>Zero gate voltage drain current</td>
<td>( I_{DS} )</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>( \mu \text{A} )</td>
<td>( V_{DS} = 30 \text{ V}, V_{GS} = 0 )</td>
</tr>
<tr>
<td>Gate to source cutoff voltage</td>
<td>( V_{GS(\text{off})} )</td>
<td>1.2</td>
<td>—</td>
<td>2.5</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(on)} )</td>
<td>—</td>
<td>4.0</td>
<td>5.2</td>
<td>m( \Omega )</td>
<td>( I_D = 17.5 \text{ A}, V_{GS} = 10 \text{ V} )</td>
</tr>
<tr>
<td>Forward transfer admittance</td>
<td>(</td>
<td>y_{fs}</td>
<td>)</td>
<td>—</td>
<td>70</td>
<td>—</td>
</tr>
<tr>
<td>Input capacitance</td>
<td>( C_{iss} )</td>
<td>—</td>
<td>2180</td>
<td>—</td>
<td>pF</td>
<td>( V_{DS} = 10 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz} )</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>( C_{oss} )</td>
<td>—</td>
<td>420</td>
<td>—</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Reverse transfer capacitance</td>
<td>( C_{rss} )</td>
<td>—</td>
<td>135</td>
<td>—</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td>Gate Resistance</td>
<td>( R_g )</td>
<td>—</td>
<td>2.0</td>
<td>—</td>
<td>( \Omega )</td>
<td></td>
</tr>
<tr>
<td>Total gate charge</td>
<td>( Q_g )</td>
<td>—</td>
<td>14</td>
<td>—</td>
<td>nC</td>
<td>( V_{DD} = 10 \text{ V}, V_{GS} = 4.5 \text{ V}, I_D = 35 \text{ A} )</td>
</tr>
<tr>
<td>Gate to source charge</td>
<td>( Q_{gs} )</td>
<td>—</td>
<td>6.0</td>
<td>—</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>Gate to drain charge</td>
<td>( Q_{gd} )</td>
<td>—</td>
<td>3.0</td>
<td>—</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>Turn-on delay time</td>
<td>( t_{(on)} )</td>
<td>—</td>
<td>8.5</td>
<td>—</td>
<td>ns</td>
<td>( V_{GS} = 10 \text{ V}, I_D = 17.5 \text{ A}, V_{DD} \approx 10 \text{ V}, R_L = 0.57 \text{ \Omega}, R_g = 4.7 \text{ \Omega} )</td>
</tr>
<tr>
<td>Rise time</td>
<td>( t_r )</td>
<td>—</td>
<td>4.8</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Turn-off delay time</td>
<td>( t_{(off)} )</td>
<td>—</td>
<td>47.5</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Fall time</td>
<td>( t_f )</td>
<td>—</td>
<td>6.0</td>
<td>—</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Body–drain diode forward voltage</td>
<td>( V_{DF} )</td>
<td>—</td>
<td>0.83</td>
<td>1.08</td>
<td>V</td>
<td>( I_F = 35 \text{ A}, V_{GS} = 0 )</td>
</tr>
<tr>
<td>Body–drain diode reverse recovery time</td>
<td>( t_{tr} )</td>
<td>—</td>
<td>25</td>
<td>—</td>
<td>ns</td>
<td>( I_F = 35 \text{ A}, V_{GS} = 0 ), ( \text{di/dt} = 100 \text{ A/\mu s} )</td>
</tr>
</tbody>
</table>

Notes: 4. Pulse test
Main Characteristics

Power vs. Temperature Derating

Channel Dissipation vs. Case Temperature

Drain to Source Saturation Voltage vs. Gate to Source Voltage

Typical Output Characteristics

Drain Current vs. Drain to Source Voltage

Typical Transfer Characteristics

Drain Current vs. Gate to Source Voltage

Static Drain to Source On State Resistance vs. Drain Current

Maximum Safe Operation Area

Drain to Source Voltage vs. Drain Current

Operation in this area is limited by RDSON

DC Operation

PW = 10 ms

Operation in this area is limited by RDSON

Tc = 25°C

1 shot Pulse

VGS = 3.2 V

VDS = 10 V

ID = 5 A

VGS = 4.5 V

RDSON (Ω)

0.1

1

10

100

1000

0.1

1

10

100

1000

0 4 8 12 16 20

1 2 3 4 5

0 2468 1 0

50

40

30

20

10

0

VGS = 10 V

10 V

3.2 V

3.0 V

2.8 V

VDS = 2.6 V

10 A

5 A

1 A

VGS = 4.5 V

10 V

3.0 V

3.2 V

4.5 V
Normalized Transient Thermal Impedance vs. Pulse Width

Avalanche Test Circuit

Avalanche Waveform

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

Switching Time Test Circuit

Switching Time Waveform

\[ \theta_{ch - c}(t) = \theta_{ch - c} \cdot \gamma \cdot (t) \]

\[ \theta_{ch - c} = 3.13 \, \text{°C/W}, \quad T_c = 25^\circ \text{C} \]
### Package Dimensions

| Package Name | JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] | Unit: mm |
|--------------|---------------------|--------------|---------------|------------|
| WPJA(3F)     | —                   | PWSN0008DE-A | WPJA(3F)V     | 0.075g     |

#### Ordering Information

<table>
<thead>
<tr>
<th>Orderable Part Number</th>
<th>Quantity</th>
<th>Shipping Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJK0353DPA-01-J0B</td>
<td>2500 pcs</td>
<td>Taping</td>
</tr>
</tbody>
</table>

Note: The symbol of 2nd ",-" is occasionally presented as ",#".
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