RJP30H1DPD
Silicon N Channel IGBT
High speed power switching

Features

- Trench gate and thin wafer technology (G6H-II series)
- High speed switching: \( t_r = 80 \text{ ns typ.}, \ t_f = 150 \text{ ns typ.} \)
- Low collector to emitter saturation voltage: \( V_{CE(sat)} = 1.5 \text{ V typ.} \)
- Low leak current: \( I_{CES} = 1 \mu A \text{ max.} \)

Outline

RENESAS Package code: PRSS0004ZJ-A
(Package name : TO-252)

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector to emitter voltage</td>
<td>(V_{CES})</td>
<td>360</td>
<td>V</td>
</tr>
<tr>
<td>Gate to emitter voltage</td>
<td>(V_{GES})</td>
<td>±30</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td>(I_C)</td>
<td>30</td>
<td>A</td>
</tr>
<tr>
<td>Collector peak current</td>
<td>(i_C(\text{peak})^{\text{Note1}})</td>
<td>200</td>
<td>A</td>
</tr>
<tr>
<td>Collector dissipation</td>
<td>(P_C^{\text{Note2}})</td>
<td>40</td>
<td>W</td>
</tr>
<tr>
<td>Junction to case thermal impedance</td>
<td>(\theta_{j-c})</td>
<td>3.13</td>
<td>°C/W</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>(T_j)</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. \(PW \leq 10 \mu s\), duty cycle \(\leq 1\%\)
2. \(T_c = 25^\circ C\)
### Electrical Characteristics

(Tj = 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>Zero gate voltage collector current</td>
<td>I&lt;sub&gt;CES&lt;/sub&gt;</td>
<td>—</td>
<td>—</td>
<td>1</td>
<td>μA</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 360 V, V&lt;sub&gt;GE&lt;/sub&gt; = 0</td>
</tr>
<tr>
<td>Gate to emitter leak current</td>
<td>I&lt;sub&gt;GES&lt;/sub&gt;</td>
<td>—</td>
<td>—</td>
<td>±100</td>
<td>nA</td>
<td>V&lt;sub&gt;GE&lt;/sub&gt; = ±30 V, V&lt;sub&gt;CE&lt;/sub&gt; = 0</td>
</tr>
<tr>
<td>Gate to emitter cutoff voltage</td>
<td>V&lt;sub&gt;GE(off)&lt;/sub&gt;</td>
<td>2.5</td>
<td>—</td>
<td>5</td>
<td>V</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 10 V, I&lt;sub&gt;C&lt;/sub&gt; = 1 mA</td>
</tr>
<tr>
<td>Collector to emitter saturation voltage</td>
<td>V&lt;sub&gt;CE(sat)&lt;/sub&gt;</td>
<td>—</td>
<td>1.5</td>
<td>2</td>
<td>V</td>
<td>I&lt;sub&gt;C&lt;/sub&gt; = 30 A, V&lt;sub&gt;GE&lt;/sub&gt; = 15 V&lt;sup&gt;Note3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Input capacitance</td>
<td>C&lt;sub&gt;ies&lt;/sub&gt;</td>
<td>—</td>
<td>740</td>
<td>—</td>
<td>pF</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 25 V</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>C&lt;sub&gt;oes&lt;/sub&gt;</td>
<td>—</td>
<td>40</td>
<td>—</td>
<td>pF</td>
<td>V&lt;sub&gt;GE&lt;/sub&gt; = 0</td>
</tr>
<tr>
<td>Reverses transfer capacitance</td>
<td>C&lt;sub&gt;res&lt;/sub&gt;</td>
<td>—</td>
<td>17</td>
<td>—</td>
<td>pF</td>
<td>f = 1 MHz</td>
</tr>
<tr>
<td>Total gate charge</td>
<td>Q&lt;sub&gt;g&lt;/sub&gt;</td>
<td>—</td>
<td>23</td>
<td>—</td>
<td>nC</td>
<td>V&lt;sub&gt;GE&lt;/sub&gt; = 15 V</td>
</tr>
<tr>
<td>Gate to emitter charge</td>
<td>Q&lt;sub&gt;ge&lt;/sub&gt;</td>
<td>—</td>
<td>4</td>
<td>—</td>
<td>nC</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 150 V</td>
</tr>
<tr>
<td>Gate to collector charge</td>
<td>Q&lt;sub&gt;gc&lt;/sub&gt;</td>
<td>—</td>
<td>8</td>
<td>—</td>
<td>nC</td>
<td>I&lt;sub&gt;C&lt;/sub&gt; = 30 A</td>
</tr>
<tr>
<td>Switching time</td>
<td>t&lt;sub&gt;on&lt;/sub&gt;</td>
<td>—</td>
<td>0.02</td>
<td>—</td>
<td>μs</td>
<td>I&lt;sub&gt;C&lt;/sub&gt; = 30 A</td>
</tr>
<tr>
<td></td>
<td>t&lt;sub&gt;r&lt;/sub&gt;</td>
<td>—</td>
<td>0.08</td>
<td>—</td>
<td>μs</td>
<td>R&lt;sub&gt;L&lt;/sub&gt; = 5 Ω</td>
</tr>
<tr>
<td></td>
<td>t&lt;sub&gt;off&lt;/sub&gt;</td>
<td>—</td>
<td>0.04</td>
<td>—</td>
<td>μs</td>
<td>V&lt;sub&gt;GE&lt;/sub&gt; = 15 V</td>
</tr>
<tr>
<td></td>
<td>t&lt;sub&gt;i&lt;/sub&gt;</td>
<td>—</td>
<td>0.15</td>
<td>—</td>
<td>μs</td>
<td>R&lt;sub&gt;G&lt;/sub&gt; = 5 Ω</td>
</tr>
</tbody>
</table>

Notes: 3. Pulse test
Main Characteristics

**Maximum Safe Operation Area**

- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector to Emitter Saturation Voltage $V_{CE(sat)}$

**Typical Output Characteristics (1)**

- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Gate to Emitter Voltage $V_{GE}$

**Typical Output Characteristics (2)**

- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Gate to Emitter Voltage $V_{GE}$

**Typical Transfer Characteristics**

- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Collector to Emitter Voltage $V_{CE}$
- Collector Current $I_C$ vs. Gate to Emitter Voltage $V_{GE}$

**Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage**

- Collector to Emitter Saturation Voltage $V_{CE(sat)}$ vs. Gate to Emitter Voltage $V_{GE}$

**Collector to Emitter Saturation Voltage vs. Collector Current**

- Collector to Emitter Saturation Voltage $V_{CE(sat)}$ vs. Collector Current $I_C$
Normalized Transient Thermal Impedance vs. Pulse Width

Switching Time Test Circuit

Waveform
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>TO-252</td>
<td>—</td>
<td>PR3500042A</td>
<td>—</td>
<td>0.319g</td>
</tr>
</tbody>
</table>

![Package Diagram]

Ordering Information

<table>
<thead>
<tr>
<th>Orderable Part Number</th>
<th>Quantity</th>
<th>Shipping Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJP30H1DPD-00-J2</td>
<td>3000 pcs</td>
<td>Taping</td>
</tr>
</tbody>
</table>
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