2SD755, 2SD756, 2SD756A

Silicon NPN Epitaxial

HITACHI

Application

- Low frequency high voltage amplifier
- Complementary pair with 2SB715, 2SB716 and 2SB716A

Outline

1. Emitter
2. Collector
3. Base
## 2SD755, 2SD756, 2SD756A

### Absolute Maximum Ratings (Ta = 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>2SD755</th>
<th>2SD756</th>
<th>2SD756A</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector to base voltage</td>
<td>V&lt;sub&gt;CBO&lt;/sub&gt;</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>V</td>
</tr>
<tr>
<td>Collector to emitter voltage</td>
<td>V&lt;sub&gt;CEO&lt;/sub&gt;</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>V</td>
</tr>
<tr>
<td>Emitter to base voltage</td>
<td>V&lt;sub&gt;EBO&lt;/sub&gt;</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td>I&lt;sub&gt;C&lt;/sub&gt;</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>Collector power dissipation</td>
<td>P&lt;sub&gt;C&lt;/sub&gt;</td>
<td>750</td>
<td>750</td>
<td>750</td>
<td>mW</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>T&lt;sub&gt;j&lt;/sub&gt;</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>T&lt;sub&gt;stg&lt;/sub&gt;</td>
<td>−55 to +150</td>
<td>−55 to +150</td>
<td>−55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Electrical Characteristics (Ta = 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>2SD755</th>
<th>2SD756</th>
<th>2SD756A</th>
<th>Unit</th>
<th>Test conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector to emitter breakdown voltage</td>
<td>V&lt;sub&gt;(BRV)CEO&lt;/sub&gt;</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>V</td>
<td>I&lt;sub&gt;C&lt;/sub&gt; = 1 mA, R&lt;sub&gt;BE&lt;/sub&gt; = ∞</td>
</tr>
<tr>
<td>Collector to base breakdown voltage</td>
<td>V&lt;sub&gt;(BRV)CBO&lt;/sub&gt;</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>V</td>
<td>I&lt;sub&gt;C&lt;/sub&gt; = 10 μA, I&lt;sub&gt;E&lt;/sub&gt; = 0</td>
</tr>
<tr>
<td>Collector cutoff current</td>
<td>I&lt;sub&gt;CBO&lt;/sub&gt;</td>
<td>—</td>
<td>0.5</td>
<td>—</td>
<td>0.5</td>
<td>μA V&lt;sub&gt;CB&lt;/sub&gt; = 100 V, I&lt;sub&gt;E&lt;/sub&gt; = 0</td>
</tr>
<tr>
<td>DC current transfer ratio h&lt;sub&gt;FE1&lt;/sub&gt;</td>
<td>250</td>
<td>1200</td>
<td>250</td>
<td>800</td>
<td>500</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 12 V, I&lt;sub&gt;C&lt;/sub&gt; = 2 mA</td>
</tr>
<tr>
<td></td>
<td>h&lt;sub&gt;FE2&lt;/sub&gt;</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>V&lt;sub&gt;CE&lt;/sub&gt; = 12 V, I&lt;sub&gt;C&lt;/sub&gt; = 10 mA</td>
</tr>
<tr>
<td>Base to emitter voltage</td>
<td>V&lt;sub&gt;BE&lt;/sub&gt;</td>
<td>—</td>
<td>0.75</td>
<td>—</td>
<td>0.75</td>
<td>V V&lt;sub&gt;CE&lt;/sub&gt; = 12 V, I&lt;sub&gt;C&lt;/sub&gt; = 2 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>0.2</td>
<td>—</td>
<td>0.2</td>
<td>V I&lt;sub&gt;C&lt;/sub&gt; = 10 mA, I&lt;sub&gt;E&lt;/sub&gt; = 1 mA</td>
</tr>
<tr>
<td>Gain bandwidth product</td>
<td>f&lt;sub&gt;T&lt;/sub&gt;</td>
<td>—</td>
<td>350</td>
<td>—</td>
<td>350</td>
<td>MHz V&lt;sub&gt;CE&lt;/sub&gt; = 12 V, I&lt;sub&gt;C&lt;/sub&gt; = 5 mA</td>
</tr>
<tr>
<td>Collector output capacitance</td>
<td>C&lt;sub&gt;Ob&lt;/sub&gt;</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
<td>pF V&lt;sub&gt;CB&lt;/sub&gt; = 25 V, I&lt;sub&gt;E&lt;/sub&gt; = 0, f = 1 MHz</td>
</tr>
</tbody>
</table>

Note: 1. The 2SD755, 2SD756 and 2SD756A are grouped by h<sub>FE1</sub> as follows.

<table>
<thead>
<tr>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SD755</td>
<td>250 to 500</td>
<td>400 to 800</td>
</tr>
<tr>
<td>2SD756</td>
<td>250 to 500</td>
<td>400 to 800</td>
</tr>
<tr>
<td>2SD756A</td>
<td>250 to 500</td>
<td>—</td>
</tr>
</tbody>
</table>

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2SD755, 2SD756, 2SD756A

Maximum Collector Dissipation Curve

Typical Output Characteristics

Collector Power Dissipation $P_c$ (mW)

Collector Current $I_C$ (mA)

Collector to Emitter Voltage $V_{CE}$ (V)

DC Current Transfer Ratio vs. Collector Current

Typical Transfer Characteristics

DC Current Transfer Ratio $h_{FE}$

Typical Output Characteristics

Collector Current $I_C$ (mA)

Collector to Emitter Voltage $V_{CE}$ (V)

DC Current Transfer Ratio $h_{FE}$

Typical Transfer Characteristics

Collector Current $I_C$ (mA)

Collector to Emitter Voltage $V_{BE}$ (V)

V $V_{CE} = 12$ V

Ta = 100°C 75 50 25 0

–25

0

DC Current Transfer Ratio $h_{FE}$

0.1 0.3 0.5 0.7 0.9

0.01 0.03 0.05 0.07 0.09

0.2 0.4 0.6 0.8

0.01 0.03 0.05 0.07 0.09

0.2 0.4 0.6 0.8

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Gain Bandwidth Product vs. Collector Current

Collector Output Capacitance vs. Collector to Base Voltage

Area of Safe Operation

V_{CE} = 12 V

Collector to Emitter Voltage V_{CE} (V)

Collector Current I_{C} (mA)

Collector Output Capacitance C_{ob} (pF)

Collector to Base Voltage V_{CB} (V)

Collector Current I_{C} (mA)

Collector to Emitter Voltage V_{CE} (V)

2SD755, 2SD756, 2SD756A

Gain Bandwidth Product vs. Collector Current

Collector Current I_{C} (mA)

0.01 0.03 0.1 0.3 1.0 3 10 30

Gain Bandwidth Product f_{T} (MHz)

V_{CE} = 12 V

Collector Output Capacitance vs. Collector to Base Voltage

Collector to Base Voltage V_{CB} (V)

Collector Output Capacitance C_{ob} (pF)

1 3 10 30 100

0.5

1

2

2

2

f = 1 MHz

I_{E} = 0

Area of Safe Operation

Collector to Emitter Voltage V_{CE} (V)

Collector Current I_{C} (mA)

100 50 20 10 5 2 1

5 10 20 50 100 200 500

1 5 10 20 50 100 200 500

Ta = 25°C

P_{C} = 750 mW

(50 V, 15 mA)

(100 V, 6 mA)

(120 V, 5 mA)

(140 V, 4 mA)

2SD755

2SD756

2SD756A

(120 V, 5 mA)

(140 V, 4 mA)
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