CPH6003A

RF Transistor
12V, 150mA, fT=7GHz, NPN Single CPH6

Features
- High gain (fT=7GHz typ)
- High Current (Ic=150mA)
- Ultraminiature and thin 6pin package
- Large Collector Disspation (800mW)

Specifications

Absolute Maximum Ratings at Ta=25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-to-Base Voltage</td>
<td>VCEO</td>
<td></td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Collector-to-Emitter Voltage</td>
<td>VCEO</td>
<td></td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-to-Base Voltage</td>
<td>VCEO</td>
<td></td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>Collector Current</td>
<td>IC</td>
<td>When mounted on ceramic substrate (250mm²×0.8mm)</td>
<td>150</td>
<td>mA</td>
</tr>
<tr>
<td>Collector Dissipation</td>
<td>PC</td>
<td></td>
<td>800</td>
<td>mW</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>Tj</td>
<td></td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>Tstg</td>
<td></td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)
7018A-002

Product & Package Information
- Package : CPH6
- JEITA, JEDEC : SC-74, SOT-26, SOT-457
- Minimum Packing Quantity : 3,000 pcs./reel

Packing Type: TL

Marking

Electrical Connection
### Electrical Characteristics at Ta=25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>min</td>
<td>typ</td>
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<tr>
<td>Collector Cutoff Current</td>
<td>ICBO</td>
<td>VCB=10V, IE=0A</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Emitter Cutoff Current</td>
<td>IEBO</td>
<td>VEB=1V, IC=0A</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>DC Current Gain</td>
<td>hFE</td>
<td>VCE=5V, IC=50mA</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Gain-Bandwidth Product</td>
<td>fT</td>
<td></td>
<td></td>
<td>7</td>
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<tr>
<td>Output Capacitance</td>
<td>Cob</td>
<td>VCB=10V, f=1MHz</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>Cre</td>
<td></td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Forward Transfer Gain</td>
<td></td>
<td>S21e</td>
<td>VCE=5V, IC=50mA, f=1GHz</td>
<td>9</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>NF</td>
<td>VCE=5V, IC=50mA, f=1GHz</td>
<td>1.8</td>
<td></td>
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</table>

Marking : GC Continued on next page

### Ordering Information

<table>
<thead>
<tr>
<th>Device</th>
<th>Package</th>
<th>Shipping</th>
<th>memo</th>
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<tbody>
<tr>
<td>CPH6003A-TL-E</td>
<td>CPH6</td>
<td>3,000pcs./reel</td>
<td>Pb Free</td>
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</table>
### S Parameters (Common emitter)

**\(V_{CE}=5V, \, I_{C}=20mA, \, ZO=50\Omega\)**

<table>
<thead>
<tr>
<th>Freq (MHz)</th>
<th>(S_{11})</th>
<th>(S_{11})</th>
<th>(S_{21})</th>
<th>(S_{21})</th>
<th>(S_{12})</th>
<th>(S_{12})</th>
<th>(S_{22})</th>
<th>(S_{22})</th>
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<tbody>
<tr>
<td>100</td>
<td>0.550</td>
<td>254.1</td>
<td>21.532</td>
<td>119.9</td>
<td>0.036</td>
<td>54.6</td>
<td>0.527</td>
<td>-62.8</td>
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<td>200</td>
<td>0.492</td>
<td>218.1</td>
<td>12.273</td>
<td>103.0</td>
<td>0.050</td>
<td>56.5</td>
<td>0.332</td>
<td>-80.3</td>
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<tr>
<td>300</td>
<td>0.477</td>
<td>201.9</td>
<td>8.448</td>
<td>95.3</td>
<td>0.063</td>
<td>61.7</td>
<td>0.267</td>
<td>-88.3</td>
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<tr>
<td>400</td>
<td>0.470</td>
<td>192.4</td>
<td>6.427</td>
<td>90.4</td>
<td>0.078</td>
<td>65.3</td>
<td>0.242</td>
<td>268.1</td>
</tr>
<tr>
<td>500</td>
<td>0.518</td>
<td>181.0</td>
<td>5.015</td>
<td>86.8</td>
<td>0.089</td>
<td>68.2</td>
<td>0.217</td>
<td>245.3</td>
</tr>
<tr>
<td>600</td>
<td>0.513</td>
<td>175.8</td>
<td>4.221</td>
<td>83.9</td>
<td>0.104</td>
<td>70.2</td>
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<td>700</td>
<td>0.510</td>
<td>171.5</td>
<td>3.658</td>
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<td>167.6</td>
<td>3.234</td>
<td>78.9</td>
<td>0.135</td>
<td>72.7</td>
<td>0.220</td>
<td>249.3</td>
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<td>900</td>
<td>0.503</td>
<td>163.7</td>
<td>2.900</td>
<td>76.7</td>
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<td>73.2</td>
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<td>0.196</td>
<td>74.1</td>
<td>0.247</td>
<td>258.8</td>
</tr>
</tbody>
</table>

**\(V_{CE}=5V, \, I_{C}=50mA, \, ZO=50\Omega\)**

<table>
<thead>
<tr>
<th>Freq (MHz)</th>
<th>(S_{11})</th>
<th>(S_{11})</th>
<th>(S_{21})</th>
<th>(S_{21})</th>
<th>(S_{12})</th>
<th>(S_{12})</th>
<th>(S_{22})</th>
<th>(S_{22})</th>
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<tbody>
<tr>
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<td>0.465</td>
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<td>25.203</td>
<td>111.9</td>
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<td>59.2</td>
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<td>0.449</td>
<td>203.4</td>
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<td>3.127</td>
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<td>75.5</td>
<td>0.239</td>
<td>242.0</td>
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</table>

**\(V_{CE}=5V, \, I_{C}=100mA, \, ZO=50\Omega\)**

<table>
<thead>
<tr>
<th>Freq (MHz)</th>
<th>(S_{11})</th>
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<th>(S_{21})</th>
<th>(S_{21})</th>
<th>(S_{12})</th>
<th>(S_{12})</th>
<th>(S_{22})</th>
<th>(S_{22})</th>
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<tbody>
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<td>4.550</td>
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<td>76.7</td>
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<td>0.236</td>
<td>239.3</td>
</tr>
</tbody>
</table>


**Embossed Taping Specification**

CPH6003A-TL-E

---

### 1. Packing Format

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Carrier Tape Type</th>
<th>Maximum Number of Devices contained (pcs)</th>
<th>Packing Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPH6</td>
<td>CPH6</td>
<td>3,000</td>
<td></td>
</tr>
</tbody>
</table>

- **Inner BOX (C-1):**
  - 5 reels contained
  - Dimensions: mm (external) $183 \times 72 \times 185$
- **Outer BOX (A-7):**
  - 5 inner boxes contained
  - Dimensions: mm (external) $440 \times 195 \times 210$

**Packing method**

- **Type No.**
- **LOT No.**
- **Quantity**
- **Origin**

**Reel label, Inner box label** (unit: mm)

**Outer box label**

*It is a label at the time of factory shipment. The form of a label may change in physical distribution process.*

**NOTES (1)**

The LEAD FREE \# description shows that the surface treatment of the terminal is lead free.

<table>
<thead>
<tr>
<th>Label</th>
<th>JEITA Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEAD FREE 3</td>
<td>JEITA Phase 3A</td>
</tr>
<tr>
<td>LEAD FRBB 4</td>
<td>JEITA Phase 3</td>
</tr>
</tbody>
</table>

---

### 2. Taping configuration

#### 2-1. Carrier tape size (unit: mm)

- **When a device is mounted**
  - $\phi 1.5 \text{ mm}$
  - $4.0 \times 0.1$
  - $1.75 \times 0.1$
  - $3.5 \times 0.05$
  - $6.0 \times 0.2$

- **Device mounting recess square hole**

- **Reel**
- **Feed round hole**

#### 2-2. Device placement direction

- **Pin 1 index**
- **Feed direction**

*Those with pin 1 index on the feed hole side: TL*
Outline Drawing
CPH6003A-TL-E

Land Pattern Example

Mass (g) Unit
0.015 mm

Unit: mm

0.6
0.95 0.95

0.95 0.95