Description

The 2SC3519A is an NPN transistor of 180 V, 15 A. The product has constant $h_{FE}$ characteristics in a wide current range, providing high-quality audio sounds.

Features

- Complementary to 2SA1386A
- LAPT (Linear Amplifier Power Transistor)
- High Transition Frequency
- Bare Lead Frame: Pb-free (RoHS Compliant)

- **$V_{CEO}$**: 180 V
- **$I_C$**: 15 A
- **$f_T$**: 50 MHz
- **$P_C$**: 130 W

Application

- Audio Power Amplifier

Package

TO3-3L

Not to scale
**Absolute Maximum Ratings**

Unless otherwise specified, $T_A = 25\, ^\circ C$.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector to Base Voltage</td>
<td>$V_{CB0}$</td>
<td>$V_{CB} = 180, V$, $I_E = 0, A$</td>
<td>180</td>
<td>V</td>
</tr>
<tr>
<td>Collector to Emitter Voltage</td>
<td>$V_{CEO}$</td>
<td>$V_{CEO} = 180, V$</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Emitter to Base Voltage</td>
<td>$V_{EBO}$</td>
<td>$I_C = 0, A$</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Collector Current</td>
<td>$I_C$</td>
<td>$I_C = 15, A$</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td>Base Current</td>
<td>$I_B$</td>
<td>$I_B = 4, A$</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Collector Power Dissipation</td>
<td>$P_C$</td>
<td>$T_C = 25, ^\circ C$</td>
<td>130</td>
<td>W</td>
</tr>
<tr>
<td>Operating Junction Temperature</td>
<td>$T_J$</td>
<td></td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>$T_{STG} = -55$ to $150, ^\circ C$</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Thermal Characteristics**

Unless otherwise specified, $T_A = 25\, ^\circ C$.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance (Junction to Case)</td>
<td>$R_{θJC}$</td>
<td></td>
<td>—</td>
<td>—</td>
<td>0.96</td>
<td>°C/W</td>
</tr>
<tr>
<td>Thermal Resistance (Junction to Ambient)</td>
<td>$R_{θJA}$</td>
<td></td>
<td>—</td>
<td>—</td>
<td>35.7</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

**Electrical Characteristics**

Unless otherwise specified, $T_A = 25\, ^\circ C$.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector Cut-off Current</td>
<td>$I_{CB0}$</td>
<td>$V_{CB} = 4, V$, $I_C = 5, A$</td>
<td>50</td>
<td>—</td>
<td>180</td>
<td>—</td>
</tr>
<tr>
<td>Emitter Cut-off Current</td>
<td>$I_{EBO}$</td>
<td>$V_{EBO} = 5, V$, $I_E = 0, A$</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>μA</td>
</tr>
<tr>
<td>Collector to Emitter Breakdown Voltage</td>
<td>$V_{(BR)CEO}$</td>
<td>$I_C = 25, mA$</td>
<td>180</td>
<td>—</td>
<td>—</td>
<td>V</td>
</tr>
<tr>
<td>DC Current Gain</td>
<td>$h_{FE}$</td>
<td>$V_{CE} = 5, V$, $I_C = 0, A$</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>V</td>
</tr>
<tr>
<td>Collector to Emitter Saturation Voltage</td>
<td>$V_{CE(sat)}$</td>
<td>$I_C = 5, A$, $I_E = 0.5, A$</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>V</td>
</tr>
<tr>
<td>Transition Frequency</td>
<td>$f_T$</td>
<td>$V_{CE} = 12, V$, $I_E = -2, A$</td>
<td>—</td>
<td>50</td>
<td>—</td>
<td>MHz</td>
</tr>
<tr>
<td>Collector Output Capacitance</td>
<td>$C_{OB}$</td>
<td>$V_{CB} = 10, V$, $I_E = 0, A$, $f = 1, MHz$</td>
<td>—</td>
<td>250</td>
<td>—</td>
<td>pF</td>
</tr>
</tbody>
</table>

**$h_{FE}$ Rank**

For the marking area of the rank, see the Marking Diagram.

<table>
<thead>
<tr>
<th>Rank</th>
<th>O</th>
<th>P</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>$h_{FE}$</td>
<td>50 to 100</td>
<td>70 to 140</td>
<td>90 to 180</td>
</tr>
</tbody>
</table>
Rating and Characteristic Curves

Figure 1. Safe Operating Area

Figure 2. Power Dissipation vs. Ambient Temperature

Figure 3. Collector Current vs. Collector-Emitter Voltage

Figure 4. Collector-Emitter Saturation Voltage vs. Base Current
Figure 5. Collector Current vs. Base-Emitter Voltage

Figure 6. DC Current Gain Variation vs. Collector Current

Figure 7. DC Current Gain vs. Collector Current

Figure 8. Transition Frequency vs. Emitter Current
Figure 9. Transient Thermal Resistance
Physical Dimensions

- **TO3P-3L**

![Diagram of TO3P-3L dimensions]

**NOTES:**
- Gate burr: 0.3 mm (max.)
- All dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the product, be sure to minimize the working time within the following limits:
  - 260 ± 5 °C 10 ± 1 s, 2 times (flow)
  - 380 ± 10 °C 3.5 ± 0.5 s, 1 time (soldering iron)
- Soldering should be at a distance of at least 1.5 mm from the body of the product.
- The recommended screw torque for TO3P: 0.686 N-m to 0.882 N-m (7 kgf·cm to 9 kgf·cm)
2SC3519A

Marking Diagram

Specific Device Code (See Table 1)

Lot Number
Y is the last digit of the year of manufacture (0 to 9)
M is the month of the year (1 to 9, O, N, or D)
X is the $h_{FE}$ rank

Table 1. Specific Device Code

<table>
<thead>
<tr>
<th>Specific Device Code</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>C33519A</td>
<td>2SC3519A</td>
</tr>
</tbody>
</table>
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