2SAR544P
PNP -2.5A -80V Middle Power Transistor

Features
1) Suitable for Middle Power Driver
2) Complementary NPN Types : 2SCR544P
3) Low $V_{CE(sat)}$
   
   \[ V_{CE(sat)} = -0.4V \text{ Max.} \quad (I_C/I_B = -1A/-50mA) \]
4) Lead Free/RoHS Compliant.

Inner circuit

Applications
Motor driver , LED driver
Power supply

Packaging specifications

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Package</th>
<th>Package size (mm)</th>
<th>Taping code</th>
<th>Reel size (mm)</th>
<th>Tape width (mm)</th>
<th>Basic ordering unit (pcs)</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SAR544P</td>
<td>MPT3</td>
<td>4540</td>
<td>T100</td>
<td>180</td>
<td>12</td>
<td>1,000</td>
<td>MS</td>
</tr>
</tbody>
</table>

Absolute maximum ratings ($T_a = 25^\circ C$)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-base voltage</td>
<td>$V_{CBO}$</td>
<td>-80</td>
<td>V</td>
</tr>
<tr>
<td>Collector-emitter voltage</td>
<td>$V_{CEO}$</td>
<td>-80</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-base voltage</td>
<td>$V_{EBO}$</td>
<td>-6</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td>$I_C$</td>
<td>-2.5</td>
<td>A</td>
</tr>
<tr>
<td>Pulsed</td>
<td>$I_{CP}$</td>
<td>-5.0</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>$P_D$</td>
<td>0.5  $^2$</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0  $^3$</td>
<td>W</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>$T_j$</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Range of storage temperature</td>
<td>$T_{slg}$</td>
<td>-55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

$^1$ Pw=10ms , single pulse  $^2$ Each terminal mounted on a reference land
$^3$ Mounted on a ceramic board (40×40×.70mm)
### Electrical characteristics (Ta = 25°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-emitter breakdown voltage</td>
<td>BV_{CEO}</td>
<td>I_C = -1mA</td>
<td>-80</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Collector-base breakdown voltage</td>
<td>BV_{CBO}</td>
<td>I_C = -100μA</td>
<td>-80</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-base breakdown voltage</td>
<td>BV_{EBO}</td>
<td>I_E = -100μA</td>
<td>-6</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Collector cut-off current</td>
<td>I_{CBO}</td>
<td>V_{CB} = -80V</td>
<td>-</td>
<td>-</td>
<td>-0.20</td>
<td>μA</td>
</tr>
<tr>
<td>Emitter cut-off current</td>
<td>I_{EBO}</td>
<td>V_{EB} = -4V</td>
<td>-</td>
<td>-</td>
<td>-1</td>
<td>μA</td>
</tr>
<tr>
<td>Collector-emitter saturation voltage</td>
<td>V_{CE(sat)}</td>
<td>I_C = -1A, I_B = -50mA</td>
<td>-0.20</td>
<td>-</td>
<td>-0.40</td>
<td>V</td>
</tr>
<tr>
<td>DC current gain</td>
<td>h_{FE}</td>
<td>V_{CE} = -3V, I_C = -100mA</td>
<td>120</td>
<td>-</td>
<td>390</td>
<td>-</td>
</tr>
<tr>
<td>Transition frequency</td>
<td>f_T</td>
<td>V_{CE} = -10V, I_E = 500mA, f = 100MHz</td>
<td>-</td>
<td>280</td>
<td>-</td>
<td>MHz</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>C_{ob}</td>
<td>V_{CB} = -10V, I_E = 0A, f = 1MHz</td>
<td>-</td>
<td>32</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Turn-on time</td>
<td>t_{on}</td>
<td>I_C = -1.3A</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Storage time</td>
<td>t_{stg}</td>
<td>I_B1 = -130mA, I_B2 = 130mA</td>
<td>-</td>
<td>400</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Fall time</td>
<td>t_f</td>
<td>V_{CC} ≤ -10V</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

*1 Pulsed
*2 See switching time test circuit

#### Switching time test circuit

![Switching time test circuit diagram](image-url)

- **Collector-emitter breakdown voltage** (BV_{CEO})
- **Collector-base breakdown voltage** (BV_{CBO})
- **Emitter-base breakdown voltage** (BV_{EBO})
- **Collector cut-off current** (I_{CBO})
- **Emitter cut-off current** (I_{EBO})
- **Collector-emitter saturation voltage** (V_{CE(sat)})
- **DC current gain** (h_{FE})
- **Transition frequency** (f_T)
- **Output capacitance** (C_{ob})
- **Turn-on time** (t_{on})
- **Storage time** (t_{stg})
- **Fall time** (t_f)
Electrical characteristic curves (Ta = 25°C)

Fig. 1 Ground Emitter Propagation Characteristics

Fig. 2 Typical Output Characteristics

Fig. 3 DC Current Gain vs. Collector Current (I)

Fig. 4 DC current gain vs. output current (II)
**Electrical characteristic curves** ($\text{Ta} = 25^\circ\text{C}$)

**Fig. 5** Collector-Emitter Saturation Voltage vs. Collector Current (I)

**Fig. 6** Collector-Emitter Saturation Voltage vs. Collector Current (II)

**Fig. 7** Base-Emitter Saturation Voltage vs. Collector Current

**Fig. 8** Gain Bandwidth Product vs. Emitter Current
Electrical characteristic curves (Ta = 25°C)

Fig. 9 Emitter input capacitance vs. Emitter-Base Voltage
Collector output capacitance vs. Collector-Base Voltage

Fig. 10 Safe Operating Area
● Dimensions (Unit : mm)

Pattern of terminal position areas

[Not a recommended pattern of soldering pads]

Dimension in mm / inches
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