1. **General description**

NPN high-voltage transistor in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. **Features and benefits**

- High voltage (max. 300 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. **Applications**

- Telephony and professional communication equipment

4. **Quick reference data**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{CEO}$</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>V</td>
</tr>
<tr>
<td>$I_C$</td>
<td>collector current</td>
<td></td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = 10 \text{ V}; I_C = 30 \text{ mA}; T_{amb} = 25 \degree C$</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = 10 \text{ V}; I_C = 10 \text{ mA}; T_{amb} = 25 \degree C$</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = 10 \text{ V}; I_C = 1 \text{ mA}; T_{amb} = 25 \degree C$</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

5. **Pinning information**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
<td>base</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>emitter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>collector</td>
<td>SOT23</td>
<td>sym02f</td>
</tr>
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</table>
6. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMBTA42-Q</td>
<td>SOT23</td>
<td>plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body</td>
<td>SOT23</td>
<td></td>
</tr>
</tbody>
</table>

7. Marking

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code[1]</th>
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</thead>
<tbody>
<tr>
<td>PMBTA42-Q</td>
<td>%1D</td>
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</tbody>
</table>

[1] % = placeholder for manufacturing site code

8. Limiting values

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_CBO</td>
<td>collector-base voltage</td>
<td>open emitter</td>
<td>-</td>
<td>300</td>
<td>V</td>
</tr>
<tr>
<td>V_CE0</td>
<td>collector-emitter voltage</td>
<td>open base</td>
<td>-</td>
<td>300</td>
<td>V</td>
</tr>
<tr>
<td>V_EBO</td>
<td>emitter-base voltage</td>
<td>open collector</td>
<td>-</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>I_C</td>
<td>collector current</td>
<td></td>
<td>-</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>I_CM</td>
<td>peak collector current</td>
<td>single pulse; ( t_p \leq 1 \text{ ms} )</td>
<td>-</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>I_BM</td>
<td>peak base current</td>
<td></td>
<td>-</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>P_tot</td>
<td>total power dissipation</td>
<td>( T_{\text{amb}} \leq 25 \degree \text{C} )</td>
<td>-</td>
<td>250</td>
<td>mW</td>
</tr>
<tr>
<td>T_j</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>\degree\text{C}</td>
</tr>
<tr>
<td>T_amb</td>
<td>ambient temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>\degree\text{C}</td>
</tr>
<tr>
<td>T_stg</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>\degree\text{C}</td>
</tr>
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</table>


9. Thermal characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_{th(j-a)}</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>500</td>
<td>K/W</td>
</tr>
</tbody>
</table>

10. Characteristics

Table 7. Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{CBO}$</td>
<td>collector-base cut-off current</td>
<td>$V_{CB} = 200 , \text{V}; , I_E = 0 , \text{A}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td>$I_{EBO}$</td>
<td>emitter-base cut-off current</td>
<td>$V_{EB} = 6 , \text{V}; , I_C = 0 , \text{A}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td>$h_{FE}$</td>
<td>DC current gain</td>
<td>$V_{CE} = 10 , \text{V}; , I_C = 1 , \text{mA}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = 10 , \text{V}; , I_C = 10 , \text{mA}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{CE} = 10 , \text{V}; , I_C = 30 , \text{mA}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$V_{CE_{sat}}$</td>
<td>collector-emitter saturation voltage</td>
<td>$I_C = 20 , \text{mA}; , I_B = 2 , \text{mA}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>500</td>
<td>mV</td>
</tr>
<tr>
<td>$V_{BE_{sat}}$</td>
<td>base-emitter saturation voltage</td>
<td>-</td>
<td>-</td>
<td>900</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td>$C_{re}$</td>
<td>feedback capacitance</td>
<td>$V_{GB} = 20 , \text{V}; , I_C = 0 , \text{A}; , i_c = 0 , \text{A}; , f = 1 , \text{MHz}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>F</td>
</tr>
<tr>
<td>$f_T$</td>
<td>transition frequency</td>
<td>$V_{CE} = 20 , \text{V}; , I_C = 10 , \text{mA}; , f = 100 , \text{MHz}; , T_{amb} = 25 ^\circ \text{C}$</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>MHz</td>
</tr>
</tbody>
</table>

11. Test information

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

12. Package outline

Fig. 1. Package outline SOT23
13. Soldering

Fig. 2. Reflow soldering footprint for SOT23

Fig. 3. Wave soldering footprint for SOT23
## 14. Revision history

<table>
<thead>
<tr>
<th>Data sheet ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMBTA42-Q v.1</td>
<td>20230703</td>
<td>Product data sheet</td>
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<td>-</td>
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</table>
15. Legal information

Data sheet status

<table>
<thead>
<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary</td>
<td>Development</td>
<td>This document contains data from the subjective specification for product development.</td>
</tr>
<tr>
<td>Objective [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term "short data sheet" is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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