
# PZTA44-Q

## NPN high-voltage transistor

24 June 2024 Product data sheet

## 1. General description

NPN high-voltage transistor in a SOT223 (SC73) Surface-Mounted Device plastic package.

## 2. Features and benefits

- Low current (max. 300 mA)
- High voltage (max. 400 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Telecommunication

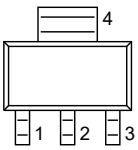
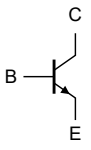
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | | - | - | 400 | V |
| $I_C$ | collector current | | | - | - | 300 | mA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 10 V; $I_C$ = 1 mA; $T_{amb}$ = 25 °C | | 40 | - | - | |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | B | base |  |  |
| 2 | C | collector | | |
| 3 | E | emitter | | |
| 4 | C | collector | | |



**SC-73 (SOT223)**



*sym123*

## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PZTA44-Q | SC-73 | plastic, surface-mounted package with increased heatsink; 4 leads; 2.3 mm pitch; 6.5 mm x 3.5 mm x 1.65 mm body | SOT223 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| PZTA44-Q | PZTA44 |

# 8. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | open emitter | | - | 500 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | | - | 400 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | | - | 6 | V |
| $I_C$ | collector current | | | - | 300 | mA |
| $I_{CM}$ | peak collector current | single pulse; $t_p \leq 1$ ms | | - | 300 | mA |
| $I_{BM}$ | peak base current | | | - | 100 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] [2] | - | 1.35 | W |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -65 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 $cm^2$.
[2] For other mounting conditions, see “Thermal considerations for SOT223 in the General Part of associated Handbook”.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

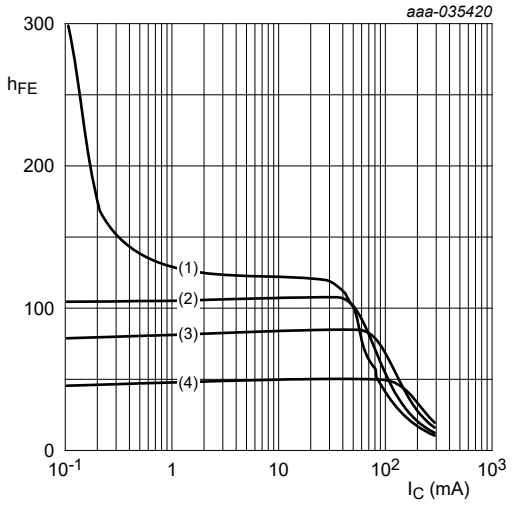
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 91 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | - | - | 10 | K/W |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 $cm^2$.
[2] For other mounting conditions, see “Thermal considerations for SOT223 in the General Part of associated Handbook”.

# 10. Characteristics

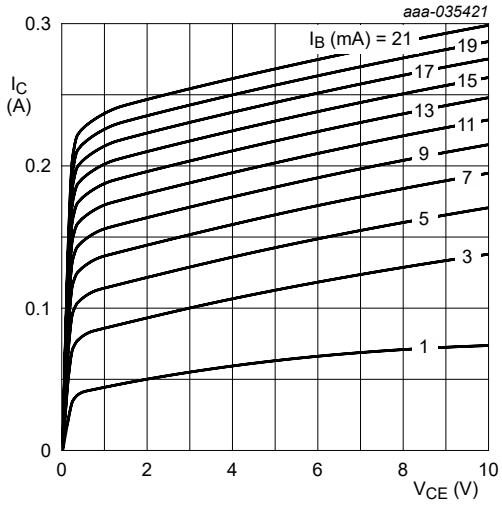
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = 400 V; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | - | - | 100 | nA |
| | | $V_{CB}$ = 400 V; $I_E$ = 0 A; $T_j$ = 150 °C | | - | - | 10 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = 4 V; $I_C$ = 0 A; $T_{amb}$ = 25 °C | | - | - | 100 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = 10 V; $I_C$ = 1 mA; $T_{amb}$ = 25 °C | | 40 | - | - | |
| | | $V_{CE}$ = 10 V; $I_C$ = 10 mA; $T_{amb}$ = 25 °C | | 50 | - | 200 | |
| | | $V_{CE}$ = 10 V; $I_C$ = 50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | 45 | - | - | |
| | | $V_{CE}$ = 10 V; $I_C$ = 100 mA; pulsed; $t_p \leq$ 300 µs; $T_{amb}$ = 25 °C | | 40 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = 1 mA; $I_B$ = 0.1 mA; $T_{amb}$ = 25 °C | | - | - | 400 | mV |
| | | $I_C$ = 10 mA; $I_B$ = 1 mA; $T_{amb}$ = 25 °C | | - | - | 500 | mV |
| | | $I_C$ = 50 mA; $I_B$ = 5 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_{amb}$ = 25 °C | | - | - | 750 | mV |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = 10 mA; $I_B$ = 1 mA; $T_{amb}$ = 25 °C | | - | - | 850 | mV |
| $f_T$ | transition frequency | $V_{CE}$ = 10 V; $I_C$ = 10 mA; f = 100 MHz; $T_{amb}$ = 25 °C | | 20 | - | - | MHz |
| $C_c$ | collector capacitance | $V_{CB}$ = 20 V; $I_E$ = 0 A; $i_e$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | - | 7 | pF |
| $C_e$ | emitter capacitance | $V_{EB}$ = 500 mV; $I_C$ = 0 A; $i_c$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | - | 180 | pF |



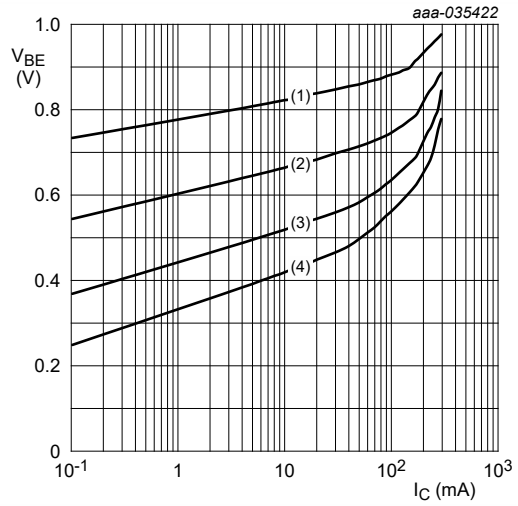

$V_{CE}$ = 10 V
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 100 °C
(3) $T_{amb}$ = 25 °C
(4) $T_{amb}$ = -55 °C

**Fig. 1. DC current gain as a function of collector current; typical values**



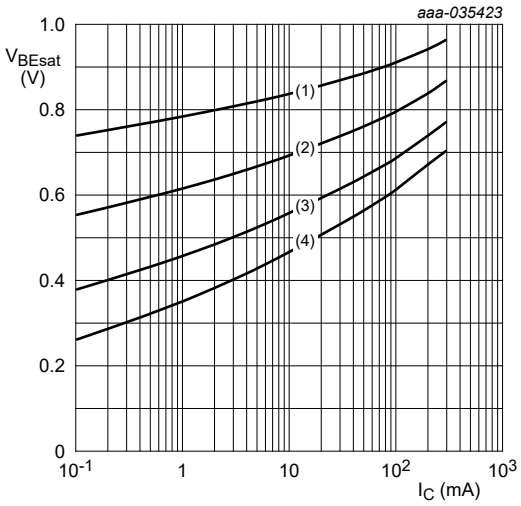

$T_{amb}$ = 25 °C

**Fig. 2. Collector current as a function of collector-emitter voltage; typical values**



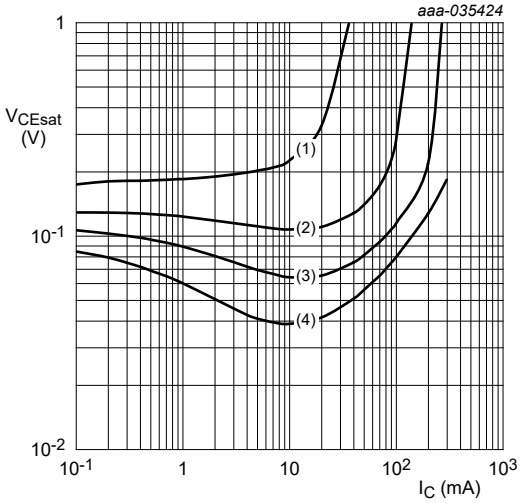

$V_{CE}$ = 10 V
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 100 °C
(4) $T_{amb}$ = 150 °C

**Fig. 3. Base-emitter voltage as a function of collector current; typical values**



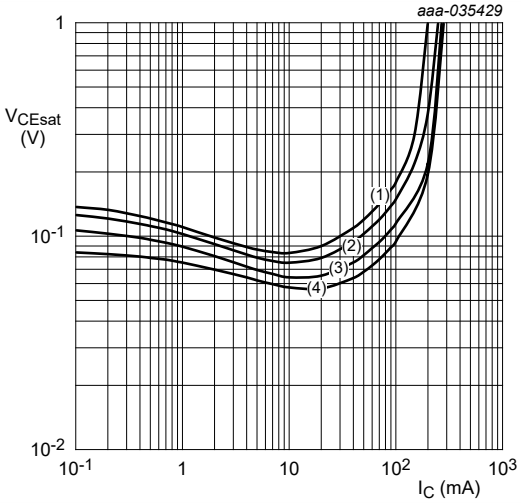

$I_C/I_B$ = 10
(1) $T_{amb}$ = -55 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = 100 °C
(4) $T_{amb}$ = 150 °C

**Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values**




$T_{amb}$ = 25 °C
(1) $I_C/I_B$ = 50
(2) $I_C/I_B$ = 20
(3) $I_C/I_B$ = 10
(4) $I_C/I_B$ = 5

**Fig. 5. Collector-emitter saturation voltage as a function of collector current; typical values**




$I_C/I_B$ = 10
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 100 °C
(3) $T_{amb}$ = 25 °C
(4) $T_{amb}$ = -55 °C

**Fig. 6. Collector-emitter saturation voltage as a function of collector current; typical values**

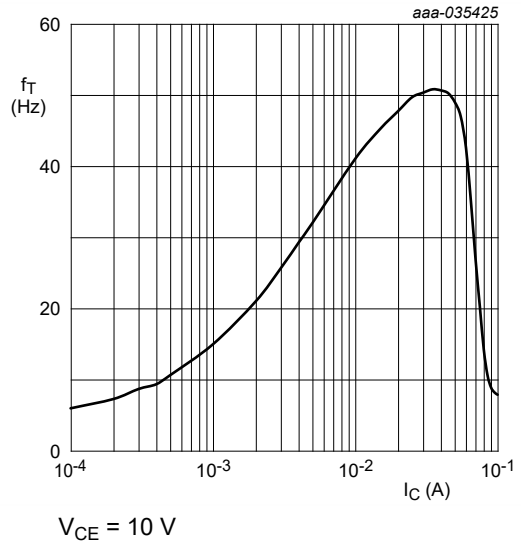



**Fig. 7. Transition frequency as a function of collector current; typical values**

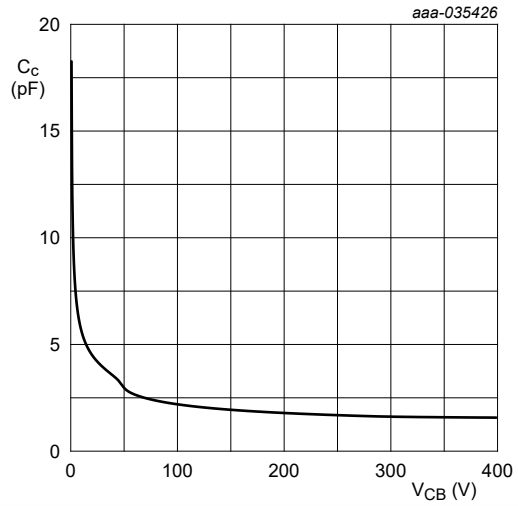



**Fig. 8. Collector capacitance as a function of collector-base voltage; typical values**

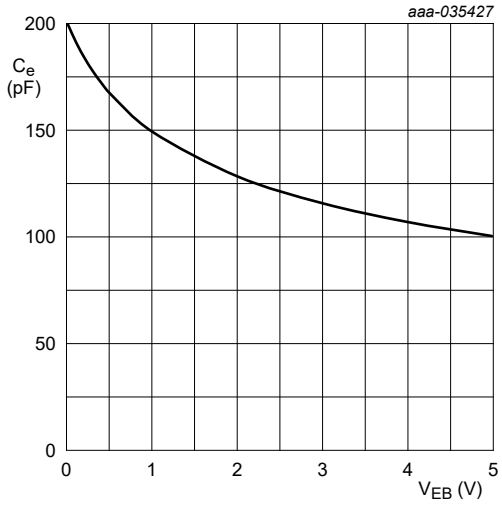



**Fig. 9. Emitter capacitance as a function of emitter-base voltage; typical values**

# 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

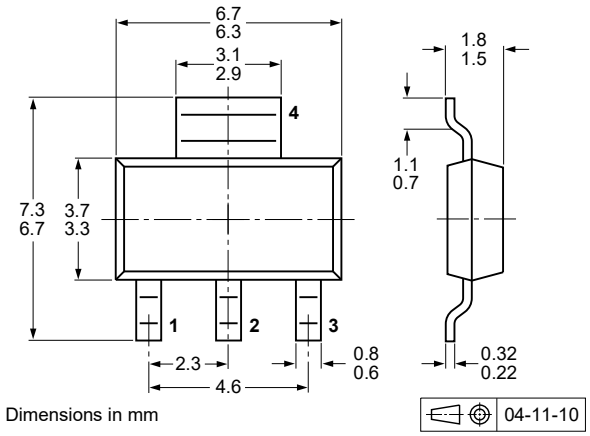



**Fig. 10. Package outline SC-73 (SOT223)**

## 13. Soldering

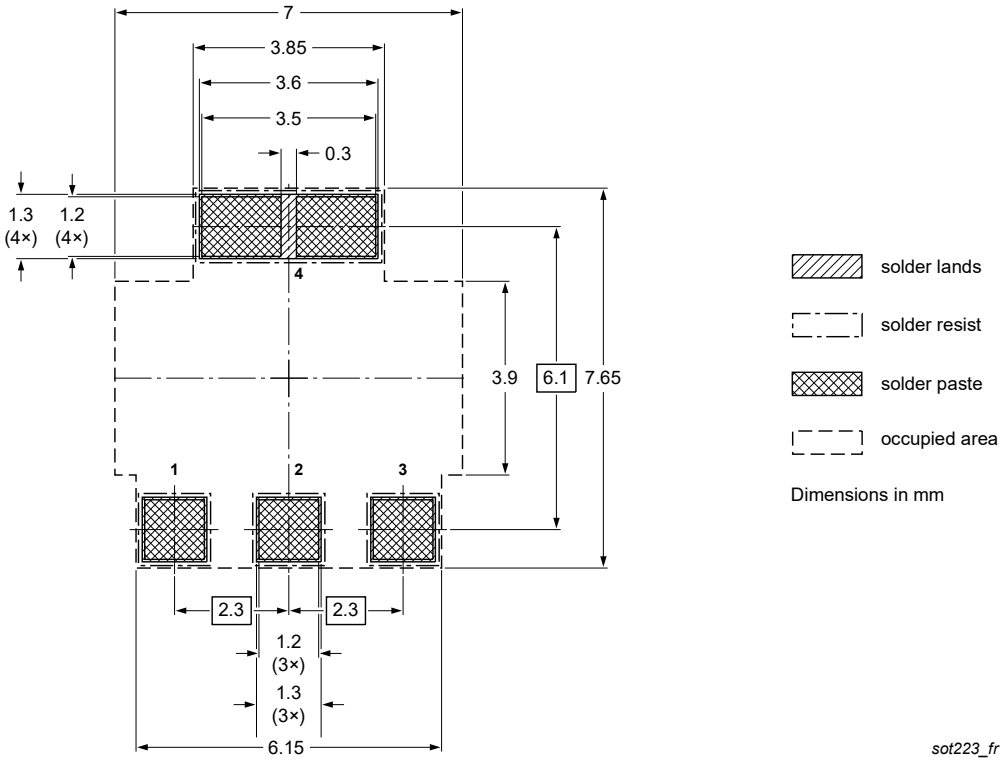



**Fig. 11. Reflow soldering footprint for SC-73 (SOT223)**

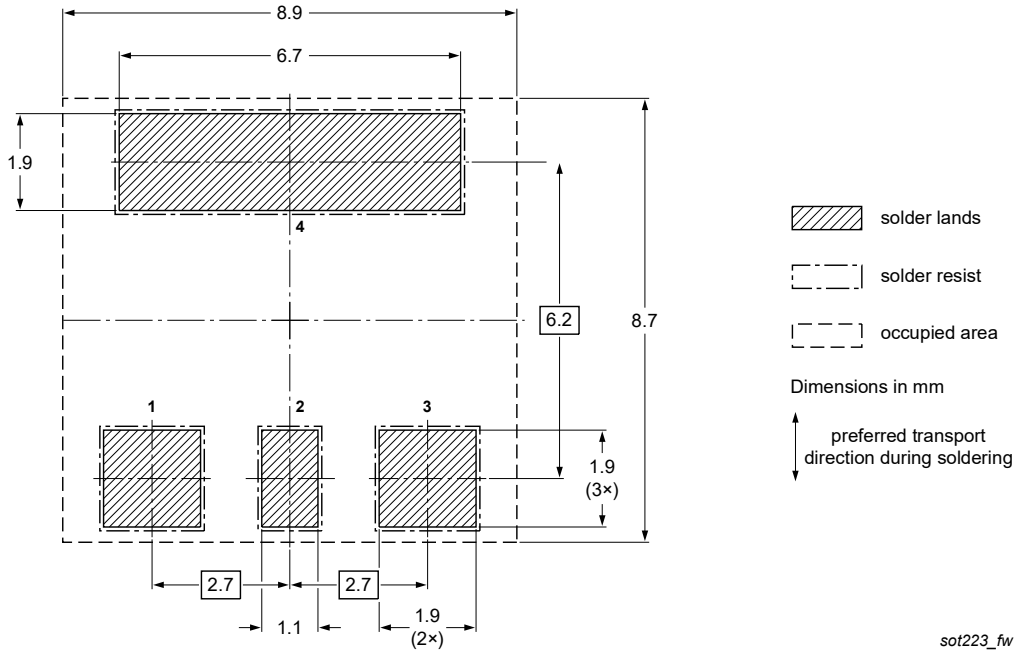



**Fig. 12. Wave soldering footprint for SC-73 (SOT223)**

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PZTA44-Q v.2 | 20240624 | Product data sheet | - | - |
| Modifications: | • Pinning information: Table 2 corrected<br>• Characteristics: Figures 1 - 9 added | | | |
| PZTA44-Q v.1 | 20211209 | Product data sheet | - | - |

# 15. Legal information

## Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[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".
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