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

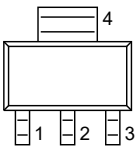
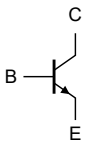
4. Quick reference data

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	 SC-73 (SOT223)	 sym123
2	C	collector		
3	E	emitter		
4	C	collector		

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

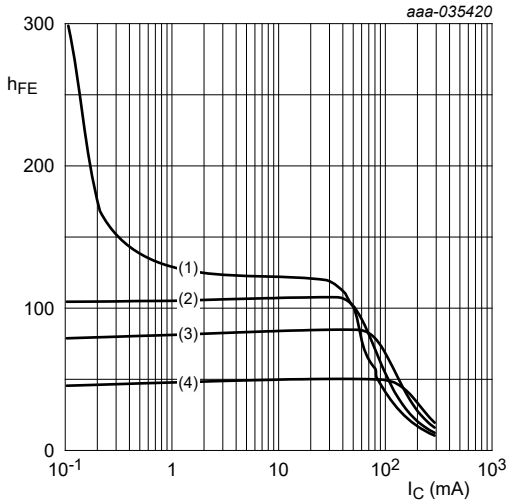
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	91	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	10	K/W

[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

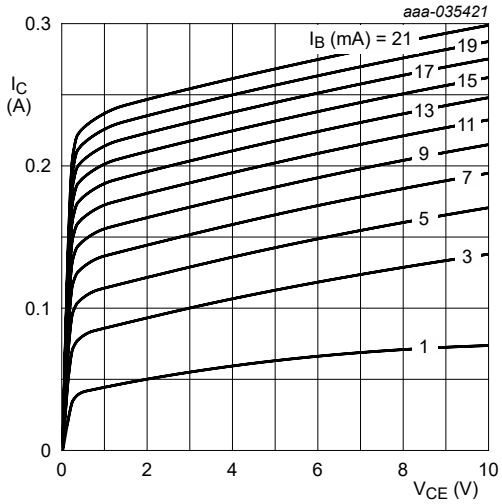
Table 7. Characteristics

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



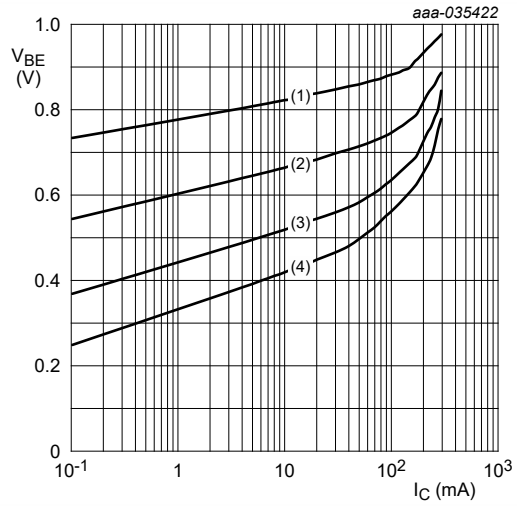
V_{CE} = 10 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 100 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -55 °C

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



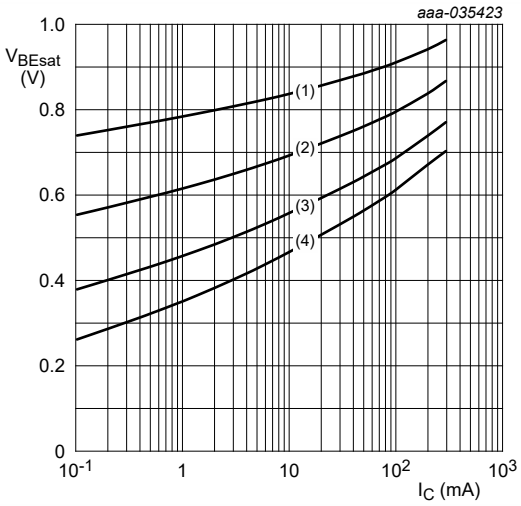
T_{amb} = 25 °C

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



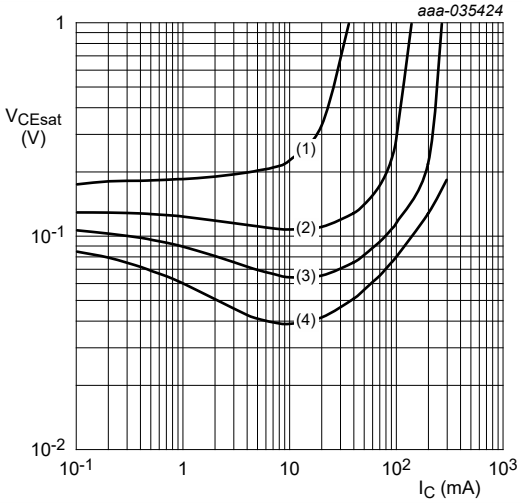
V_{CE} = 10 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C
(4) T_{amb} = 150 °C

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



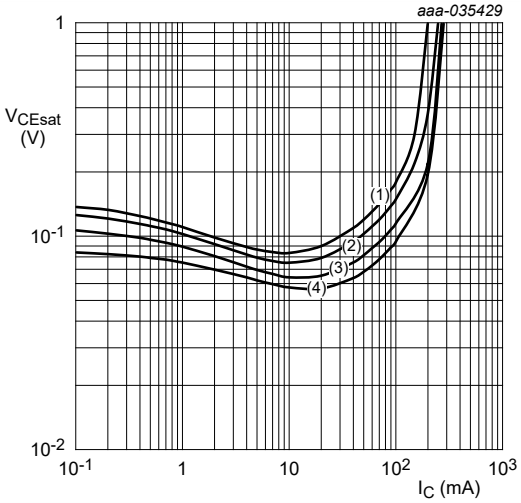
I_C/I_B = 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C
(4) T_{amb} = 150 °C

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

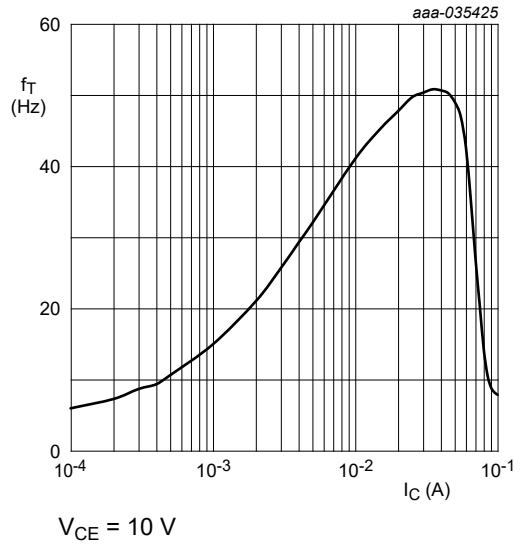


Fig. 7. Transition frequency as a function of collector current; typical values

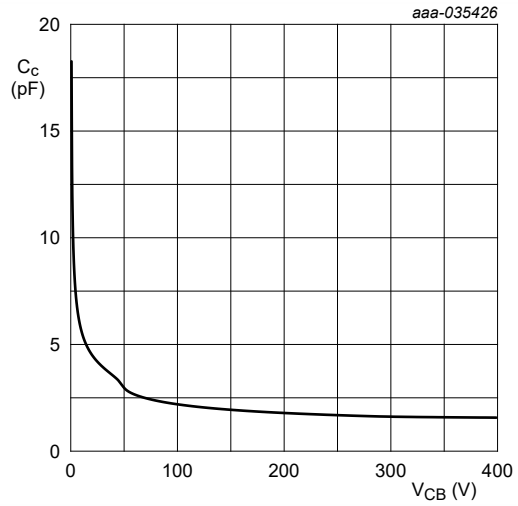


Fig. 8. Collector capacitance as a function of collector-base voltage; typical values

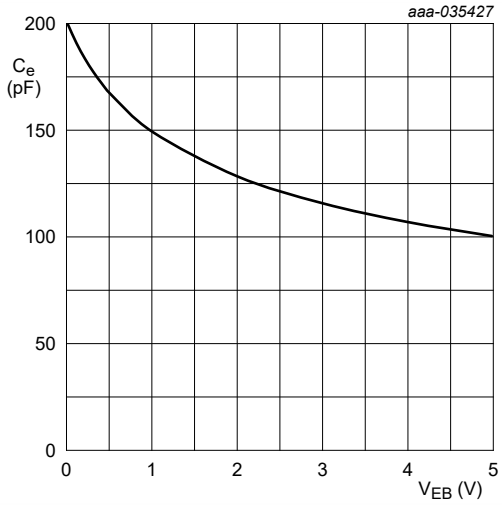


Fig. 9. Emitter capacitance as a function of emitter-base voltage; typical values

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

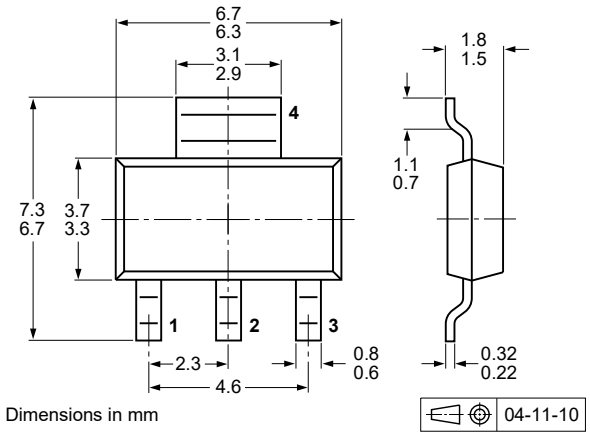


Fig. 10. Package outline SC-73 (SOT223)

13. Soldering

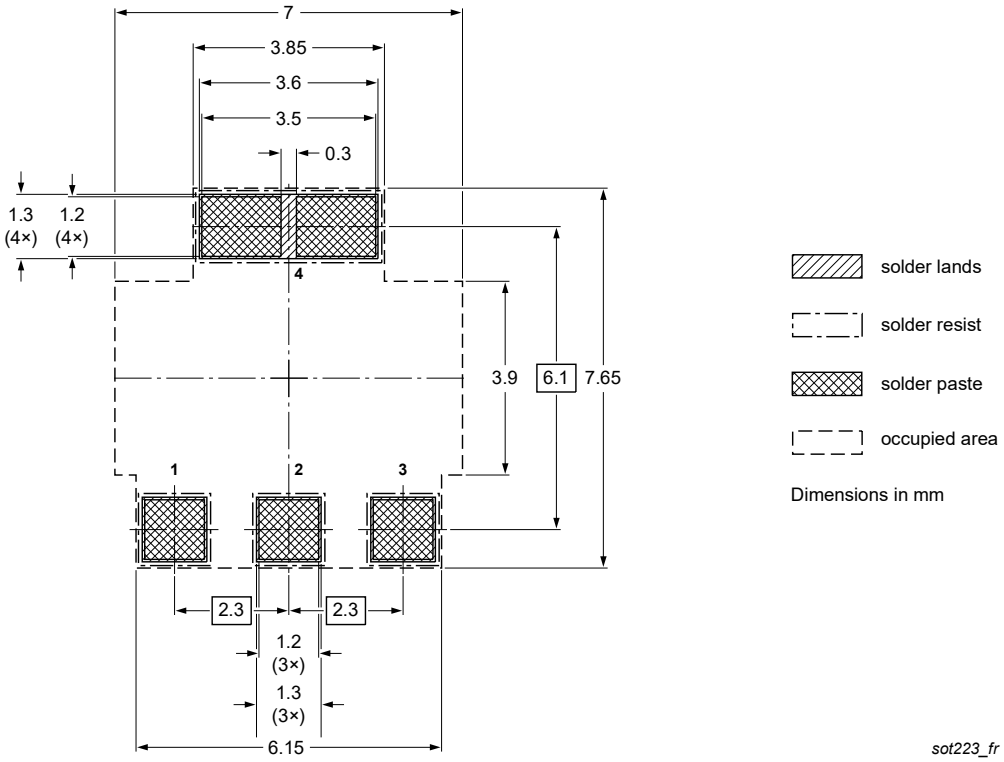


Fig. 11. Reflow soldering footprint for SC-73 (SOT223)

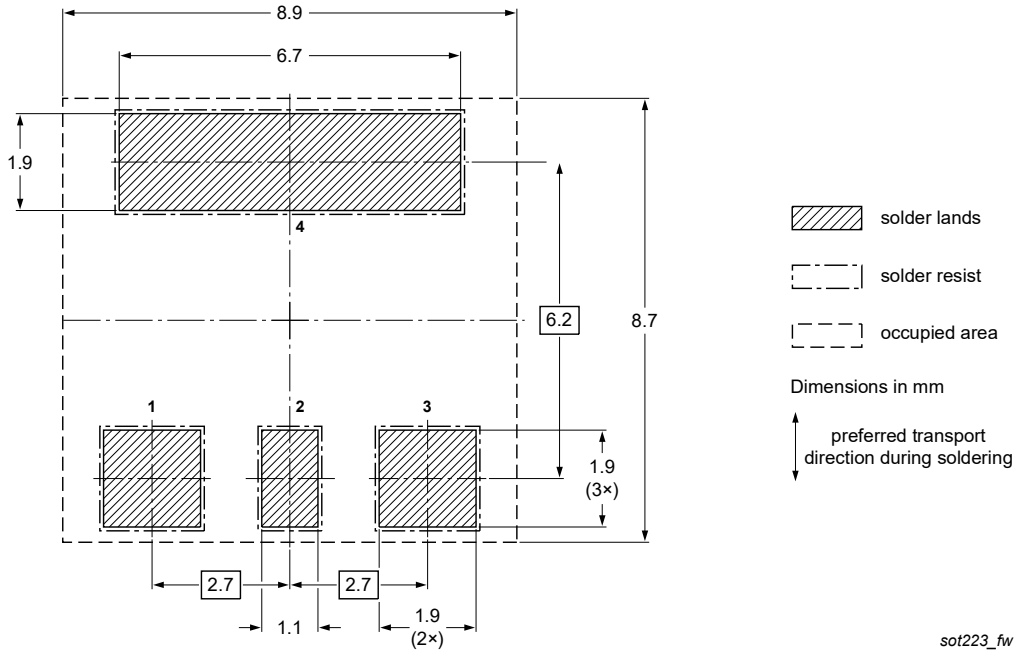


Fig. 12. Wave soldering footprint for SC-73 (SOT223)

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 • 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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Date of release: 24 June 2024

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