PZT4403-Q

40 V, 600 mA PNP switching transistor

27 June 2023 Product data sheet

1. General description

PNP switching transistor in a medium power SOT223 (SC-73) small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High current (max. 600 mA)
- Collector-emitter voltage V_{CEO} = 40 V
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Switching and linear amplification

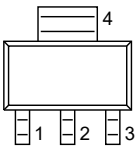
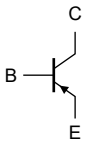
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-40	V
I_C	collector current			-	-	-600	mA
h_{FE}	DC current gain	V_{CE} = -1 V; I_C = -150 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		100	-	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 SC-73 (SOT223)	 sym028
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PZT4403-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
PZT4403-Q	ZT4403

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		-	-40	V
V_{CEO}	collector-emitter voltage	open base		-	-40	V
V_{EBO}	emitter-base voltage	open collector		-	-6	V
I_C	collector current			-	-600	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-800	mA
I_{BM}	peak base current			-	-200	mA
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

9. Thermal characteristics

Table 6. Thermal characteristics

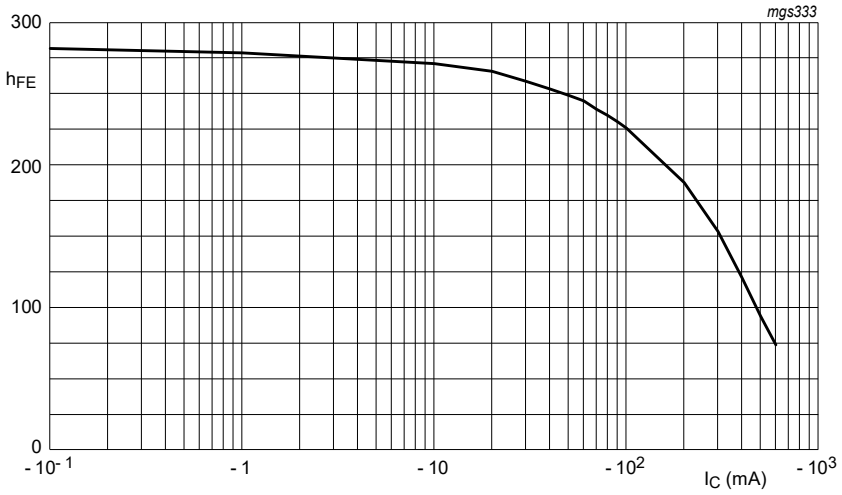
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	106	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	25	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm^2.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = -40 V; I_E = 0 A; T_{amb} = 25 °C		-	-	-50	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A; T_{amb} = 25 °C		-	-	-50	nA
h_{FE}	DC current gain	V_{CE} = -1 V; I_C = -0.1 mA; T_{amb} = 25 °C		30	-	-	
		V_{CE} = -1 V; I_C = -1 mA; T_{amb} = 25 °C		60	-	-	
		V_{CE} = -1 V; I_C = -10 mA; T_{amb} = 25 °C		100	-	-	
		V_{CE} = -1 V; I_C = -150 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		100	-	300	
		V_{CE} = -2 V; I_C = -500 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		20	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -150 mA; I_B = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	-400	mV
		I_C = -500 mA; I_B = -50 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 = -150 mA; I_B = -15 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	-950	mV
		I_C = -500 mA; I_B = -50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	-1300	mV
t_d	delay time	I_C = -150 mA; I_{Bon} = -15 mA; I_{Boff} = 15 mA; V_{CC} = -29.5 V; V_{BB} = 3.5 V; T_{amb} = 25 °C		-	-	15	ns
t_r	rise time			-	-	30	ns
t_{on}	turn-on time			-	-	40	ns
t_s	storage time			-	-	300	ns
t_f	fall time			-	-	50	ns
t_{off}	turn-off time			-	-	350	ns
C_c	collector capacitance	V_{CB} = -5 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	8.5	pF
C_e	emitter capacitance	V_{EB} = -500 mV; I_C = 0 A; i_c = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	35	pF
f_T	transition frequency	V_{CE} = -10 V; I_C = -20 mA; f = 100 MHz; T_{amb} = 25 °C		200	-	-	MHz



V_{CE} = -1 V

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

11. Test information

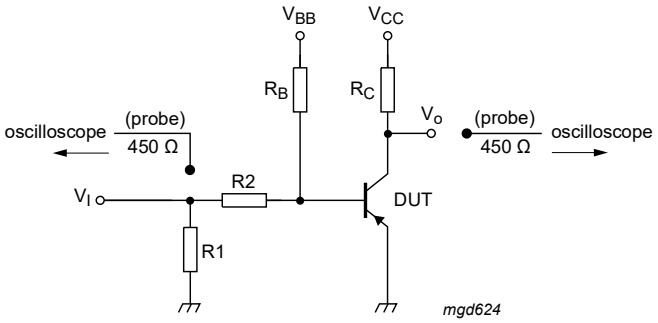


Fig. 2. Test circuit for switching times

V_i = -9.5 V; T = 500 µs; tp = 10 µs; $t_r = t_f \leq 3$ ns

R1 = 68 Ω; R2 = 325 Ω; R_B = 325 kΩ; R_C = 160 Ω

V_{BB} = 3.5 V; V_{CC} = -29.5 V

Oscilloscope: input impedance Z_i = 50 Ω

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

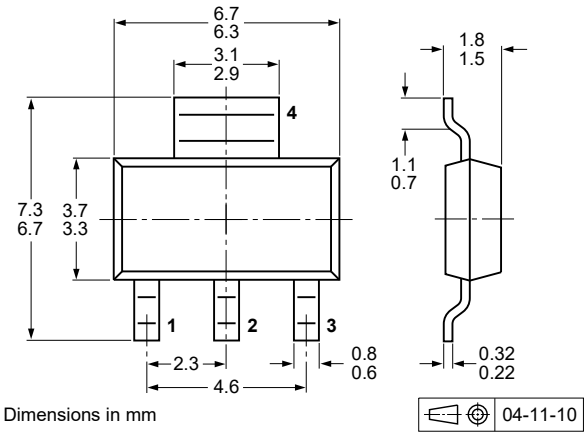


Fig. 3. Package outline SC-73 (SOT223)

13. Soldering

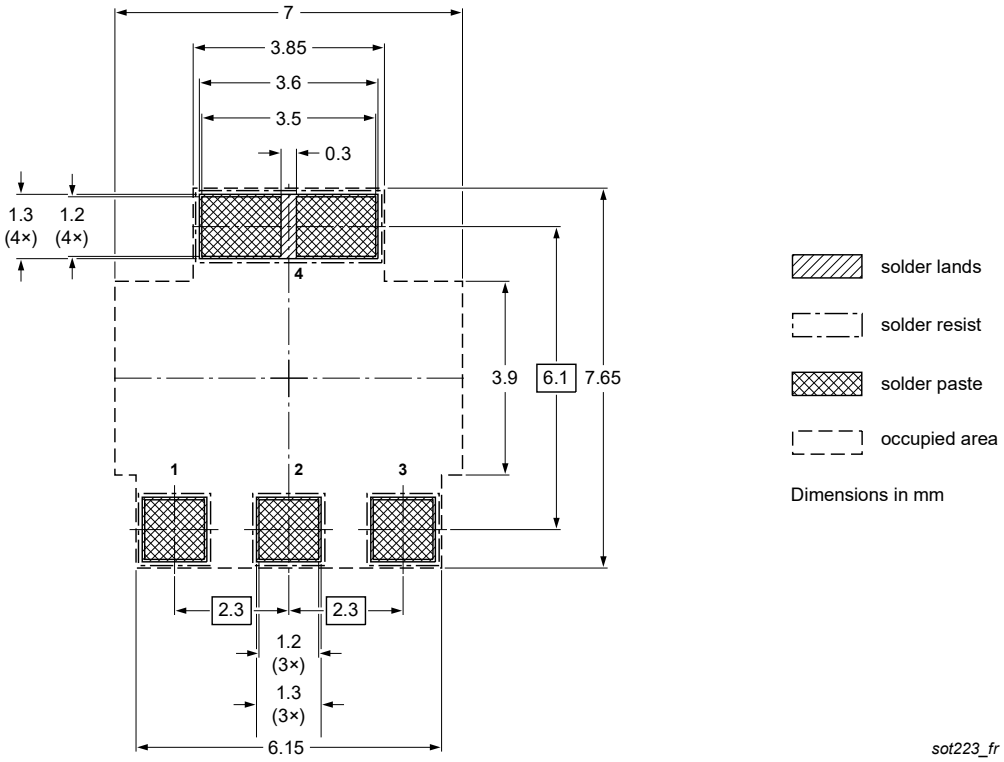


Fig. 4. Reflow soldering footprint for SC-73 (SOT223)

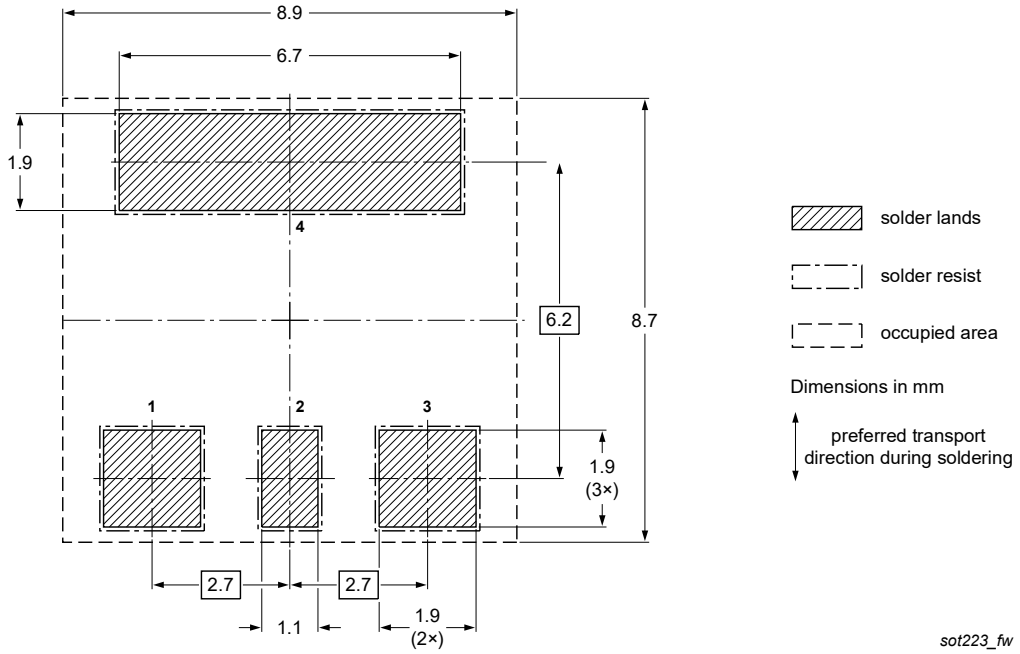


Fig. 5. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PZT4403-Q v.1	20230627	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: 27 June 2023