PZT4403-Q

40 V, 600 mA PNP switching transistor

17 January 2025 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

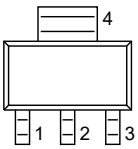
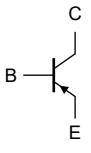
4. Quick reference data

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
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	600	mW
			[2]	-	900	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

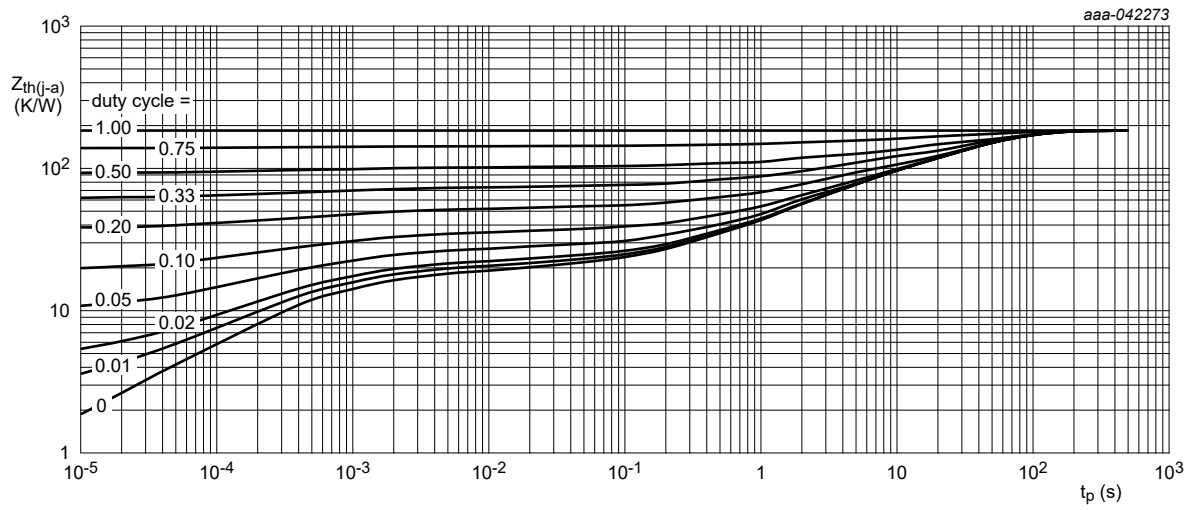
[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint
[2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

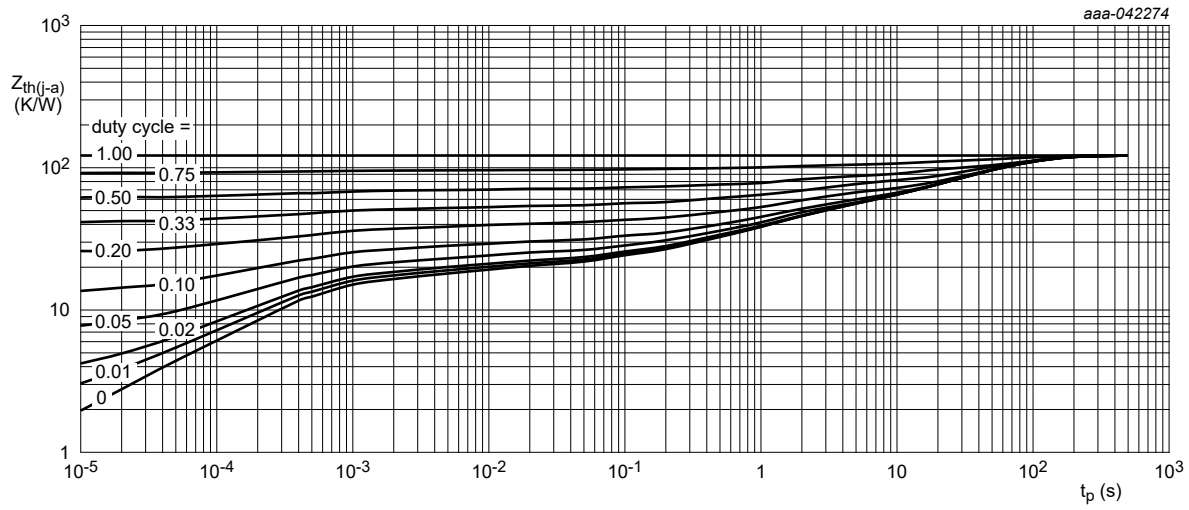
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	209	K/W
			[2]	-	-	139	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	25	K/W

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



FR4 PCB, standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



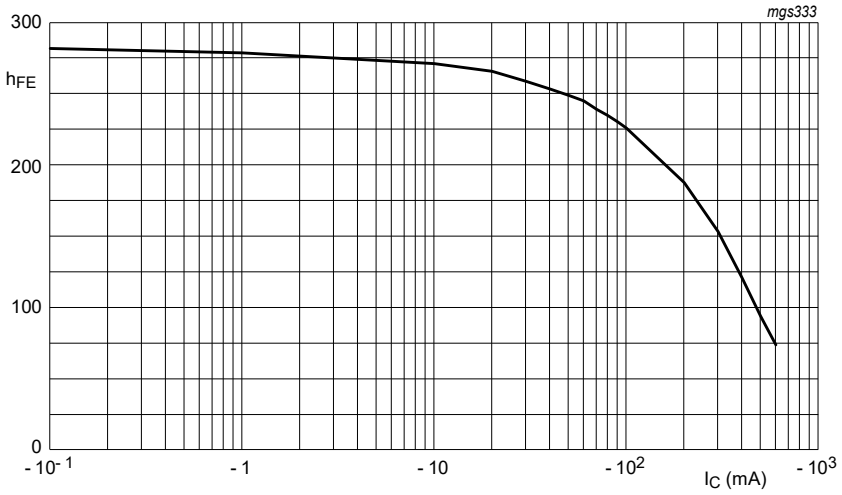
FR4 PCB, mounting pad for cathode 1 cm^2

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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

11. Test information

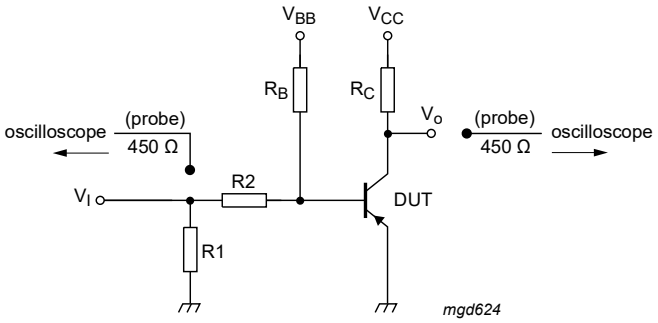


Fig. 4. Test circuit for switching times

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

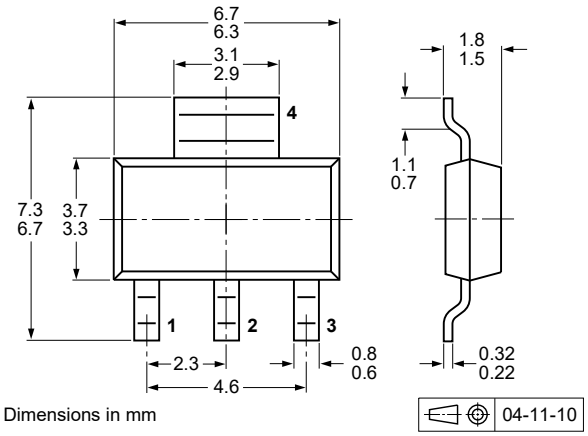


Fig. 5. Package outline SC-73 (SOT223)

13. Soldering

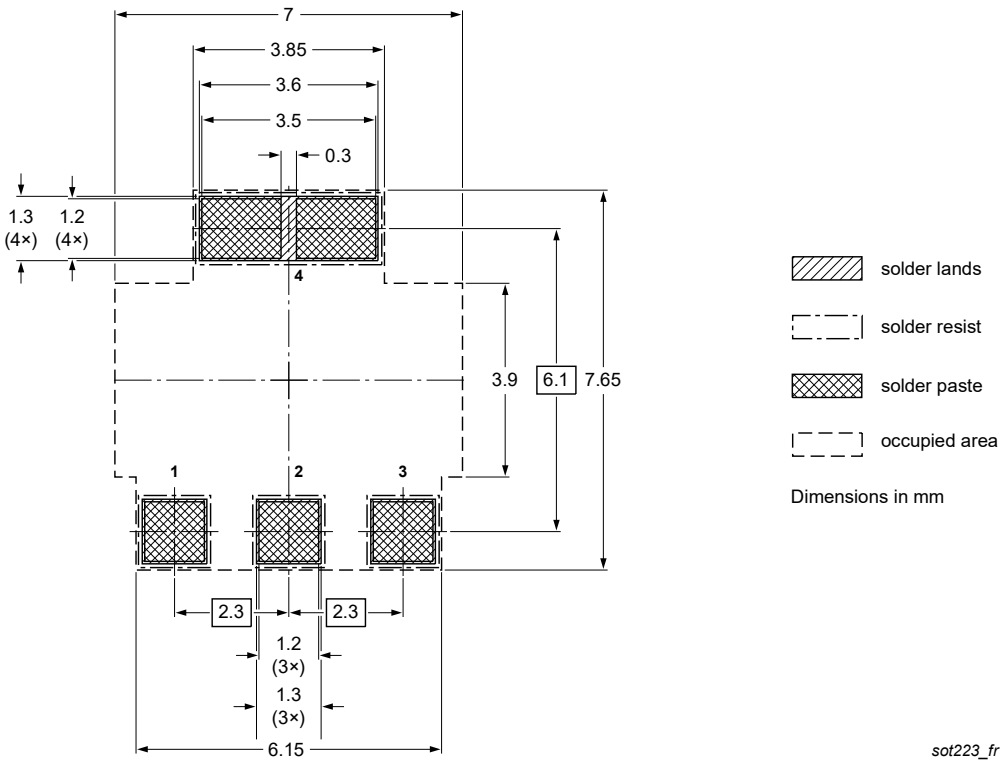


Fig. 6. Reflow soldering footprint for SC-73 (SOT223)

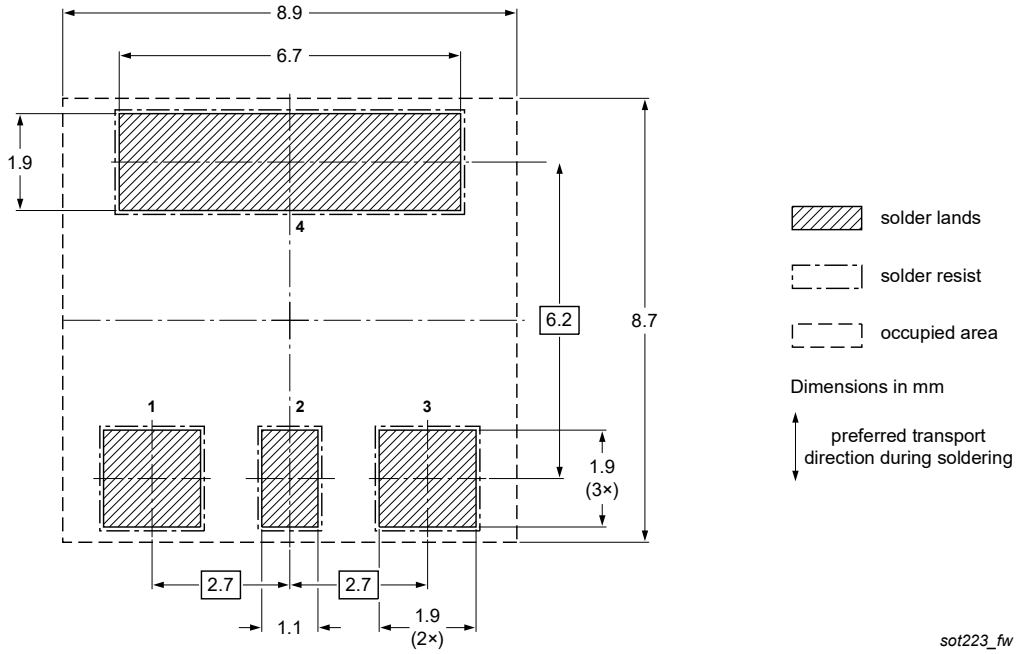


Fig. 7. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PZT4403-Q v.2	20250117	Product data sheet	-	PZT4403-Q v.1
Modifications:	• Limiting values: P_{tot} values added • Thermal characteristic: $R_{th(j-a)}$ values changed/added and Fig 1 and 2 added			
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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Contents

1. General description....1
2. Features and benefits....1
3. Applications....1
4. Quick reference data....1
5. Pinning information....1
6. Ordering information....2
7. Marking....2
8. Limiting values....2
9. Thermal characteristics....3
10. Characteristics....4
11. Test information....5
12. Package outline....6
13. Soldering....6
14. Revision history....8
15. Legal information....9

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