

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number: BSP52-QX
Manufacturer: Nexperia USA Inc.
Package: TO-261-4, TO-261AA
Availability: Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/bsp52-qx.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



BSP52-Q

NPN Darlington transistor

24 May 2023

Product data sheet

1. General description

NPN Darlington transistor in an SOT223 Surface-Mounted Device (SMD) plastic package.

PNP complement: BSP62

2. Features and benefits

- High current of 1 A
- Low voltage of 80 V
- Integrated diode and resistor
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Industrial high gain amplification

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	-	90	V
V_{CES}	collector-emitter voltage	base short-circuited to emitter	-	-	80	V
I_C	collector current		-	-	1	A
I_{CM}	peak collector current		-	-	2	A
h_{FE}	DC current gain	$V_{CE} = 10 \text{ V}; I_C = 150 \text{ mA}$	[1]	1000	-	-

[1] Pulse test: $t_p \leq 300 \mu\text{s}$; $\delta \leq 0.02$.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	SC-73 (SOT223)	aaa-027580
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BSP52-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
BSP52-Q	BSP52

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		-	90	V
V _{CES}	collector-emitter voltage	base short-circuited to emitter		-	80	V
V _{EBO}	emitter-base voltage	open collector		-	5	V
I _C	collector current			-	1	A
I _{CM}	peak collector current			-	2	A
I _{Blim}	limiting base current			-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	1.25	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 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm².

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient		[1]	-	-	96	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	17	K/W

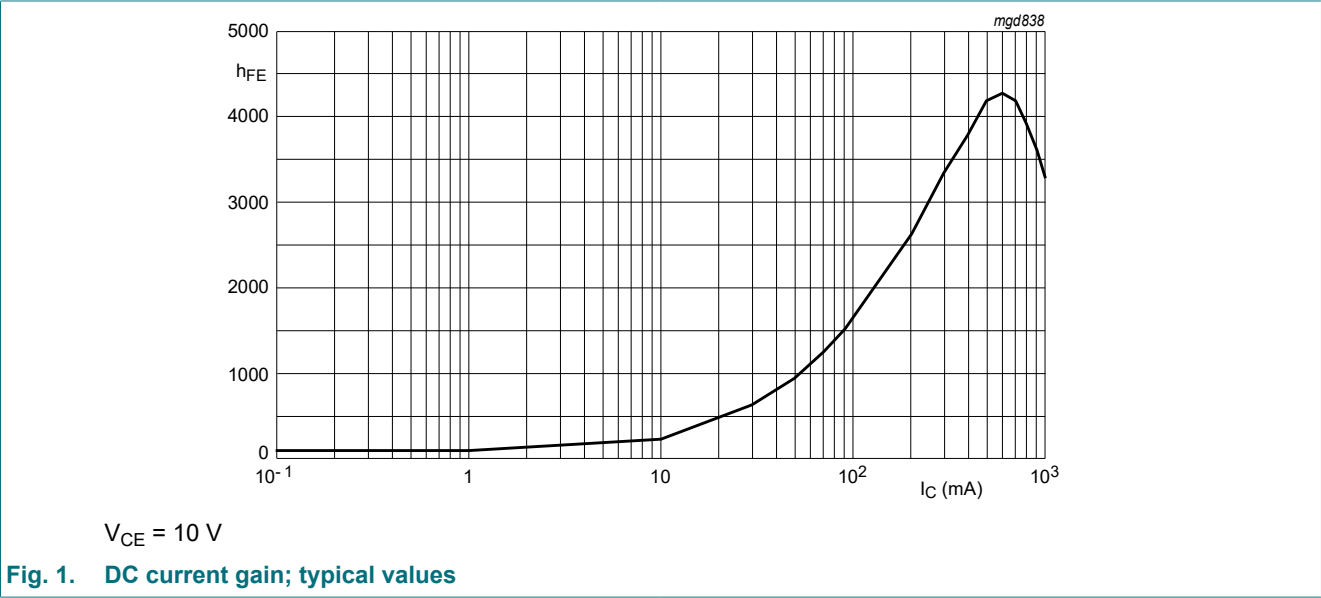
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm².

10. Characteristics

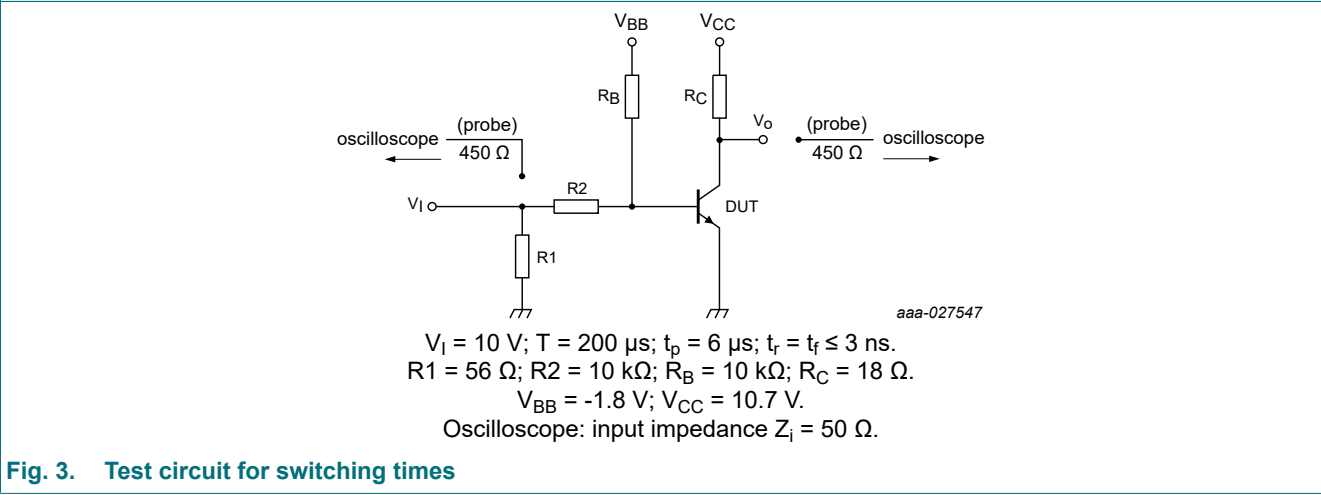
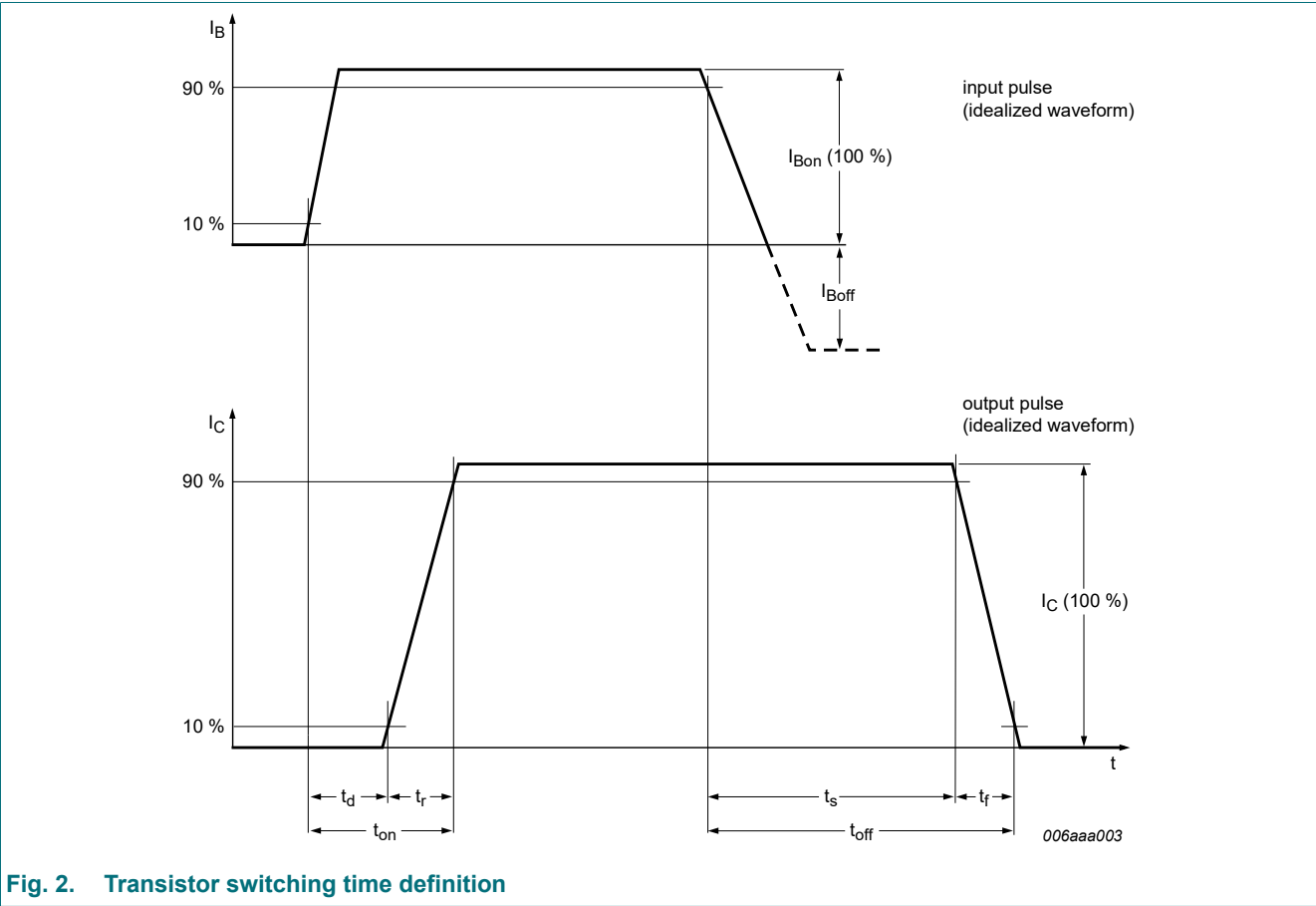
Table 7. Characteristics
T_j = 25 °C unless otherwise specified

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _{(BR)CBO}	collector-base breakdown voltage	I _C = 100 µA; I _E = 0 A		90	-	-	V
V _{(BR)CES}	collector-emitter breakdown voltage	I _C = 2 mA; V _{BE} = 0 V		80	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _C = 0 A; I _E = 100 µA		5	-	-	V
I _{CES}	collector-emitter cut-off current	V _{CE} = 80 V; V _{BE} = 0 V		-	-	50	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 4 V; I _C = 0 A		-	-	50	nA
h _{FE}	DC current gain	V _{CE} = 10 V; I _C = 150 mA	[1]	1000	-	-	
		V _{CE} = 10 V; I _C = 500 mA	[1]	2000	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 500 mA; I _B = 0.5 mA; T _j = 150 °C		-	-	1.3	V
				-	-	1.3	V
V _{BEsat}	base-emitter saturation voltage	I _C = 500 mA; I _B = 0.5 mA		-	-	1.9	V
t _{on}	turn-on time	I _C = 500 mA; I _{Bon} = 0.5 mA; I _{Boff} = -0.5 mA		-	500	-	ns
t _{off}	turn-off time			-	1300	-	ns
f _T	transition frequency	V _{CE} = 5 V; I _C = 500 mA; f = 100 MHz		-	200	-	MHz

[1] Pulse test: t_p ≤ 300 µs; δ ≤ 0.02.



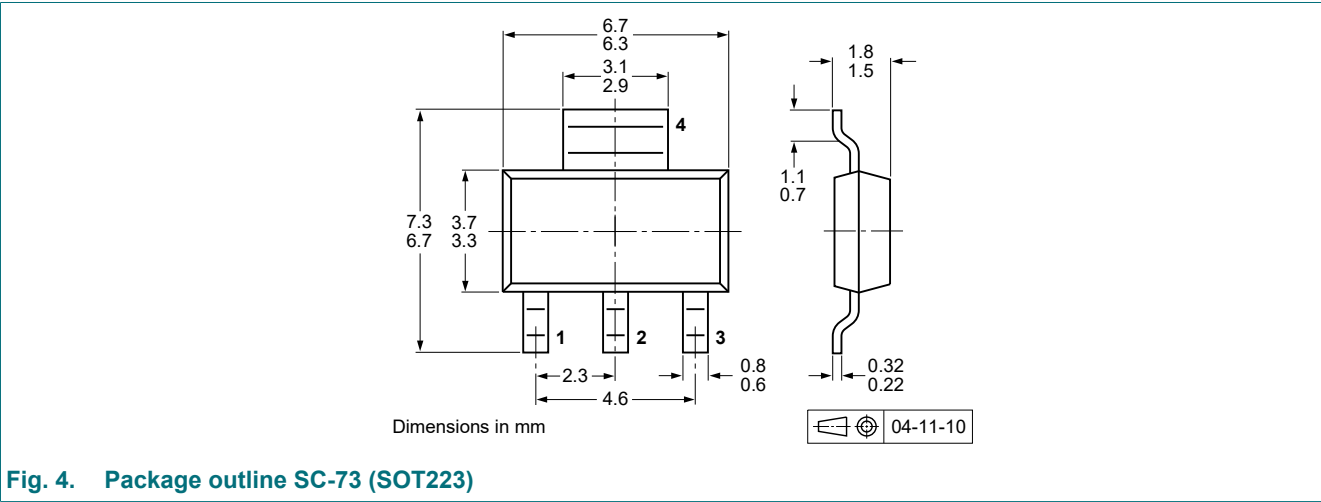
11. Test information



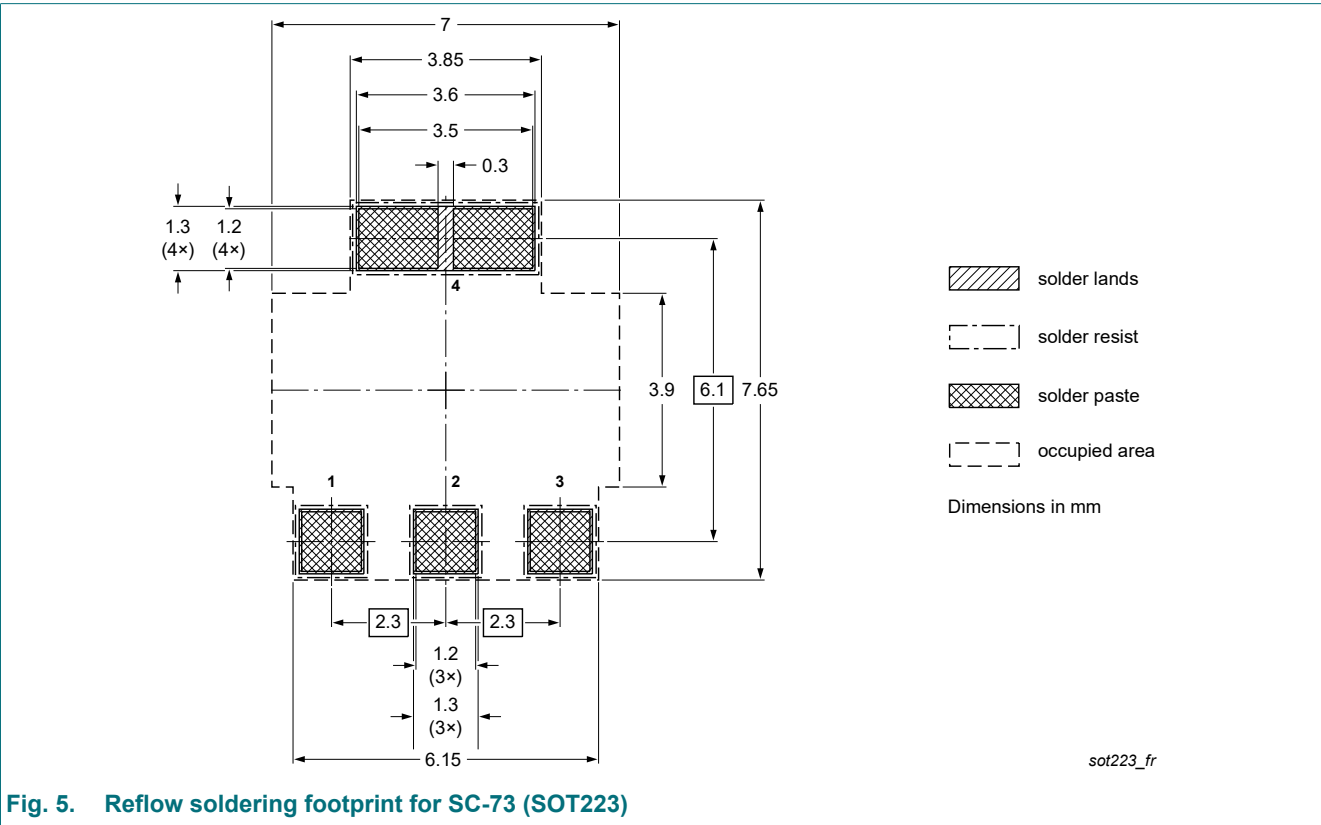
Quality information

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



13. Soldering



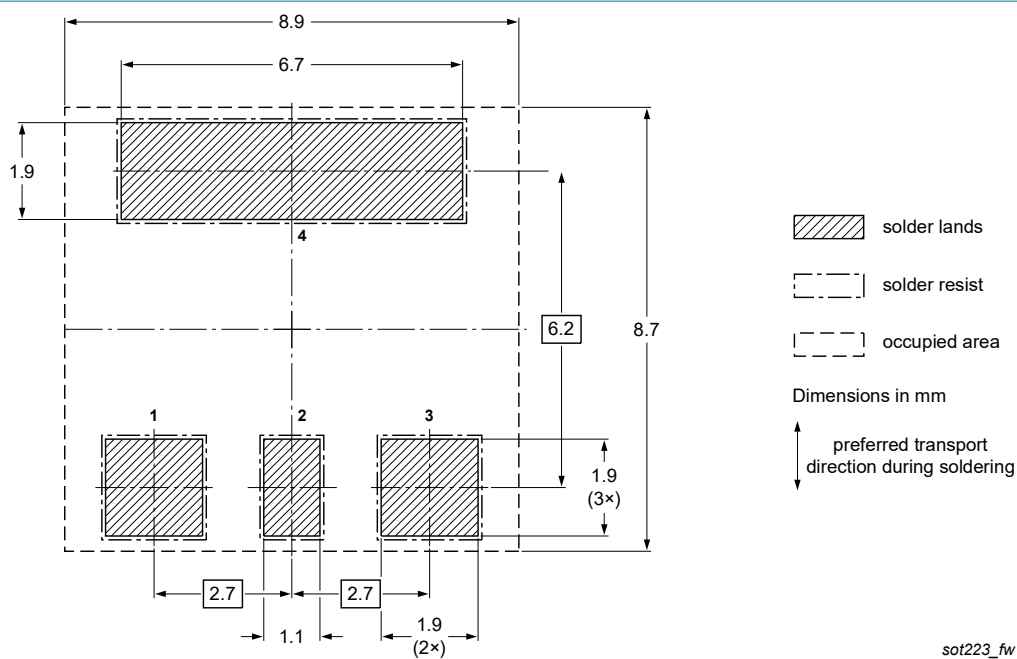


Fig. 6. Wave soldering footprint for SC-73 (SOT223)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BSP52-Q v.1	20230524	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 May 2023