

BCP55-Q series

60 V, 1 A NPN medium power transistors

Rev. 9 — 23 June 2021

Product data sheet

1. General description

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

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEITA	
BCP55-Q	SOT223	SC73	BCP52-Q
BCP55-10-Q			BCP52-10-Q
BCP55-16-Q			BCP52-16-Q

2. Features and benefits

- High current
- Three current gain selections
- High power dissipation capability
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Linear voltage regulators
- Power management
- Low-side switches
- MOSFET drivers
- Battery-driven devices
- Amplifiers

4. Quick reference data

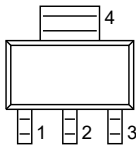
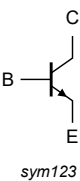
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	60	V
I_C	collector current			-	-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	2	A
h_{FE}	DC current gain						
	BCP55-Q	$V_{CE} = 2$ V; $I_C = 150$ mA $T_{amb} = 25$ °C	[1]	63	-	250	
	BCP55-10-Q		[1]	63	-	160	
	BCP55-16-Q		[1]	100	-	250	

[1] pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		 <i>sym123</i>
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BCP55-Q	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BCP55-10-Q			
BCP55-16-Q			

7. Marking

Table 5. Marking

Type number	Marking code
BCP55-Q	BCP55
BCP55-10-Q	BCP55 /10
BCP55-16-Q	BCP55 /16

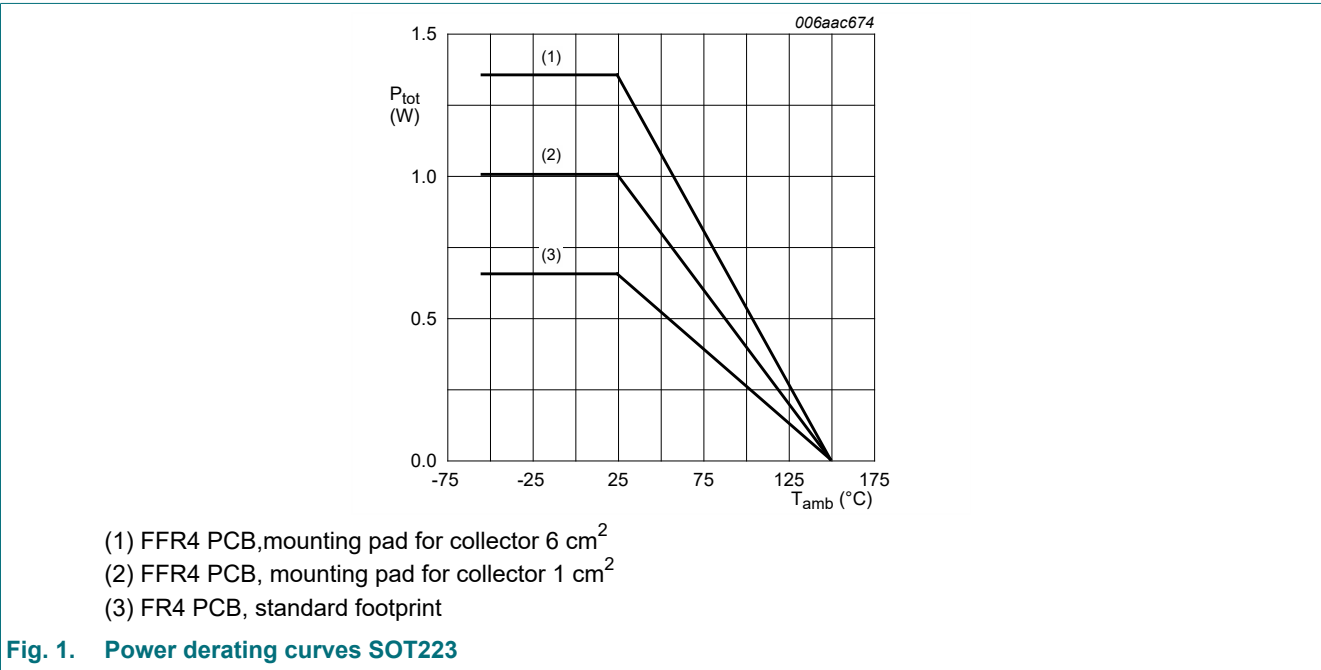
8. Limiting values

Table 6. 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	-	60	V
V_{CEO}	collector-emitter voltage	open base	-	60	V
V_{EBO}	emitter-base voltage	open collector	-	5	V
I_C	collector current		-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	2	A
I_B	base current		-	0.3	A
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$ [1]	-	0.65	W
		[2]	-	1.00	W
		[3]	-	1.35	W
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	150	$^{\circ}\text{C}$

- [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 cm².
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm².



9. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	192	K/W
			[2]	-	-	125	K/W
			[3]	-	-	93	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	16	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; monting pad for collector 1 cm².
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; monting pad for collector 6 cm².

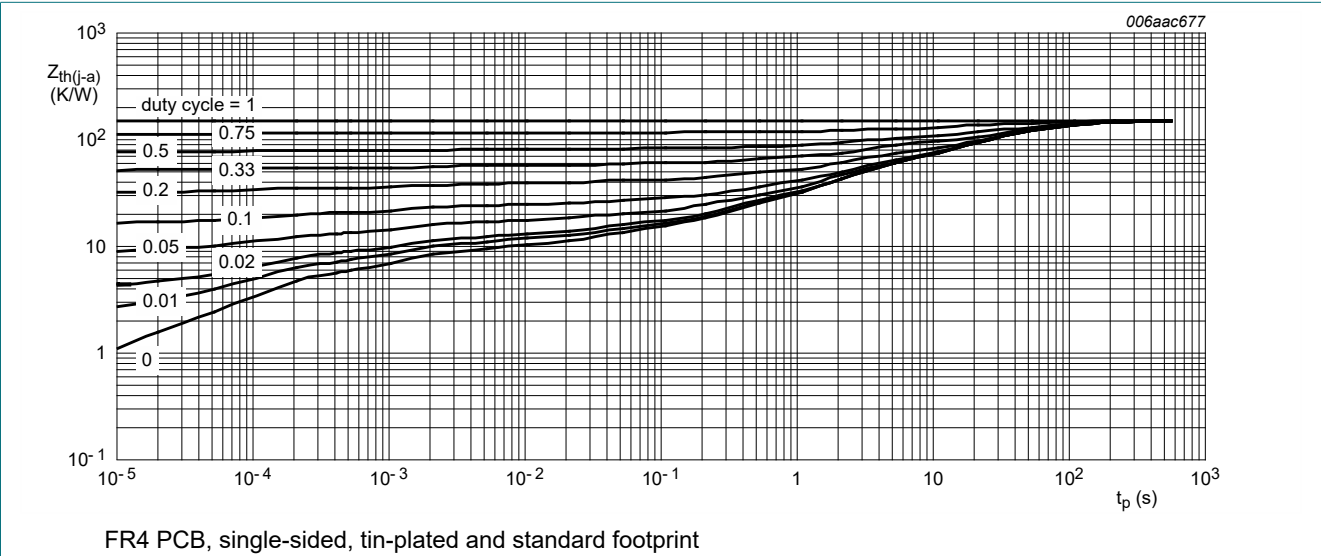


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

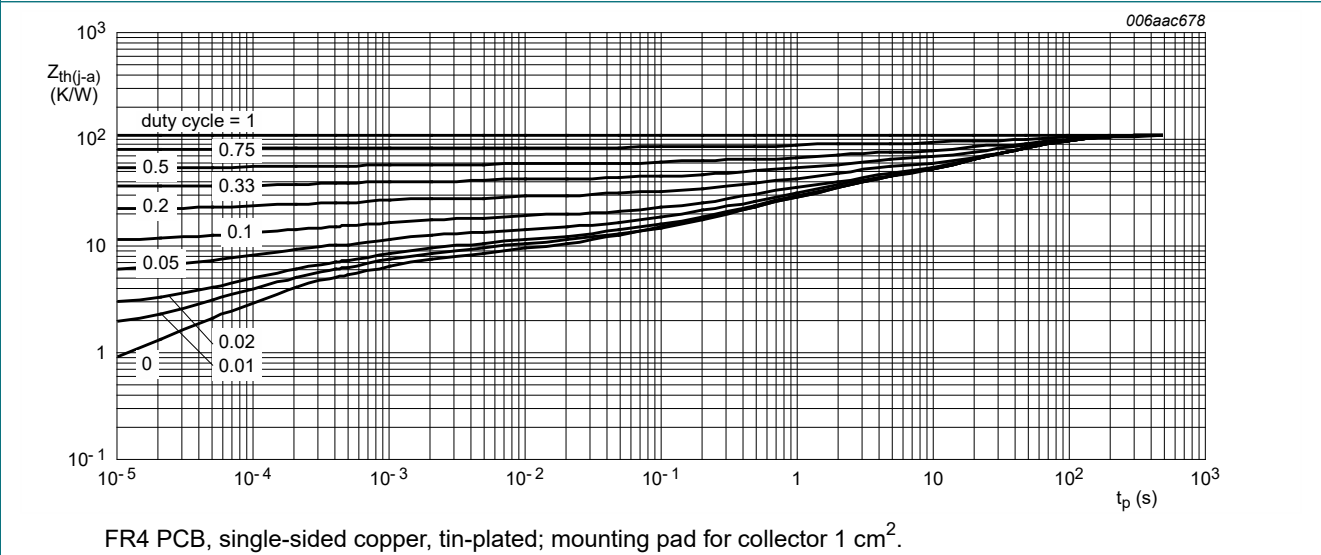


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100 \mu A$; $I_E = 0$; $T_{amb} = 25^\circ C$		60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 10 \mu A$; $I_B = 0 A$; $T_{amb} = 25^\circ C$		60	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 A$; $I_E = 100 \mu A$		5	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = 30 V$; $I_E = 0 A$; $T_{amb} = 25^\circ C$		-	-	100	nA
		$V_{CB} = 30 V$; $I_E = 0 A$; $T_J = 150^\circ C$		-	-	10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5 V$; $I_C = 0 A$; $T_{amb} = 25^\circ C$		-	-	100	nA
h_{FE}	DC current gain						
	BCP55-Q	$V_{CE} = 2 V$; $I_C = 5 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	-	
		$V_{CE} = 2 V$; $I_C = 150 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	250	
		$V_{CE} = 2 V$; $I_C = 500 mA$; $T_{amb} = 25^\circ C$	[1]	40	-	-	
	BCP55-10-Q	$V_{CE} = 2 V$; $I_C = 5 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	-	
		$V_{CE} = 2 V$; $I_C = 150 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	160	
		$V_{CE} = 2 V$; $I_C = 500 mA$; $T_{amb} = 25^\circ C$	[1]	40	-	-	
	BCP55-16-Q	$V_{CE} = 2 V$; $I_C = 5 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	-	
		$V_{CE} = 2 V$; $I_C = 150 mA$; $T_{amb} = 25^\circ C$	[1]	100	-	250	
		$V_{CE} = 2 V$; $I_C = 500 mA$; $T_{amb} = 25^\circ C$	[1]	40	-	-	
h_{FE}	DC current gain	$V_{CE} = 2 V$; $I_C = 5 mA$; $T_{amb} = 25^\circ C$	[1]	63	-	-	
h_{FE}	DC current gain	$V_{CE} = 2 V$; $I_C = 500 mA$; $T_{amb} = 25^\circ C$	[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500 mA$; $I_B = 50 mA$; $T_{amb} = 25^\circ C$	[1]	-	-	0.5	V
V_{BE}	base-emitter voltage	$V_{CE} = 2 V$; $I_C = 500 mA$; $T_{amb} = 25^\circ C$	[1]	-	-	1	V
C_c	collector capacitance	$V_{CB} = 10 V$; $I_E = i_e = 0 A$; $f = 1 MHz$; $T_{amb} = 25^\circ C$		-	6	-	pF
f_T	transition frequency	$V_{CE} = 5 V$; $I_C = 50 mA$; $f = 100 MHz$; $T_{amb} = 25^\circ C$		100	180	-	MHz

[1] pulsed; $t_p \leq 300 \mu s$; $\delta \leq 0.02$

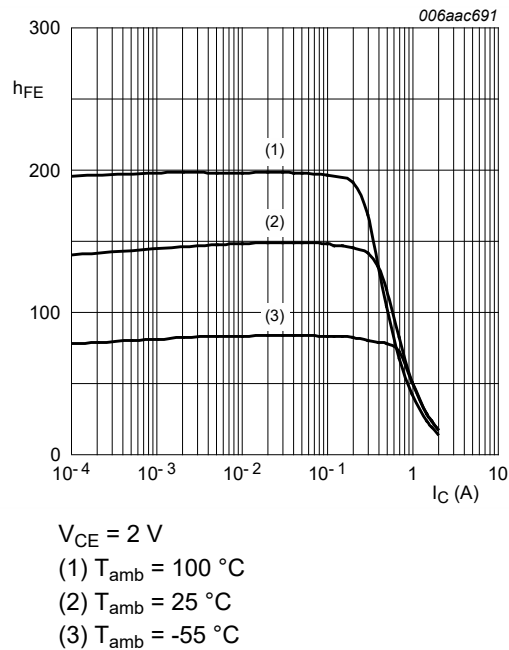


Fig. 5. DC current gain as a function of collector current; typical values

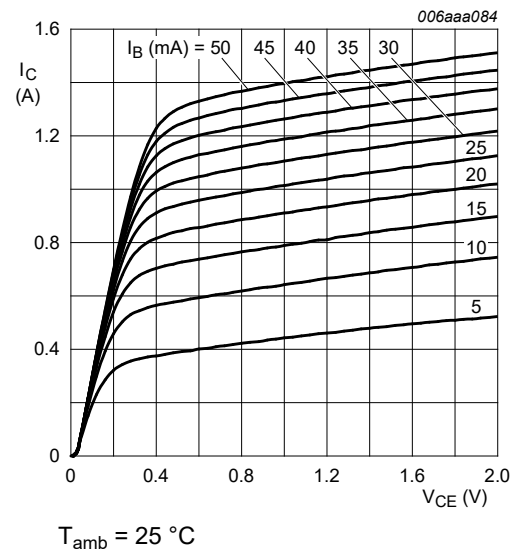


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

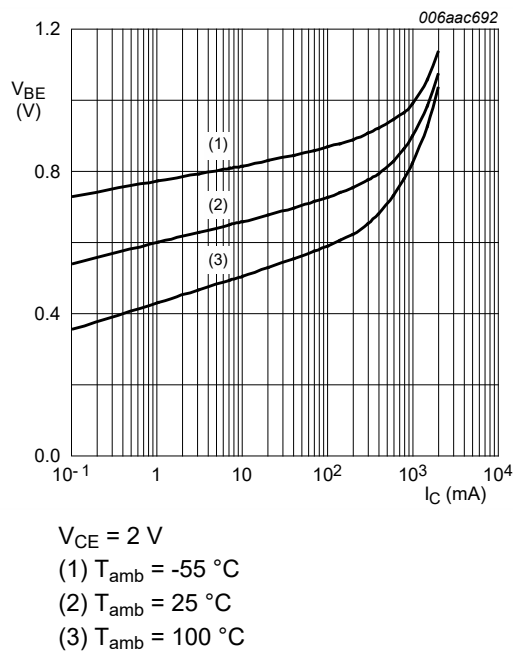


Fig. 7. Base-emitter voltage as a function of collector current; typical values

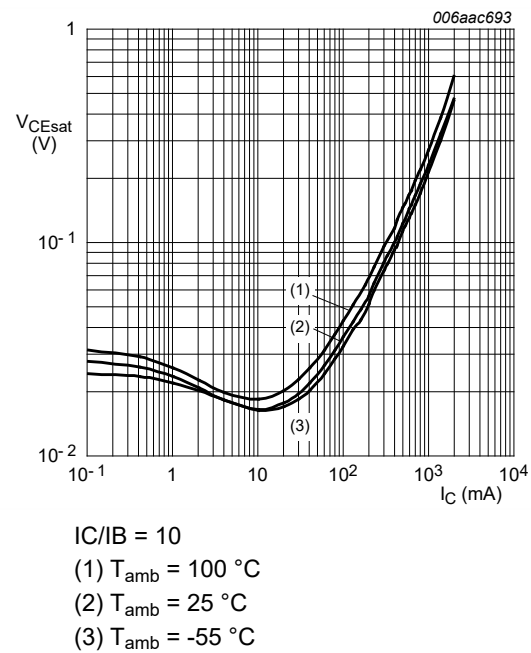


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

11.1. 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

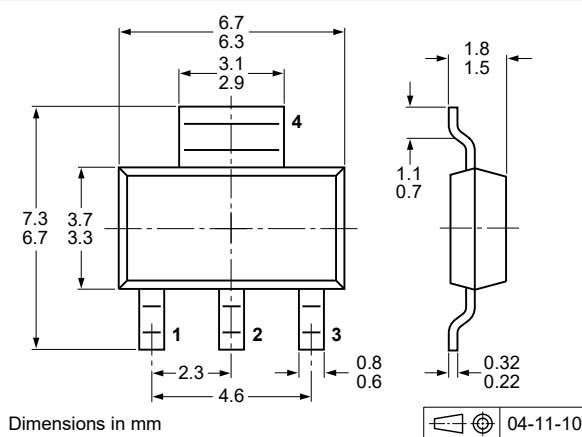
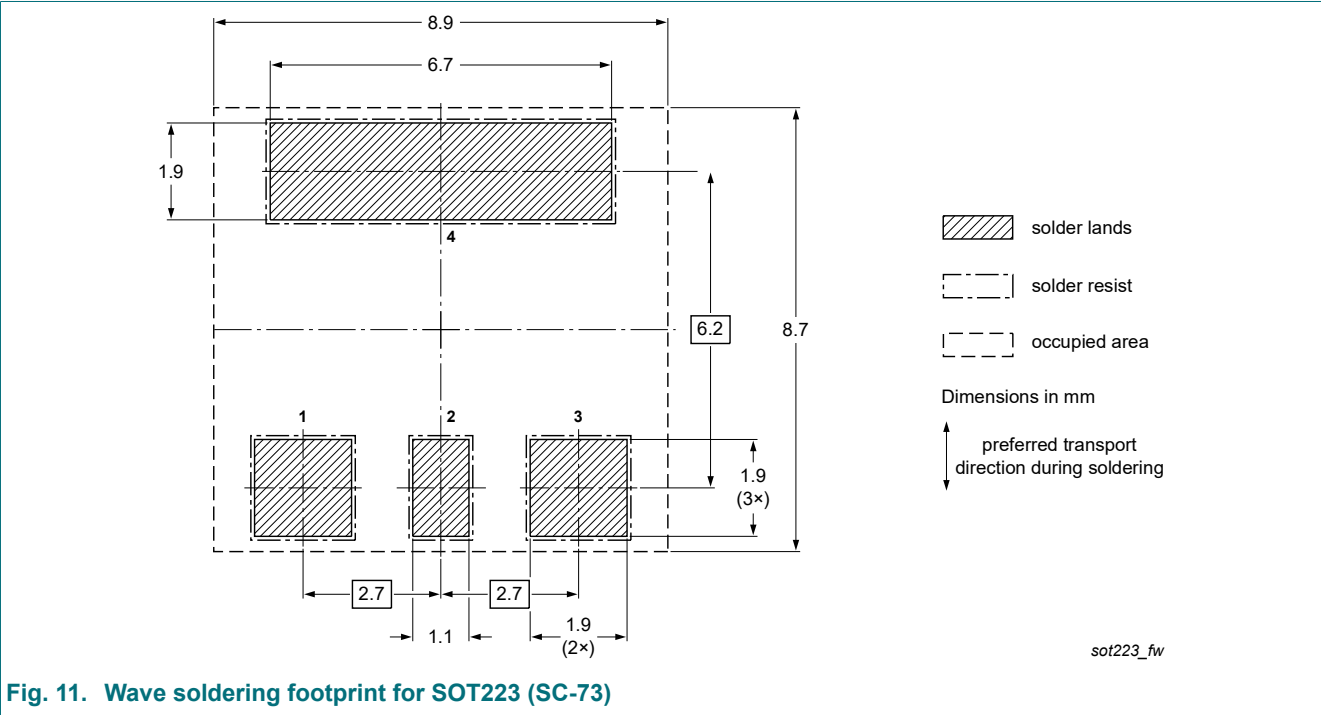
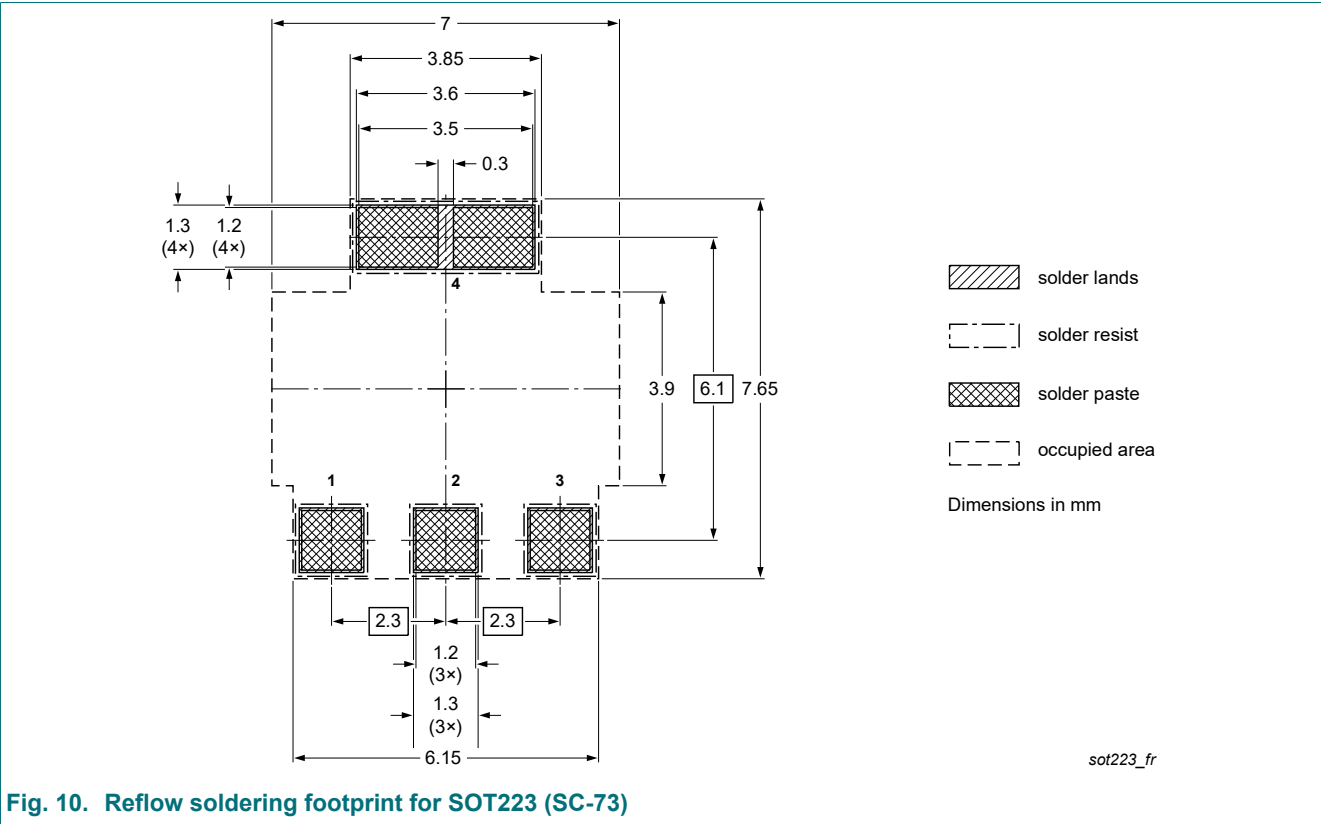


Fig. 9. Package outline SOT223 (SC-73)

13. Soldering



14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BCP55-Q_SER v.1	20210623	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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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