



BCP55 series

60 V, 1 A NPN medium power transistors

Rev. 9 — 1 July 2022

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	SOT223	SC73	BCP52
BCP55-10			BCP52-10
BCP55-16			BCP52-16

2. Features and benefits

- High current
- Three current gain selections
- High power dissipation capability

3. Applications

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

4. Quick reference data

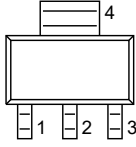
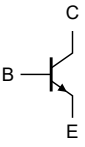
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
V_{CE0}	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	$V_{CE} = 2$ V; $I_C = 150$ mA $T_{amb} = 25$ °C	[1]	63	-	250	
	BCP55-10		[1]	63	-	160	
	BCP55-16		[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		 sym123
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 4. Ordering information

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

7. Marking

Table 5. Marking

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

8. Limiting values

Table 6. Limiting values

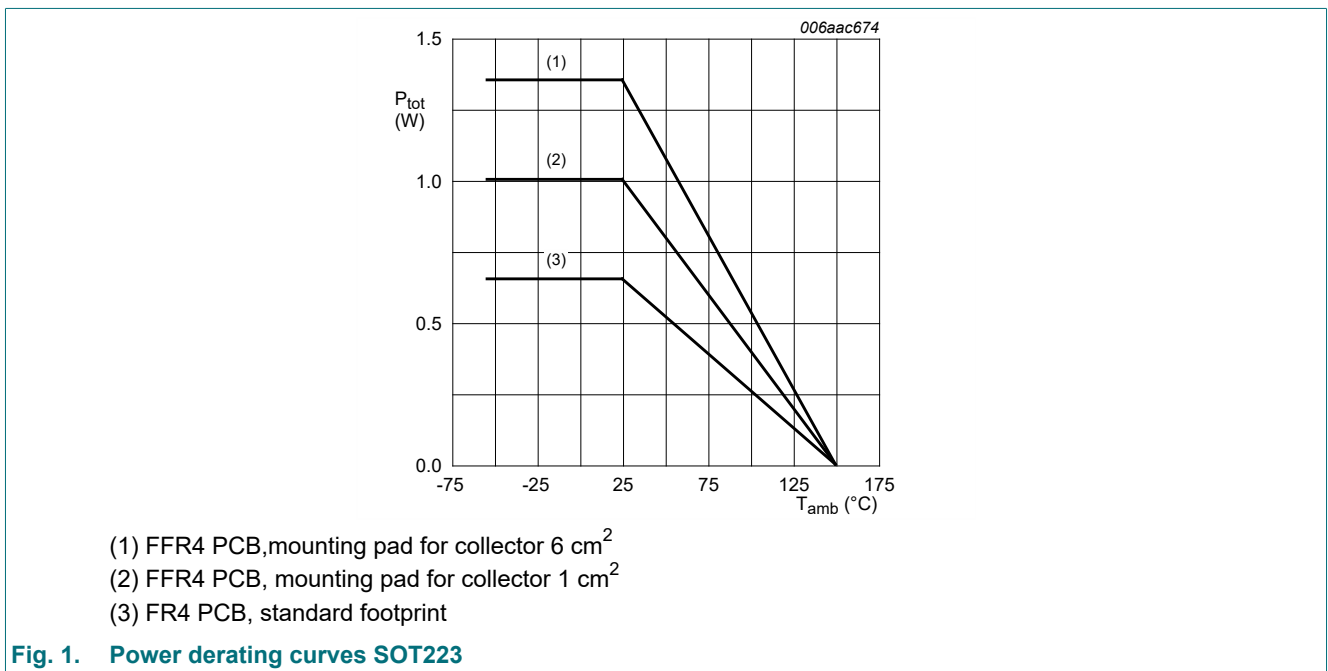
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	$T_{amb} \leq 25$ °C [1]	-	0.65	W
		[2]	-	1.00	W
		[3]	-	1.35	W
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	150	°C
T_{stg}	storage temperature		-65	150	°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; mounting pad for collector 1 cm².
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm².

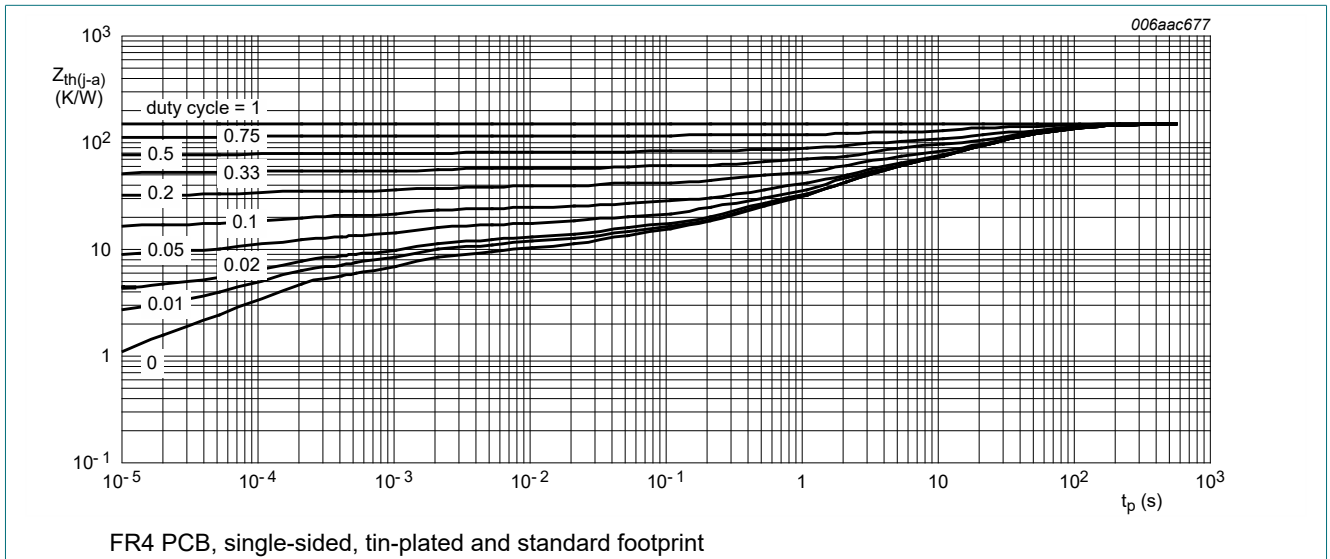


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

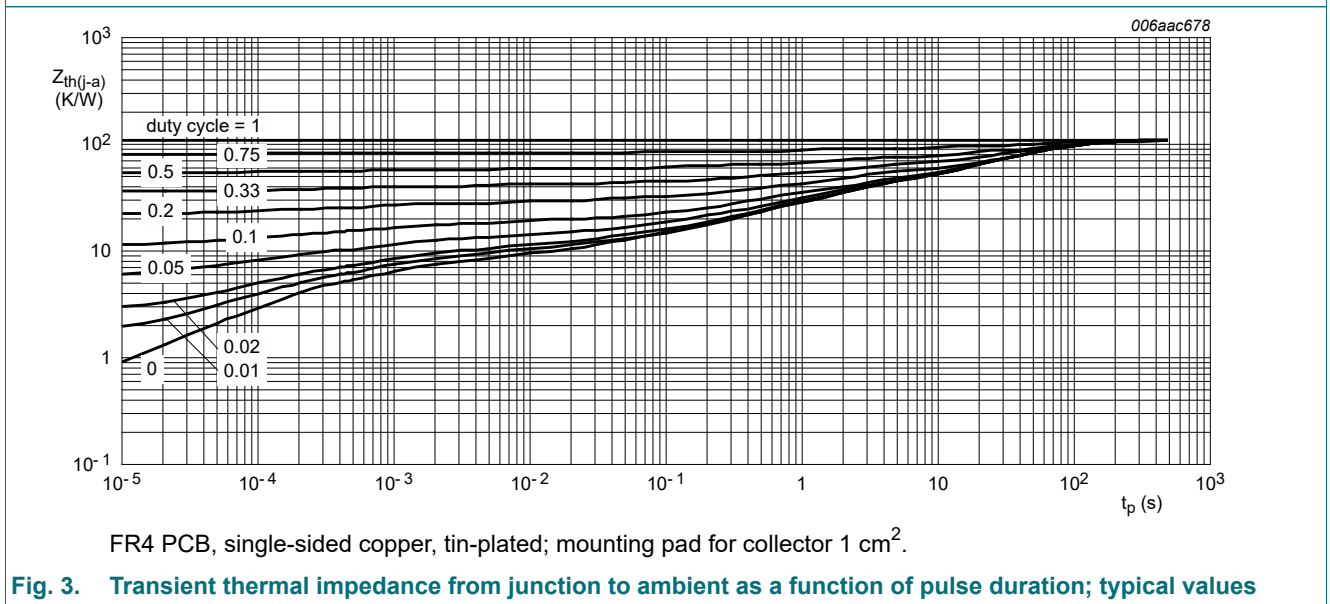
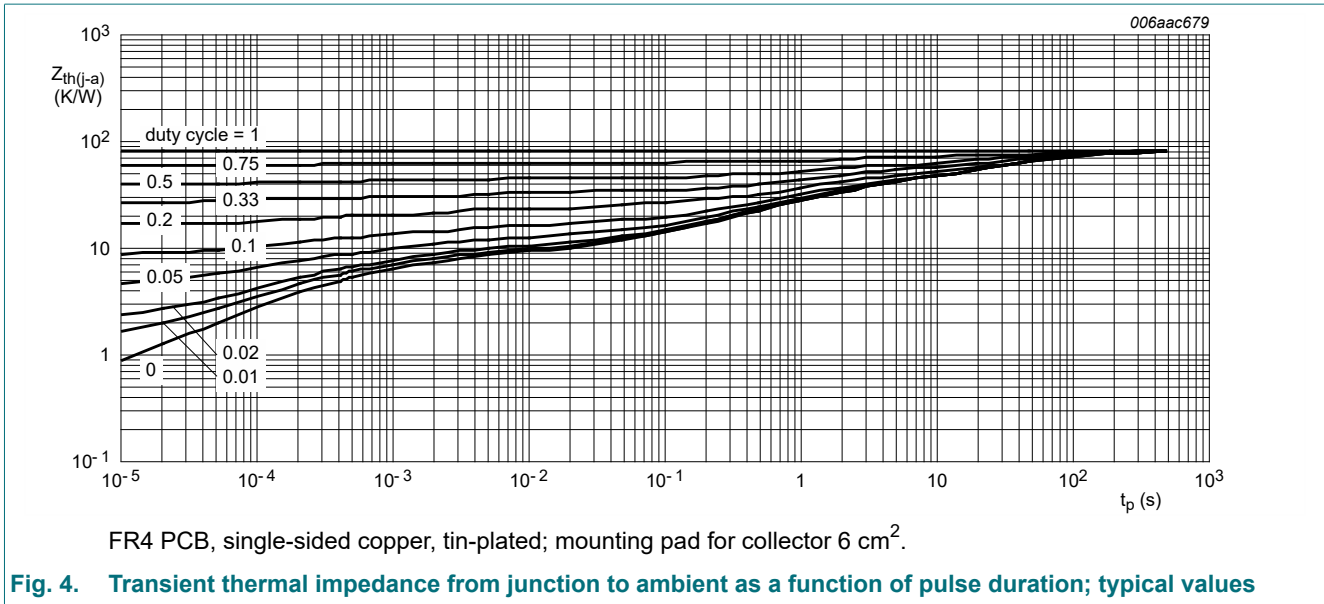


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

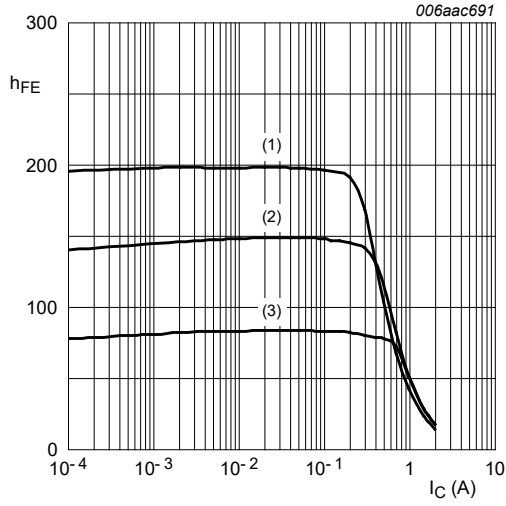


10. Characteristics

Table 8. Characteristics

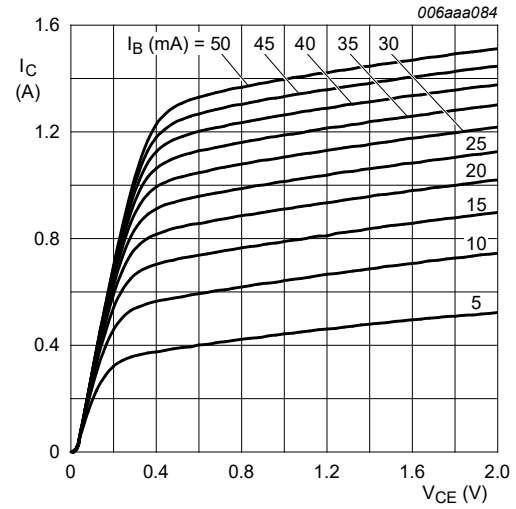
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100 \mu\text{A}; I_E = 0; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2 \mu\text{A}; I_B = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$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

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



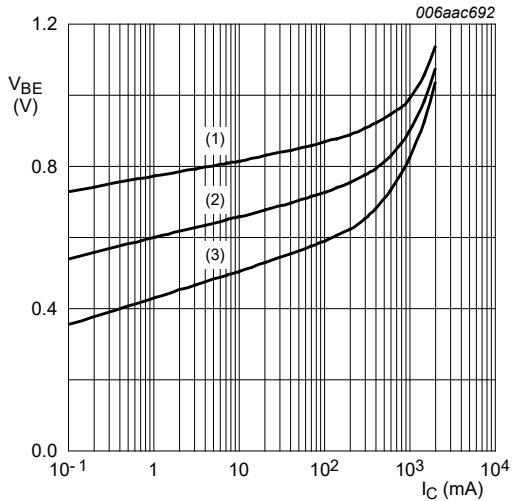
$V_{CE} = 2\text{ V}$
 (1) $T_{amb} = 100\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



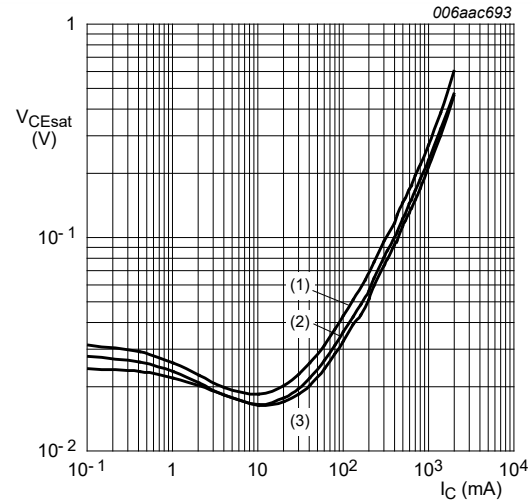
$T_{amb} = 25\text{ °C}$

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



$V_{CE} = 2\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 100\text{ °C}$

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



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

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

11. Package outline

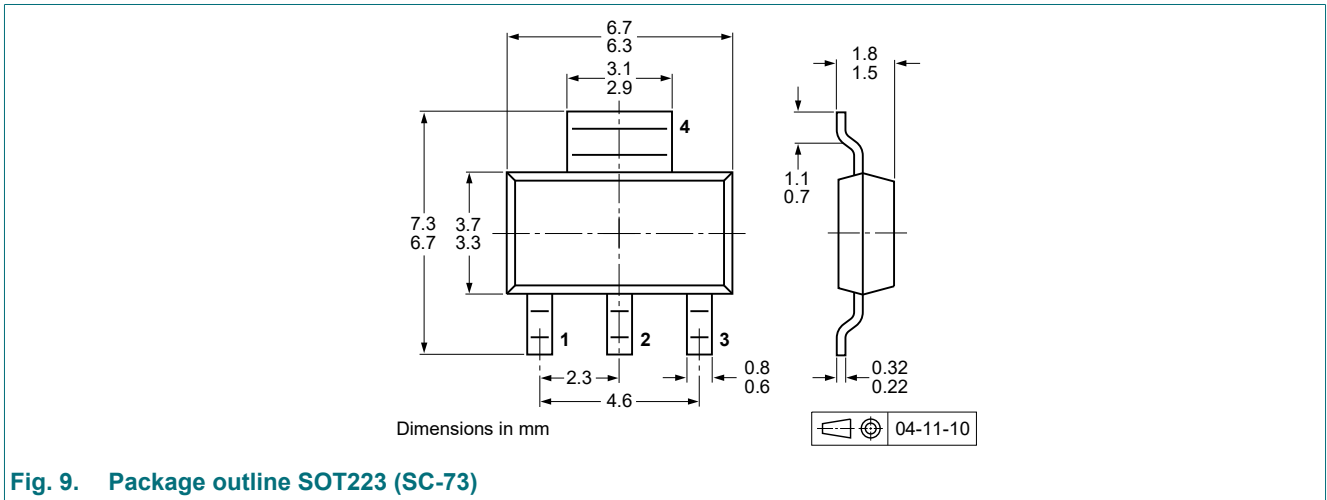


Fig. 9. Package outline SOT223 (SC-73)

12. Soldering

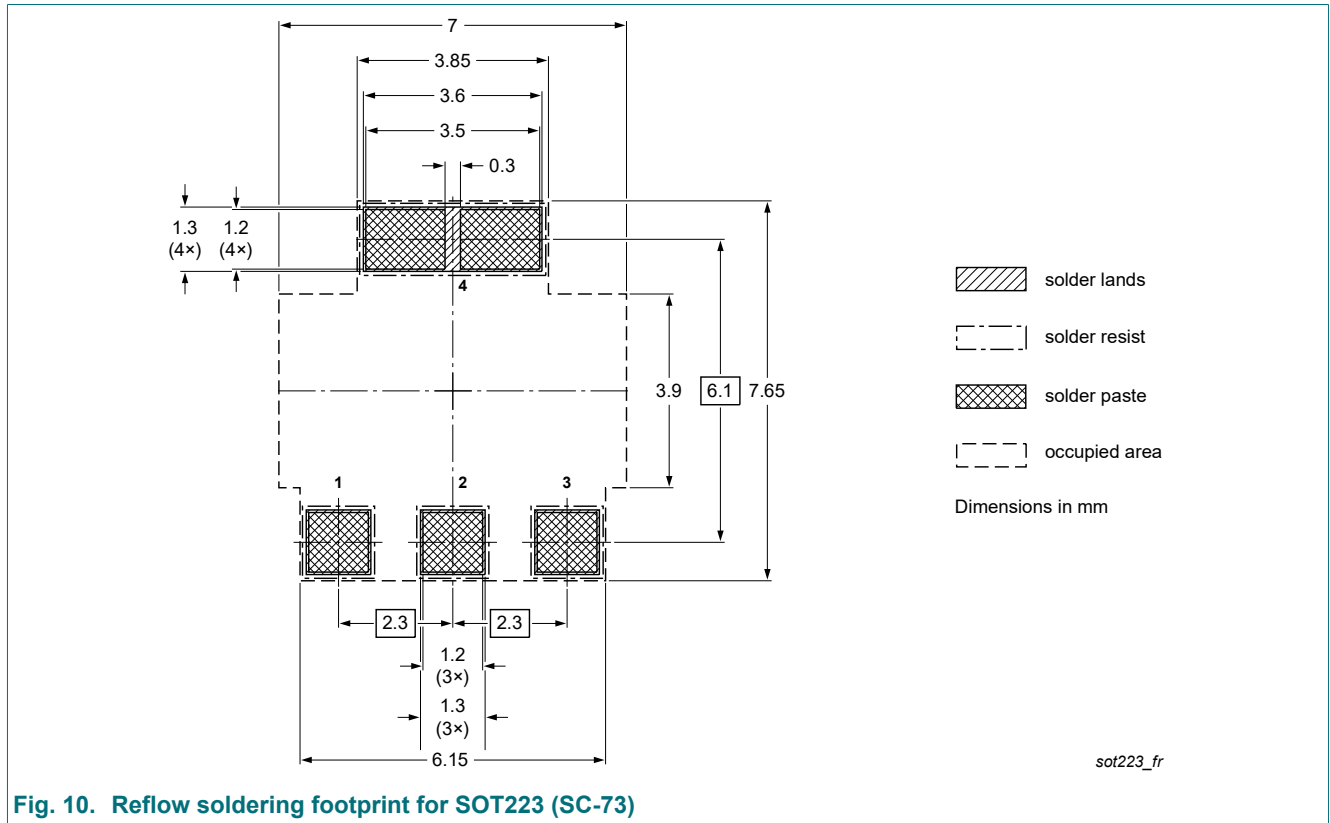


Fig. 10. Reflow soldering footprint for SOT223 (SC-73)

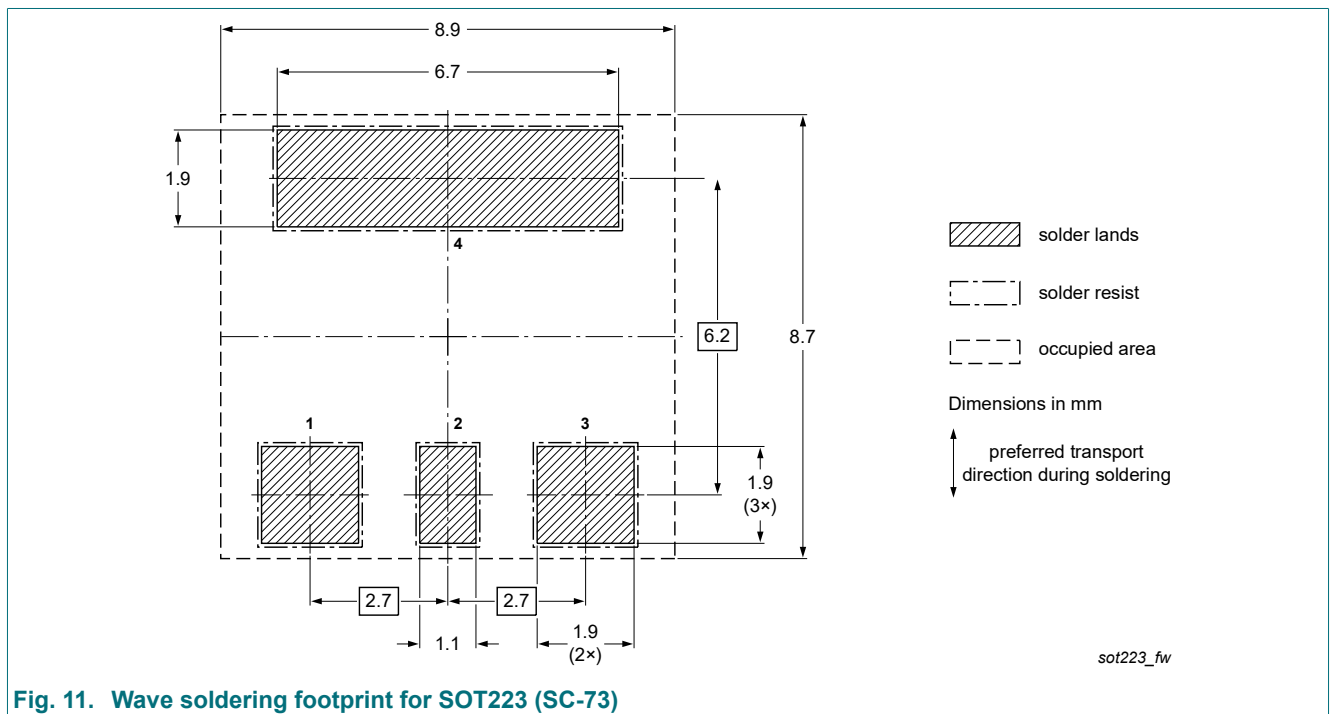


Fig. 11. Wave soldering footprint for SOT223 (SC-73)

13. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BCP55_SER v.9	20220701	Product data sheet	-	BCP55_BCX55_BC55PA v.8
Modifications:	<ul style="list-style-type: none"> Series data sheet describing several packages reduced to series data sheets per package. Package information removed. Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
BCP55_BCX55_BC55PA v.8	20111024	Product data sheet	-	BC637_BCP55_BCX55 v.7
BC637_BCP55_BCX55 v.7	20070625	Product data sheet	-	BC637_BCP55_BCX55 v.6
BC637_BCP55_BCX55 v.6	20050218	Product data sheet	CPCN200405029	BC635_637_639 v.4 BCP54_55_56 v.5 BCX54_55_56 v.4
BC635_637_639 v.4	20011010	Product Specification	-	BC635_637_639 v.3
BCP54_55_56 v.5	20030206	Product Specification	-	BCX54_55_56 v.4
BCX54_55_56 v.4	20011010	Product Specification	-	BCX54_55_56 v.3

14. 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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