

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	BCP54,115
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/bcp54-115.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



BCP54 series

45 V, 1 A NPN medium power transistors

Rev. 9 — 6 January 2023

Product data sheet

1. General description

NPN medium power transistors in a SOT223 (SC-73) flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High collector current capability I_C and I_{CM}
- Three current gain selections
- High power dissipation capability
- AEC-Q101 qualified

3. Applications

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

4. Quick reference data

Table 1. Quick reference data

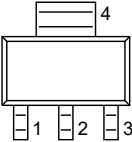
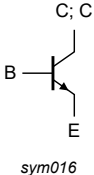
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	45	V
I_C	collector current			-	-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$		-	-	2	A
h_{FE}	DC current gain						
	BCP54	$V_{CE} = 2\text{ V}; I_C = 150\text{ mA}$	[1]	63	-	250	
	BCP54-10		[1]	63	-	160	
	BCP54-16		[1]	100	-	250	

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

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	C	collector		
3	E	emitter		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCP54	SC-73	plastic, surface-mounted package with increased heatsink; 4 leads	SOT223
BCP54-10			
BCP54-16			

7. Marking

Table 4. Marking

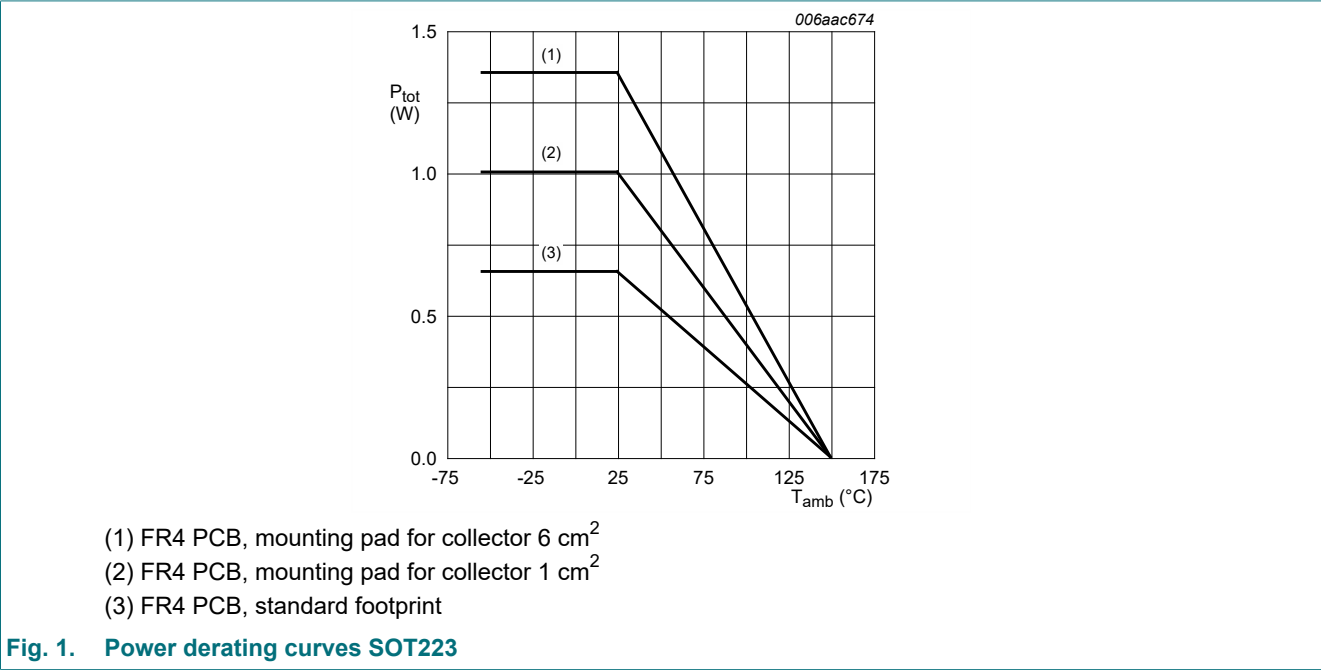
Type number	Marking code
BCP54	BCP54
BCP54-10	BCP54/10
BCP54-16	BCP54/16

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).
 $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	45	V
V_{CEO}	collector-emitter voltage	open base	-	45	V
V_{EBO}	emitter-base voltage	open collector	-	5	V
I_C	collector current		-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	2	A
I_B	base current		-	0.3	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	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 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 .
[3] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 6 cm^2 .



9. Thermal characteristics

Table 6. Thermal characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	195	K/W
			[2]			125	K/W
			[3]			93	K/W
$R_{(j-sp)}$	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.

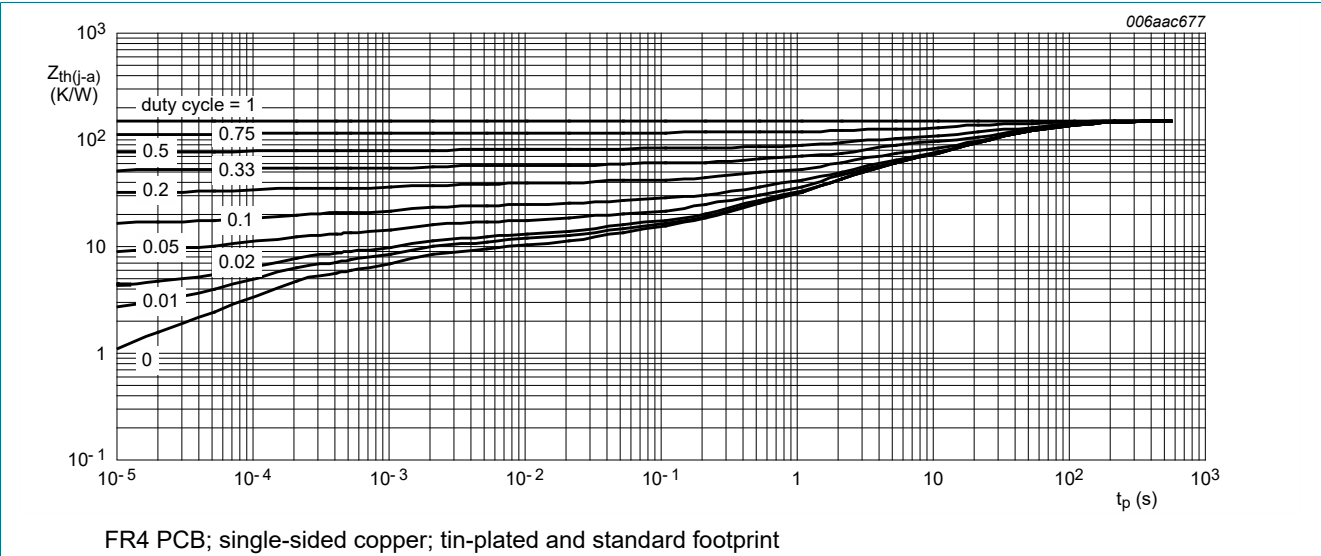


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

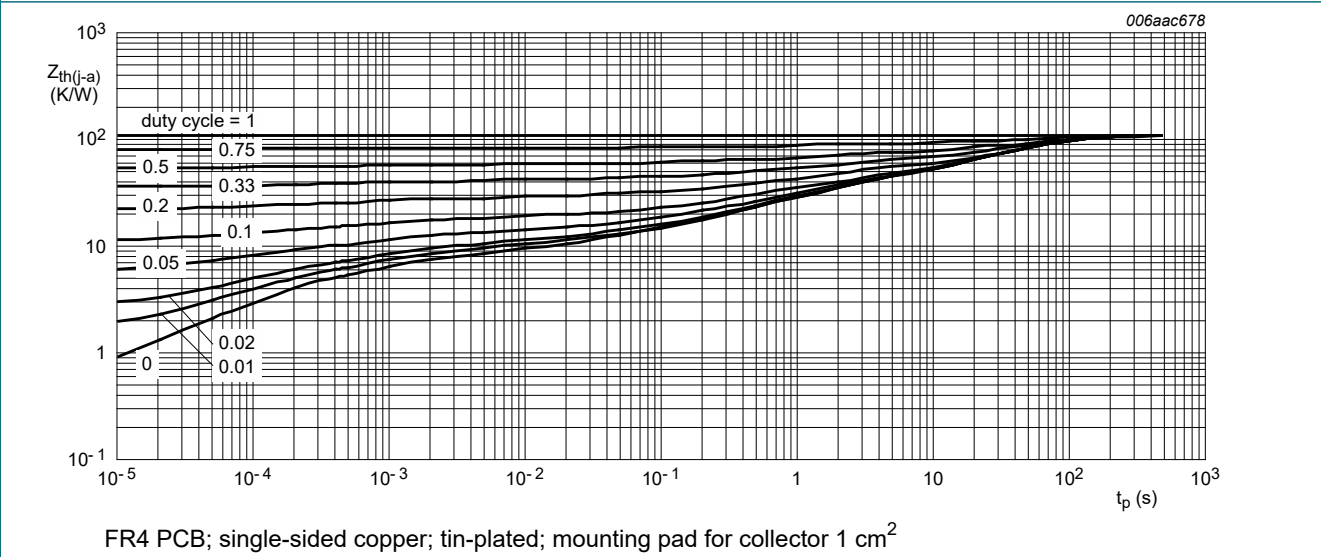
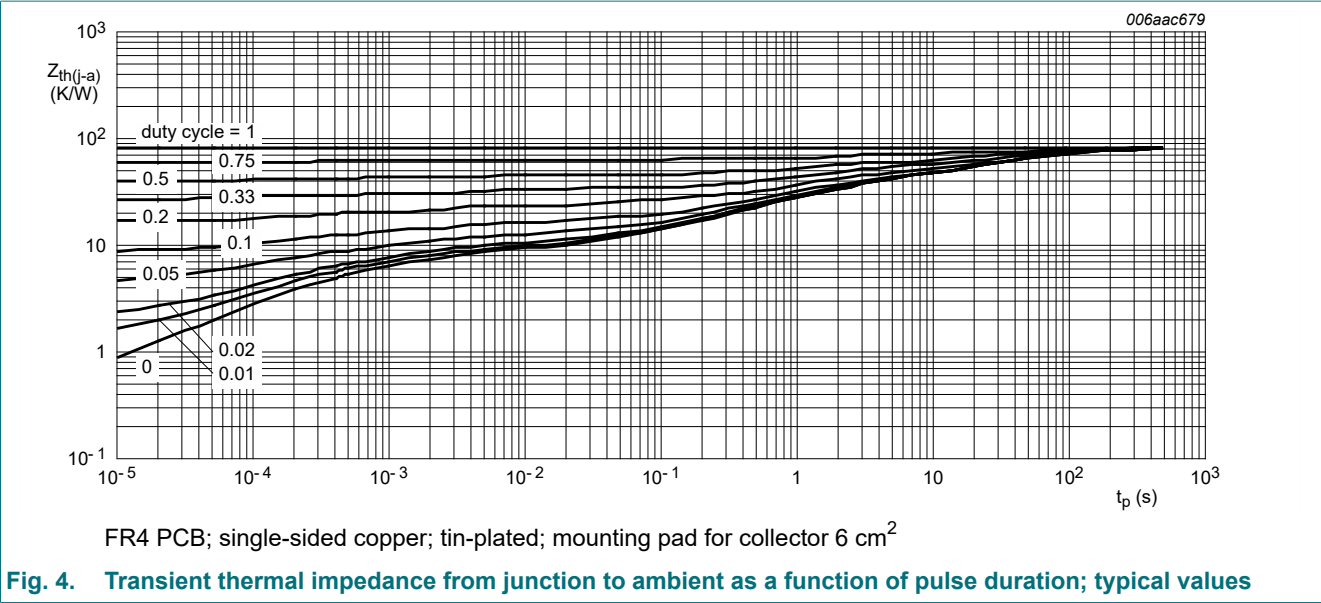


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

Table 7. Characteristics
T_{amb} = 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		45	-	-	V
V _{(BR)CEO}	collector-emitter breakdown voltage	I _C = 2 mA; I _B = 0 A		45	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _E = 100 µA; I _C = 0 A		5	-	-	V
I _{CBO}	collector-base cut-off current	V _{CB} = 30 V; I _E = 0 A		-	-	100	nA
		V _{CB} = 30 V; I _E = 0 A; T _J = 150 °C		-	-	10	µA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A		-	-	100	nA
h _{FE}	DC current gain						
	BCP54	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		63	-	250	
		V _{CE} = 2 V; I _C = 500 mA		40	-	-	
	BCP54-10	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		63	-	160	
		V _{CE} = 2 V; I _C = 500 mA		40	-	-	
	BCP54-16	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		100	-	250	
		V _{CE} = 2 V; I _C = 500 mA		40	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = 500 mA; I _B = 50 mA	[1]	-	-	0.5	V
V _{BE}	base-emitter voltage	V _{CE} = 2 V; I _C = 500 mA	[1]	-	-	1	V
C _c	collector capacitance	V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz		-	6	-	pF
f _T	transition frequency	V _{CE} = 5 V; I _C = 50 mA; f = 100 MHz		100	180	-	MHz

[1] pulsed; t_p ≤ 300 µs; δ ≤ 0.02

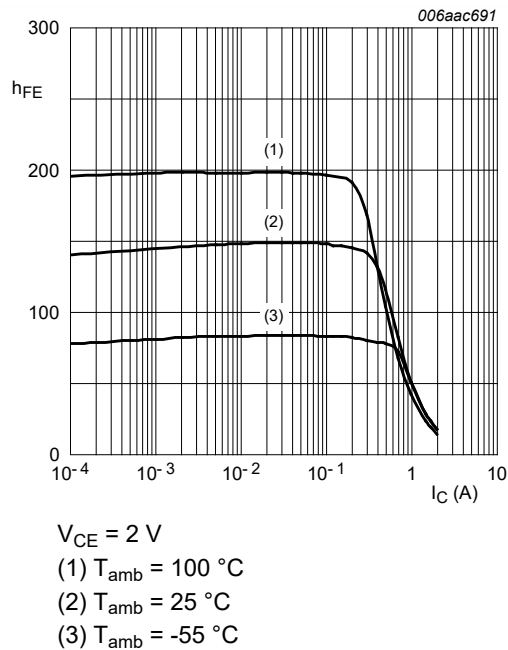


Fig. 5. DC current gain as a function of collector current; typical values

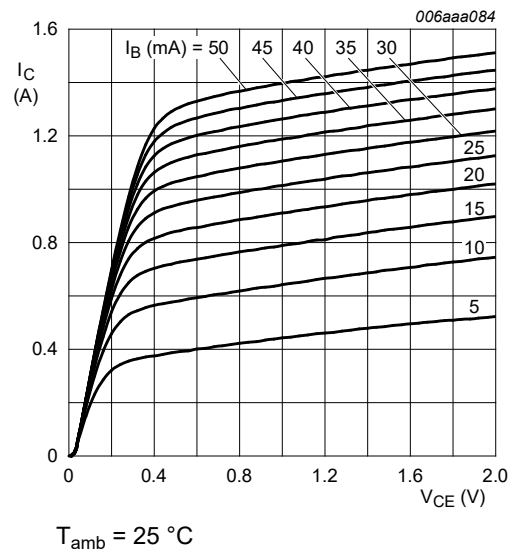


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

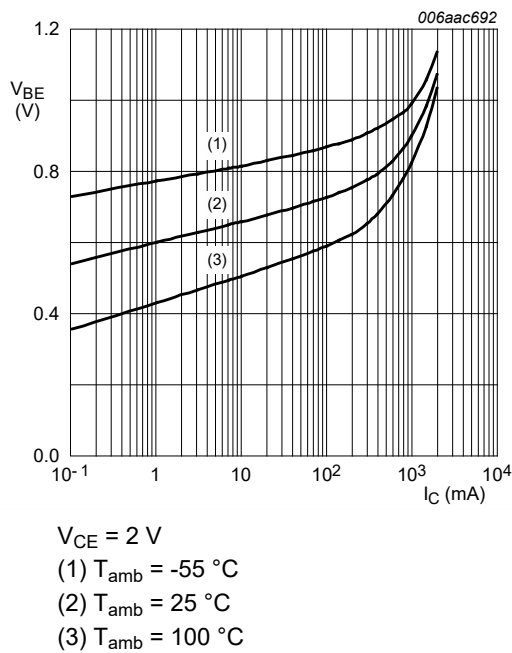


Fig. 7. Base-emitter voltage as a function of collector current; typical values

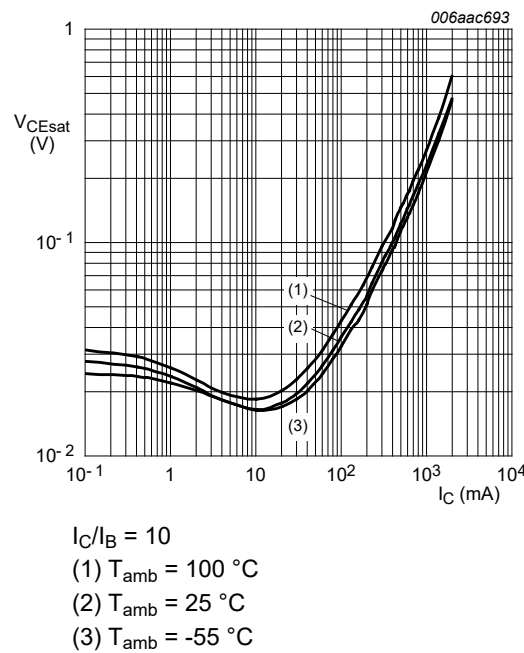


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

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

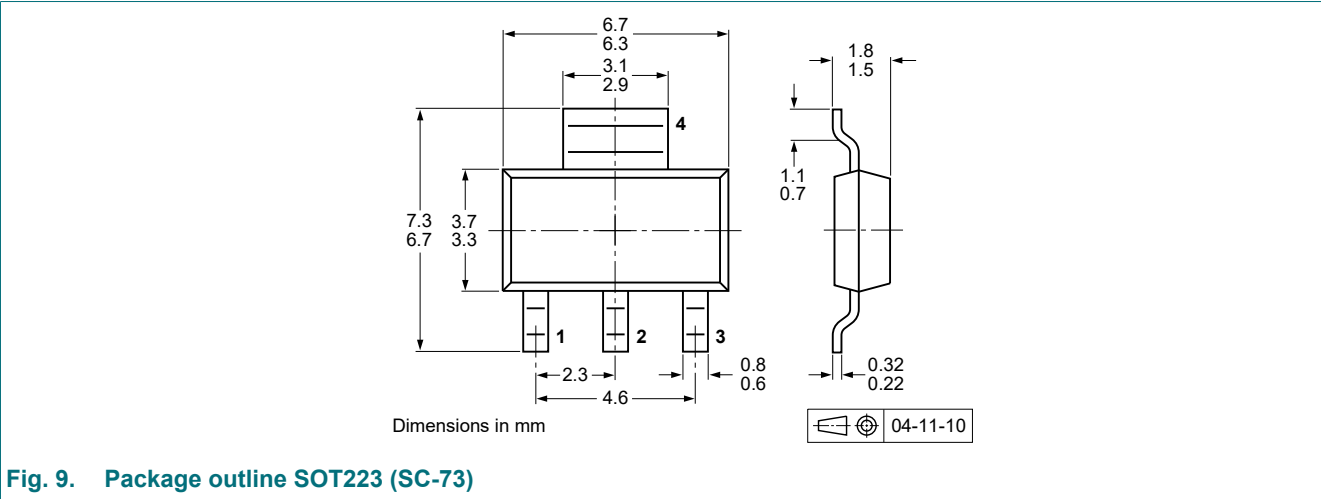
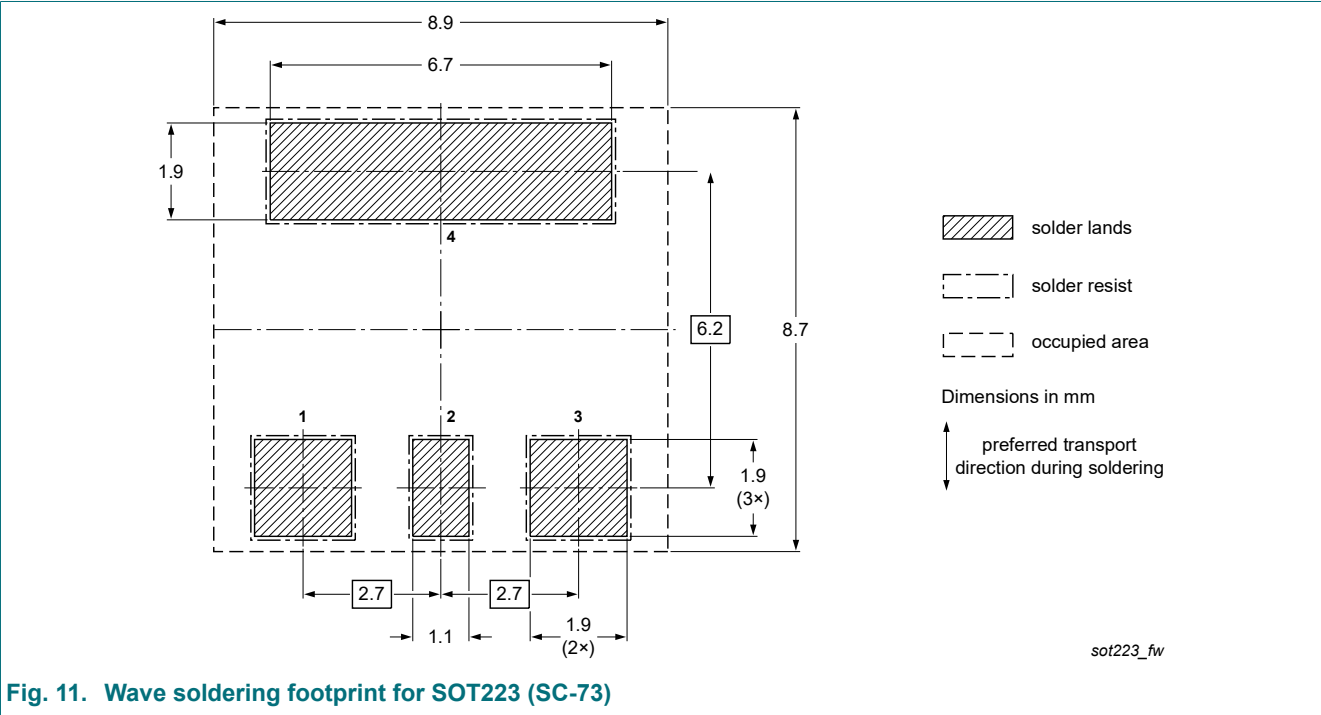
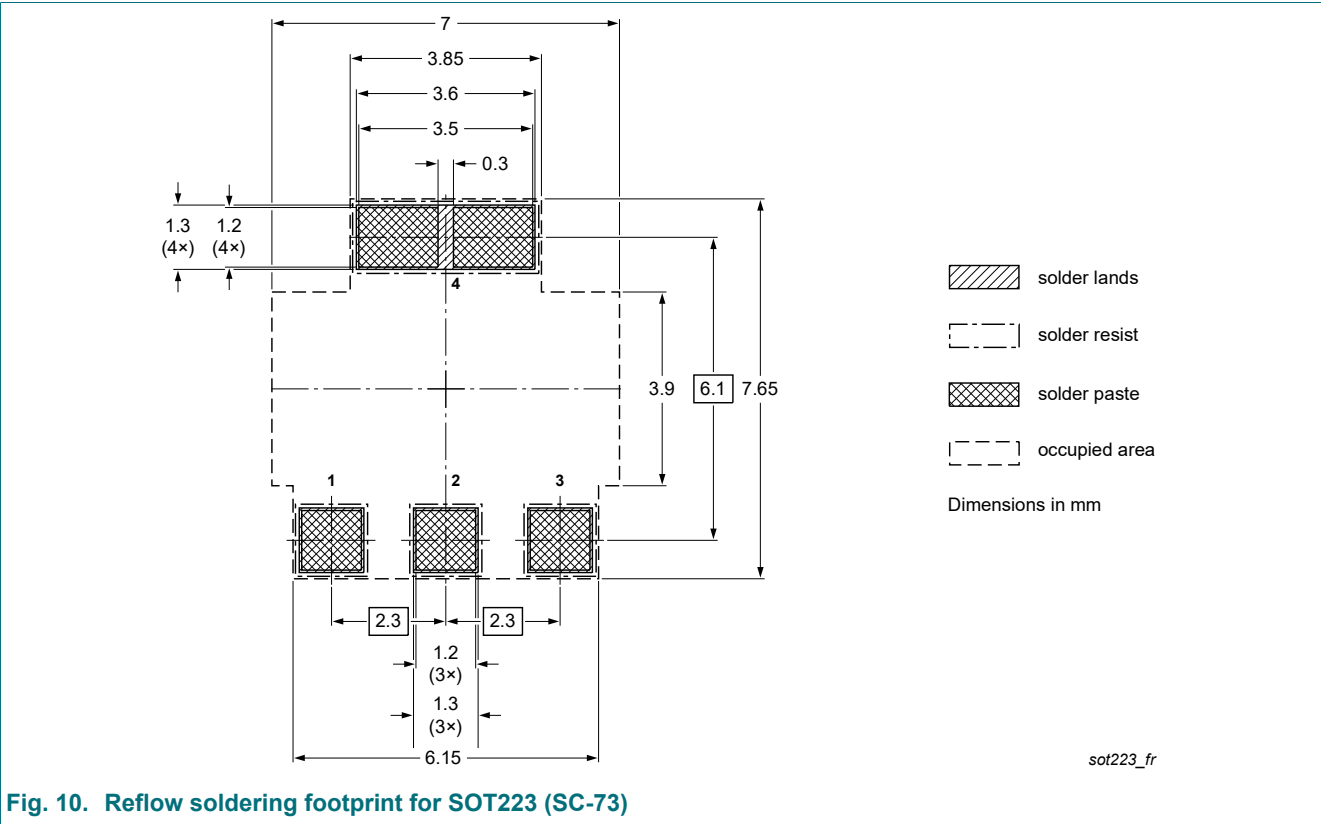


Fig. 9. Package outline SOT223 (SC-73)

13. Soldering



14. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCP54_SER v.9	20220106	Product data sheet	-	BCP54_BCX54_BC54PA v.8
Modifications:	Data sheet separated into 3 data sheets			
BCP54_BCX54_BC54PA v.8	20111021	Product data sheet	-	BC635_BCP54_BCX54 v.7
BC635_BCP54_BCX54 v.7	20070604	Product data sheet	-	BC635_BCP54_BCX54 v.6
BC635_BCP54_BCX54 v.6	20050225	Product data sheet	CPCN200405029	BC635_637_639 v.4 BCP54_55_56 v.5 BCP54_55_56 v.4
BC635_637_639 v.4	20011010	Product specification	-	BC635_637_639 v.3
BCX54_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

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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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