



BCX55-Q series

60 V, 1 A NPN medium power transistors

Rev. 1 — 14 July 2022

Product data sheet

1. General description

NPN medium power transistors in a SOT89 (SC-62) flat lead Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEITA	
BCX55-Q	SOT89	SC-62	BCX52-Q
BCX55-10-Q			BCX52-10-Q
BCX55-16-Q			BCX52-16-Q

2. Features and benefits

- High current
- Three current gain selections
- High power dissipation capability
- Exposed heatsink for excellent thermal and electrical conductivity
- 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

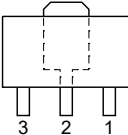
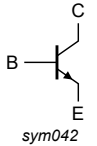
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{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						
	BCX55-Q	$V_{CE} = 2$ V; $I_C = 150$ mA; $T_{amb} = 25$ °C	[1]	63	-	250	
	BCX55-10-Q		[1]	63	-	160	
	BCX55-16-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	E	emitter		
2	C	collector		
3	B	base		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BCX55-Q	SC-62	plastic surface-mounted package; exposed die pad for good heat transfer; 3 leads	SOT89
BCX55-10-Q			
BCX55-16-Q			

7. Marking

Table 5. Marking

Type number	Marking code
BCX55-Q	BE
BCX55-10-Q	BG
BCX55-16-Q	BM

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 ≤ 1 ms	-	2	A
I _B	base current		-	0.3	A
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms	-	0.3	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C [1]	-	0.50	W
		[2]	-	0.95	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.

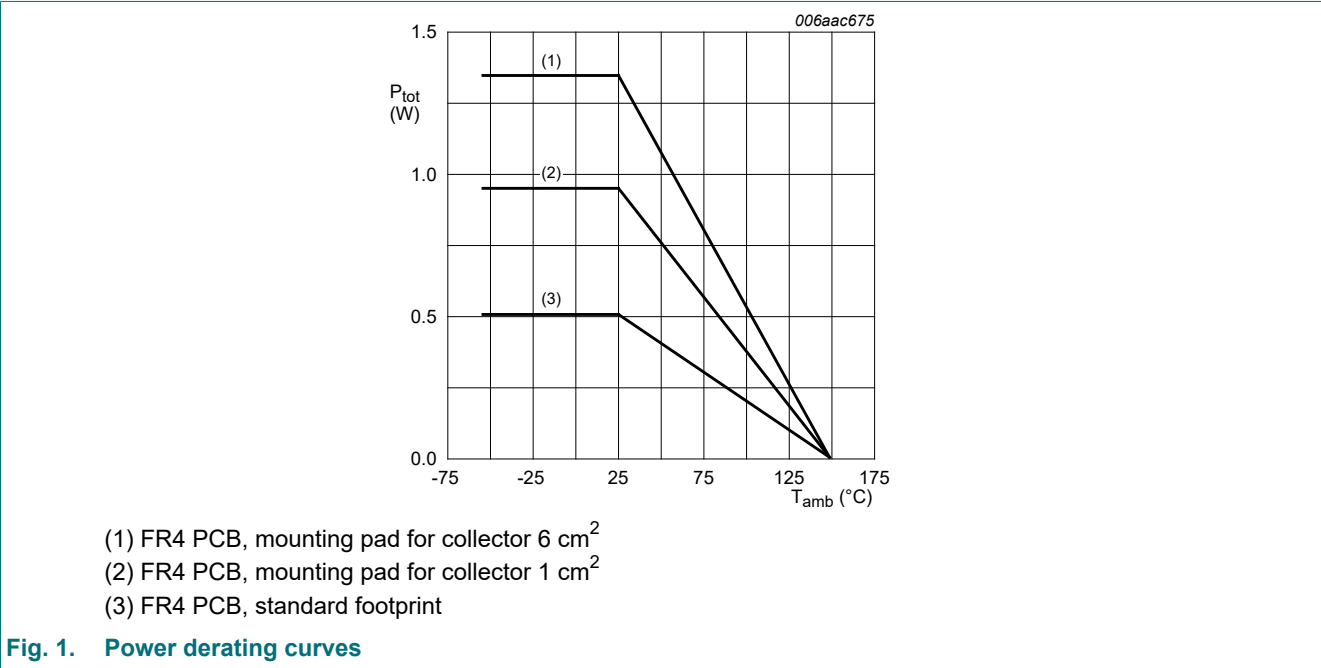


Fig. 1. Power derating curves

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]	-	-	250	K/W
			[2]	-	-	132	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.

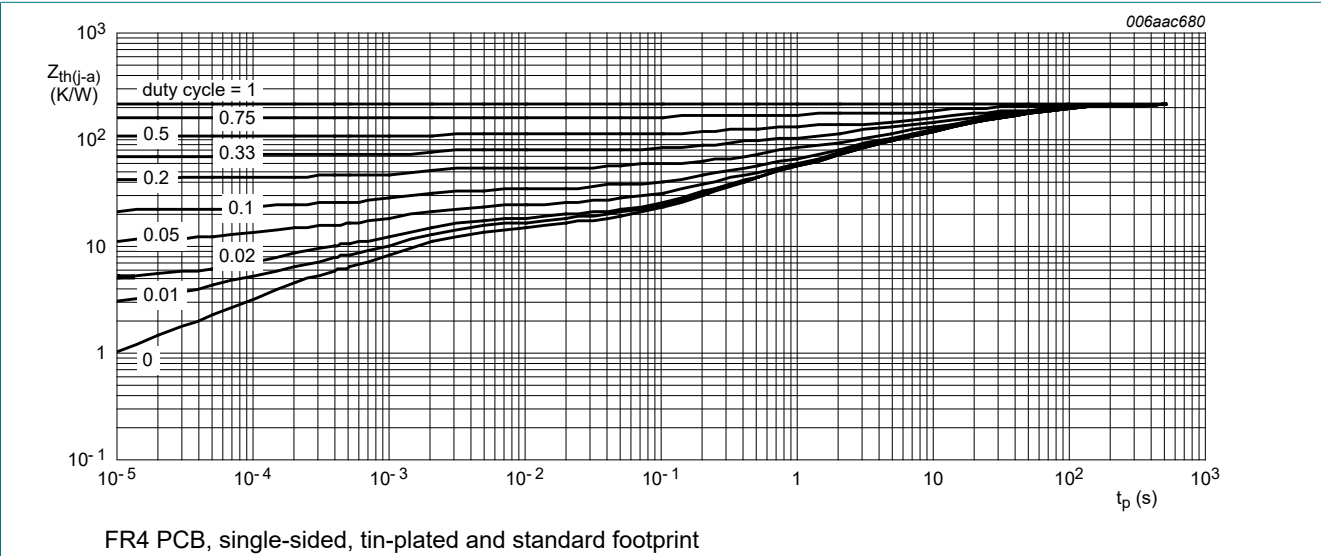


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

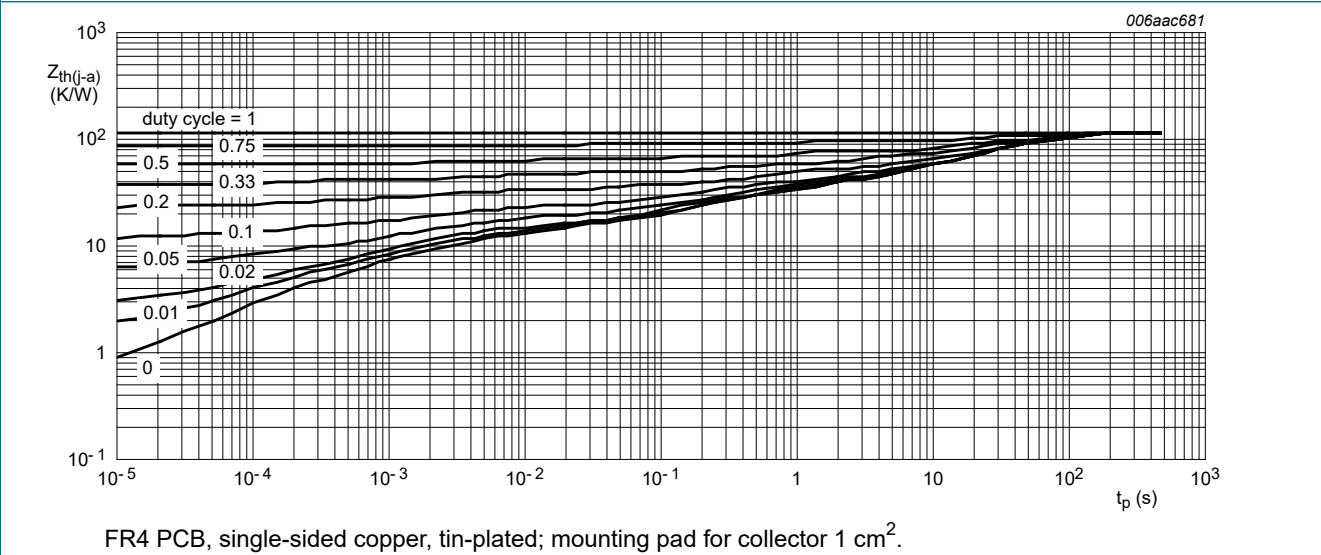
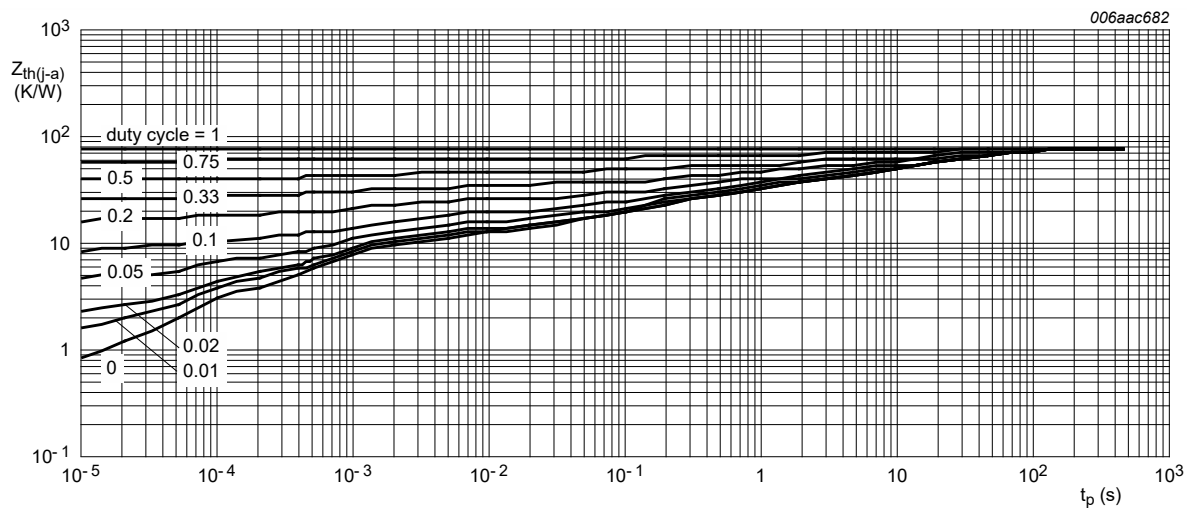


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm².

Fig. 4. 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	$I_C = 100\ \mu\text{A}$; $I_E = 0$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2\ \mu\text{A}$; $I_B = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		60	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0\ \text{A}$; $I_E = 100\ \mu\text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		5	-	-	V
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\ \text{V}$; $I_E = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	100	nA
		$V_{CB} = 30\ \text{V}$; $I_E = 0\ \text{A}$; $T_J = 150\ ^\circ\text{C}$		-	-	10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\ \text{V}$; $I_C = 0\ \text{A}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	-	100	nA
h_{FE}	DC current gain						
	BCX55-Q	$V_{CE} = 2\ \text{V}$; $I_C = 5\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2\ \text{V}$; $I_C = 150\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	63	-	250	
		$V_{CE} = 2\ \text{V}$; $I_C = 500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	40	-	-	
	BCX55-10-Q	$V_{CE} = 2\ \text{V}$; $I_C = 5\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2\ \text{V}$; $I_C = 150\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	63	-	160	
		$V_{CE} = 2\ \text{V}$; $I_C = 500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	40	-	-	
	BCX55-16-Q	$V_{CE} = 2\ \text{V}$; $I_C = 5\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2\ \text{V}$; $I_C = 150\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	100	-	250	
		$V_{CE} = 2\ \text{V}$; $I_C = 500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\ \text{mA}$; $I_B = 50\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	-	-	0.5	V
V_{BE}	base-emitter voltage	$V_{CE} = 2\ \text{V}$; $I_C = 500\ \text{mA}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$	[1]	-	-	1	V
C_c	collector capacitance	$V_{CB} = 10\ \text{V}$; $I_E = i_e = 0\ \text{A}$; $f = 1\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		-	6	-	pF
f_T	transition frequency	$V_{CE} = 5\ \text{V}$; $I_C = 50\ \text{mA}$; $f = 100\ \text{MHz}$; $T_{\text{amb}} = 25\ ^\circ\text{C}$		100	180	-	MHz

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

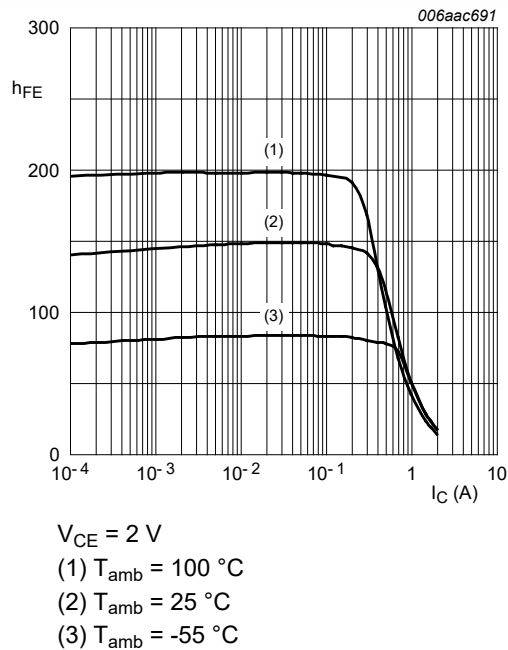


Fig. 5. DC current gain as a function of collector current; typical values

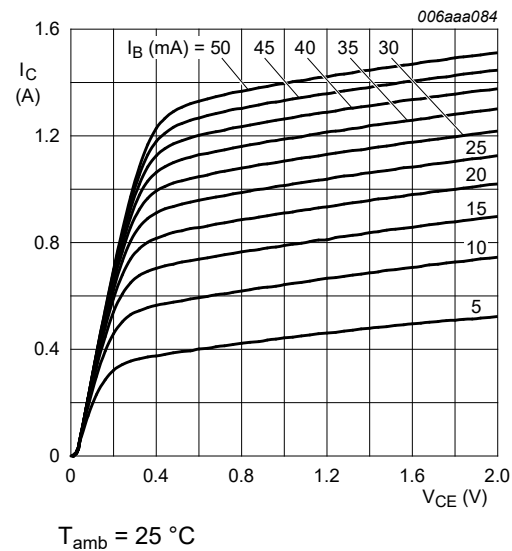


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

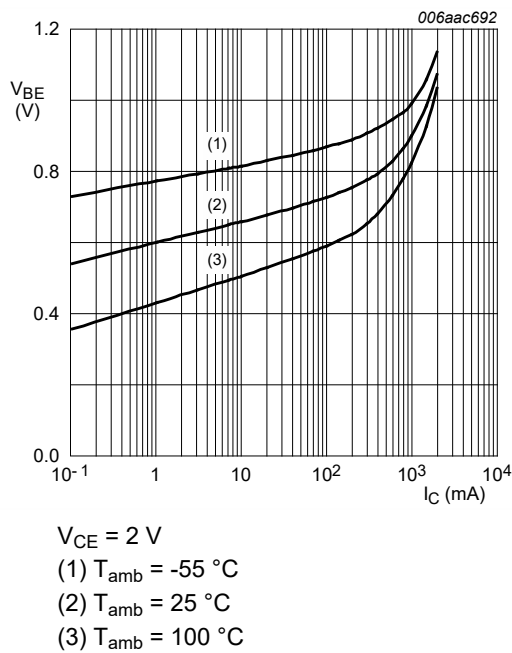


Fig. 7. Base-emitter voltage as a function of collector current; typical values

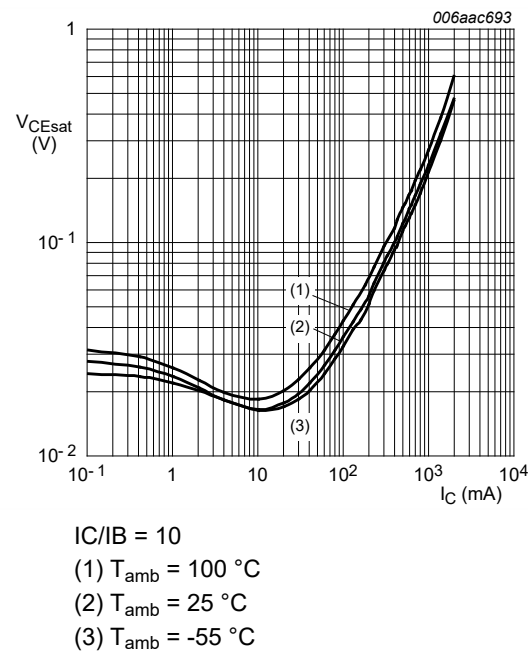


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

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

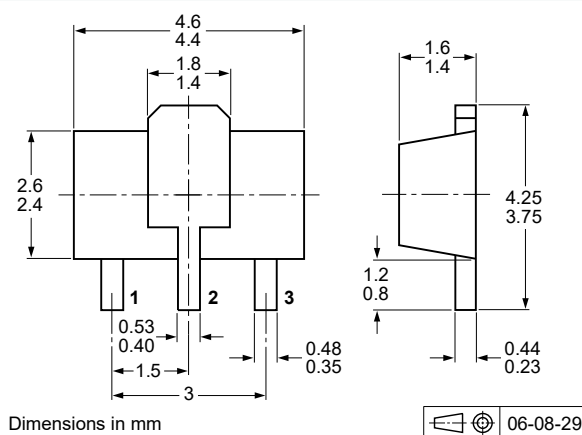


Fig. 9. Package outline SOT89 (SC-62)

13. Soldering

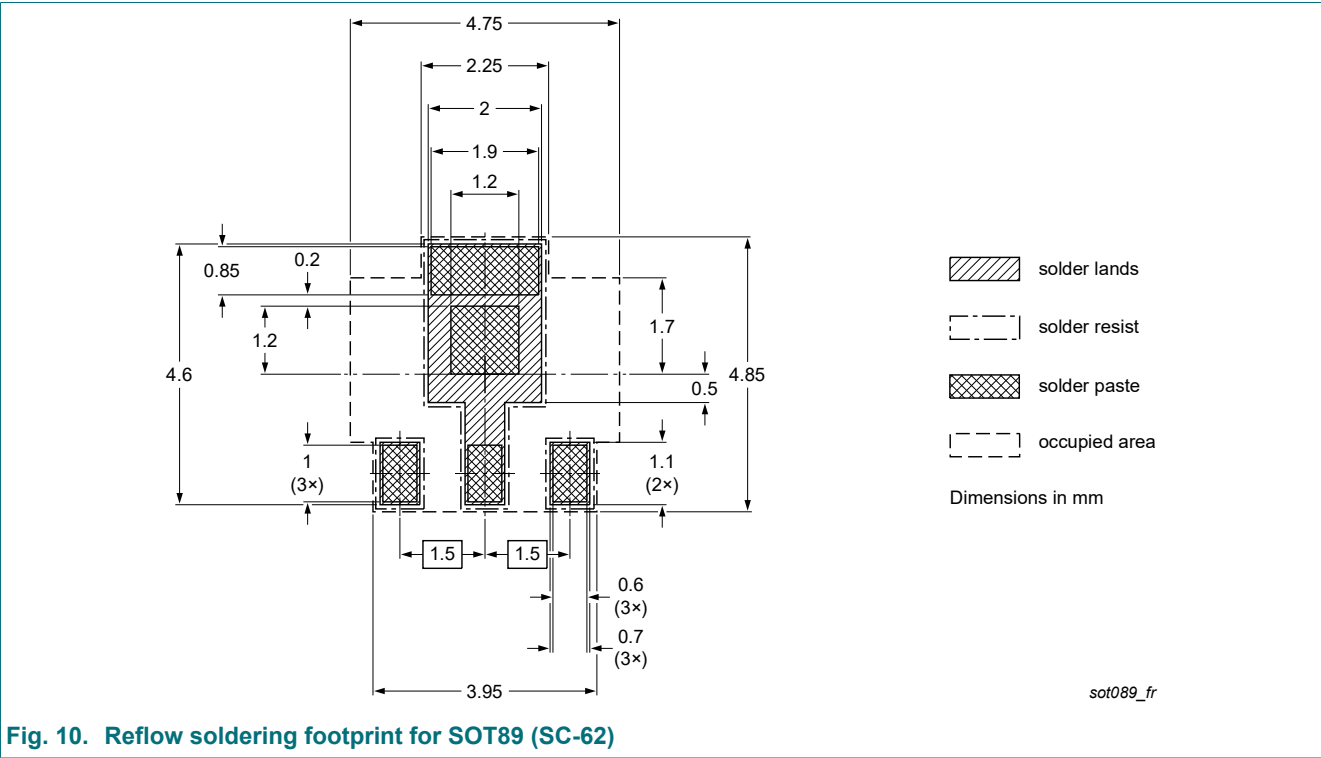


Fig. 10. Reflow soldering footprint for SOT89 (SC-62)

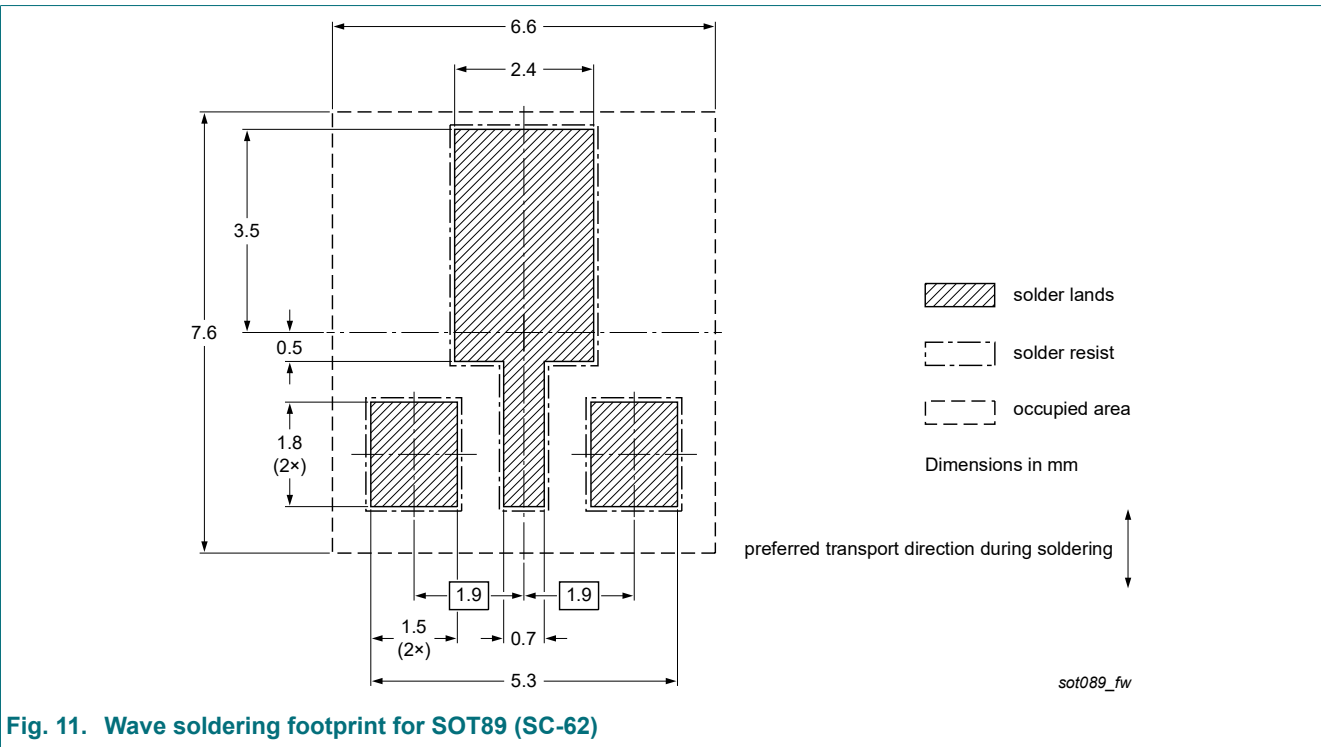


Fig. 11. Wave soldering footprint for SOT89 (SC-62)

14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BCX55-Q_SER v.1	20220714	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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