BCW68 series

45 V, 800 mA PNP general-purpose transistor

Rev. 1 — 21 April 2017 Product data sheet

1 General description

PNP general-purpose transistors in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complements: BCW66F/G/H

2 Features and benefits

- High current
- AEC-Q101 qualified

3 Applications

- General-purpose switching and amplification

4 Quick reference data

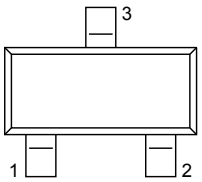
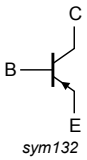
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-45	V
I_C	collector current			-	-	-800	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	-1	A
h_{FE}	DC current gain	V_{CE} = -1 V; I_C = -100 mA; T_{amb} = 25 °C	[1]				
	BCW68F			100	-	250	
	BCW68G			160	-	400	
	BCW68H			250	-	600	

[1] pulsed: $t_p \leq 300$ µs, $\delta \leq 0.02$

5 Pinning information

Table 2. Pinning

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

6 Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BCW68F	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BCW68G			
BCW68H			

7 Marking

Table 4. Marking

Type number		Marking code
BCW68F	[1]	ET%
BCW68G	[1]	EU%
BCW68H	[1]	EV%

[1] % = placeholder for manufacturing site code

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	-	-50	V
V_{CEO}	collector-emitter voltage	open base	-	-45	V
V_{EBO}	emitter-base voltage	open collector	-	-5	V
I_C	collector current		-	-800	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-1	A
I_B	base current		-	-100	mA

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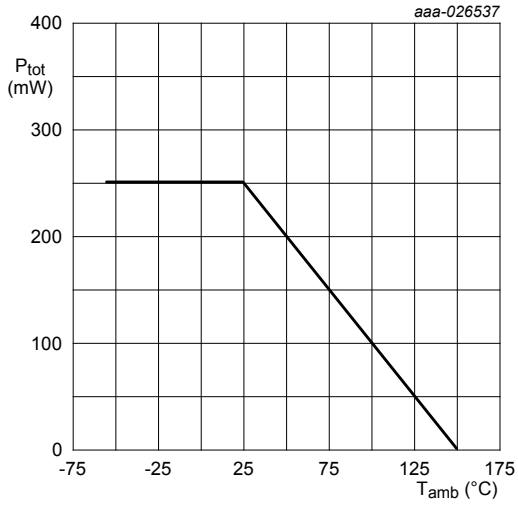
Symbol	Parameter	Conditions	Min	Max	Unit
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms	-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C [1]	-	250	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	150	°C
T_{stg}	storage temperature		-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB), single-sided chopper, tin-plated and standard footprint.



FR4 PCB, standard footprint

Figure 1. Power derating curve

9 Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air [1]	-	-	500	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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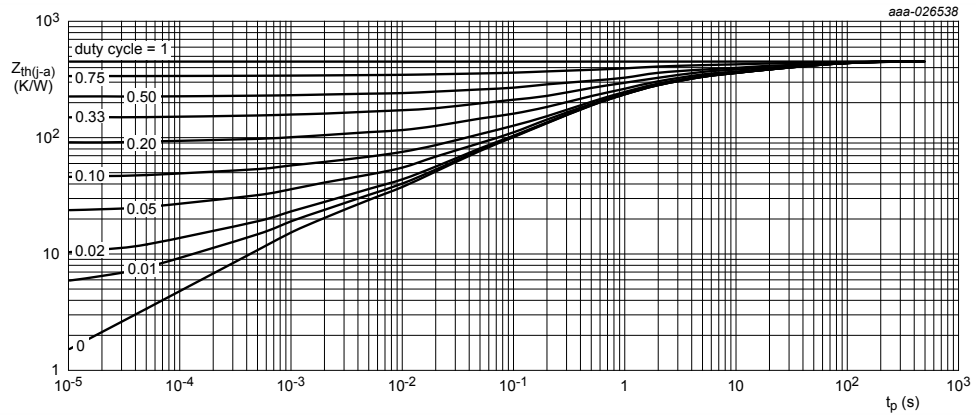

FR4 PCB, standard footprint

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

10 Electrical characteristics

Table 7. Electrical characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = -40 V; I_E = 0 A		-	-	-20	nA
		V_{CB} = -40 V; I_E = 0 A; T_j = 150 °C		-	-	-5	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A		-	-	-20	nA
h_{FE}	DC current gain						
	BCW68F/G/H	V_{CE} = -1 V; I_C = -100 µA		100	-	-	
	BCW68F/G/H	V_{CE} = -1 V; I_C = -1 mA		100	-	-	
	BCW68F/G/H	V_{CE} = -1 V; I_C = -10 mA		100	-	-	
	BCW68F	V_{CE} = -1 V; I_C = -100 mA	[1]	100	-	250	
	BCW68G			160	-	400	
	BCW68H			250	-	600	
	BCW68F	V_{CE} = -2 V; I_C = -500 mA	[1]	35	-	-	
	BCW68G			60	-	-	
	BCW68H			100	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -100 mA; I_B = -10 mA	[1]	-	-	-350	mV
		I_C = -500 mA; I_B = -50 mA	[1]	-	-	-450	mV
V_{BEsat}	base-emitter saturation voltage	I_C = -100 mA; I_B = -10 mA	[1]	-	-	-1.25	V
		I_C = -500 mA; I_B = -50 mA	[1]	-	-	-1.25	V
f_T	transition frequency	V_{CE} = -5 V; I_C = -10 mA; f = 100 MHz		80	-	-	MHz
C_c	collector capacitance	V_{CB} = -10 V; I_E = i_e = 0 A; f = 1 MHz		-	5	-	pF

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

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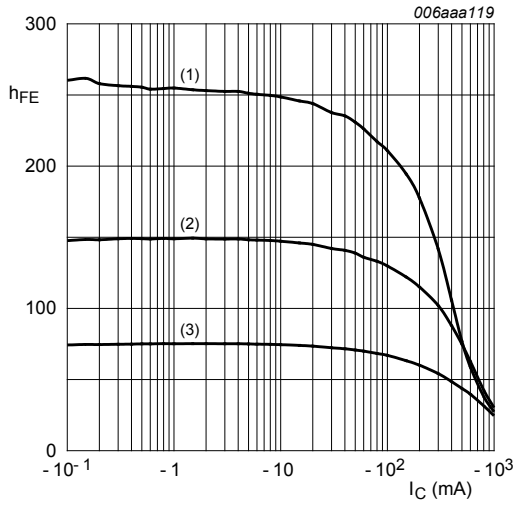
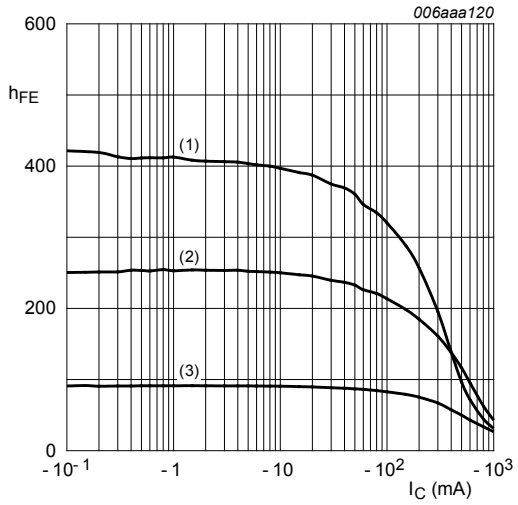
Table 8.



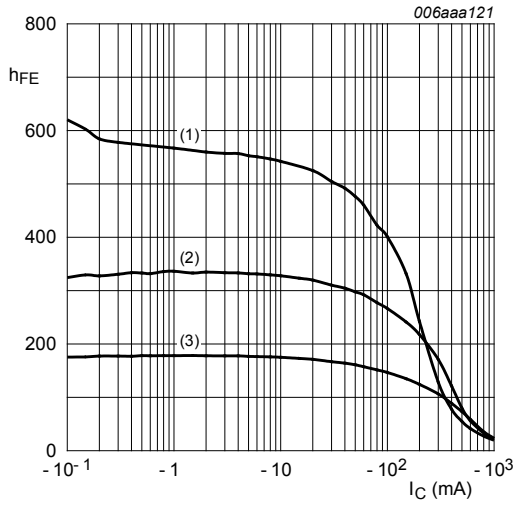
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 3. BCW68F: DC current gain as a function of collector current; typical values



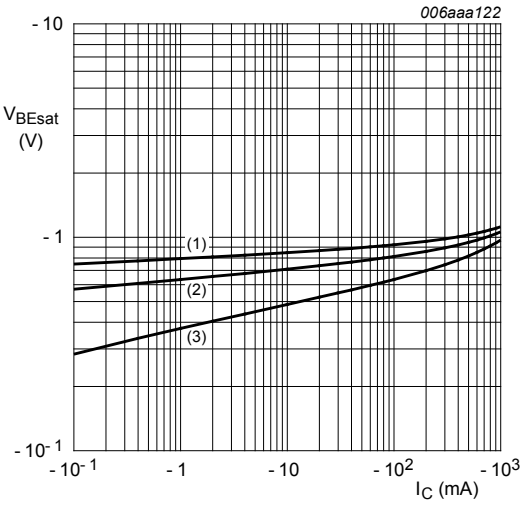
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 4. BCW68G: DC current gain as a function of collector current; typical values



V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 5. BCW68H: DC current gain as a function of collector current; typical values



I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Figure 6. BCW68F: Base-emitter saturation voltage as a function of collector current; typical values

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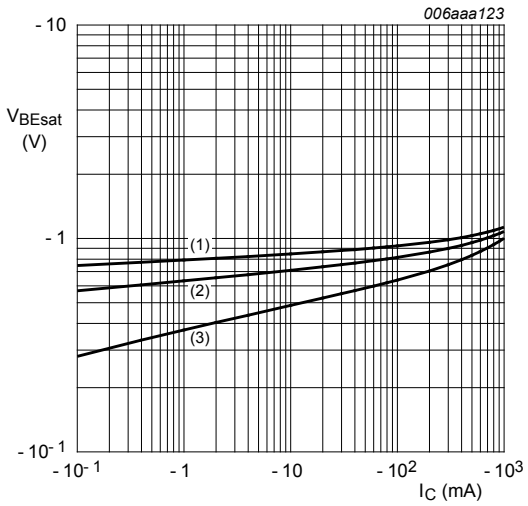
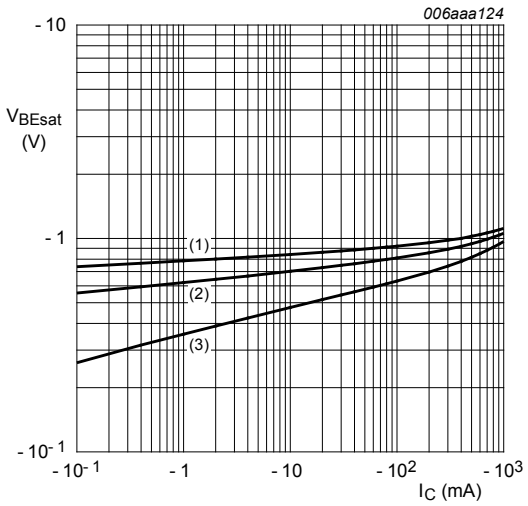


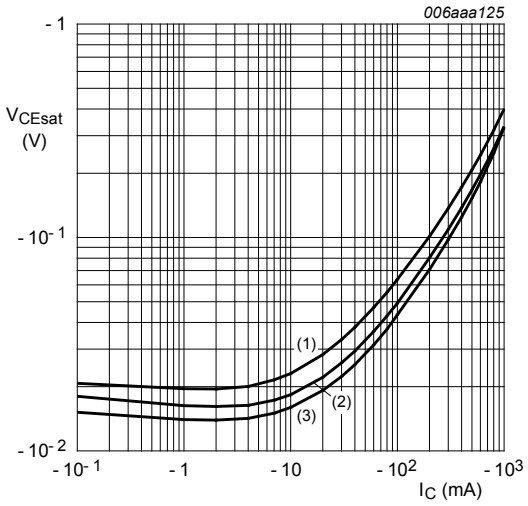
I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Figure 7. BCW68G: Base-emitter saturation voltage as a function of collector current; typical values



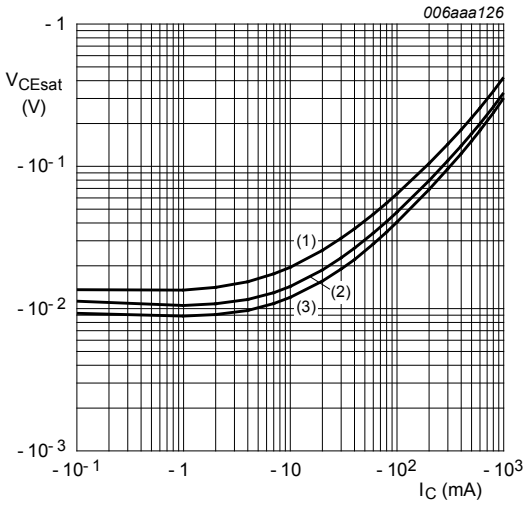
I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Figure 8. BCW68H: Base-emitter saturation voltage as a function of collector current; typical values



I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 9. BCW68F: Collector-emitter saturation voltage as a function of collector current; typical values



I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 10. BCW68G: Collector-emitter saturation voltage as a function of collector current; typical values

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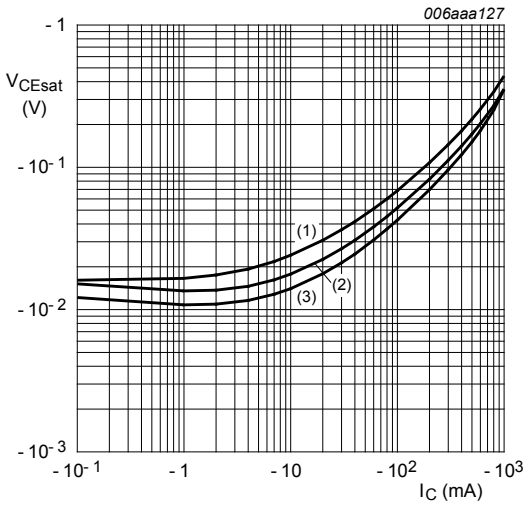
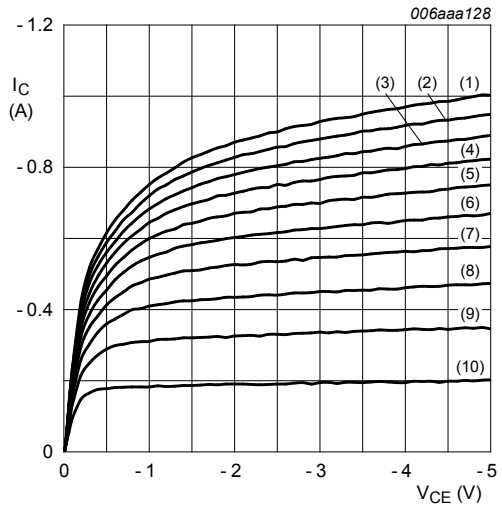


I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Figure 11. BCW68H: Collector-emitter saturation voltage as a function of collector current; typical values



T_{amb} = 25 °C
(1) I_B = -16.0 mA
(2) I_B = -14.4 mA
(3) I_B = -12.8 mA
(4) I_B = -11.2 mA
(5) I_B = -9.6 mA
(6) I_B = -8.0 mA
(7) I_B = -6.4 mA
(8) I_B = -4.8 mA
(9) I_B = -3.2 mA
(10) I_B = -1.6 mA

Figure 12. BCW68F: Collector current as a function of collector-emitter voltage; typical values

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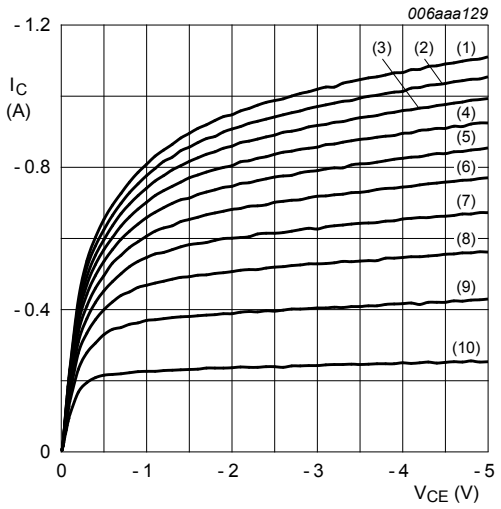
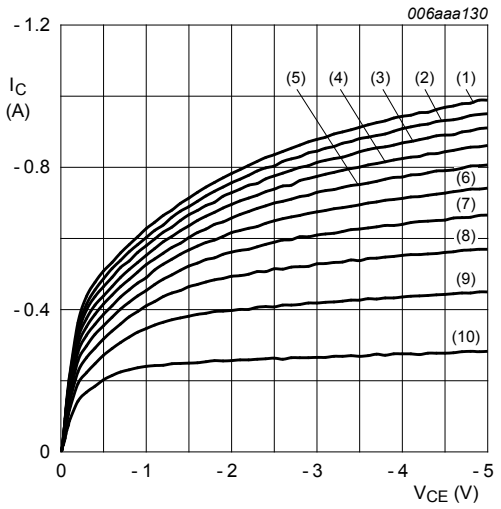


T_{amb} = 25 °C
(1) I_B = -13.0 mA
(2) I_B = -11.7 mA
(3) I_B = -10.4 mA
(4) I_B = -9.1 mA
(5) I_B = -7.8 mA
(6) I_B = -6.5 mA
(7) I_B = -5.2 mA
(8) I_B = -3.9 mA
(9) I_B = -2.6 mA
(10) I_B = -1.3 mA

Figure 13. BCW68G: Collector current as a function of collector-emitter voltage; typical values



T_{amb} = 25 °C
(1) I_B = -12.0 mA
(2) I_B = -10.8 mA
(3) I_B = -9.6 mA
(4) I_B = -8.4 mA
(5) I_B = -7.2 mA
(6) I_B = -6.0 mA
(7) I_B = -4.8 mA
(8) I_B = -3.6 mA
(9) I_B = -2.4 mA
(10) I_B = -1.2 mA

Figure 14. BCW68H: Collector current as a function of collector-emitter voltage; 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.

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12 Package outline

Table 9. Package outline

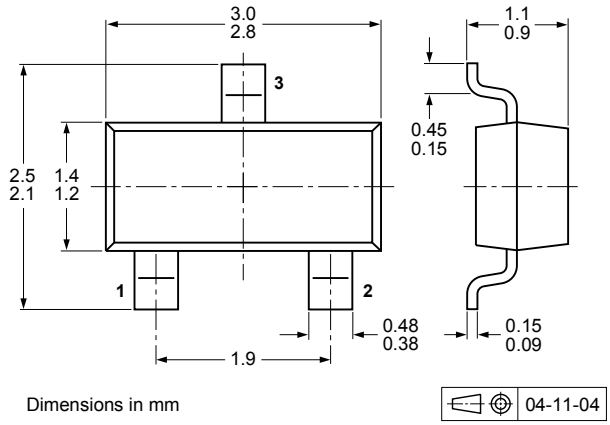

Figure 15. Package outline TO-236 (SOT23)

13 Soldering

Table 10. Soldering

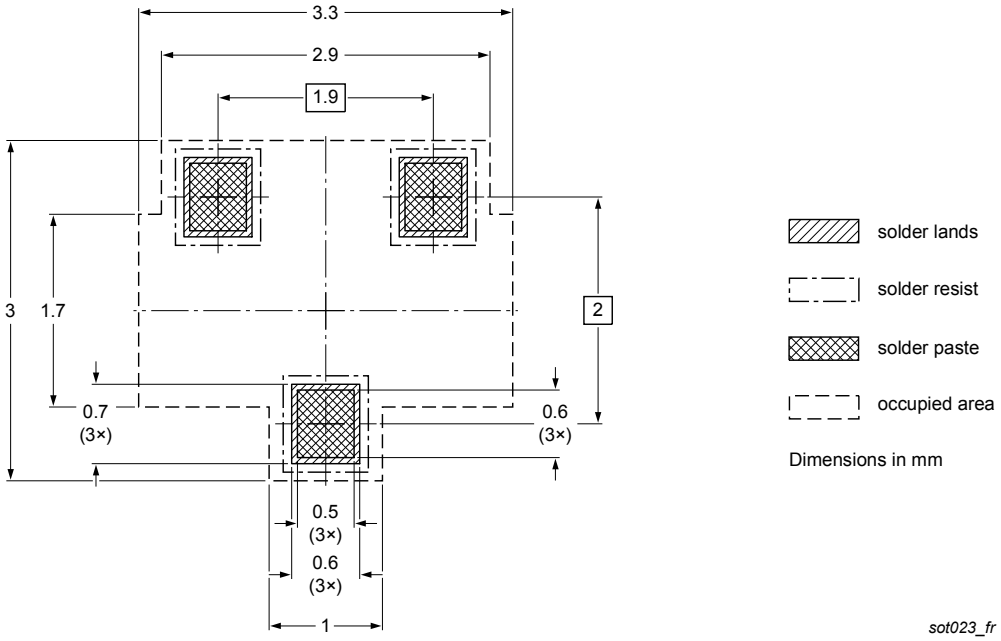

Figure 16. Reflow soldering footprint for SOT23 (TO-236AB)

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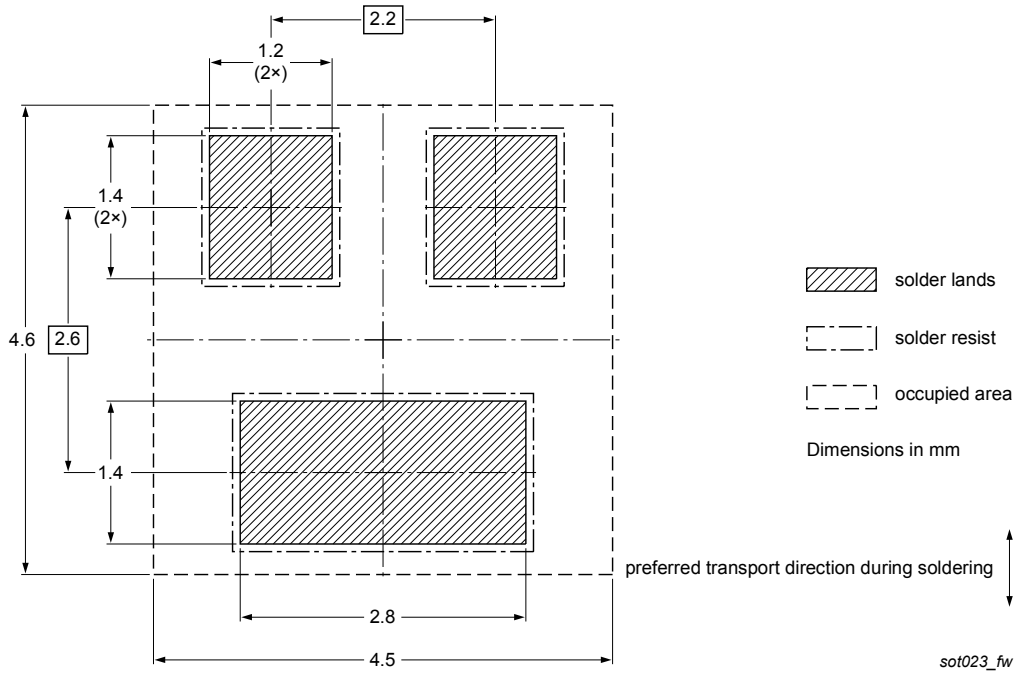

Figure 17. Wave soldering footprint for SOT23 (TO-236AB)

14 Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCW68X_SER v.1	20170421	Product data sheet	-	-

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15 Legal information

15.1 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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BCW68 series

45 V, 800 mA PNP general-purpose transistor

Contents

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Date of release: 21 April 2017
Document identifier: BCW68X_SER

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