



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

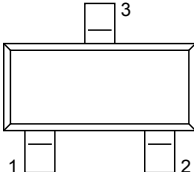
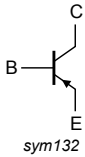
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	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: $t_p \leq 300$ μ s, $\delta \leq 0.02$

5 Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		 sym132
2	E	emitter		
3	C	collector		

6 Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
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

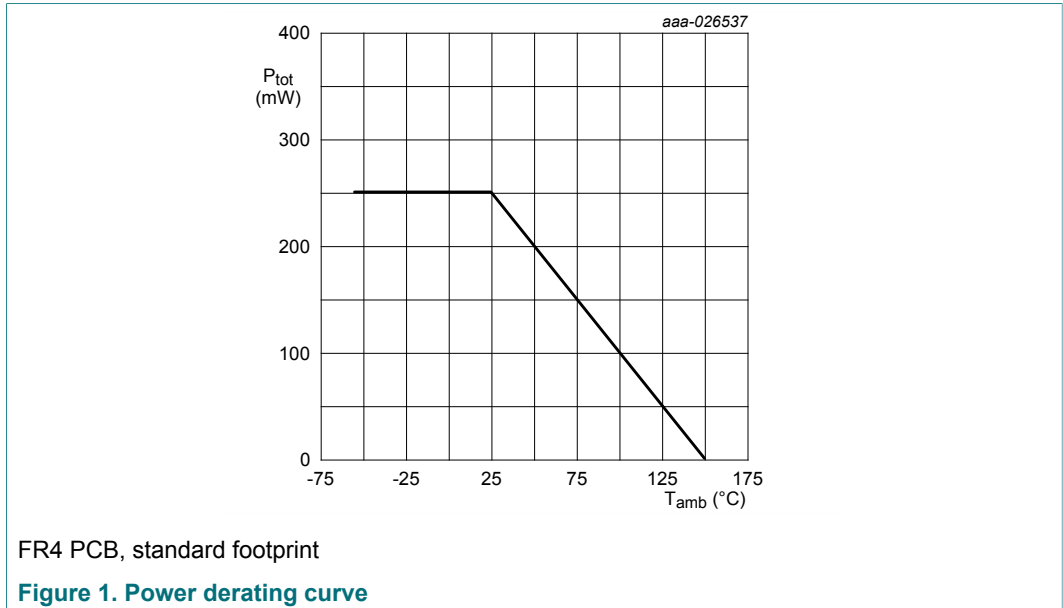
Table 5. Limiting values

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

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.

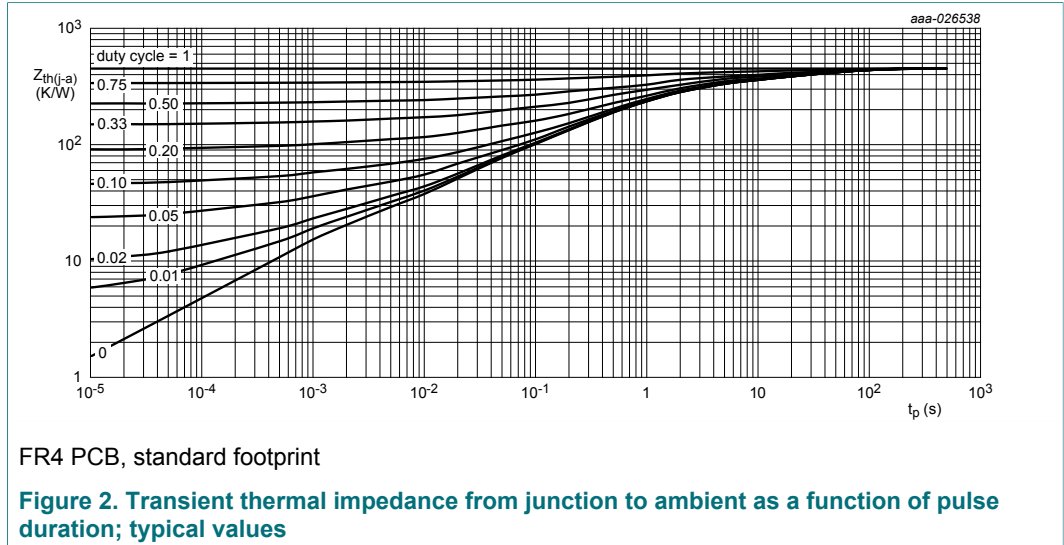


9 Thermal characteristics

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.



10 Electrical characteristics

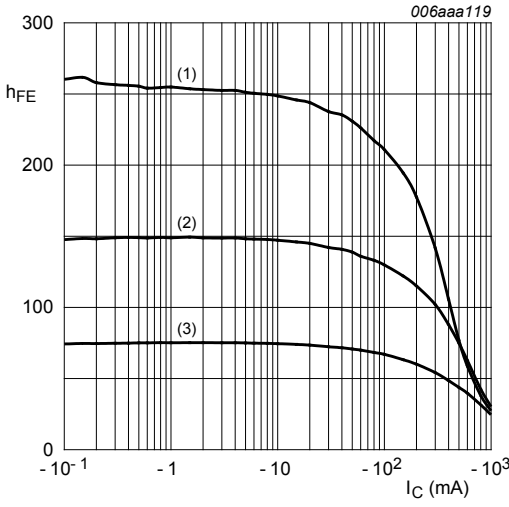
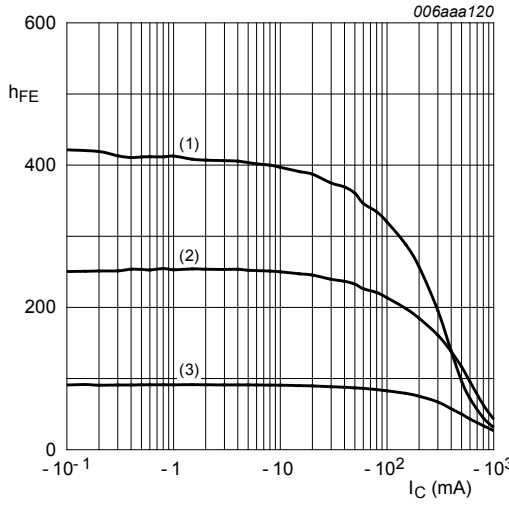
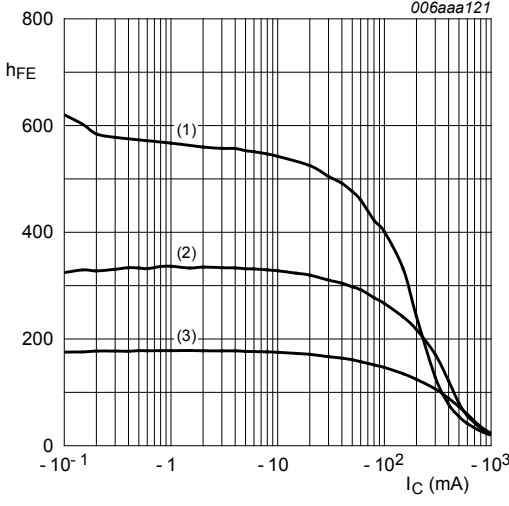
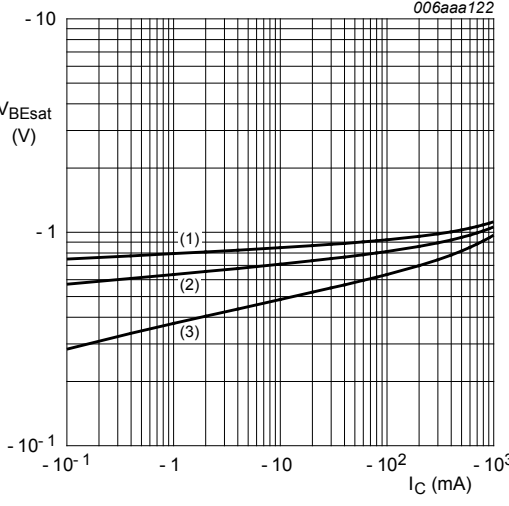
Table 7. Electrical characteristics

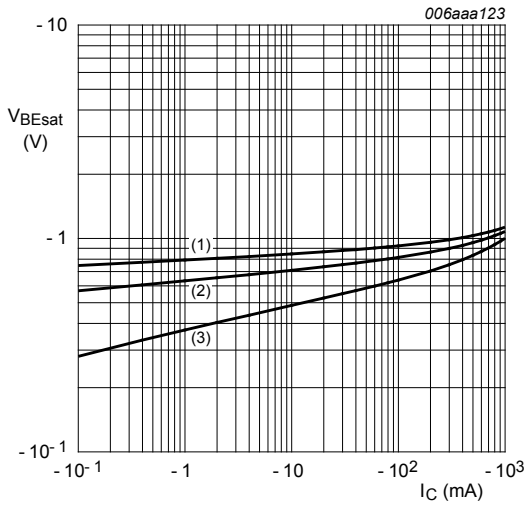
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

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

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

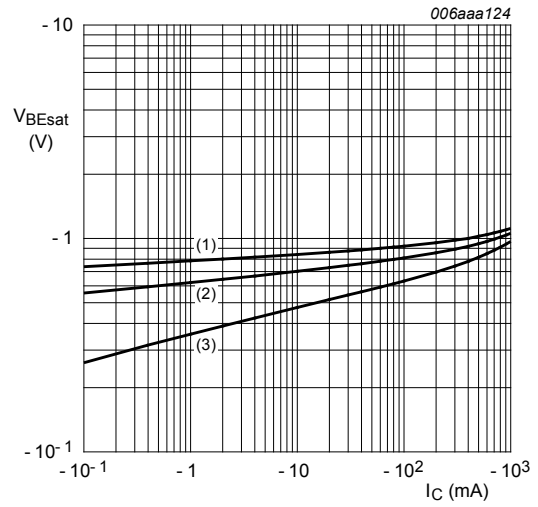
Table 8.

 <p>$V_{CE} = -1 \text{ V}$ (1) $T_{amb} = 150 \text{ }^\circ\text{C}$ (2) $T_{amb} = 25 \text{ }^\circ\text{C}$ (3) $T_{amb} = -55 \text{ }^\circ\text{C}$</p> <p>Figure 3. BCW68F: DC current gain as a function of collector current; typical values</p>	 <p>$V_{CE} = -1 \text{ V}$ (1) $T_{amb} = 150 \text{ }^\circ\text{C}$ (2) $T_{amb} = 25 \text{ }^\circ\text{C}$ (3) $T_{amb} = -55 \text{ }^\circ\text{C}$</p> <p>Figure 4. BCW68G: DC current gain as a function of collector current; typical values</p>
 <p>$V_{CE} = -1 \text{ V}$ (1) $T_{amb} = 150 \text{ }^\circ\text{C}$ (2) $T_{amb} = 25 \text{ }^\circ\text{C}$ (3) $T_{amb} = -55 \text{ }^\circ\text{C}$</p> <p>Figure 5. BCW68H: DC current gain as a function of collector current; typical values</p>	 <p>$I_C/I_B = 10$ (1) $T_{amb} = -55 \text{ }^\circ\text{C}$ (2) $T_{amb} = 25 \text{ }^\circ\text{C}$ (3) $T_{amb} = 150 \text{ }^\circ\text{C}$</p> <p>Figure 6. BCW68F: Base-emitter saturation voltage as a function of collector current; typical values</p>



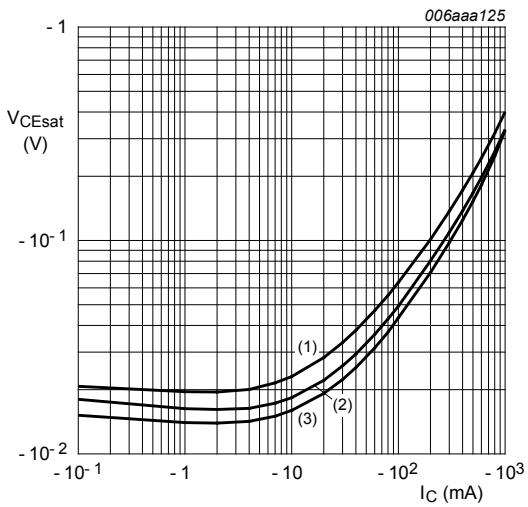
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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



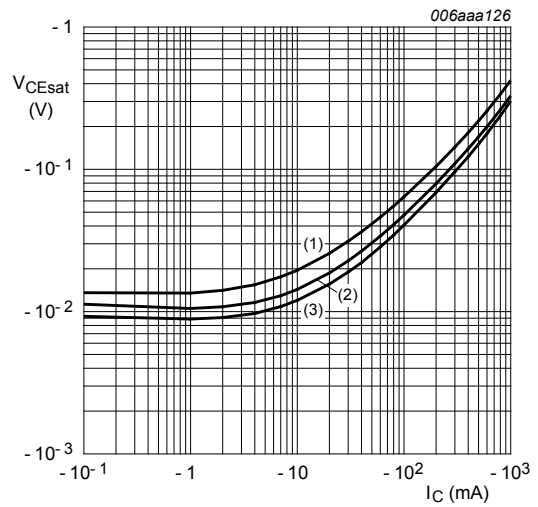
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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



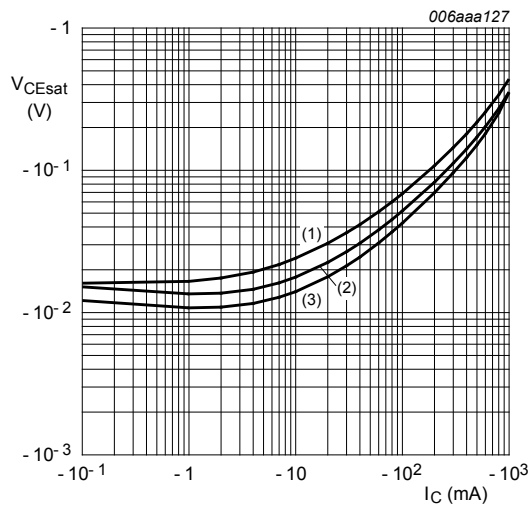
$I_C/I_B = 10$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



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

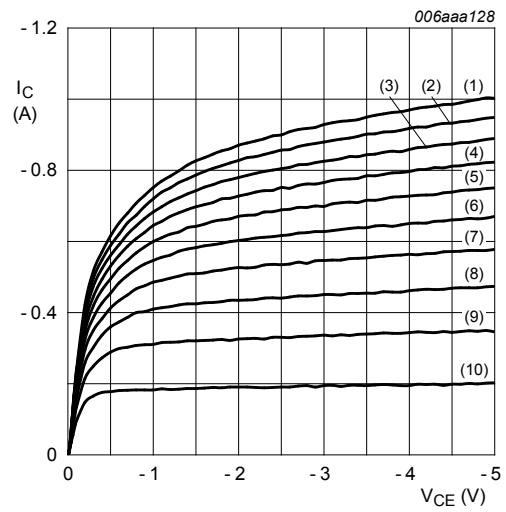
Figure 10. BCW68G: Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 10$

- (1) $T_{amb} = 150\text{ °C}$
- (2) $T_{amb} = 25\text{ °C}$
- (3) $T_{amb} = -55\text{ °C}$

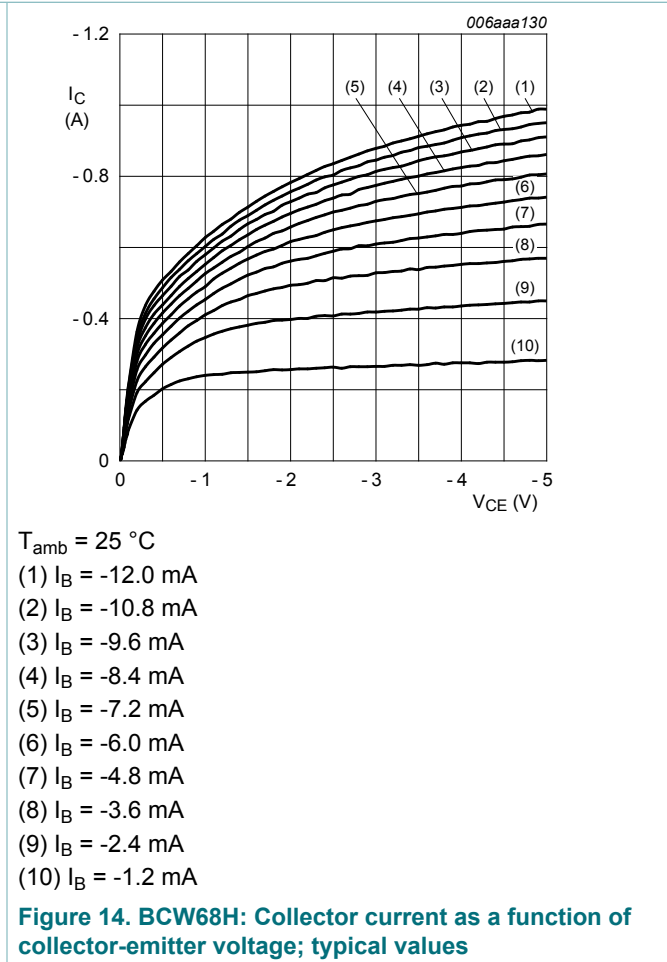
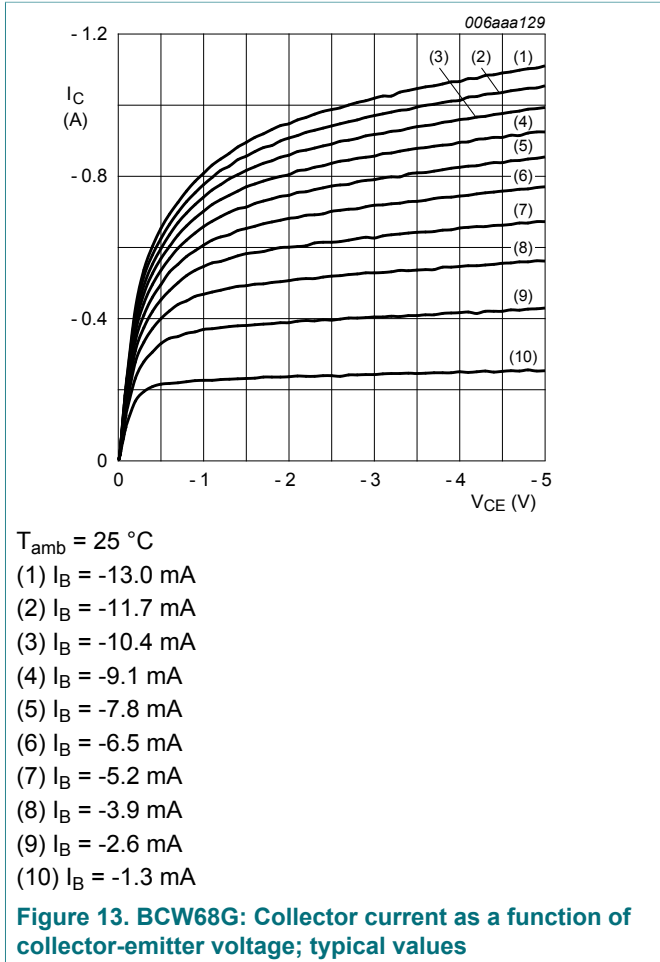
Figure 11. BCW68H: Collector-emitter saturation voltage as a function of collector current; typical values



$T_{amb} = 25\text{ °C}$

- (1) $I_B = -16.0\text{ mA}$
- (2) $I_B = -14.4\text{ mA}$
- (3) $I_B = -12.8\text{ mA}$
- (4) $I_B = -11.2\text{ mA}$
- (5) $I_B = -9.6\text{ mA}$
- (6) $I_B = -8.0\text{ mA}$
- (7) $I_B = -6.4\text{ mA}$
- (8) $I_B = -4.8\text{ mA}$
- (9) $I_B = -3.2\text{ mA}$
- (10) $I_B = -1.6\text{ mA}$

Figure 12. BCW68F: 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.

12 Package outline

Table 9. Package outline

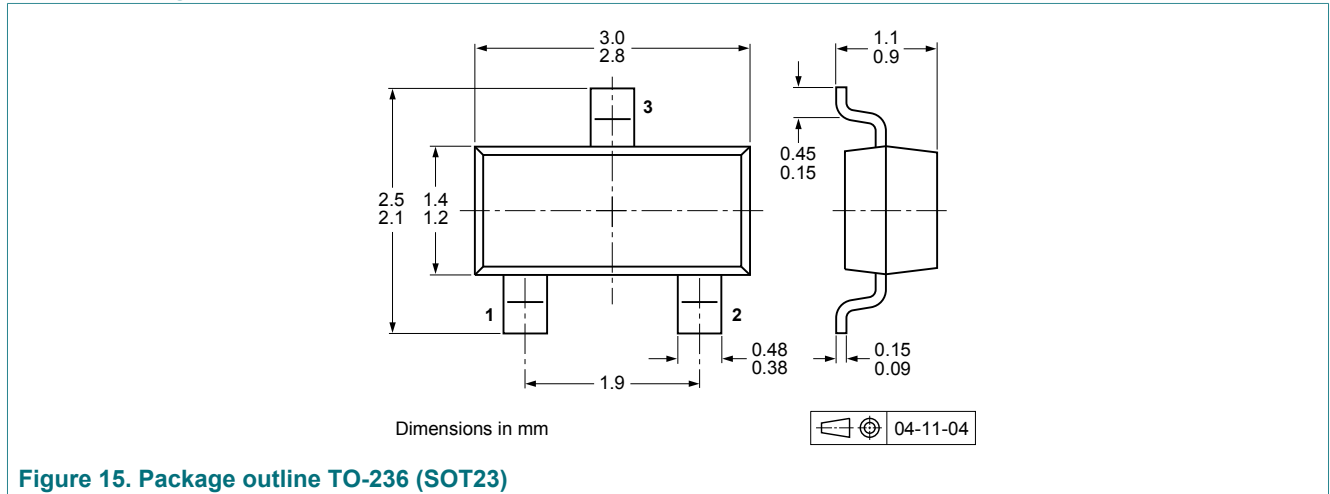


Figure 15. Package outline TO-236 (SOT23)

13 Soldering

Table 10. Soldering

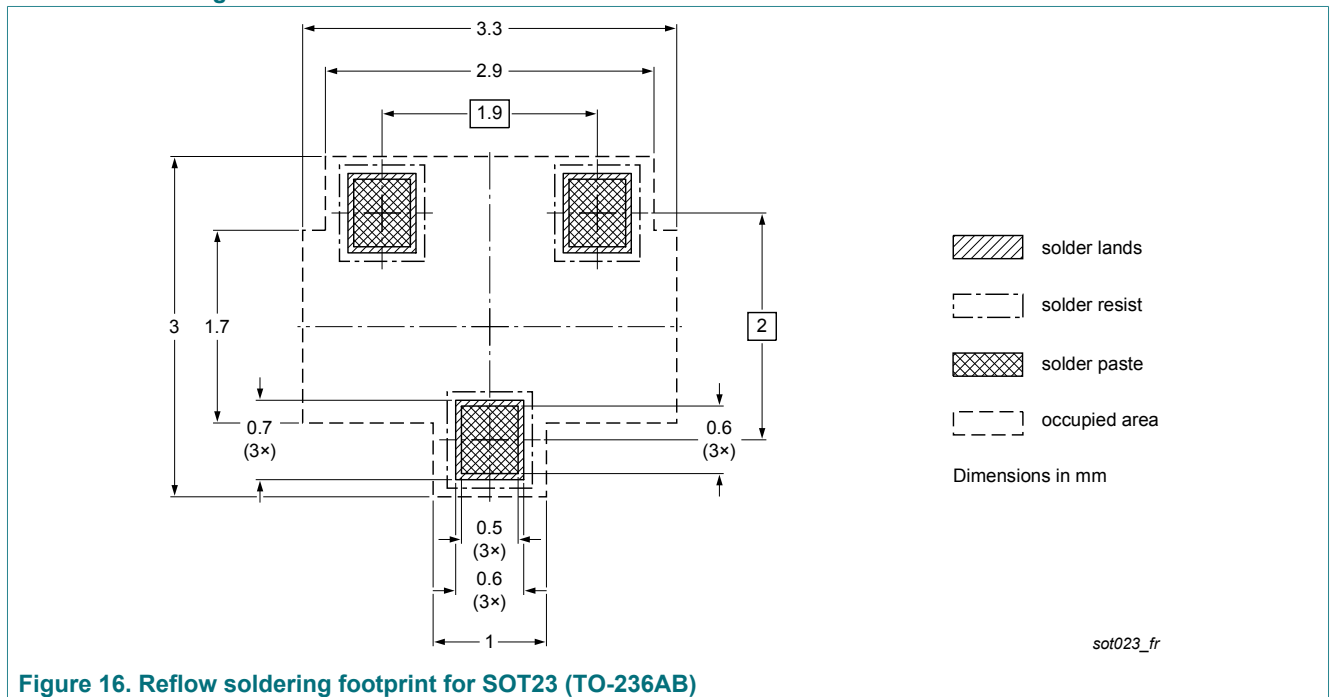
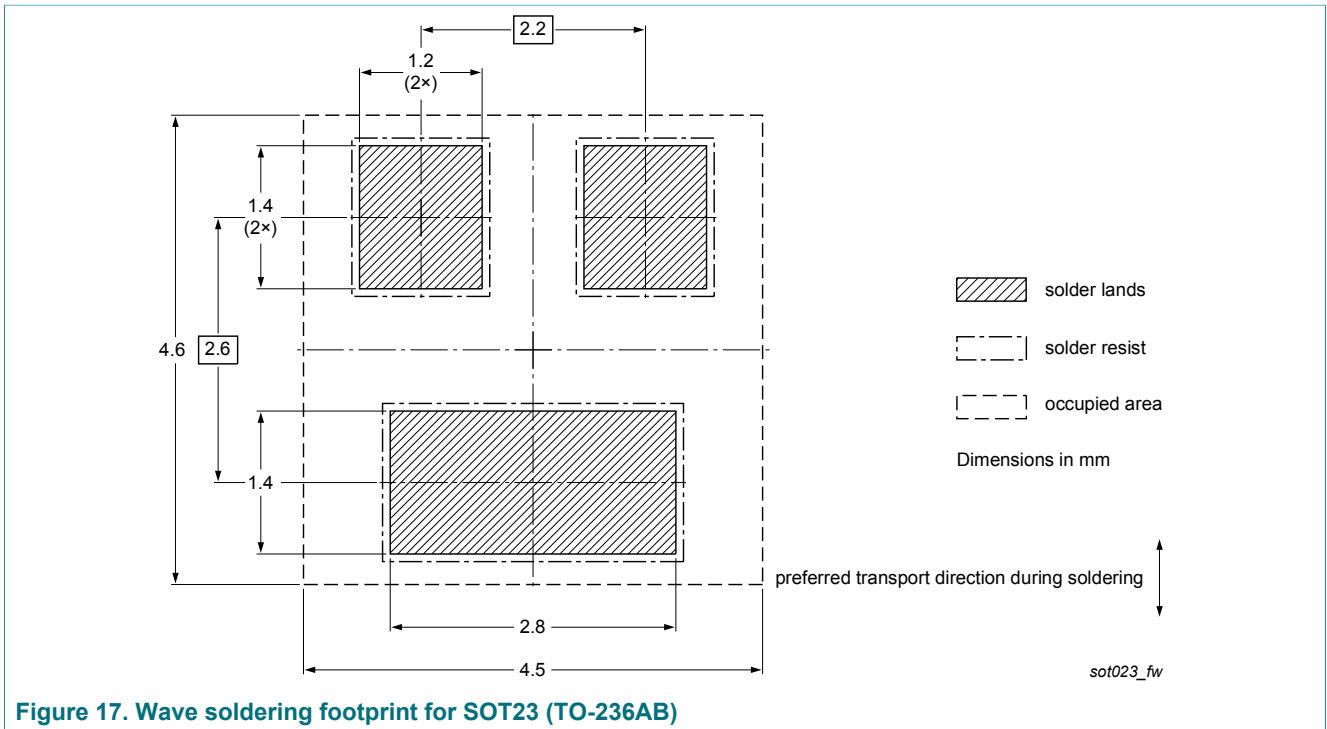


Figure 16. Reflow soldering footprint for SOT23 (TO-236AB)



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	-	-

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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