



# THE DATASHEET OF BCW66FR





# BCW66 series

45 V, 800 mA NPN general-purpose transistor

Rev. 1 — 21 April 2017

Product data sheet

## 1 General description

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

PNP complements: BCW68F/G/H

## 2 Features and benefits

- High current
- AEC-Q101 qualified

## 3 Applications

- General-purpose switching and amplification

## 4 Quick reference data

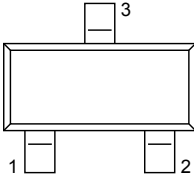
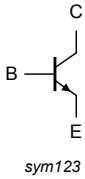
Table 1. Quick reference data

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]				
	BCW66F			100	-	250	
	BCW66G			160	-	400	
	BCW66H			250	-	600	

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

## 5 Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		 sym123
2	E	emitter		
3	C	collector		

## 6 Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BCW66F	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BCW66G			
BCW66H			

## 7 Marking

Table 4. Marking

Type number	Marking code
BCW66F	<sup>[1]</sup> EQ%
BCW66G	<sup>[1]</sup> ER%
BCW66H	<sup>[1]</sup> ES%

[1] % = placeholder for manufacturing site code

## 8 Limiting values

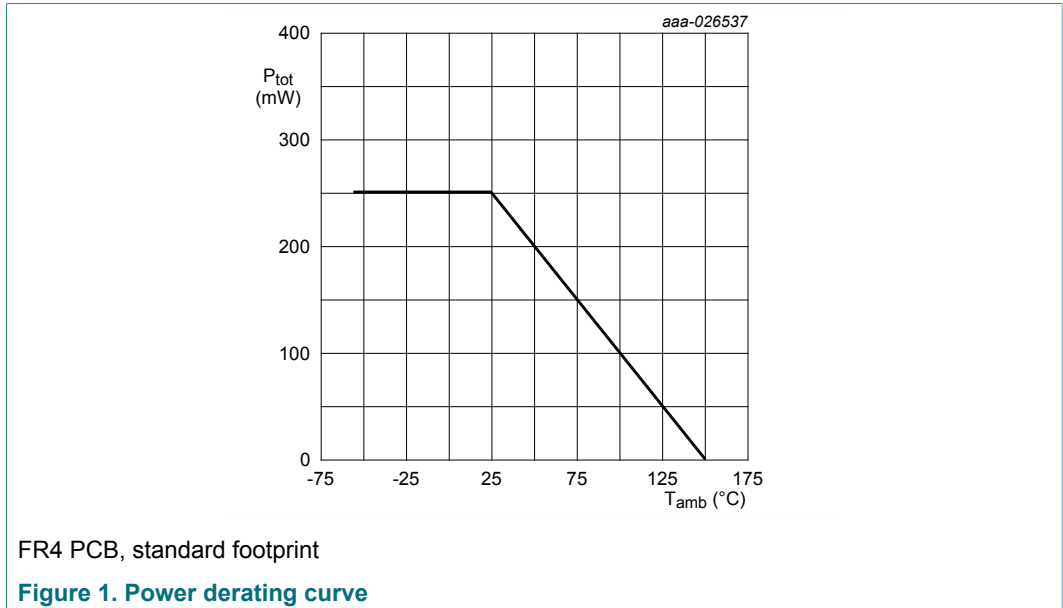
Table 5. Limiting values

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.

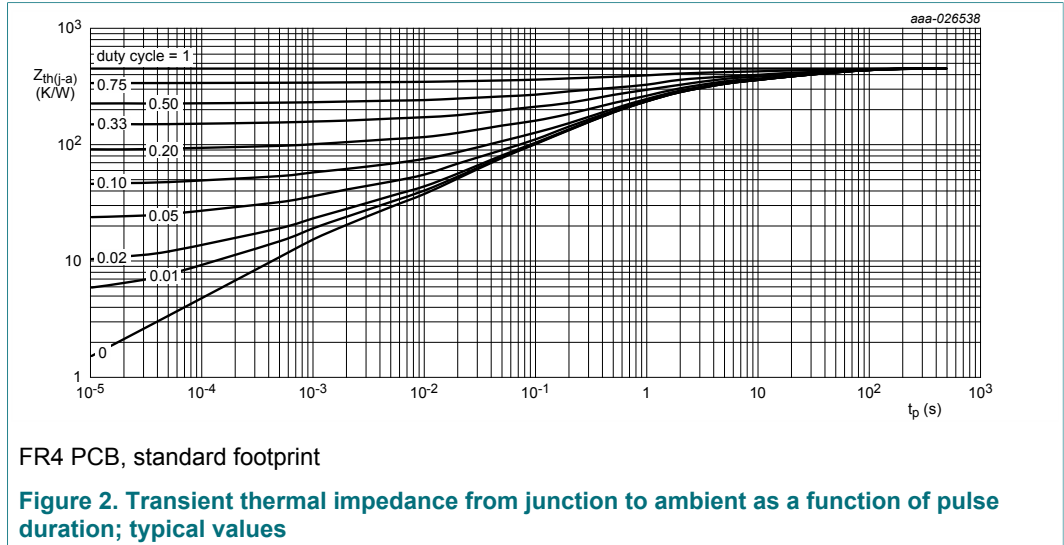


## 9 Thermal characteristics

**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

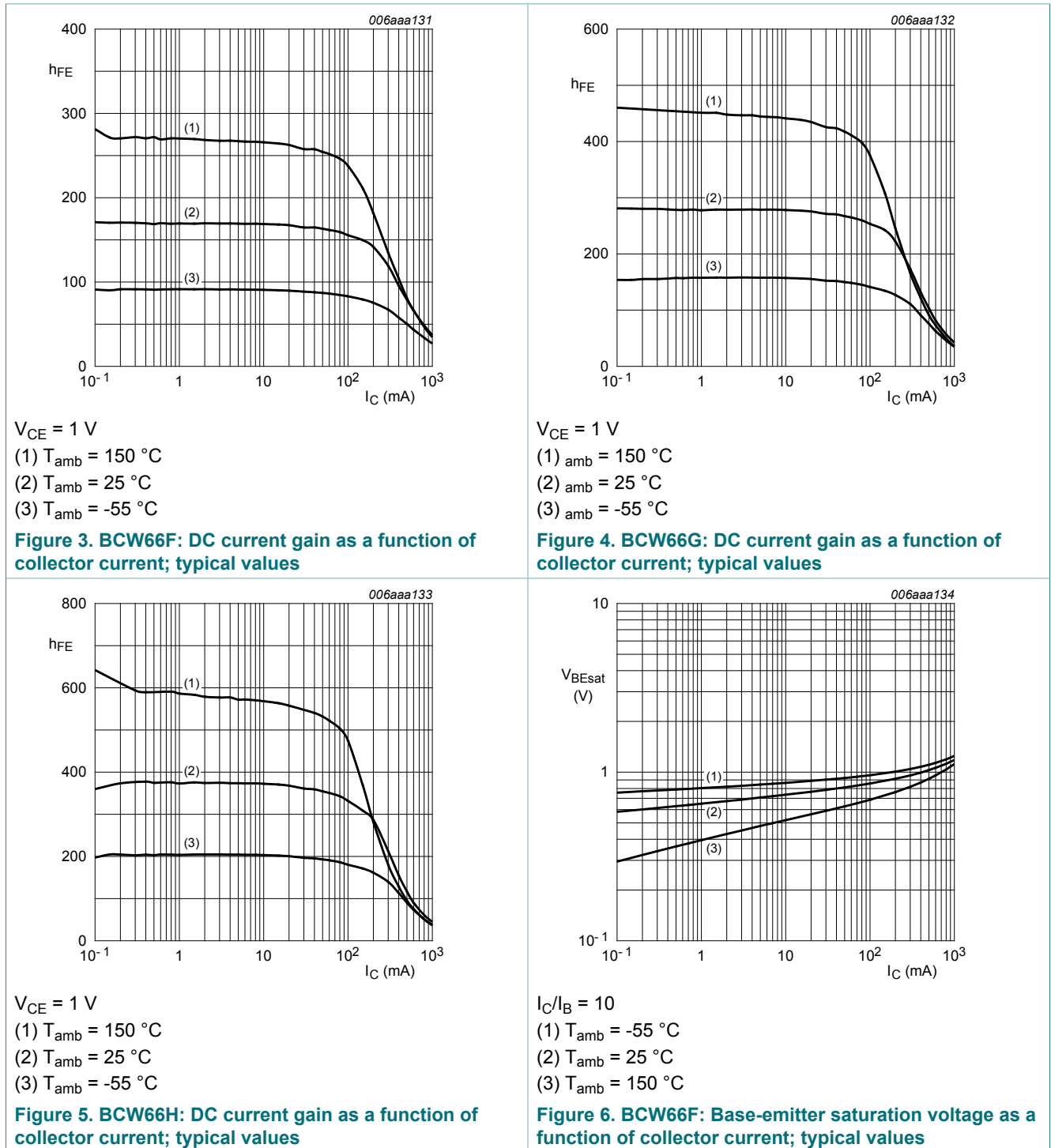
**Table 7. Electrical characteristics**

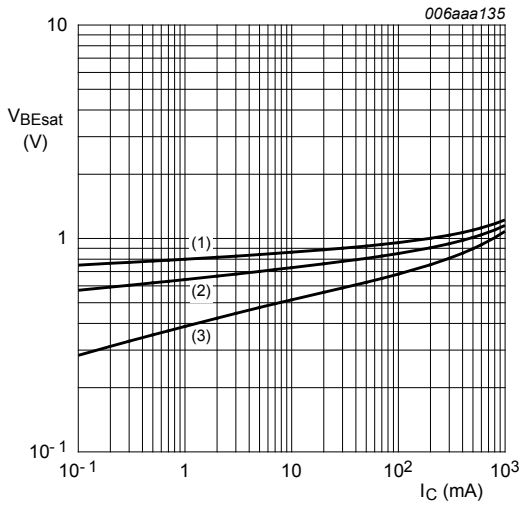
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

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	$\mu\text{A}$	
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	20	nA	
$h_{FE}$	DC current gain						
	BCW66F/G/H	$V_{CE} = 1\text{ V}; I_C = 100\text{ }\mu\text{A}$	75	-	-		
	BCW66F/G/H	$V_{CE} = 1\text{ V}; I_C = 1\text{ mA}$	75	-	-		
	BCW66F/G/H	$V_{CE} = 1\text{ V}; I_C = 10\text{ mA}$	75	-	-		
	BCW66F	$V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$	[1]	100	-	250	
	BCW66G		[1]	160	-	400	
	BCW66H		[1]	250	-	630	
BCW66F/G/H	$V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$	[1]	40	-	-		
$V_{CEsat}$	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	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	100	-	-	MHz	
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0\text{ A}; f = 1\text{ MHz}$	-	3	-	pF	

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

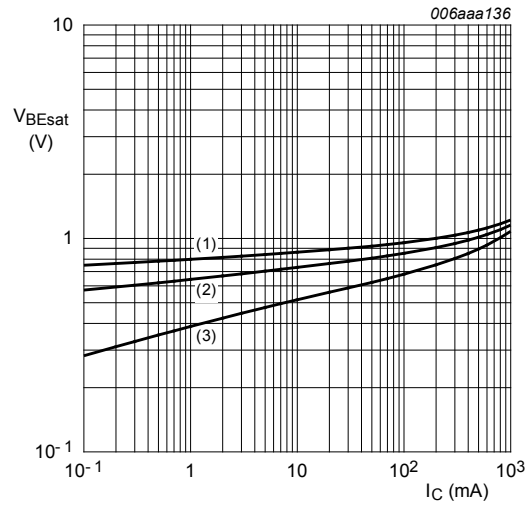
Table 8.





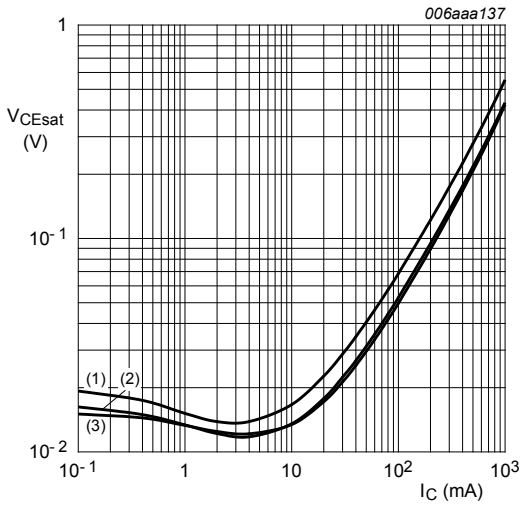
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Figure 7. BCW66G: Base-emitter saturation voltage as a function of collector current; typical values**



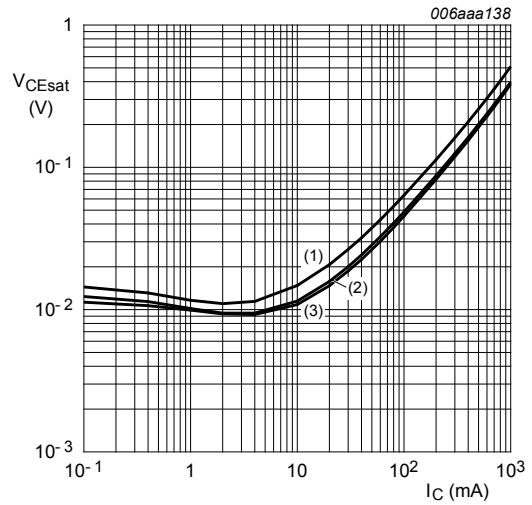
$I_C/I_B = 10$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Figure 8. BCW66H: Base-emitter saturation voltage as a function of collector current; typical values**



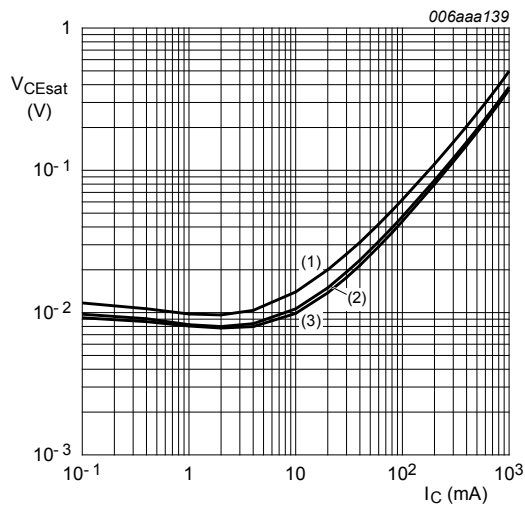
$I_C/I_B = 10$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Figure 9. BCW66F: 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)  $T_{amb} = -55\text{ °C}$

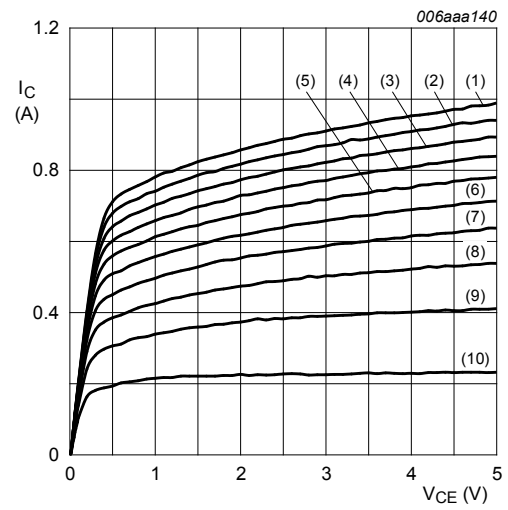
**Figure 10. BCW66G: Collector-emitter saturation voltage as a function of collector current; typical values**



$I_C/I_B = 10$

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

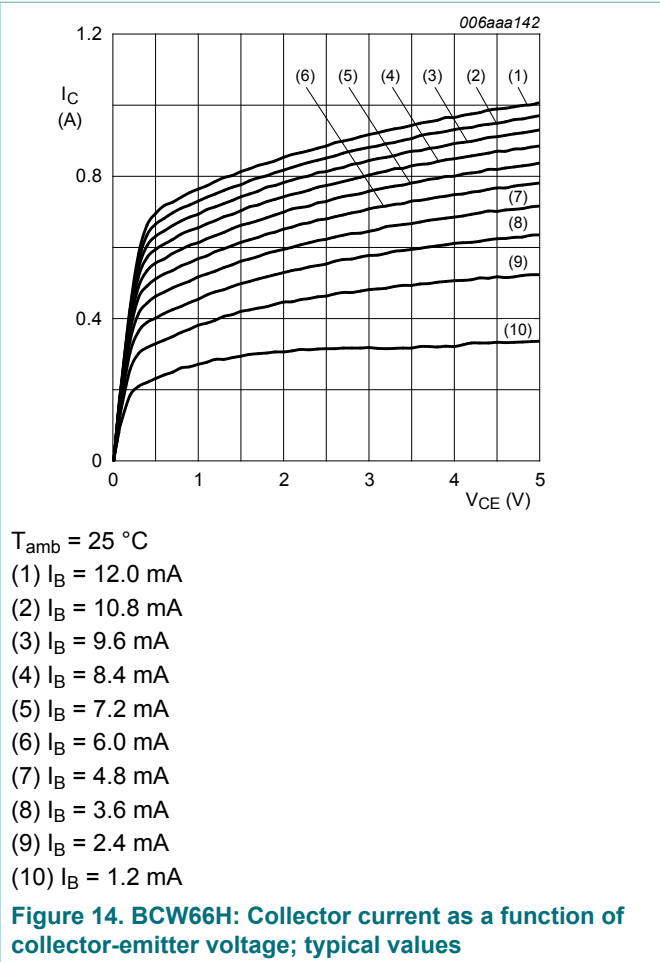
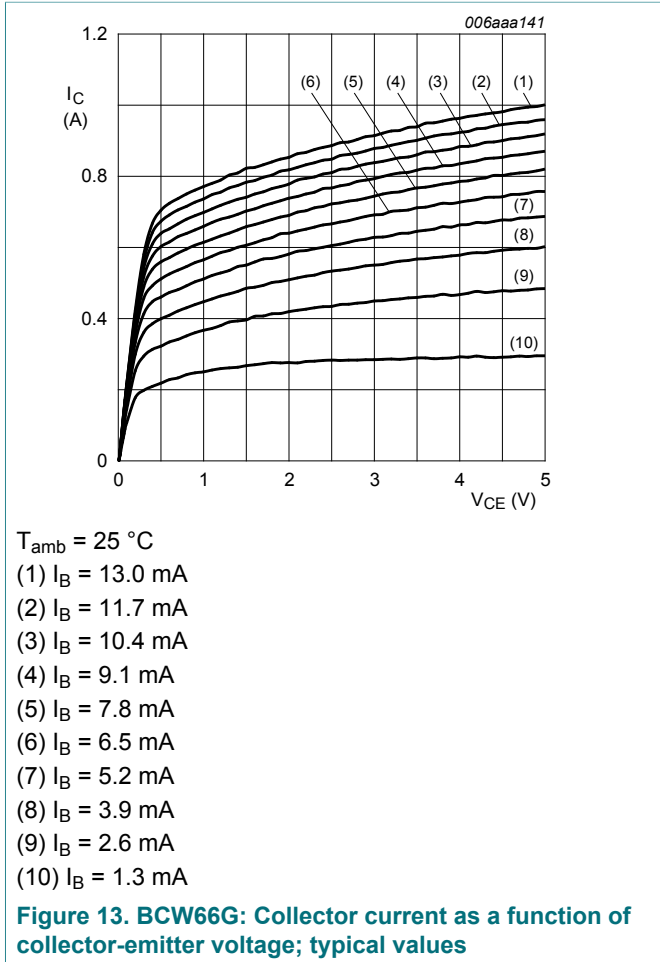
**Figure 11. BCW66H: Collector-emitter saturation voltage as a function of collector current; typical values**



$T_{amb} = 25\text{ °C}$

- (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. BCW66F: 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

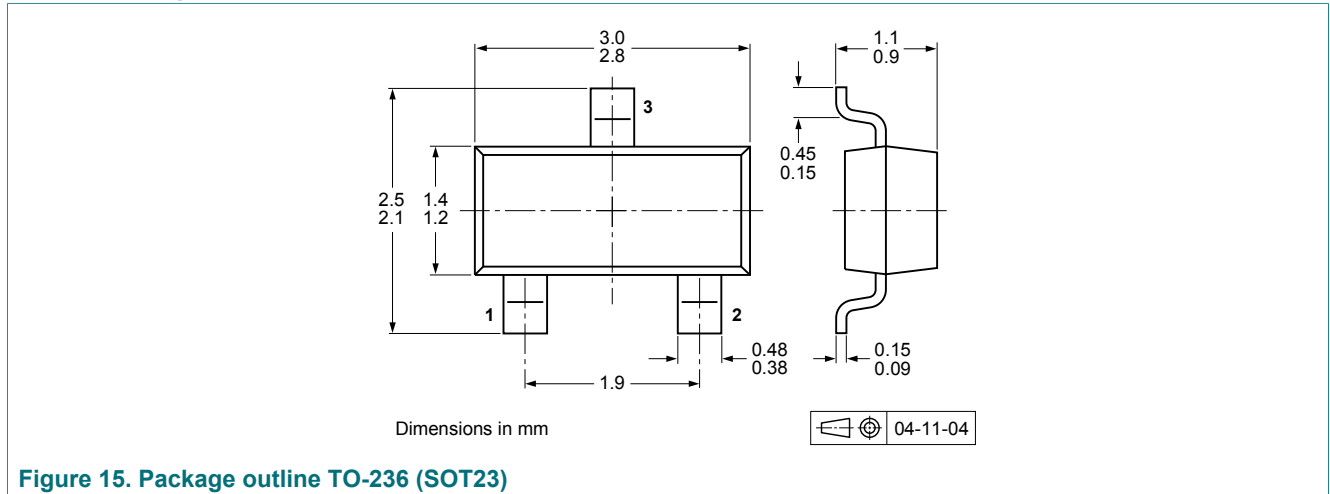


Figure 15. Package outline TO-236 (SOT23)

## 13 Soldering

Table 10. Soldering

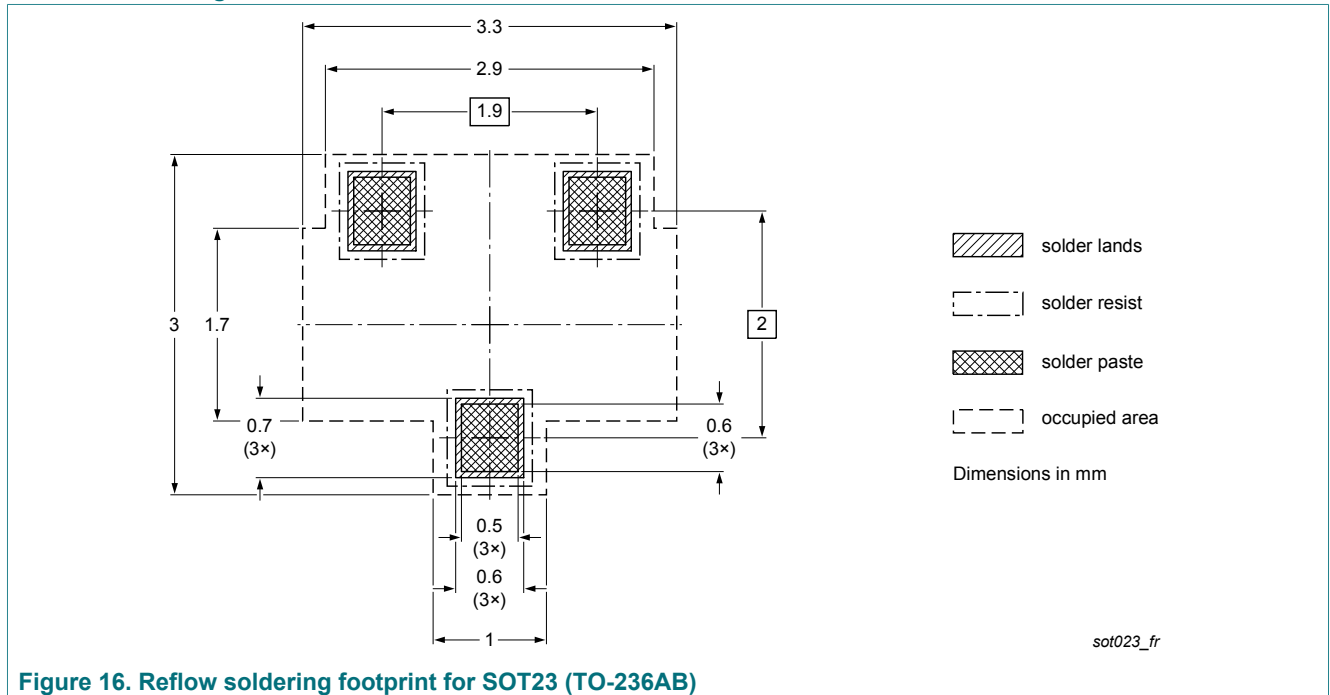
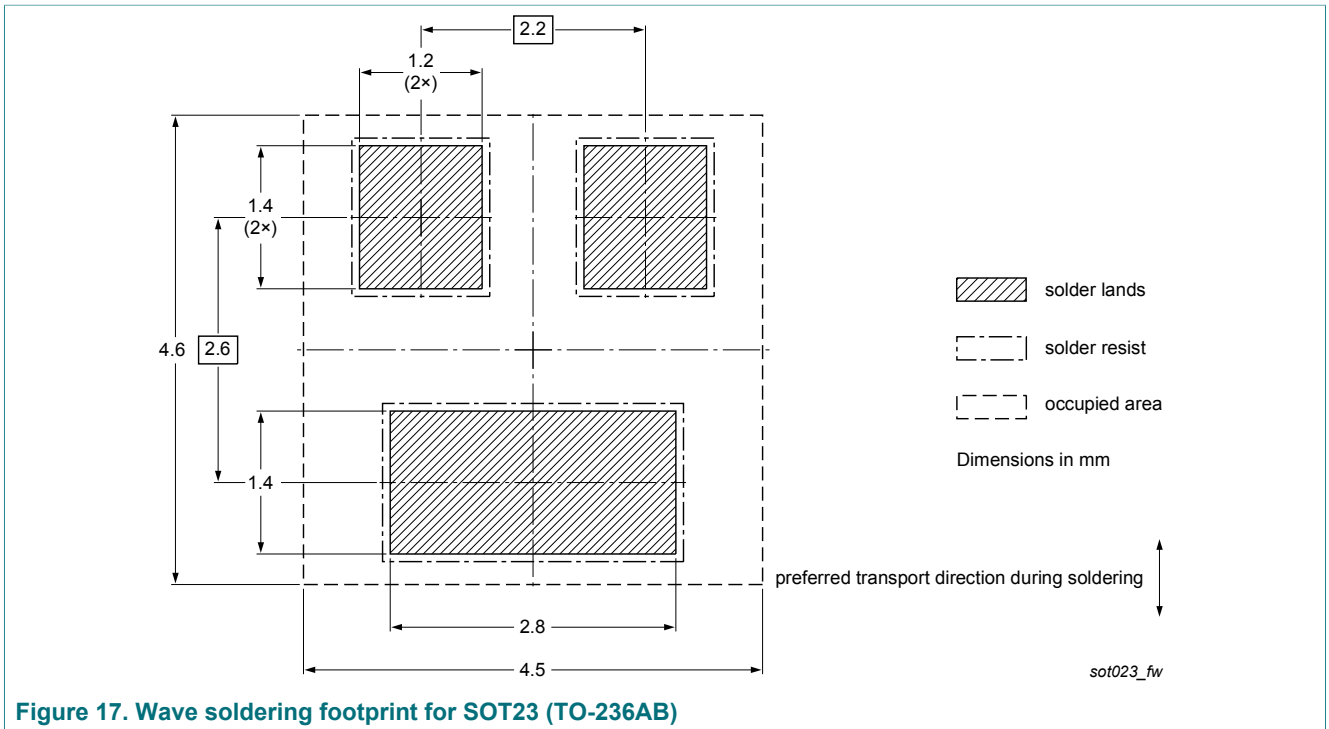


Figure 16. Reflow soldering footprint for SOT23 (TO-236AB)



## 14 Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BCW66x_SER v.1	21 April 2017	Product data sheet	-	-

## 15 Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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