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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

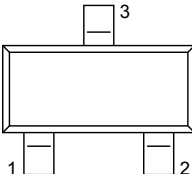
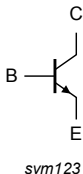
Table 1. Quick reference data

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: $t_p \leq 300$ μ 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		
	Name	Description	Version
BCW66F	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BCW66G			
BCW66H			

7 Marking

Table 4. Marking

Type number	Marking code
BCW66F	[1] EQ%
BCW66G	[1] ER%
BCW66H	[1] ES%

[1] % = placeholder for manufacturing site code

8 Limiting values

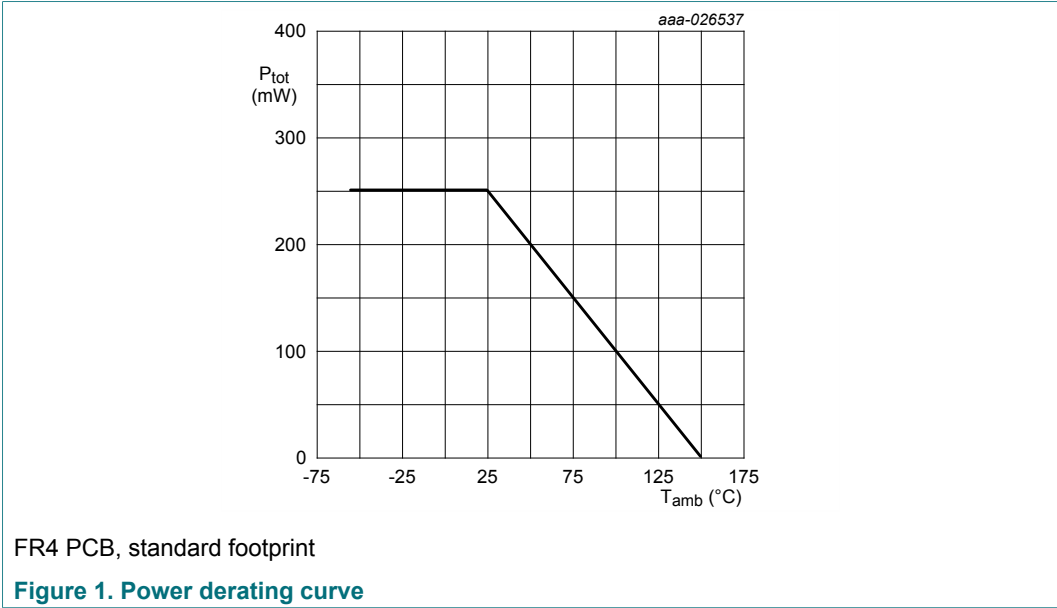
Table 5. Limiting values

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 ≤ 1 ms	-	200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 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.

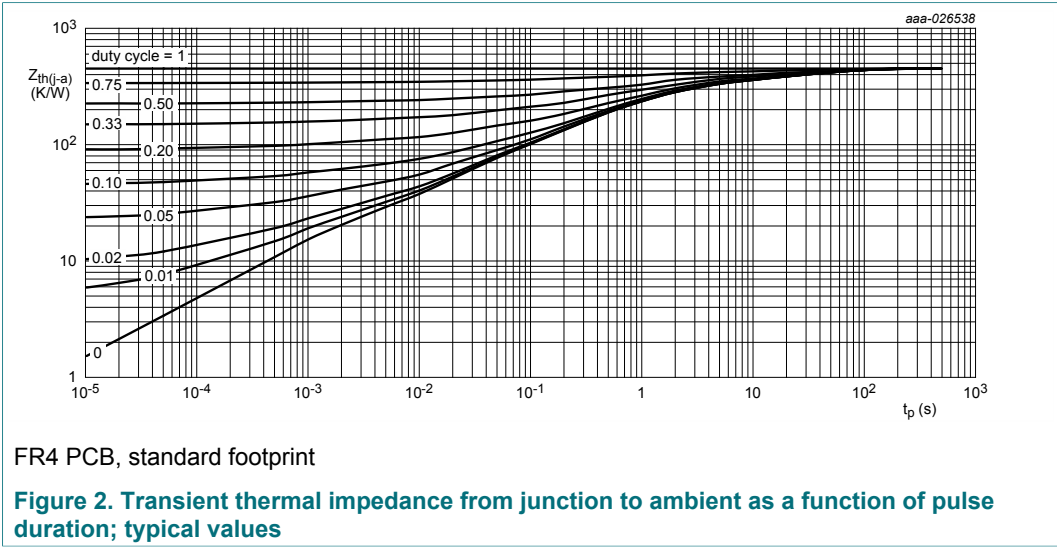


9 Thermal characteristics

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

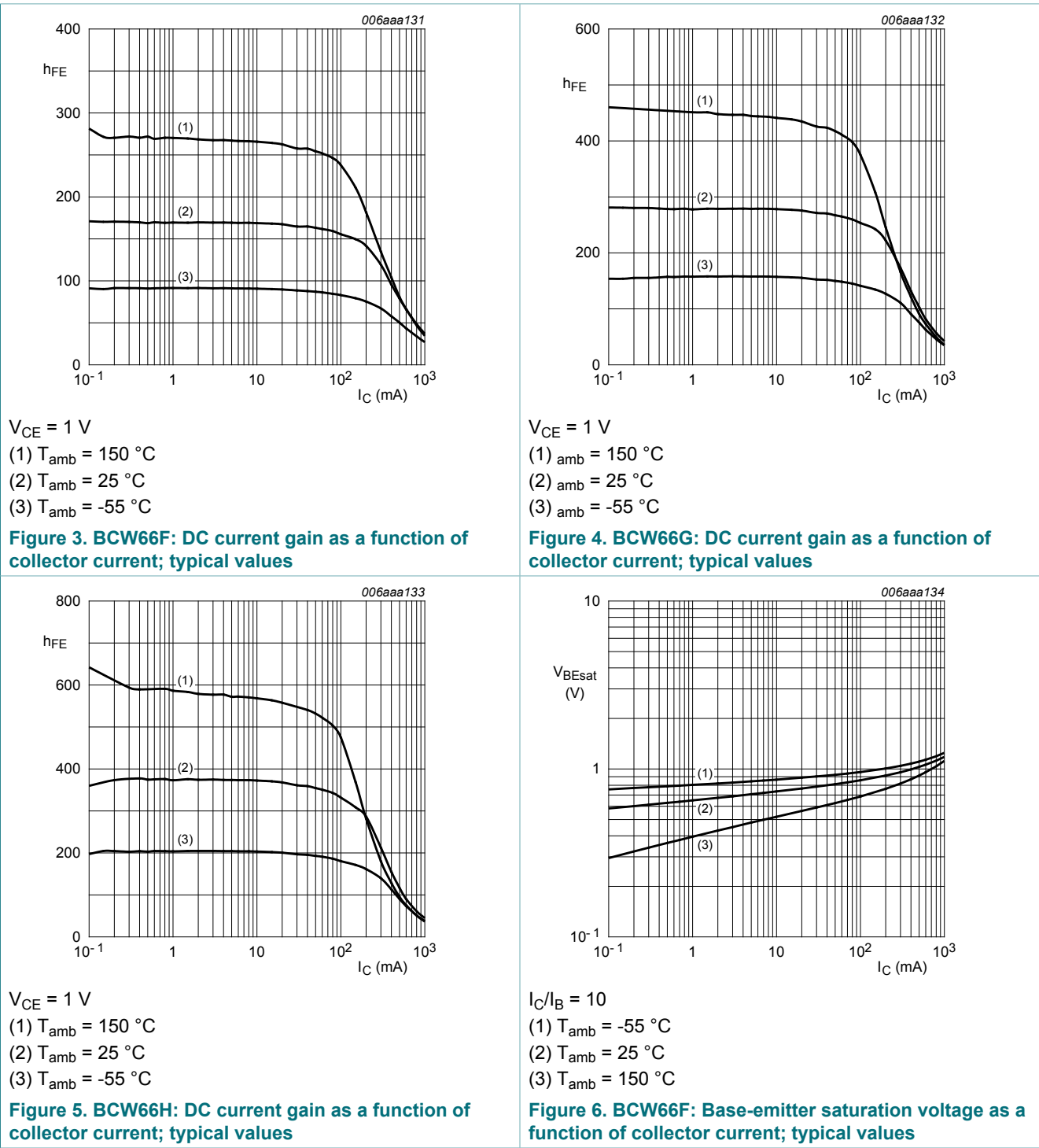
Table 7. Electrical characteristics

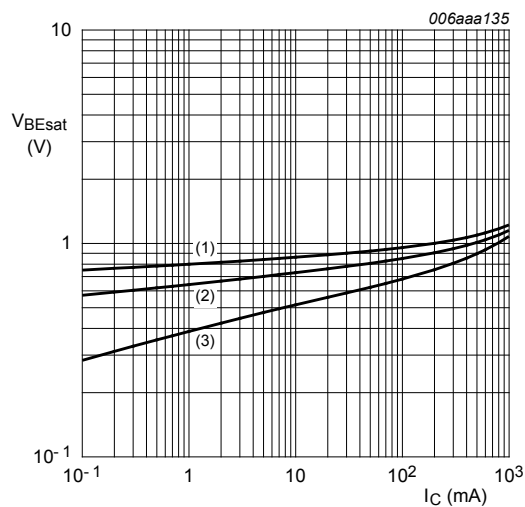
T_{amb} = 25 °C unless otherwise specified.

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						
	BCW66F/G/H	V _{CE} = 1 V; I _C = 100 μA		75	-	-	
	BCW66F/G/H	V _{CE} = 1 V; I _C = 1 mA		75	-	-	
	BCW66F/G/H	V _{CE} = 1 V; I _C = 10 mA		75	-	-	
	BCW66F	V _{CE} = 1 V; I _C = 100 mA	[1]	100	-	250	
	BCW66G		[1]	160	-	400	
	BCW66H		[1]	250	-	630	
V _{CEsat}	collector-emitter saturation voltage	V _{CE} = 1 V; I _C = 500 mA	[1]	40	-	-	
		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		100	-	-	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = I _e = 0 A; f = 1 MHz		-	3	-	pF

[1] pulsed; t_p ≤ 300 μs; δ ≤ 0.02

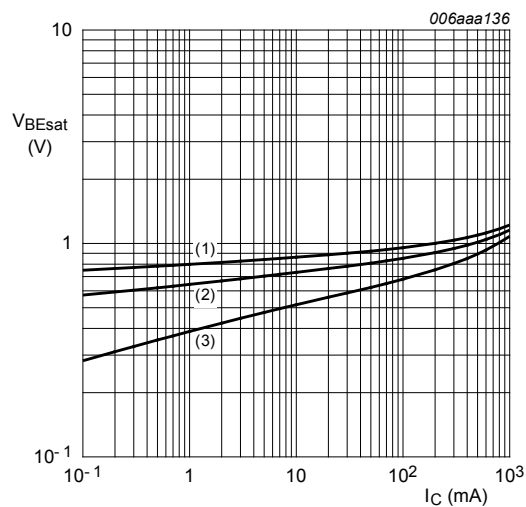
Table 8.





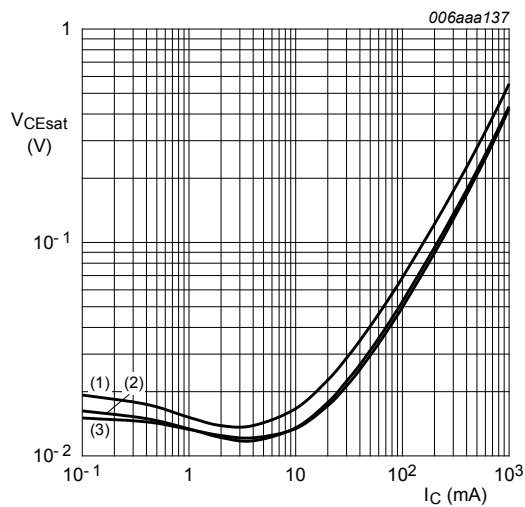
$I_C/I_B = 10$
(1) $T_{amb} = -55\text{ °C}$
(2) $T_{amb} = 25\text{ °C}$
(3) $T_{amb} = 150\text{ °C}$

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



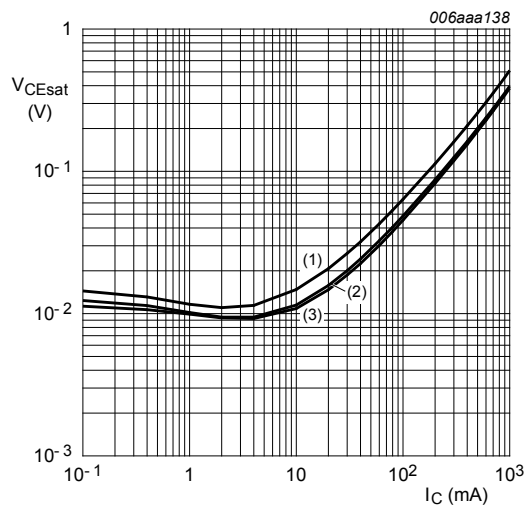
$I_C/I_B = 10$
(1) $T_{amb} = -55\text{ °C}$
(2) $T_{amb} = 25\text{ °C}$
(3) $T_{amb} = 150\text{ °C}$

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



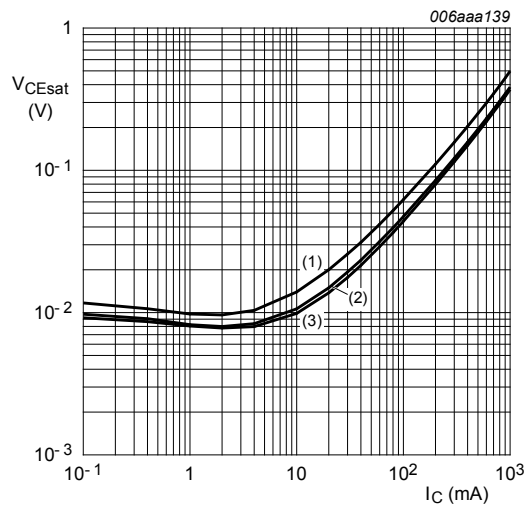
$I_C/I_B = 10$
(1) $T_{amb} = 150\text{ °C}$
(2) $T_{amb} = 25\text{ °C}$
(3) $T_{amb} = -55\text{ °C}$

Figure 9. BCW66F: Collector-emitter saturation voltage as a function of collector current; typical values



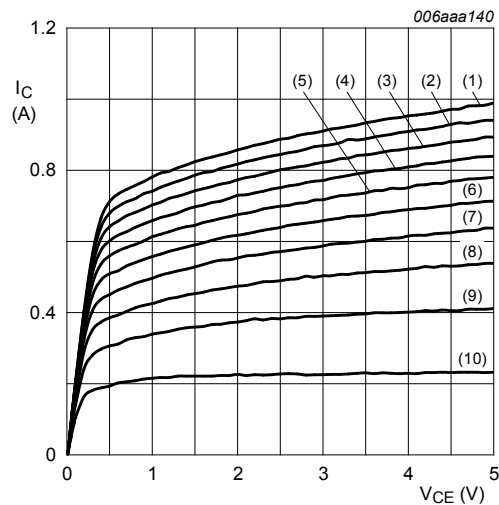
$I_C/I_B = 10$
(1) $T_{amb} = 150\text{ °C}$
(2) $T_{amb} = 25\text{ °C}$
(3) $T_{amb} = -55\text{ °C}$

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



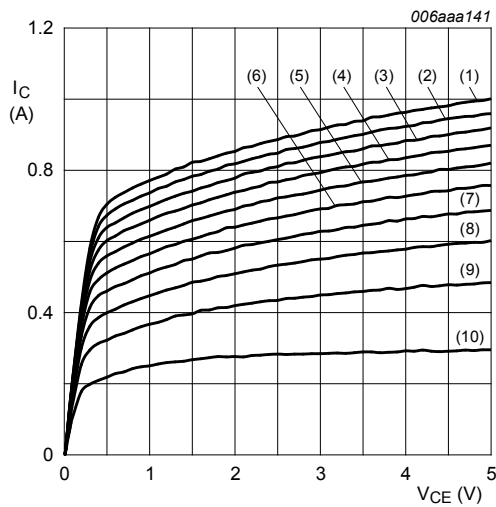
- $I_C/I_B = 10$
(1) $T_{amb} = 150\text{ °C}$
(2) $T_{amb} = 25\text{ °C}$
(3) $T_{amb} = -55\text{ °C}$

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) $I_B = 1.6\text{ mA}$

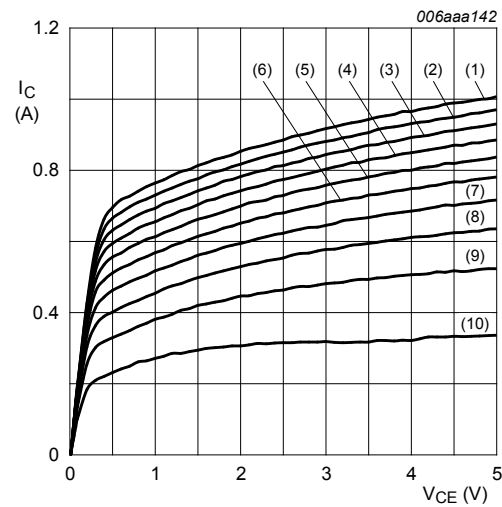
Figure 12. BCW66F: Collector current as a function of collector-emitter voltage; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$

- (1) $I_B = 13.0\text{ mA}$
- (2) $I_B = 11.7\text{ mA}$
- (3) $I_B = 10.4\text{ mA}$
- (4) $I_B = 9.1\text{ mA}$
- (5) $I_B = 7.8\text{ mA}$
- (6) $I_B = 6.5\text{ mA}$
- (7) $I_B = 5.2\text{ mA}$
- (8) $I_B = 3.9\text{ mA}$
- (9) $I_B = 2.6\text{ mA}$
- (10) $I_B = 1.3\text{ mA}$

Figure 13. BCW66G: Collector current as a function of collector-emitter voltage; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$

- (1) $I_B = 12.0\text{ mA}$
- (2) $I_B = 10.8\text{ mA}$
- (3) $I_B = 9.6\text{ mA}$
- (4) $I_B = 8.4\text{ mA}$
- (5) $I_B = 7.2\text{ mA}$
- (6) $I_B = 6.0\text{ mA}$
- (7) $I_B = 4.8\text{ mA}$
- (8) $I_B = 3.6\text{ mA}$
- (9) $I_B = 2.4\text{ mA}$
- (10) $I_B = 1.2\text{ mA}$

Figure 14. BCW66H: Collector current as a function of collector-emitter voltage; typical values

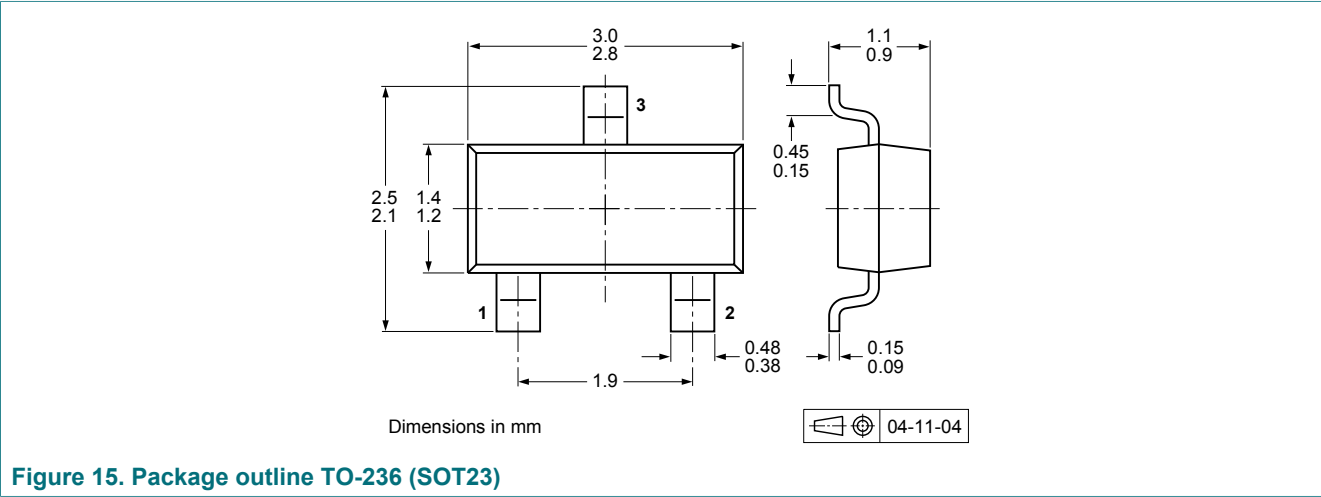
11 Test information

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.

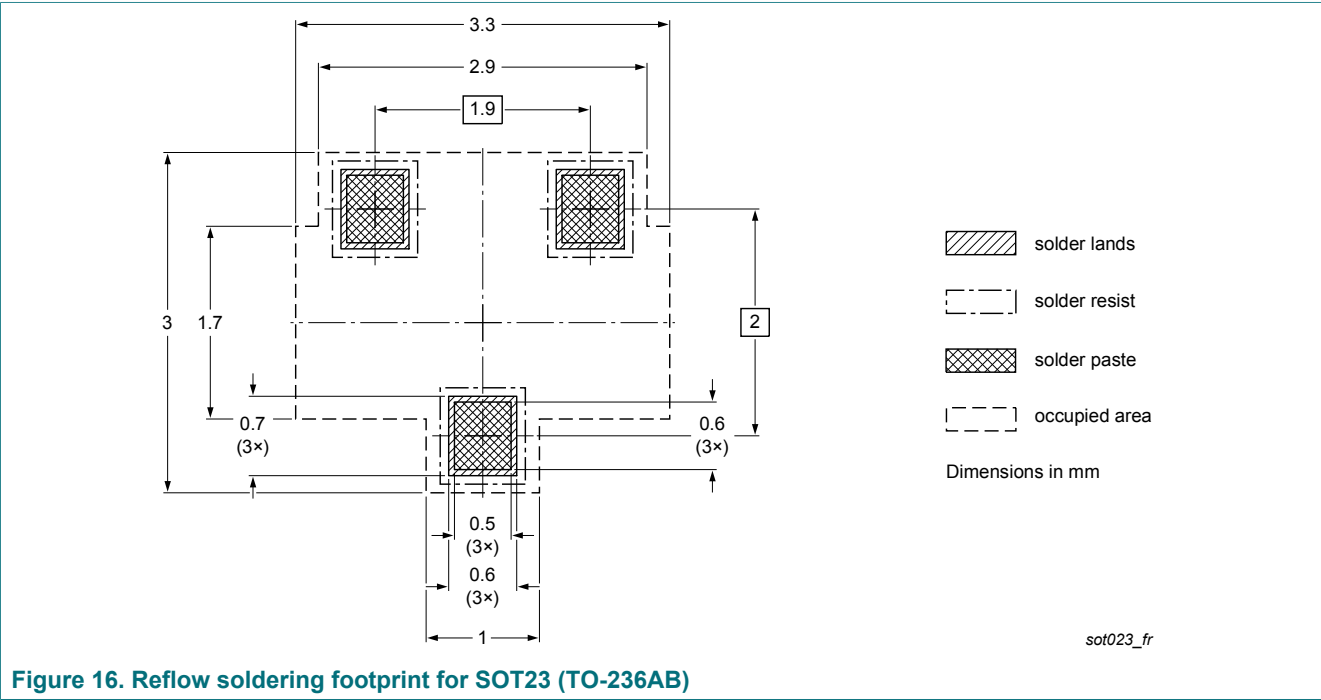
12 Package outline

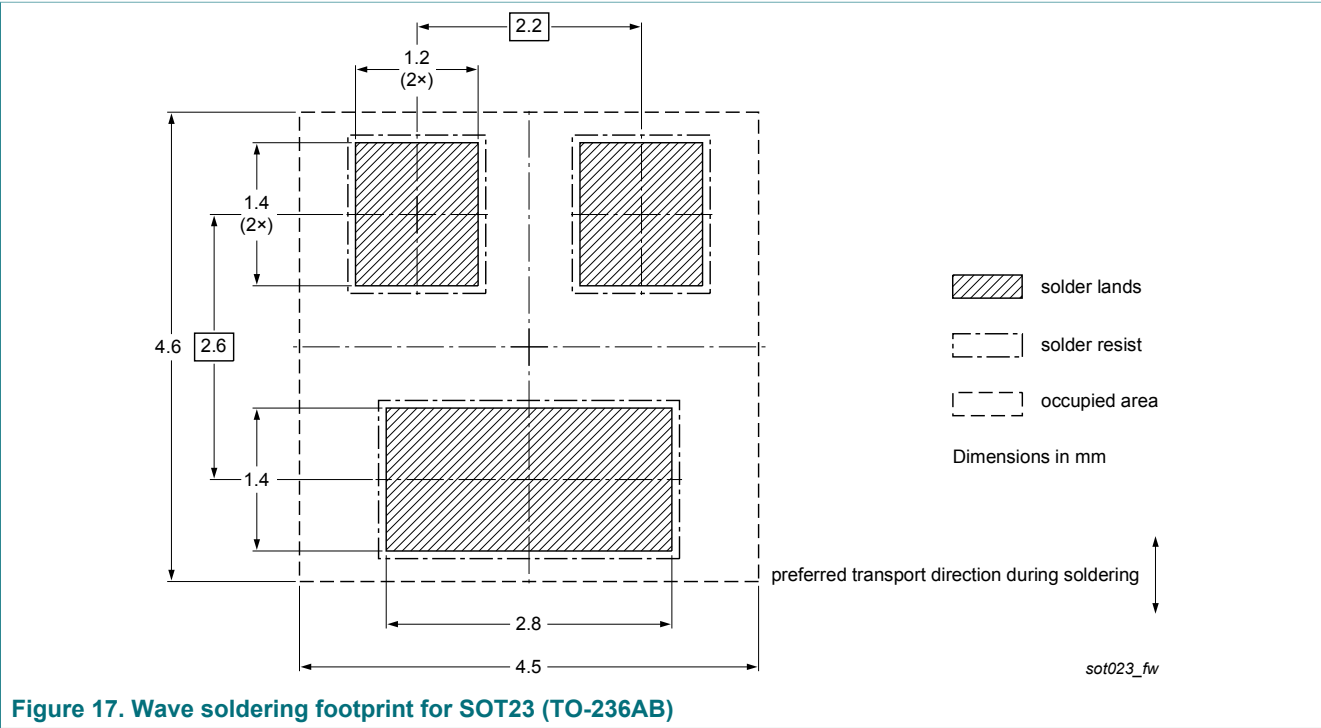
Table 9. Package outline



13 Soldering

Table 10. Soldering





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 ^{[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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