Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

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

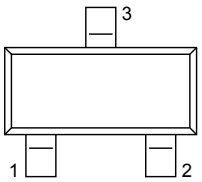
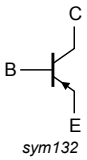
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-45	V
I_C	collector current			-	-	-800	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	-	-1	A
h_{FE}	DC current gain	V_{CE} = -1 V; I_C = -100 mA; T_{amb} = 25 °C	[1]				
	BCW68F			100	-	250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

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

nexperia

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

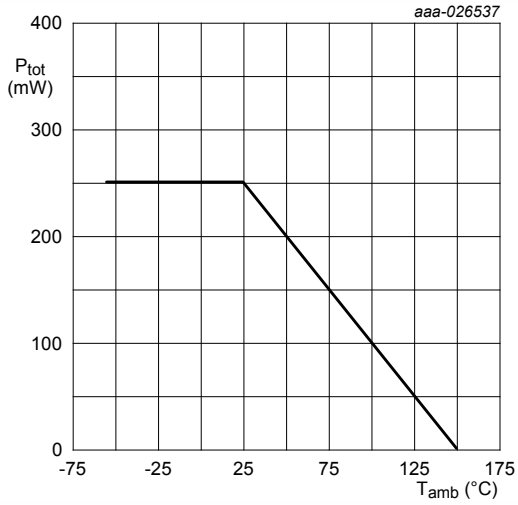
Table 5. Limiting values

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

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

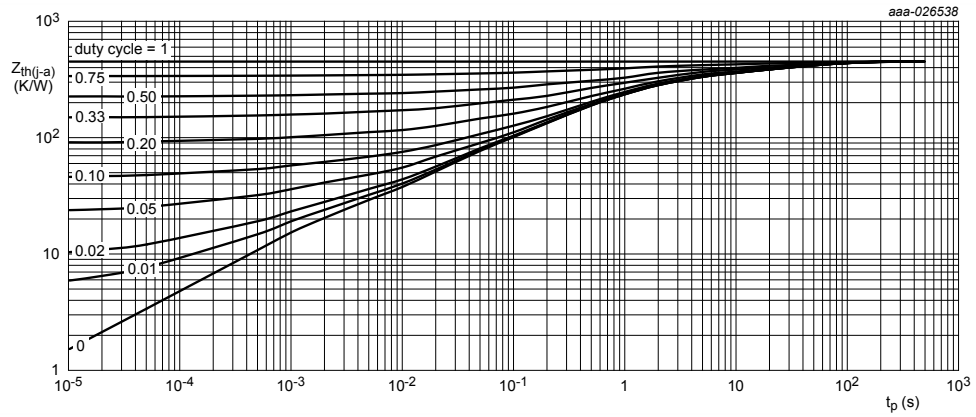
Figure 1. Power derating curve

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.



FR4 PCB, standard footprint

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

10 Electrical characteristics

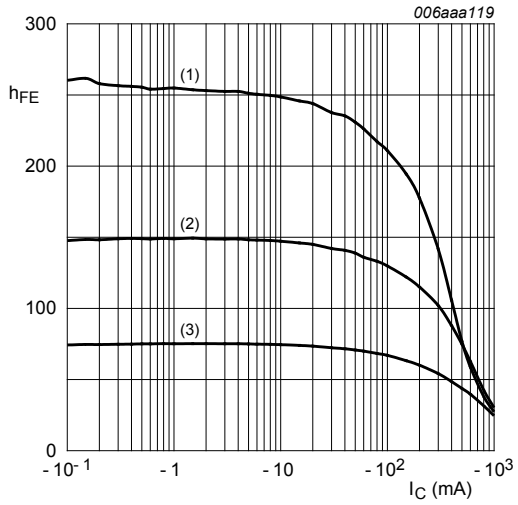
Table 7. Electrical characteristics

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

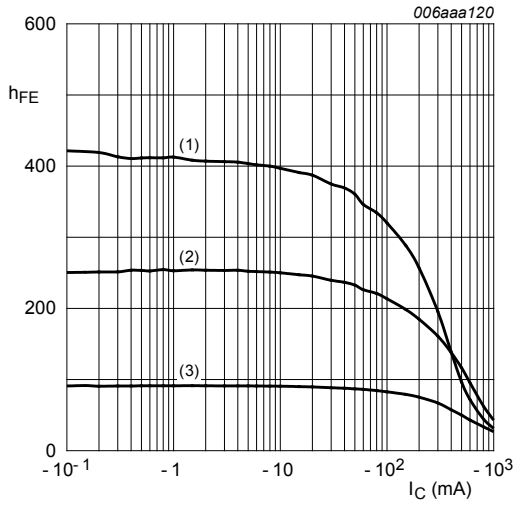
[1] pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02

Table 8.



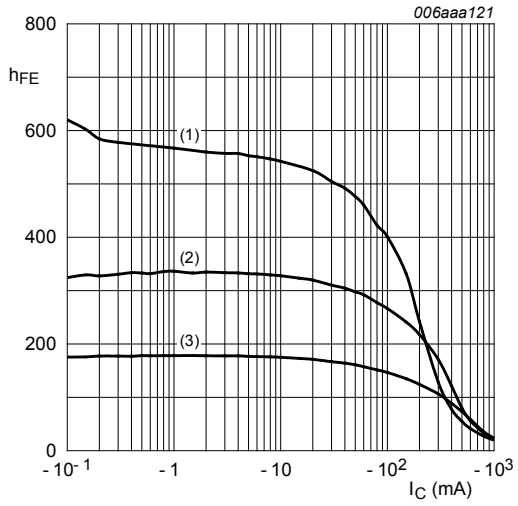
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



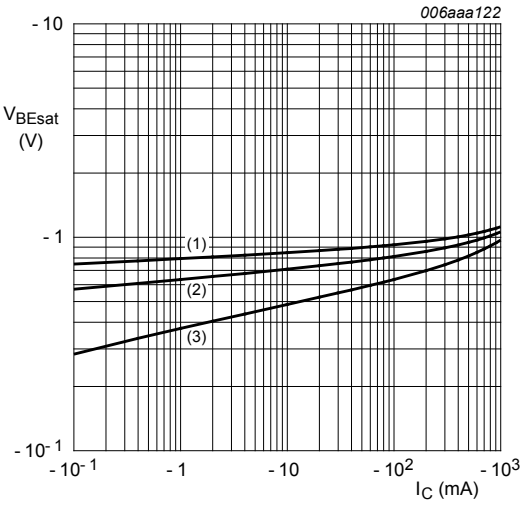
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



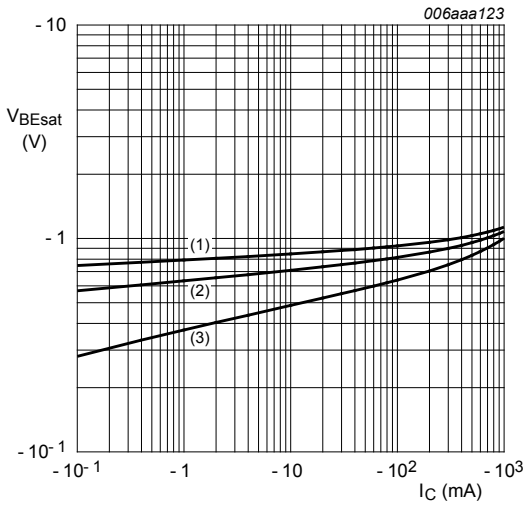
V_{CE} = -1 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



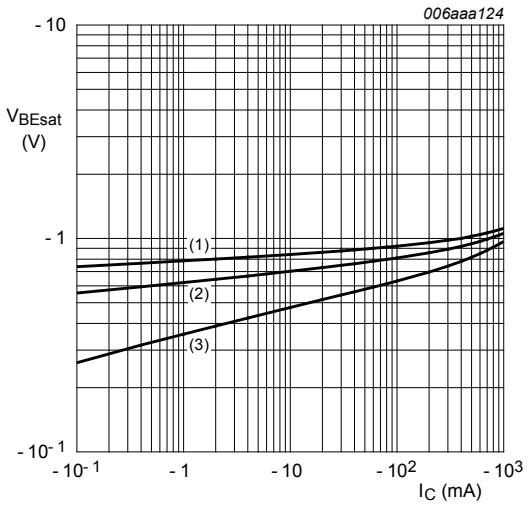
I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



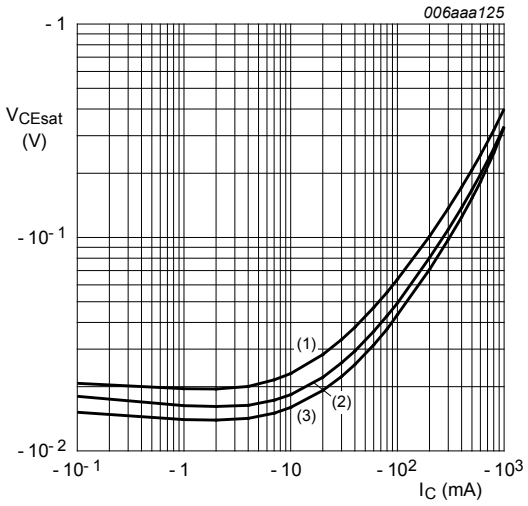
I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



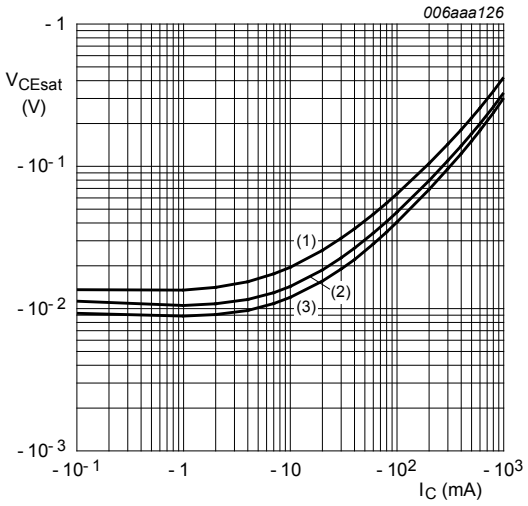
I_C/I_B= 10
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



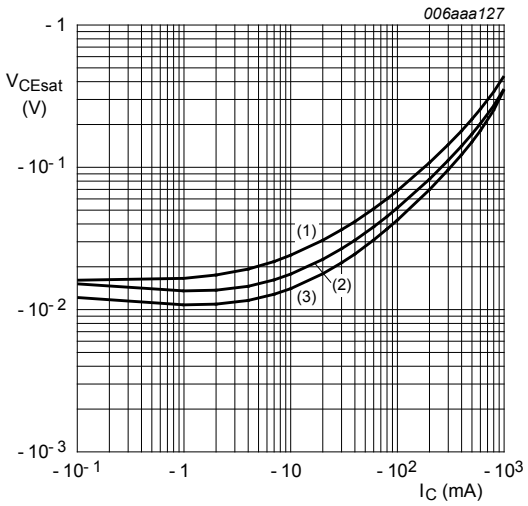
I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



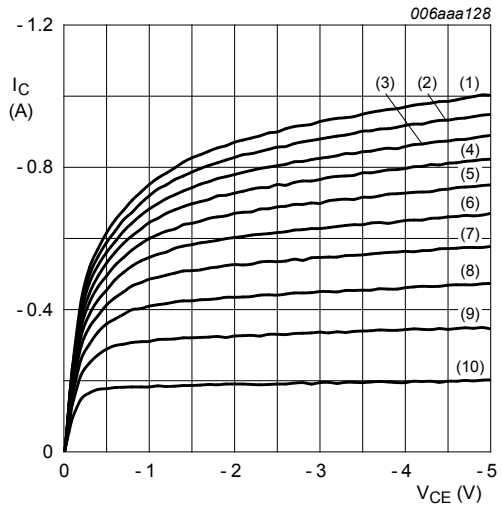
I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



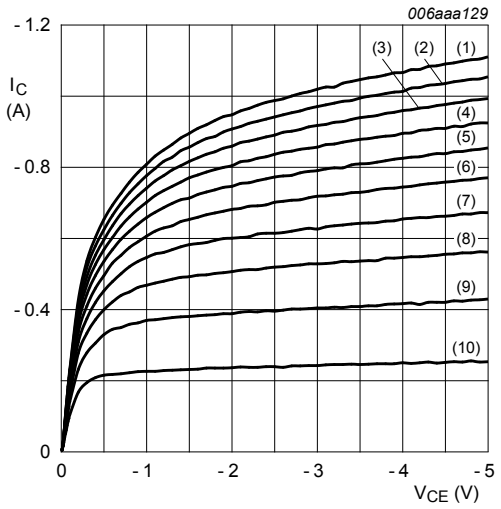
I_C/I_B= 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



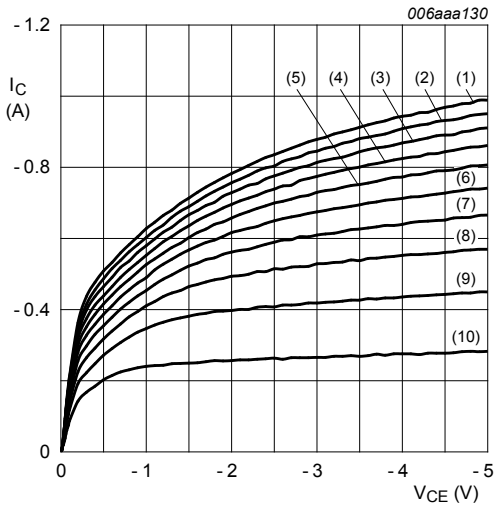
T_{amb} = 25 °C
(1) I_B = -16.0 mA
(2) I_B = -14.4 mA
(3) I_B = -12.8 mA
(4) I_B = -11.2 mA
(5) I_B = -9.6 mA
(6) I_B = -8.0 mA
(7) I_B = -6.4 mA
(8) I_B = -4.8 mA
(9) I_B = -3.2 mA
(10) I_B = -1.6 mA

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



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.

12 Package outline

Table 9. Package outline

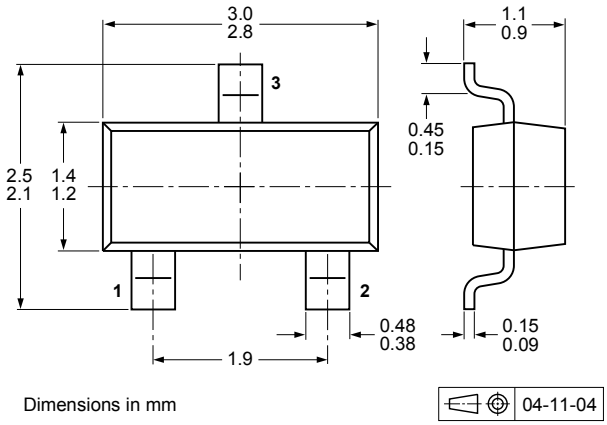


Figure 15. Package outline TO-236 (SOT23)

13 Soldering

Table 10. Soldering

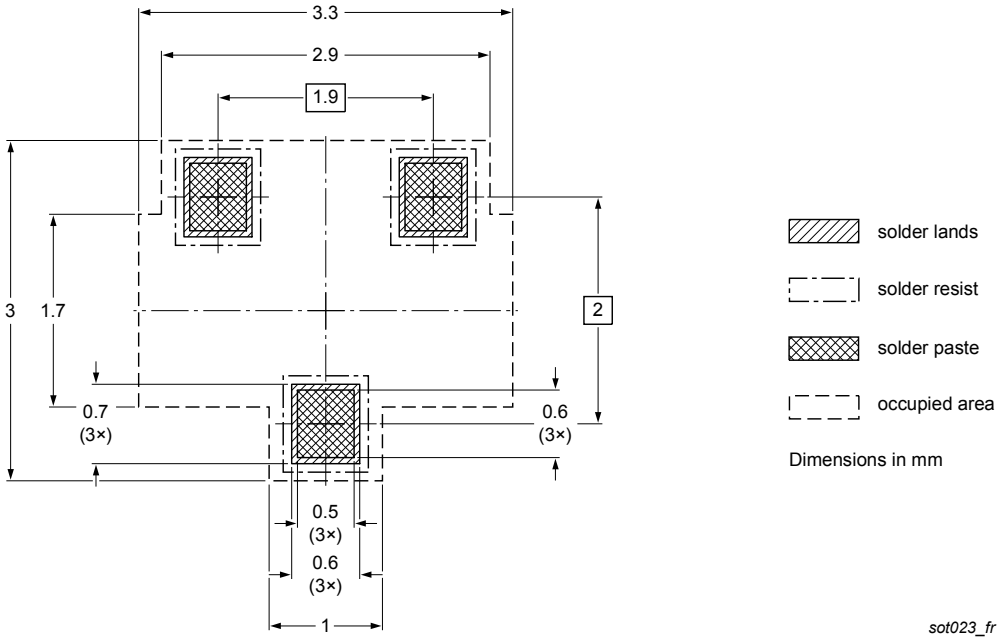


Figure 16. Reflow soldering footprint for SOT23 (TO-236AB)

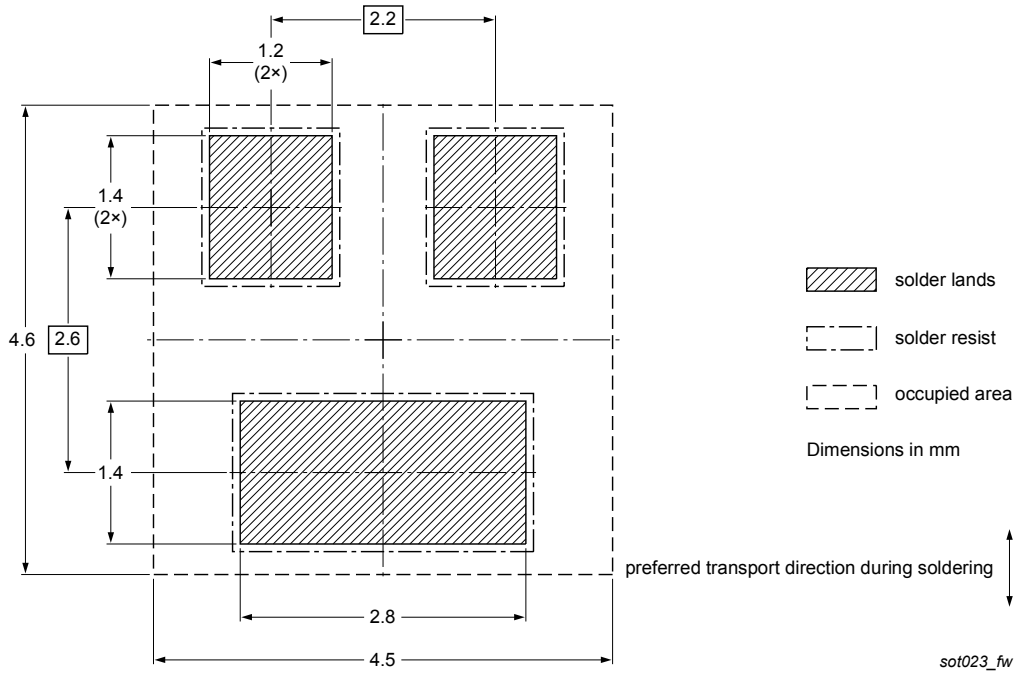


Figure 17. Wave soldering footprint for SOT23 (TO-236AB)

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	-	-

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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

15.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

15.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia. In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory. Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification. Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products. Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nexperia.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Suitability for use in automotive applications — This Nexperia product has been qualified for use in automotive applications. Unless otherwise agreed in writing, the product is not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

15.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

BCW68 series

45 V, 800 mA PNP general-purpose transistor

Contents

For more information, please visit: http://www.nexperia.com
For sales office addresses, please send an email to: salesaddresses@nexperia.com

Date of release: 21 April 2017
Document identifier: BCW68X_SER