



**THE DATASHEET OF
BC857W,115**





BC856W; BC857W; BC858W

65 V, 100 mA PNP general-purpose transistors

Rev. 4 — 10 July 2023

Product data sheet

1. General description

PNP general-purpose transistors in a very small SOT323 (SC-70), Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEDEC	
BC856W	SOT323	SC-70	BC846W
BC856AW			BC846AW
BC856BW			BC846BW
BC857W			BC847W
BC857AW			BC847AW
BC857BW			BC847BW
BC857CW			BC847CW
BC858W			BC848W

2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 65 V)

3. Applications

- General-purpose switching and amplification

4. Quick reference data

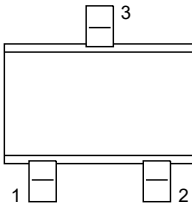
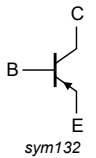
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base				
	BC856W		-	-	-65	V
	BC857W		-	-	-45	V
	BC858W		-	-	-30	V
I_C	collector current		-	-	-100	mA
I_{CM}	peak collector current		-	-	-200	mA
h_{FE}	DC current gain					
	BC856W	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	125	-	475	
	BC857W; BC858W		125	-	800	
	BC856AW; BC857AW		125	-	250	
	BC856BW; BC857BW		220	-	475	
	BC857CW		420	-	800	

5. Pinning information

Table 3. Pinning information

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

6. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BC856W	SC-70	plastic surface-mounted package; 3 leads	SOT323
BC856AW			
BC856BW			
BC857W			
BC857AW			
BC857BW			
BC857CW			
BC858W			

7. Marking

Table 5. Marking codes

Type number		Marking code
BC856W	[1]	3D%
BC856AW	[1]	3A%
BC856BW	[1]	3B%
BC857W	[1]	3H%
BC857AW	[1]	3E%
BC857CW	[1]	3G%
BC858W	[1]	3M%

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 6. 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				
	BC856W		-	-80	V	
	BC857W		-	-50	V	
	BC858W		-	-30	V	
V _{CEO}	collector-emitter voltage	open base				
	BC856W		-	-65	V	
	BC857W		-	-45	V	
	BC858W		-	-30	V	
V _{EBO}	emitter-base voltage	open collector	-	-5	V	
I _C	collector current		-	-100	mA	
I _{CM}	peak collector current		-	-200	mA	
I _{BM}	peak base current		-	-200	mA	
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	200	mW
T _j	junction temperature		-	150	°C	
T _{amb}	ambient temperature		-65	150	°C	
T _{stg}	storage temperature		-65	150	°C	

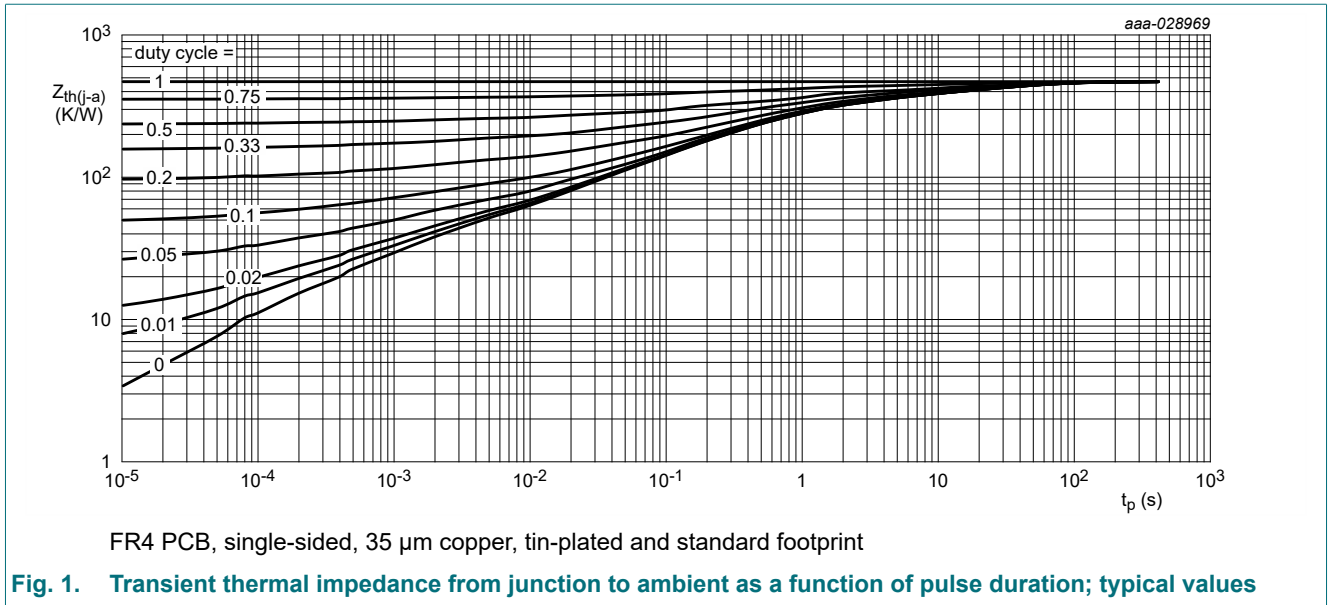
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	625	K/W

[1] Device mounted on an FR4 PCB; single-sided; 35 μ m copper; tin-plated and standard footprint.

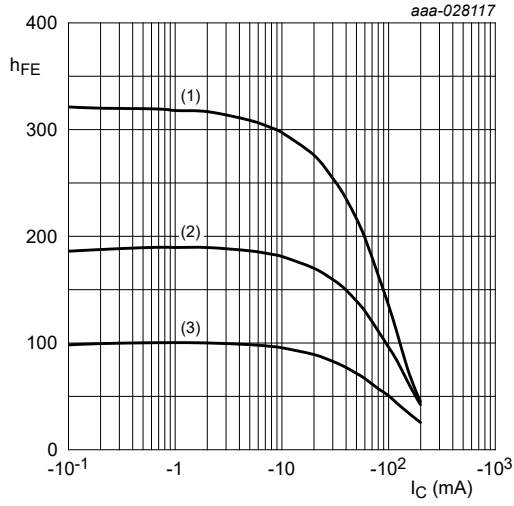


10. Characteristics

Table 8. Characteristics
 $T_{amb} = 25\text{ °C}$ unless otherwise specified.

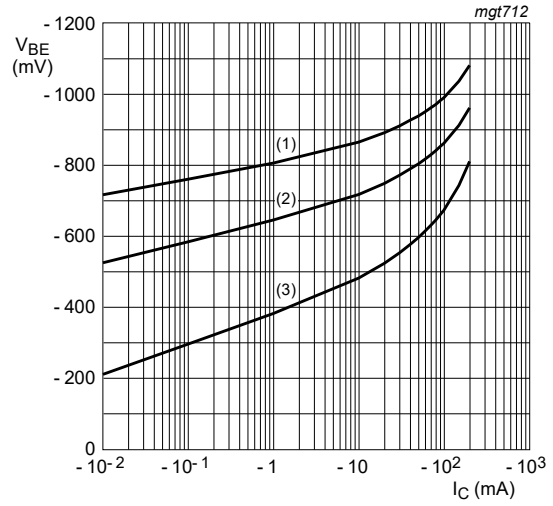
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)CBO}$	collector-base breakdown voltage						
	BC856W	$I_C = -100\text{ }\mu\text{A}; I_E = 0\text{ A}$	-80	-	-	V	
	BC857W		-50	-	-	V	
	BC858W		-30	-	-	V	
$V_{(BR)CEO}$	collector-emitter breakdown voltage						
	BC856W	$I_C = -2\text{ mA}; I_B = 0\text{ A}$	-65	-	-	V	
	BC857W		-45	-	-	V	
	BC858W		-30	-	-	V	
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0\text{ A}; I_E = -100\text{ }\mu\text{A}$	-5	-	-	V	
I_{CBO}	collector-base cut-off current	$V_{CB} = -30\text{ V}; I_E = 0\text{ A}$	-	-1	-15	nA	
		$V_{CB} = -30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$	-	-	-4	μA	
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}$	-	-	-100	nA	
h_{FE}	DC current gain						
	BC856W	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$	125	-	475		
	BC857W; BC858W		125	-	800		
	BC856AW; BC857AW		125	-	250		
	BC857BW; BC858BW		220	-	475		
	BC857CW		420	-	800		
V_{CEsat}	collector-emitter saturation voltage	$I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$	-	-75	-300	mV	
		$I_C = -100\text{ mA}; I_B = -5\text{ mA}$	[1]	-	-250	-600	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -10\text{ mA}; I_B = -0.5\text{ mA}$	[1]	-	-700	-	mV
		$I_C = -100\text{ mA}; I_B = -5\text{ mA}$	[1]	-	-850	-	mV
V_{BE}	base-emitter voltage	$V_{CE} = -5\text{ V}; I_C = -2\text{ mA}$	-600	-650	-750	mV	
		$V_{CE} = -5\text{ V}; I_C = -10\text{ mA}$	-	-	-820	mV	
C_c	collector capacitance	$V_{CB} = -10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	3	-	pF	
C_e	collector capacitance	$V_{EB} = -5\text{ V}; I_C = i_c = 0\text{ A}; f = 1\text{ MHz}$	-	12	-	pF	
f_T	transition frequency	$V_{CE} = -5\text{ V}; I_C = -10\text{ mA}; f = 100\text{ MHz}$	100	-	-	MHz	
NF	noise figure	$I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	-	2	10	dB	

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



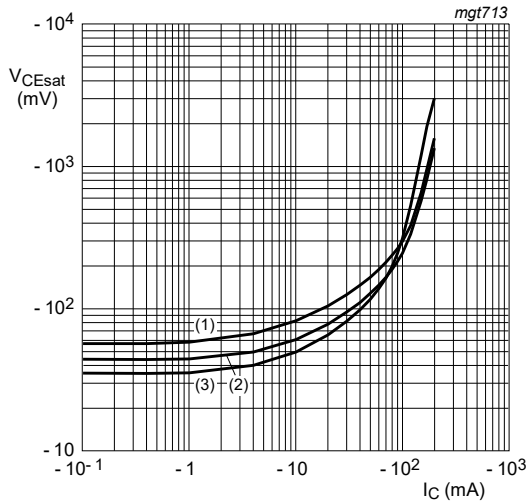
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 2. BC857AW: DC current gain as a function of collector current; typical values



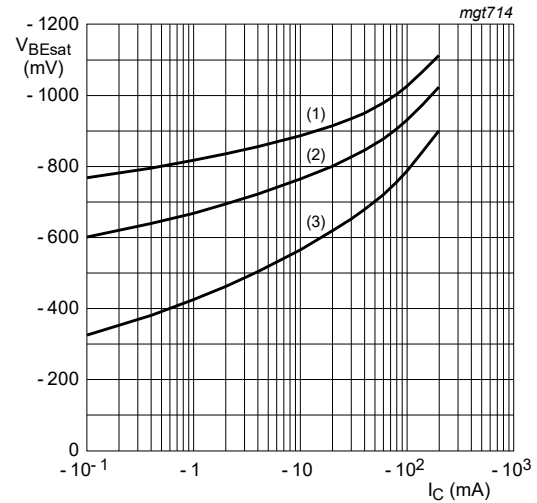
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 3. BC857AW: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 4. BC857AW: Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 5. BC857AW: Base-emitter saturation voltage as a function of collector current; typical values

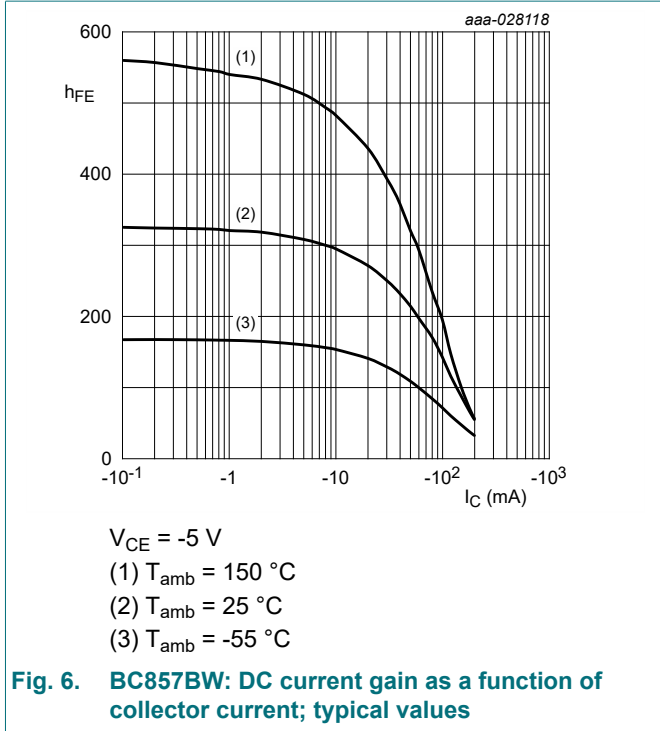


Fig. 6. BC857BW: DC current gain as a function of collector current; typical values

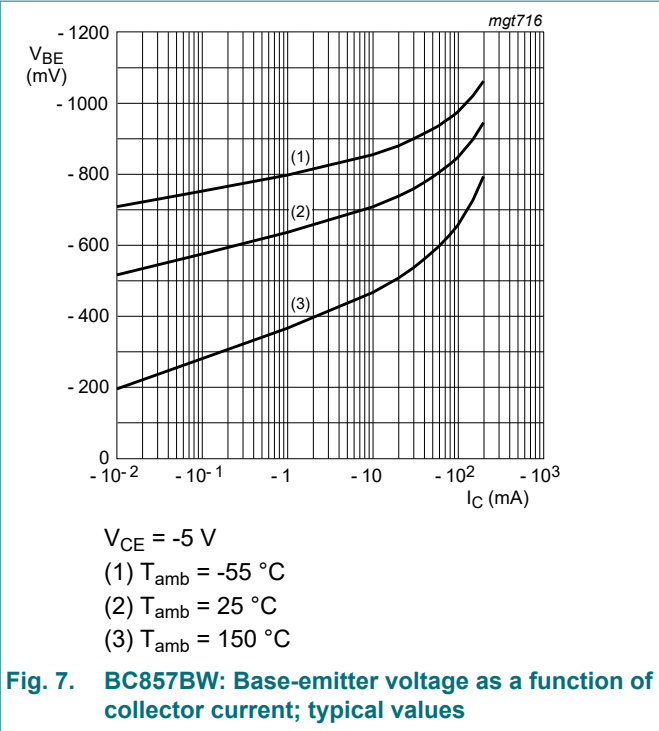


Fig. 7. BC857BW: Base-emitter voltage as a function of collector current; typical values

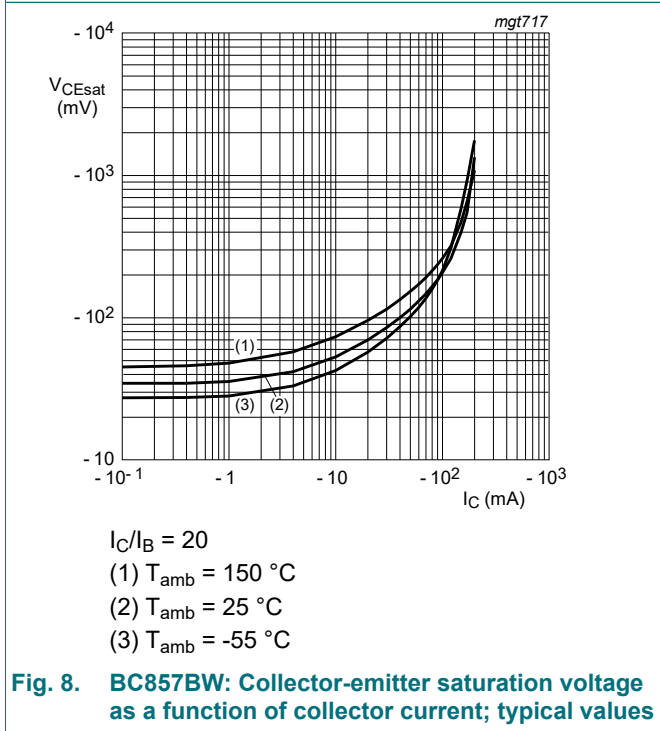


Fig. 8. BC857BW: Collector-emitter saturation voltage as a function of collector current; typical values

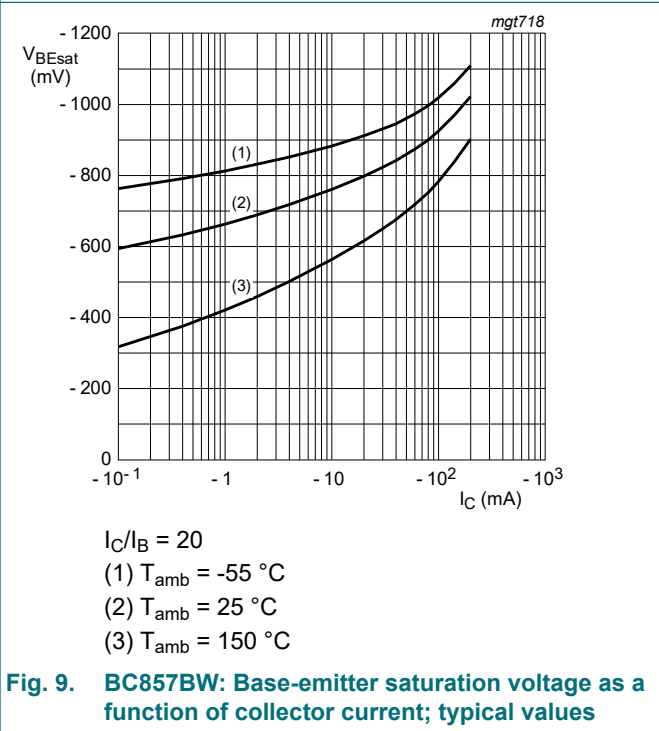
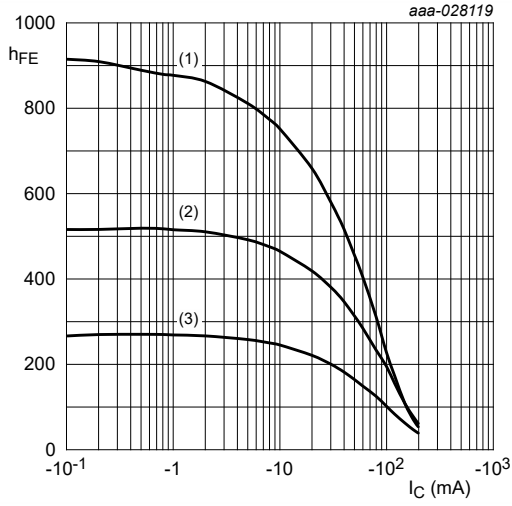
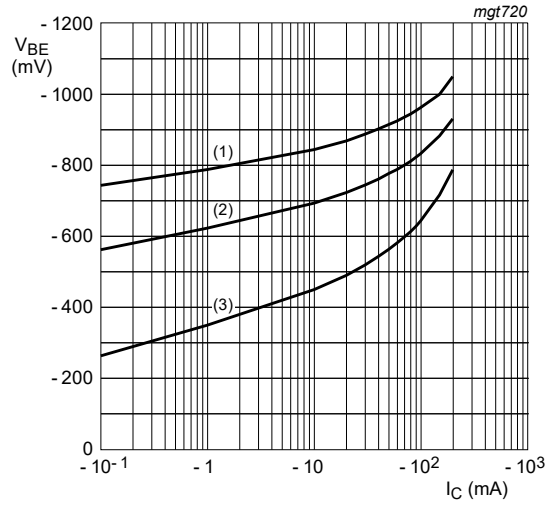


Fig. 9. BC857BW: Base-emitter saturation voltage as a function of collector current; typical values



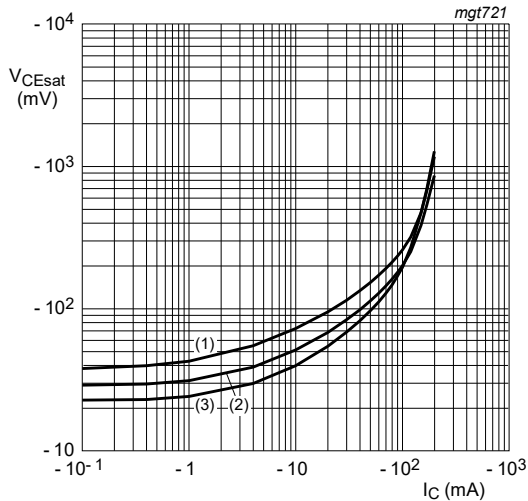
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 10. BC857CW: DC current gain as a function of collector current; typical values



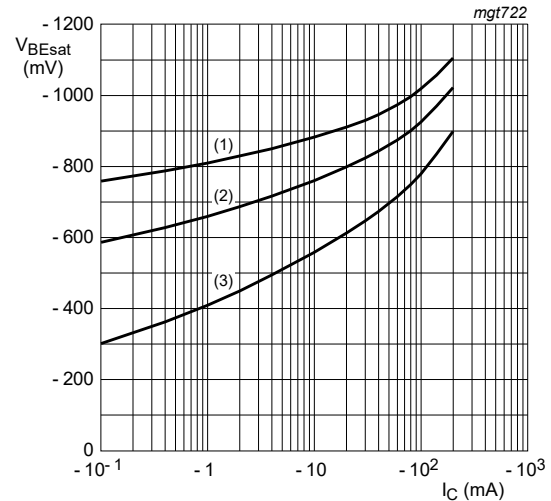
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 11. BC857CW: Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

Fig. 12. BC857CW: Collector-emitter saturation voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

Fig. 13. BC857CW: Base-emitter saturation voltage as a function of collector current; typical values

11. Package outline

Table 9. Package outline

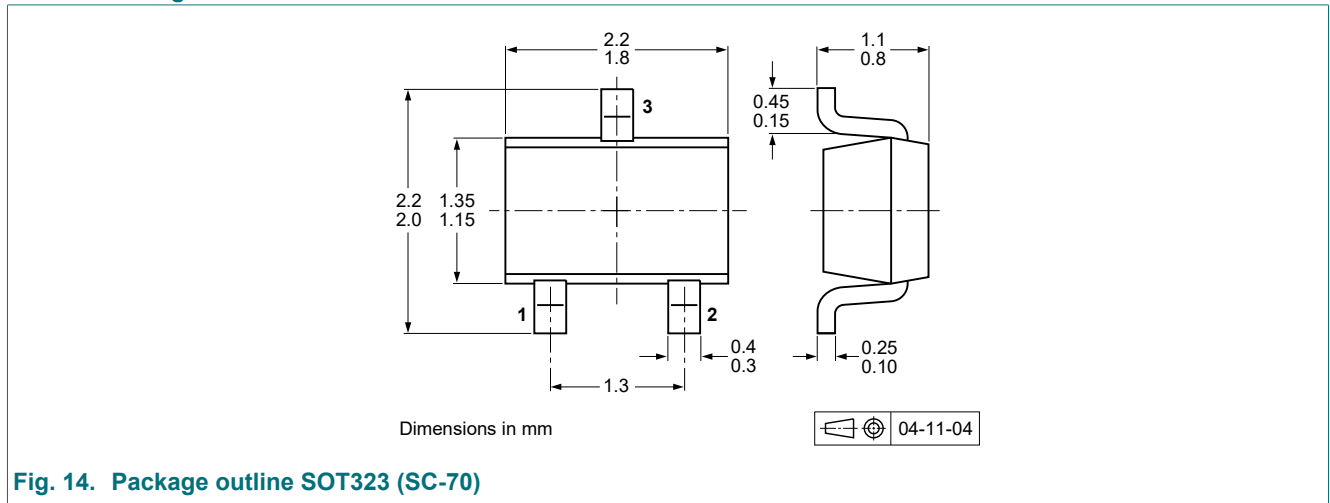


Fig. 14. Package outline SOT323 (SC-70)

12. Soldering

Table 10. Soldering

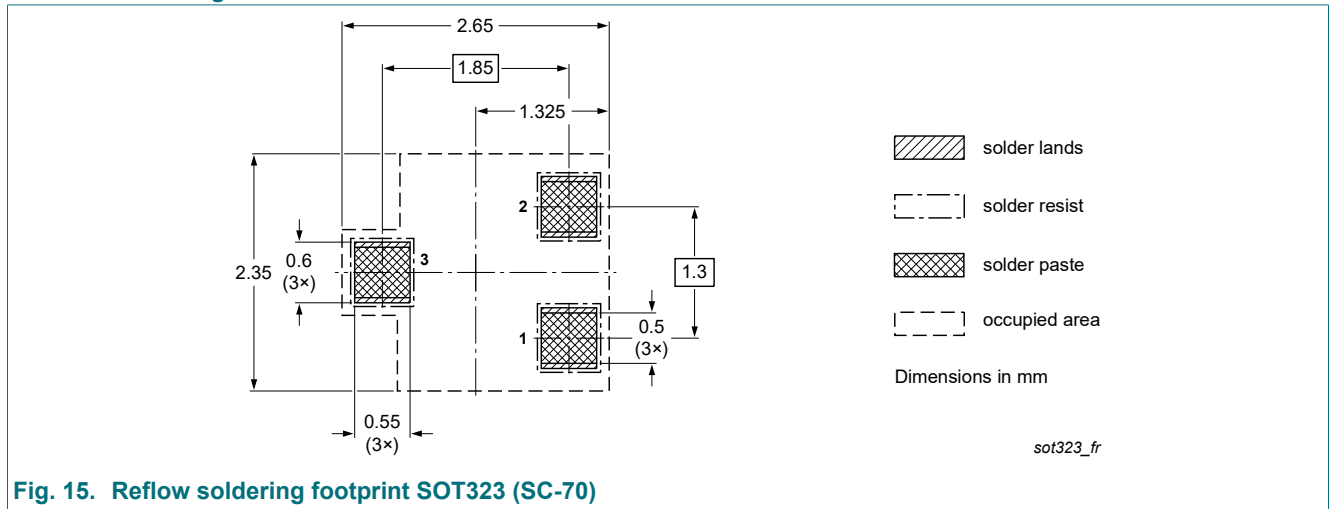


Fig. 15. Reflow soldering footprint SOT323 (SC-70)

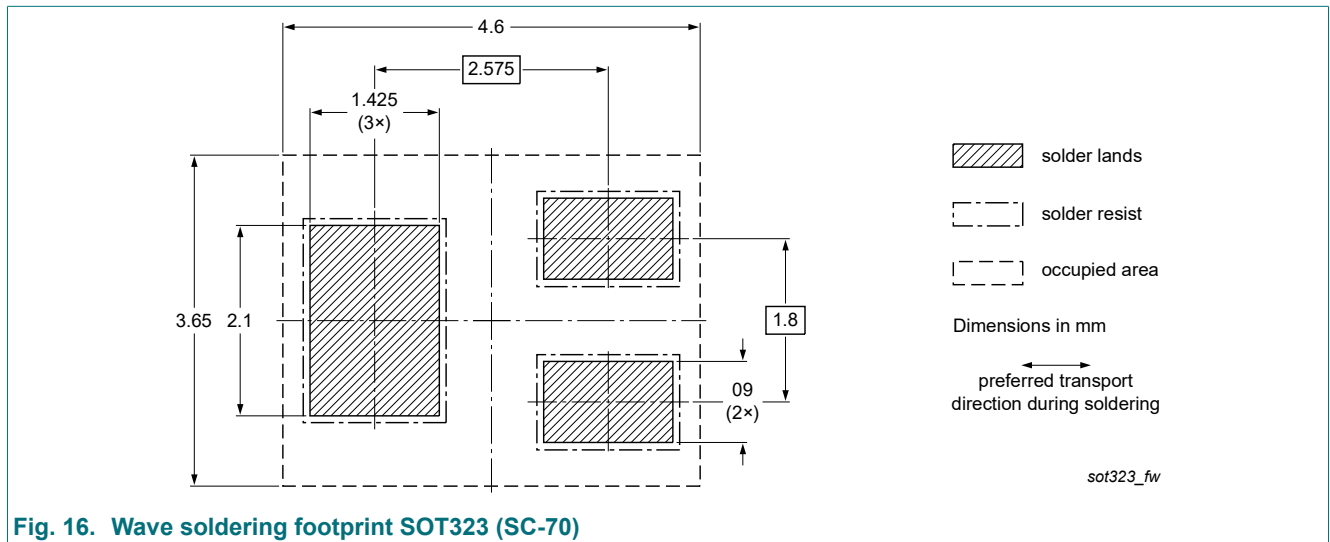


Fig. 16. Wave soldering footprint SOT323 (SC-70)

13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856W_BC857W_BC858W v.4	20230710	Product data sheet	-	BC856W_BC857W_BC858W v.3
Modifications:	• Quick reference data: typos corrected			
BC856W_BC857W_BC858W v.3	20230701	Product data sheet	-	BC856W_BC857W_BC858W v.2
BC856W_BC857W_BC858W v.2	20020204	Product data sheet	-	BC856W_BC857W_BC858W v.1
BC856W_BC857W_BC858W v.1	19990412	Product data sheet	-	-

14. Legal information

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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	2
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	3
8. Limiting values.....	3
9. Thermal characteristics.....	4
10. Characteristics.....	5
11. Package outline.....	9
12. Soldering.....	10
13. Revision history.....	11
14. Legal information.....	12

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