



# BC856; BC857; BC858

65 V, 100 mA PNP general-purpose transistors

Rev. 9 — 1 July 2022

Product data sheet

## 1. General description

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

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEDEC	
BC856	SOT23	TO-236AB	BC846
BC856A			BC846A
BC856B			BC846B
BC857			BC847
BC857A			BC847A
BC857B			BC847B
BC857C			BC847C
BC858B			BC848B

## 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

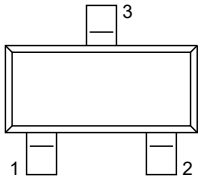
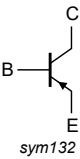
**Table 2. Quick reference data**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base				
	BC856; BC856A; BC856B		-	-	-65	V
	BC857; BC857A; BC857B; BC857C		-	-	-45	V
	BC858B		-	-	-30	V
$I_C$	collector current		-	-	-100	mA
$I_{CM}$	peak collector current		-	-	-200	mA
$h_{FE}$	DC current gain					
	BC856	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	125	-	475	
	BC857		125	-	800	
	BC856A; BC857A		125	-	250	
	BC856B; BC857B; BC858B		220	-	475	
	BC857C		420	-	800	

## 5. Pinning information

**Table 3. Pinning information**

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

## 6. Ordering information

**Table 4. Ordering information**

Type number	Package		Version
	Name	Description	
<a href="#">BC856</a>	TO-236AB	plastic surface-mounted package; 3 leads	<a href="#">SOT23</a>
<a href="#">BC856A</a>			
<a href="#">BC856B</a>			
<a href="#">BC857</a>			
<a href="#">BC857A</a>			
<a href="#">BC857B</a>			
<a href="#">BC857C</a>			
<a href="#">BC858B</a>			

## 7. Marking

Table 5. Marking codes

Type number		Marking code
BC856	[1]	3D%
BC856A	[1]	3A%
BC856B	[1]	3B%
BC857	[1]	3H%
BC857A	[1]	3E%
BC857B	[1]	3F%
BC857C	[1]	3G%
BC858B	[1]	3K%

[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			
	BC856; BC856A; BC856B		-	-80	V
	BC857; BC857A; BC857B; BC857C		-	-50	V
	BC858B		-	-30	V
$V_{CEO}$	collector-emitter voltage	open base			
	BC856; BC856A; BC856B		-	-65	V
	BC857; BC857A; BC857B; BC857C		-	-45	V
	BC858B		-	-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	$T_{amb} \leq 25\text{ °C}$	[1] -	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

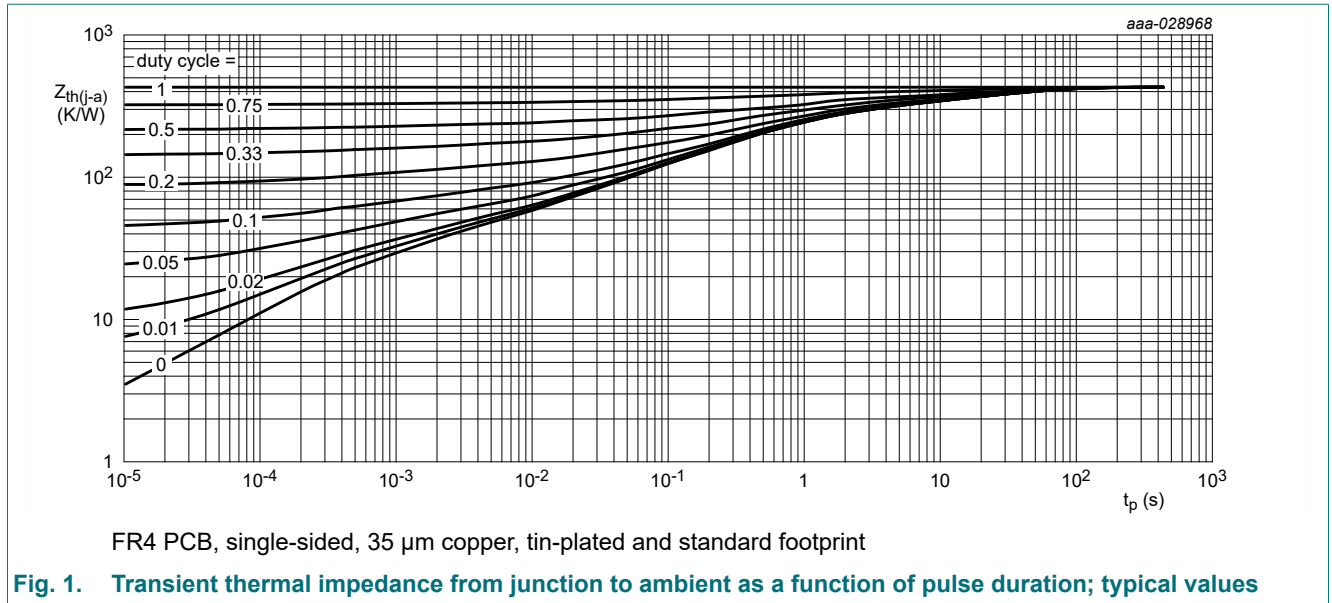
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

## 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]	-	500	K/W

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

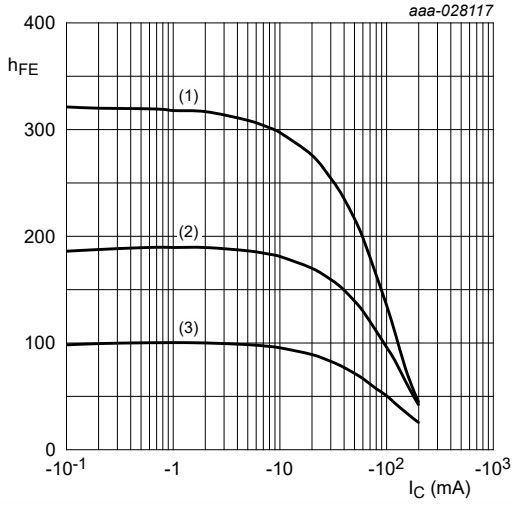


## 10. Characteristics

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

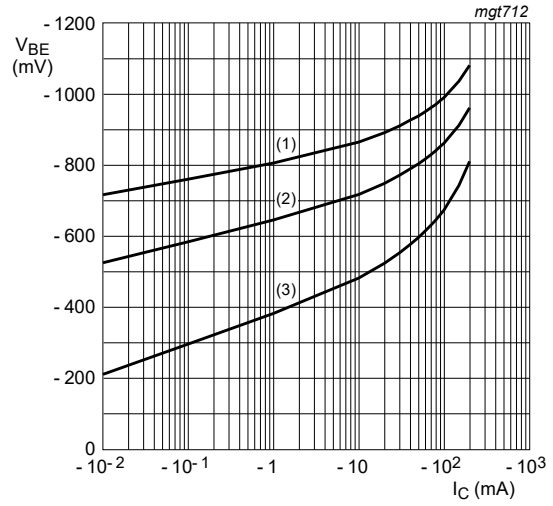
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)CBO}$	collector-base breakdown voltage						
	BC856; BC856A; BC856B	$I_C = -100\ \mu\text{A}; I_E = 0\ \text{A}$	-80	-	-	V	
	BC857; BC857A; BC857B; BC857C		-50	-	-	V	
BC858B	-30		-	-	V		
$V_{(BR)CEO}$	collector-emitter breakdown voltage						
	BC856; BC856A; BC856B	$I_C = -2\ \text{mA}; I_B = 0\ \text{A}$	-65	-	-	V	
	BC857; BC857A; BC857B; BC857C		-45	-	-	V	
BC858B	-30		-	-	V		
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0\ \text{A}; I_E = -100\ \mu\text{A}$	-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	$\mu\text{A}$	
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\ \text{V}; I_C = 0\ \text{A}$	-	-	-100	nA	
$h_{FE}$	DC current gain						
	BC856	$V_{CE} = -5\ \text{V}; I_C = -2\ \text{mA}$	125	-	475		
	BC857		125	-	800		
	BC856A; BC857A		125	-	250		
	BC856B; BC857B; BC858B		220	-	475		
BC857C	420		-	800			
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -10\ \text{mA}; I_B = -0.5\ \text{mA}$	-	-75	-300	mV	
		$I_C = -100\ \mu\text{A}; I_B = -5\ \text{mA}$	[1]	-	-250	-650	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -10\ \text{mA}; I_B = -0.5\ \text{mA}$	[1]	-	-700	-	mV
		$I_C = -100\ \mu\text{A}; I_B = -5\ \text{mA}$	[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	$V_{CB} = -10\ \text{V}; I_E = i_e = 0\ \text{A}; f = 1\ \text{MHz}$	-	4.5	-	pF	
$f_T$	transition frequency	$V_{CE} = -5\ \text{V}; I_C = -10\ \text{mA}; f = 100\ \text{MHz}$	100	-	-	MHz	
NF	noise figure	$I_C = -200\ \mu\text{A}; V_{CE} = -5\ \text{V}; R_S = 2\ \text{k}\Omega;$ $f = 1\ \text{kHz}; B = 200\text{Hz}$	-	2	10	dB	

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



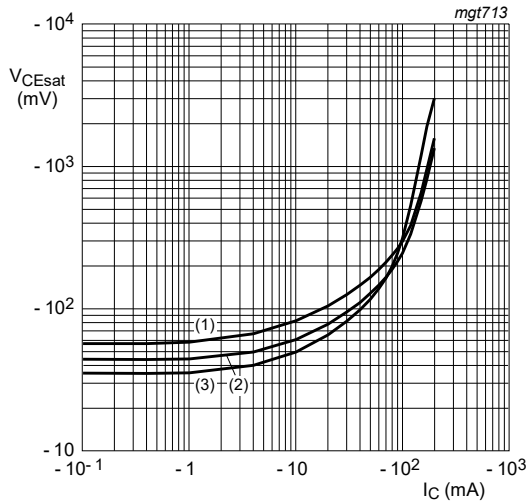
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 2. BC856A; BC857A: DC current gain as a function of collector current; typical values



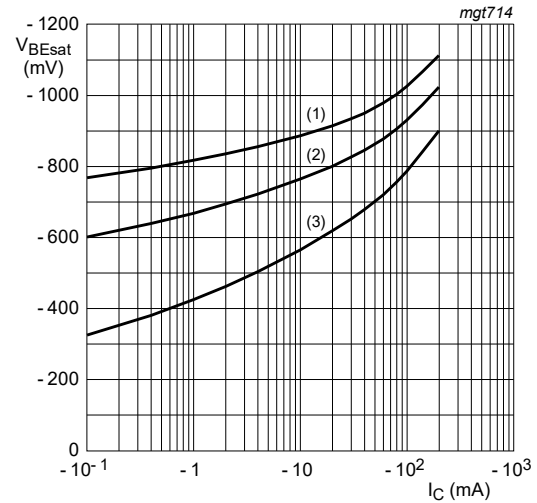
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 3. BC856A; BC857A: Base-emitter voltage as a function of collector current; typical values



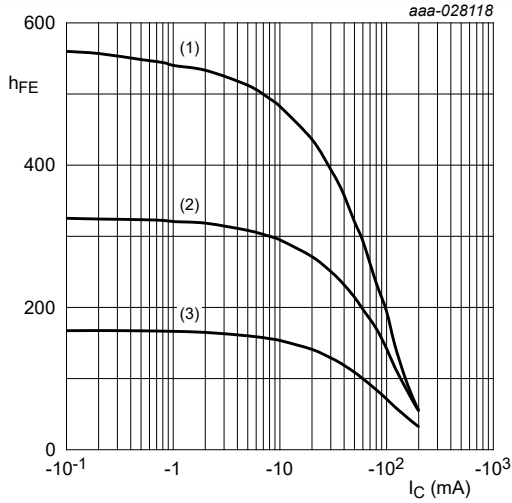
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 4. BC856A; BC857A: Collector-emitter saturation voltage as a function of collector current; typical values



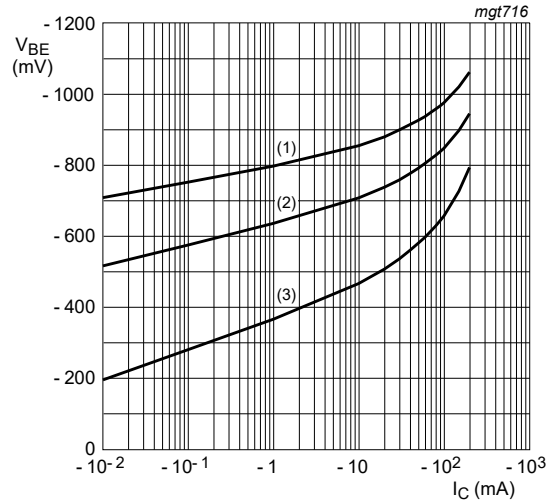
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 5. BC856A; BC857A: Base-emitter saturation voltage as a function of collector current; typical values



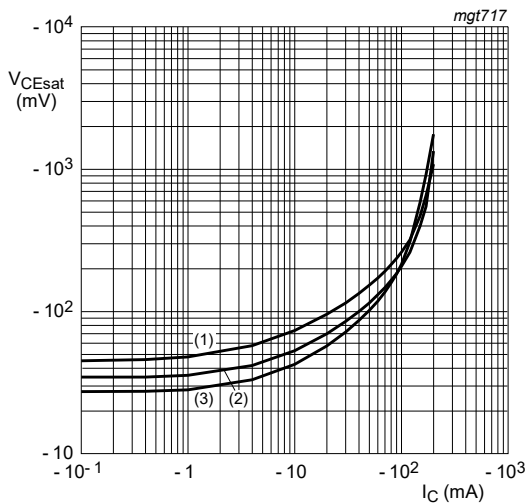
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig. 6. BC856B; BC857B; BC858B: DC current gain as a function of collector current; typical values**



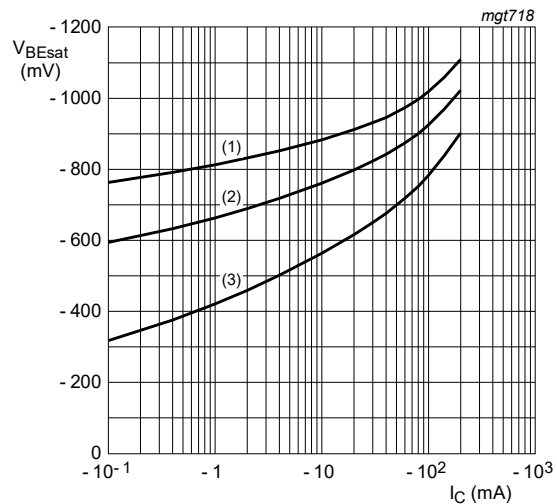
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig. 7. BC856B; BC857B; BC858B: Base-emitter voltage as a function of collector current; typical values**



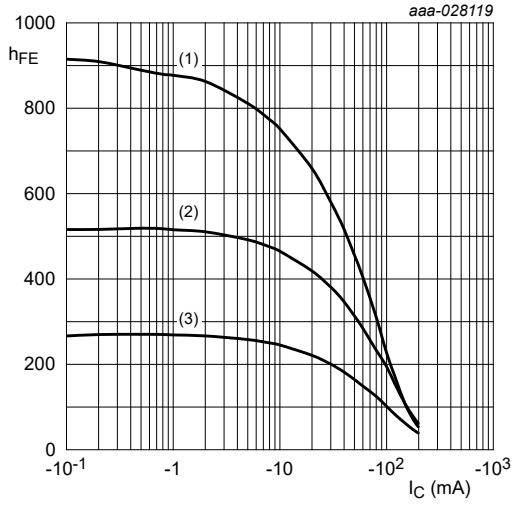
$I_C/I_B = 20$   
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = -55\text{ }^{\circ}\text{C}$

**Fig. 8. BC856B; BC857B; BC858B: Collector-emitter saturation voltage as a function of collector current; typical values**



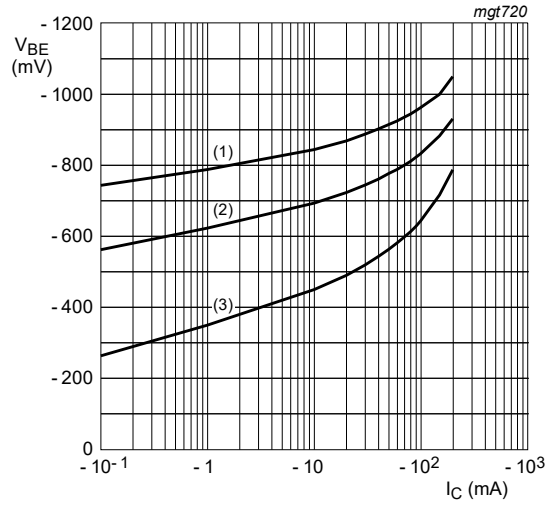
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 150\text{ }^{\circ}\text{C}$

**Fig. 9. BC856B; BC857B; BC858B: Base-emitter saturation voltage as a function of collector current; typical values**



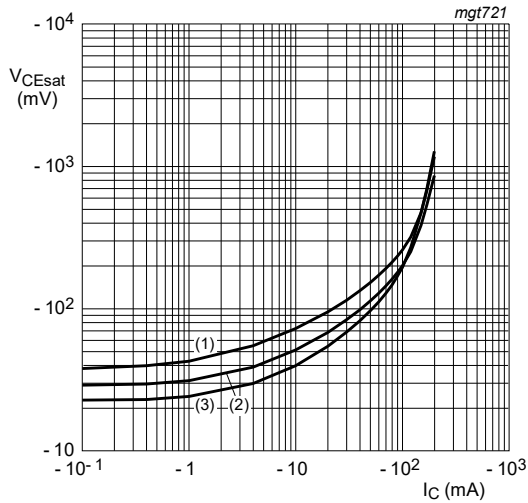
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

Fig. 10. BC857C: DC current gain as a function of collector current; typical values



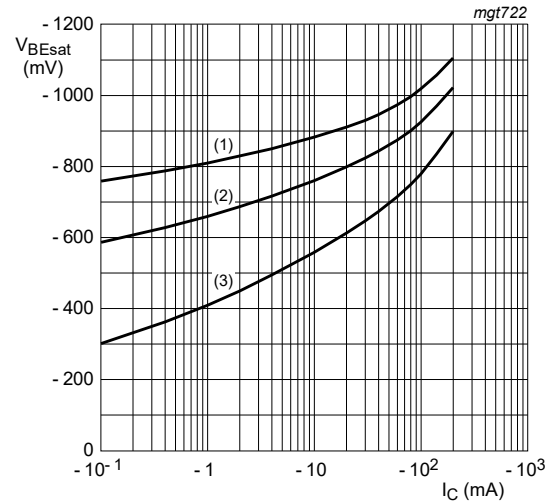
$V_{CE} = -5\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

Fig. 11. BC857C: 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. BC857C: 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. BC857C: Base-emitter saturation voltage as a function of collector current; typical values



## 11. Package outline

Table 9. Package outline

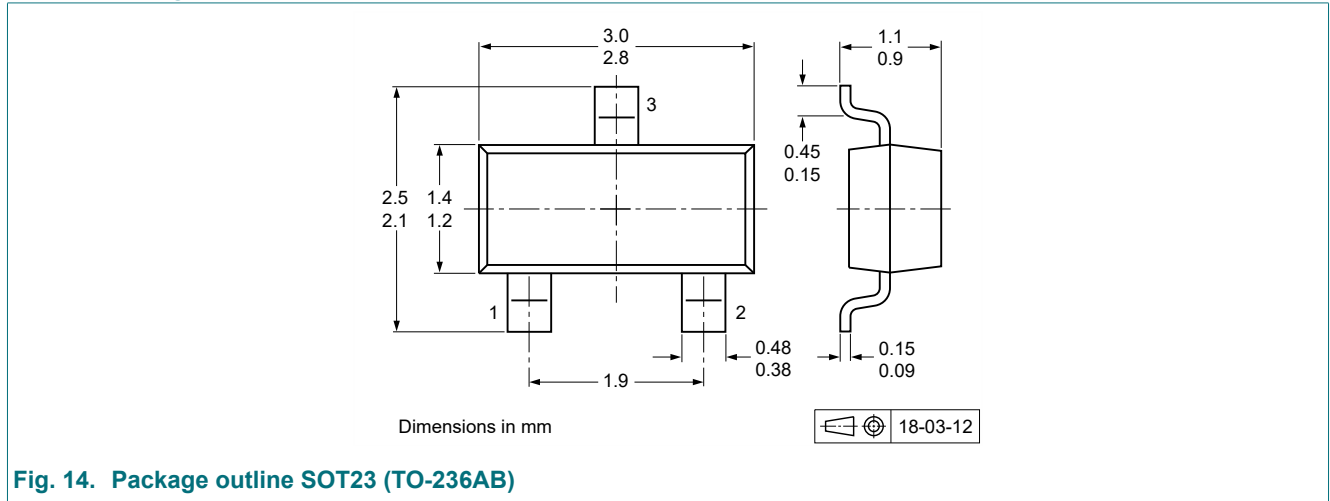


Fig. 14. Package outline SOT23 (TO-236AB)

## 12. Soldering

Table 10. Soldering

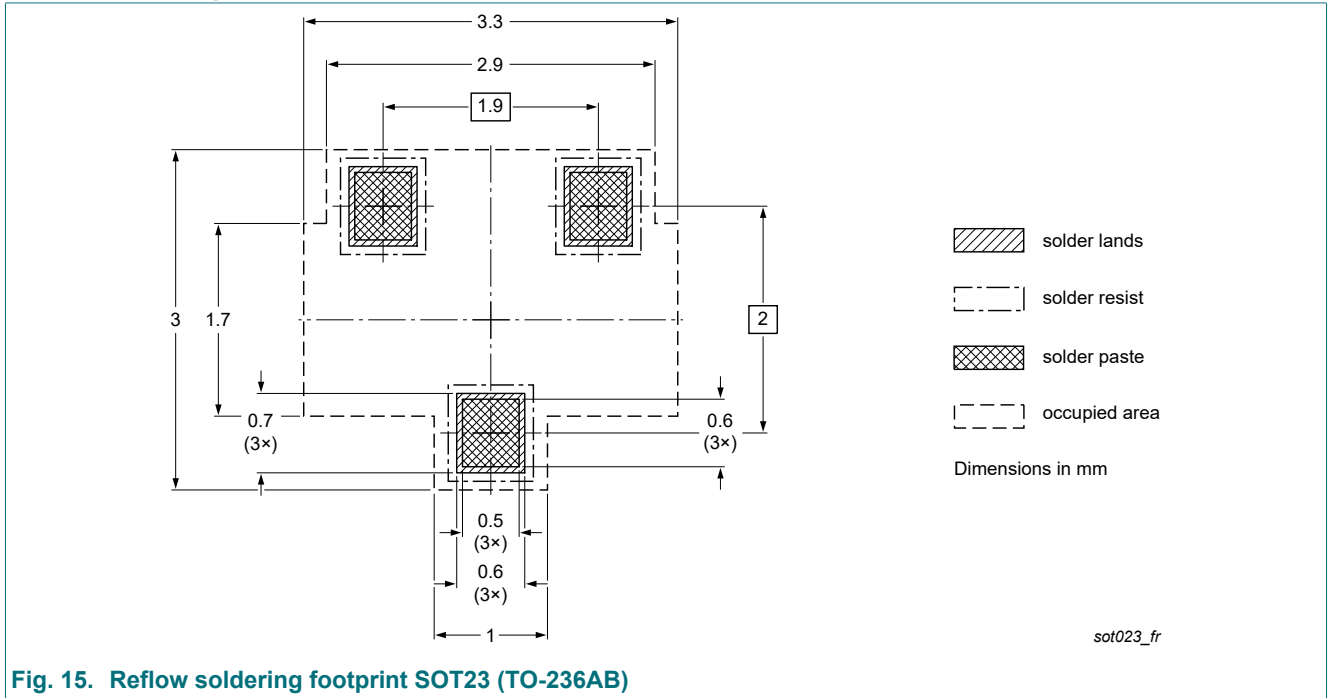


Fig. 15. Reflow soldering footprint SOT23 (TO-236AB)

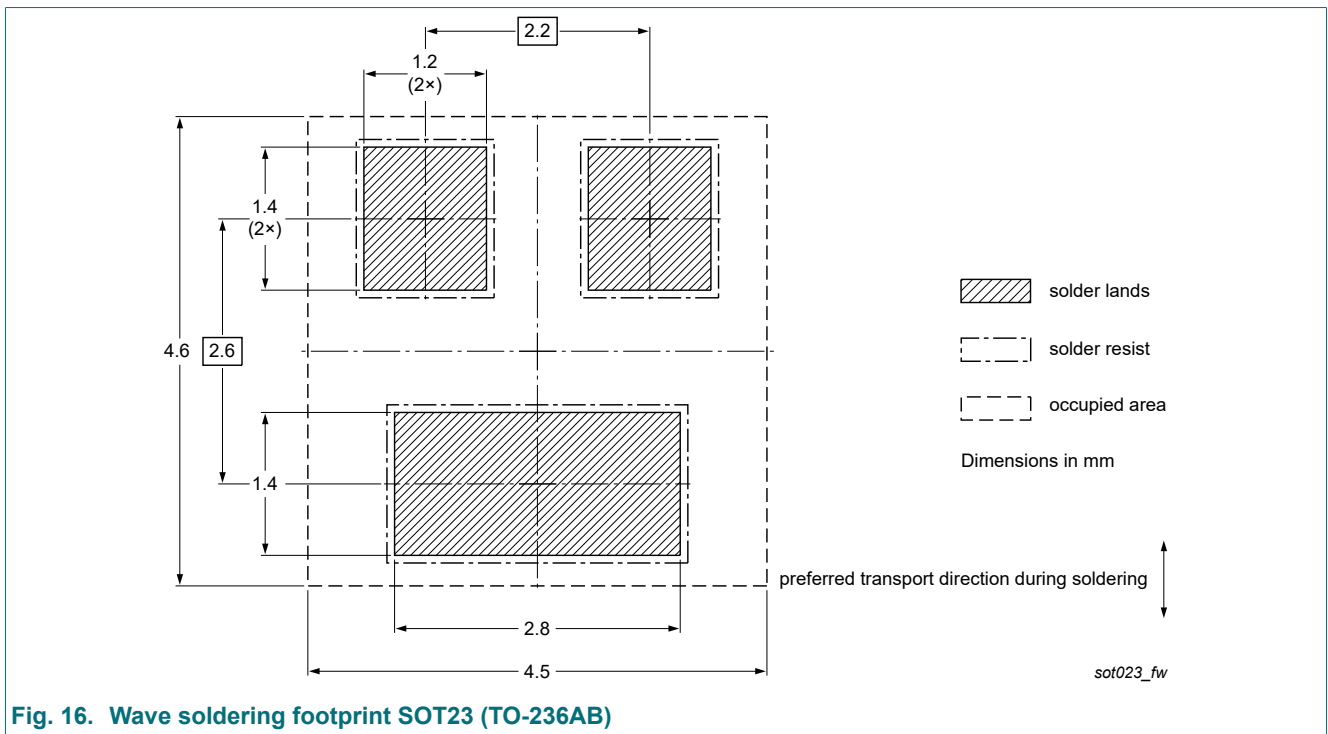


Fig. 16. Wave soldering footprint SOT23 (TO-236AB)

## 13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856_BC857_BC858 v.9	20220701	Product data sheet	-	BC856_BC857_BC858 v.8
Modifications:	<ul style="list-style-type: none"> <li>Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li> </ul>			
BC856_BC857_BC858 v.8	20210221	Product data sheet	-	BC856_BC857_BC858 v.7
BC856_BC857_BC858 v.7	20180416	Product data sheet	-	BC856_BC857_BC858 v.6
BC856_BC857_BC858 v.6	20040106	Product data sheet	-	BC856_BC857_BC858 v.5

## 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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Date of release: 1 July 2022

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