



BC856-Q; BC857-Q; BC858-Q

65 V, 100 mA PNP general-purpose transistors

Rev. 2 — 21 February 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-Q	SOT23	TO-236AB	BC846-Q
BC856A-Q			BC846A-Q
BC856B-Q			BC846B-Q
BC857-Q			BC847-Q
BC857A-Q			BC847A-Q
BC857B-Q			BC847B-Q
BC857C-Q			BC847C-Q
BC858B-Q			BC848B-Q

2. Features and benefits

- Low current (max. 100 mA)
- Low voltage (max. 65 V)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General-purpose switching and amplification

4. Quick reference data

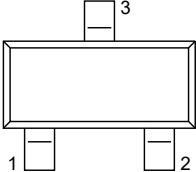
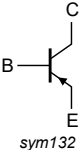
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base				
	BC856-Q; BC856A-Q; BC856B-Q		-	-	-65	V
	BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q		-	-	-45	V
	BC858B-Q		-	-	-30	V
I_C	collector current		-	-	-100	mA
I_{CM}	peak collector current		-	-	-200	mA
h_{FE}	DC current gain					
	BC856-Q	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}$	125	-	475	
	BC857-Q		125	-	800	
	BC856A-Q; BC857A-Q		125	-	250	
	BC856B-Q; BC857B-Q; BC858B-Q		220	-	475	
	BC857C-Q		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	
BC856-Q	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BC856A-Q			
BC856B-Q			
BC857-Q			
BC857A-Q			
BC857B-Q			
BC857C-Q			
BC858B-Q			

7. Marking

Table 5. Marking codes

Type number		Marking code
BC856-Q	[1]	3D%
BC856A-Q	[1]	3A%
BC856B-Q	[1]	3B%
BC857-Q	[1]	3H%
BC857A-Q	[1]	3E%
BC857B-Q	[1]	3F%
BC857C-Q	[1]	3G%
BC858B-Q	[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-Q; BC856A-Q; BC856B-Q		-	-80	V
	BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q		-	-50	V
	BC858B-Q		-	-30	V
V _{CEO}	collector-emitter voltage	open base			
	BC856-Q; BC856A-Q; BC856B-Q		-	-65	V
	BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q		-	-45	V
	BC858B-Q		-	-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]	250	mW
T _j	junction temperature		-	150	°C
T _{amb}	ambient temperature		-65	150	°C
T _{stg}	storage temperature		-65	150	°C

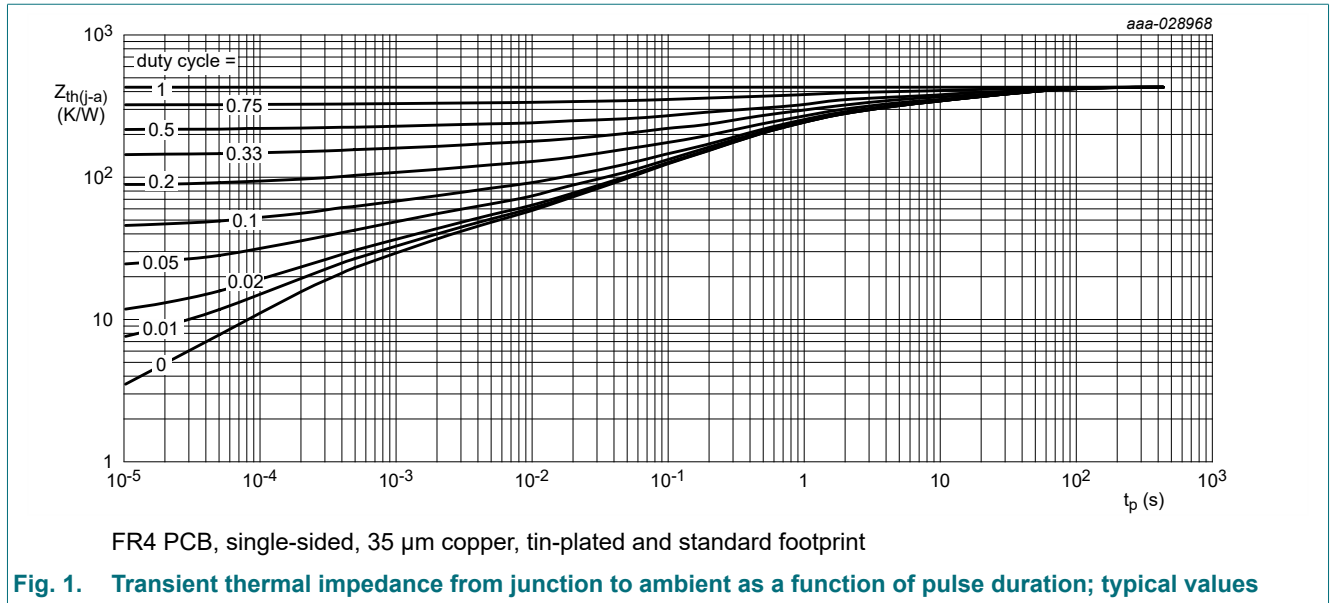
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

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 μ m copper; tin-plated and standard footprint.

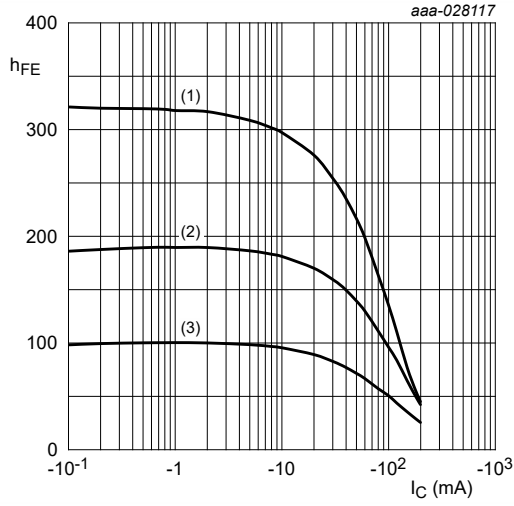


10. Characteristics

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

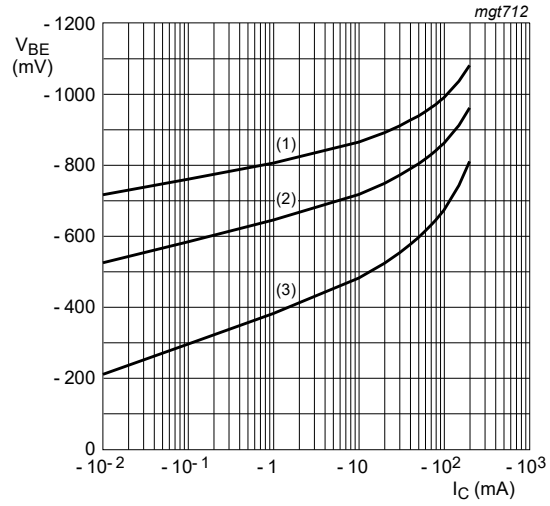
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)CBO}$	collector-base breakdown voltage						
	BC856-Q; BC856A-Q; BC856B-Q	$I_C = -100\ \mu\text{A}; I_E = 0\ \text{A}$	-80	-	-	V	
	BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q		-50	-	-	V	
	BC858B-Q		-30	-	-	V	
$V_{(BR)CEO}$	collector-emitter breakdown voltage						
	BC856-Q; BC856A-Q; BC856B-Q	$I_C = -2\ \text{mA}; I_B = 0\ \text{A}$	-65	-	-	V	
	BC857-Q; BC857A-Q; BC857B-Q; BC857C-Q		-45	-	-	V	
	BC858B-Q		-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	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						
	BC856-Q	$V_{CE} = -5\ \text{V}; I_C = -2\ \text{mA}$	125	-	475		
	BC857-Q		125	-	800		
	BC856A-Q; BC857A-Q		125	-	250		
	BC856B-Q; BC857B-Q; BC858B-Q		220	-	475		
	BC857C-Q		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	-650	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = -10\ \text{mA}; I_B = -0.5\ \text{mA}$	[1]	-	-700	-	mV
		$I_C = -100\ \text{mA}; I_B = -5\ \text{mA}$	[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	$V_{CB} = -10\ \text{V}; I_E = I_e = 0\ \text{A}; f = 1\ \text{MHz}$	-	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; $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$



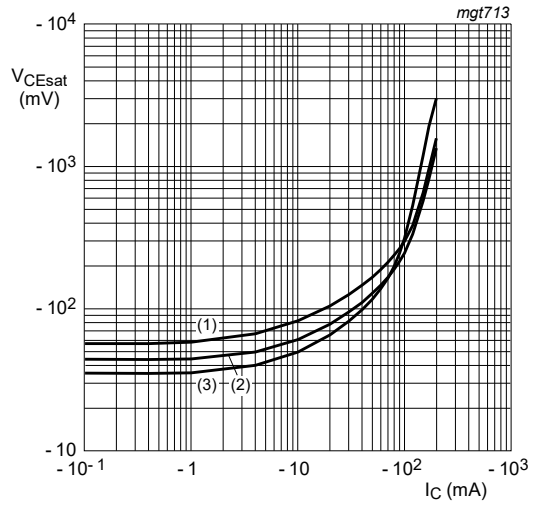
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



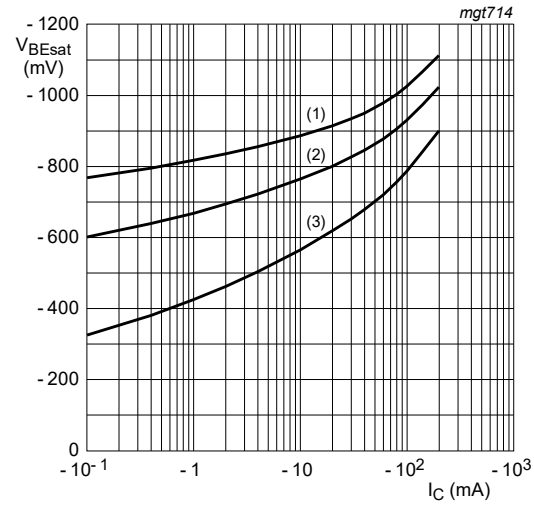
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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



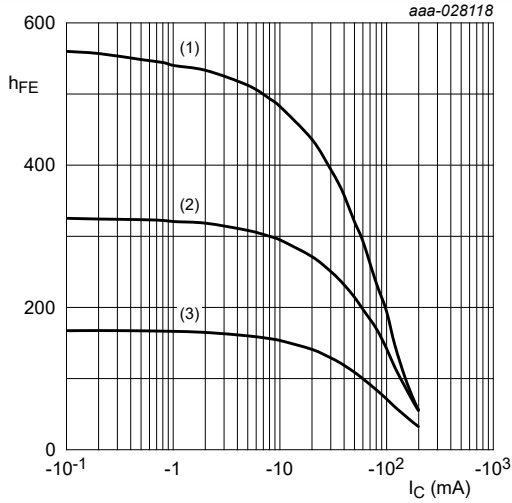
$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = -55\text{ °C}$

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



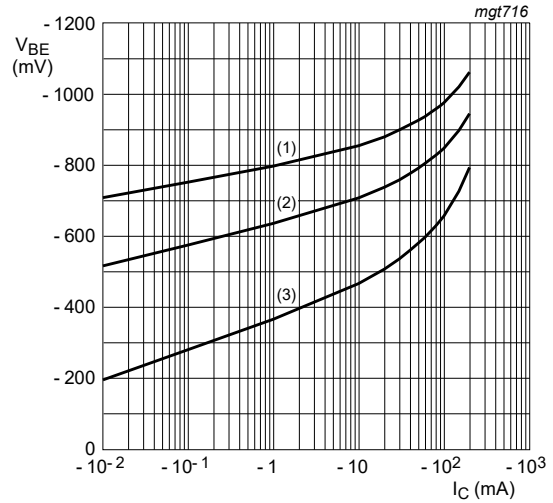
$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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



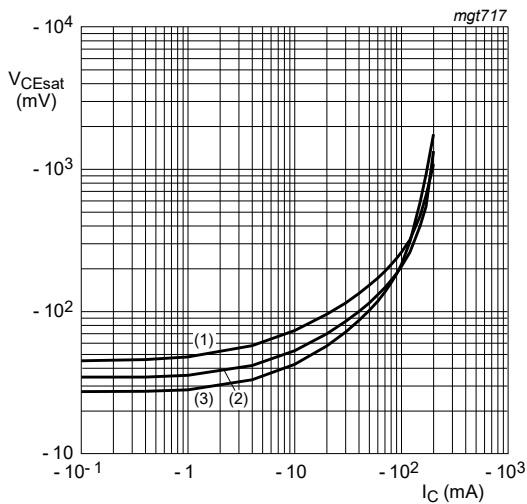
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



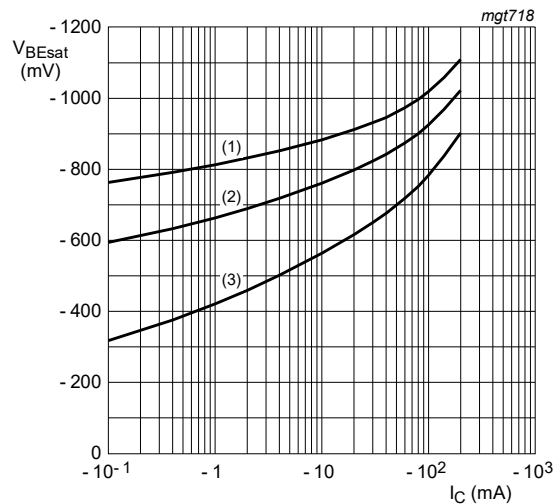
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



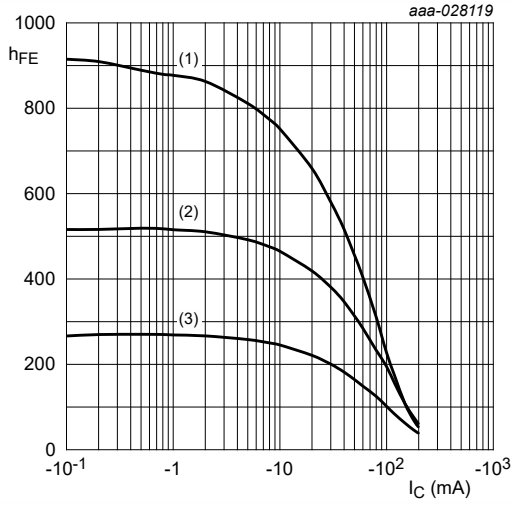
$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



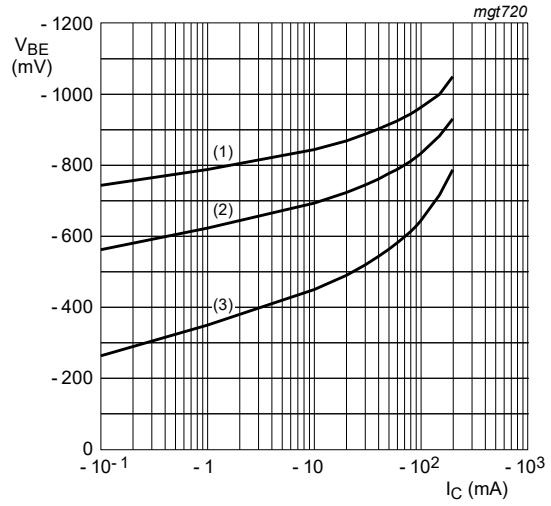
$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



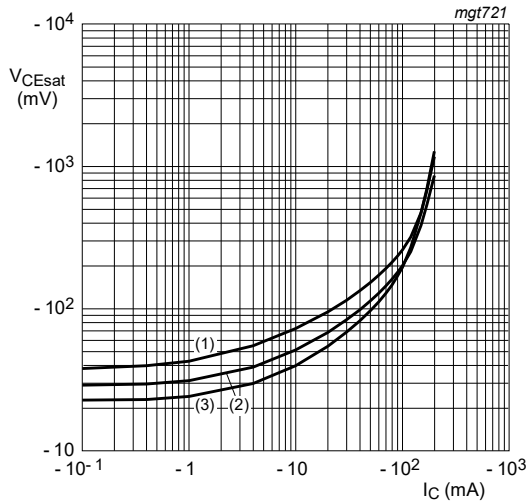
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 150 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = -55 \text{ }^\circ\text{C}$

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



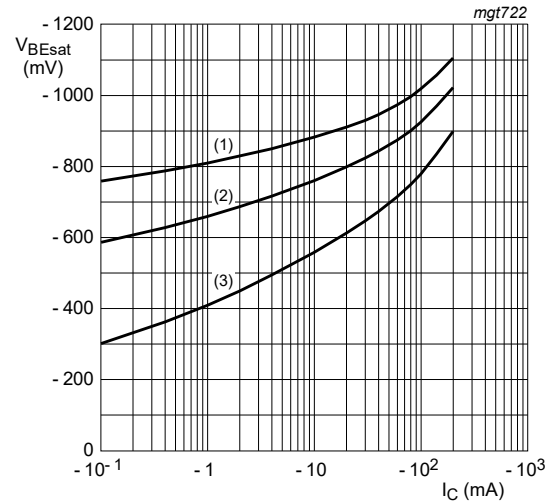
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^\circ\text{C}$
 (2) $T_{amb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{amb} = 150 \text{ }^\circ\text{C}$

Fig. 11. BC857C-Q: 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. 12. BC857C-Q: 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. 13. BC857C-Q: Base-emitter saturation voltage as a function of collector current; 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

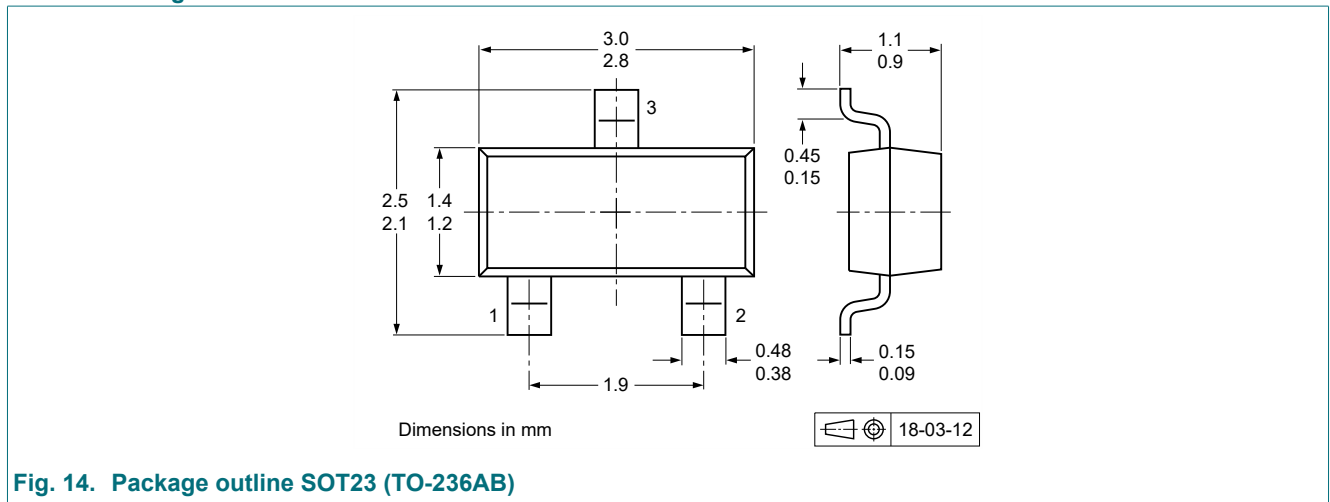


Fig. 14. Package outline SOT23 (TO-236AB)

13. Soldering

Table 10. Soldering

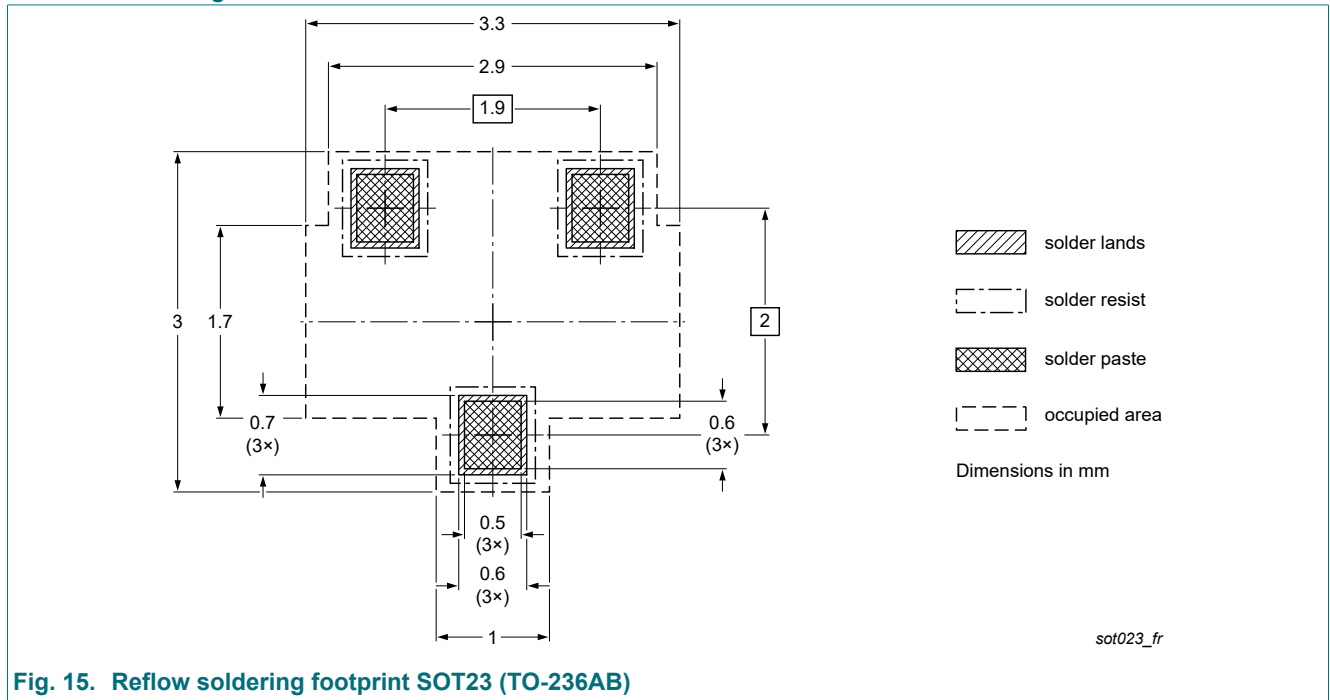


Fig. 15. Reflow soldering footprint SOT23 (TO-236AB)

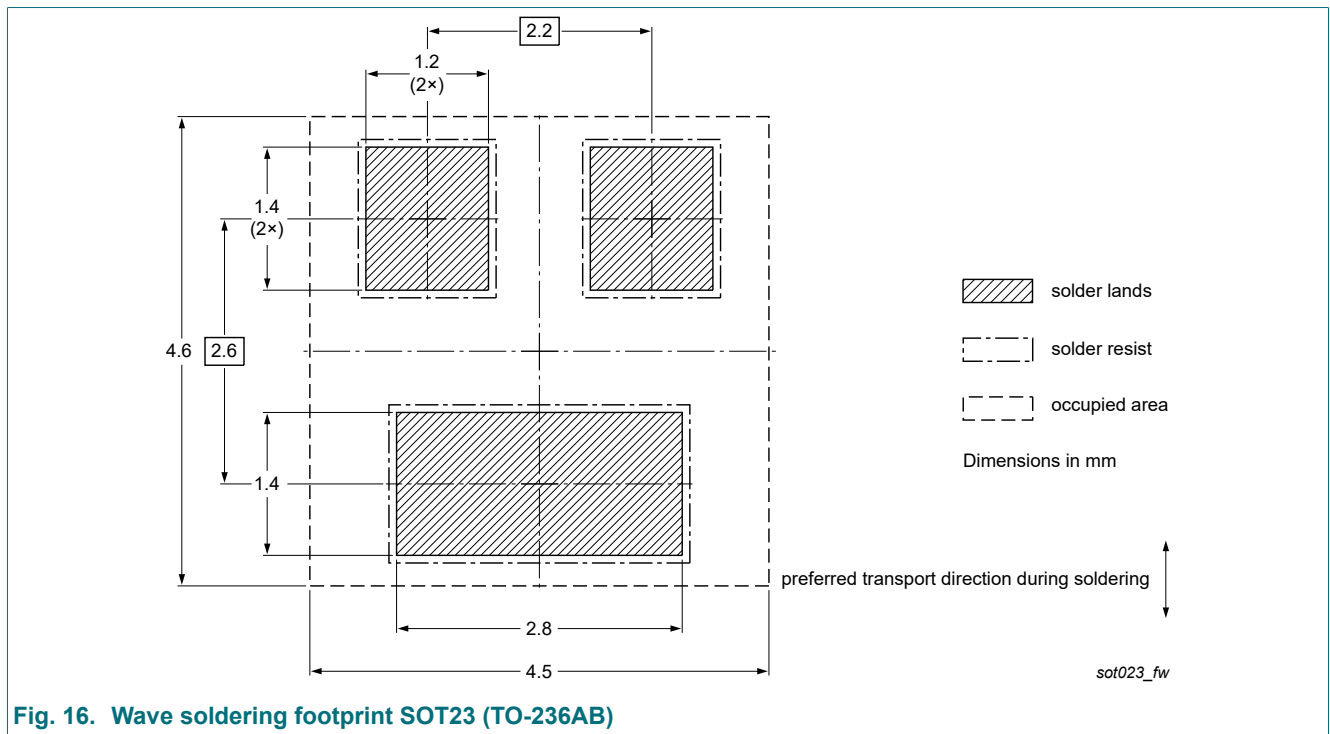


Fig. 16. Wave soldering footprint SOT23 (TO-236AB)

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC856-Q_BC857-Q_BC858-Q v.2	20220221	Product data sheet	-	BC856-Q_BC857-Q_BC858-Q v.1
Modifications:	<ul style="list-style-type: none"> Quick reference data: BC856-Q corrected to BC856B-Q at h_{FE} Limiting values and Characteristics: Product names changed to detailed descriptions 			
BC856-Q_BC857-Q_BC858-Q v.1	20210624	Product data sheet	-	-

15. 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.

- [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 <https://www.nexperia.com>.

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