

# BC857B,235 Datasheet



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DiGi Electronics Part Number	BC857B,235-DG
Manufacturer	<a href="#">Nexperia USA Inc.</a>
Manufacturer Product Number	BC857B,235
Description	TRANS PNP 45V 0.1A TO236AB
Detailed Description	Bipolar (BJT) Transistor PNP 45 V 100 mA 100MHz 2 50 mW Surface Mount TO-236AB



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## Purchase and inquiry

Manufacturer Product Number:

BC857B,235

Series:

-

Transistor Type:

PNP

Voltage - Collector Emitter Breakdown (Max):

45 V

Current - Collector Cutoff (Max):

15nA (ICBO)

Power - Max:

250 mW

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q101

Package / Case:

TO-236-3, SC-59, SOT-23-3

Base Product Number:

BC857

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Current - Collector (Ic) (Max):

100 mA

Vce Saturation (Max) @ Ib, Ic:

650mV @ 5mA, 100mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

220 @ 2mA, 5V

Frequency - Transition:

100MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

TO-236AB

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



# 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

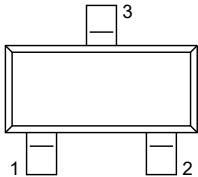
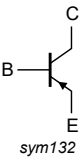
## 4. Quick reference data

**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

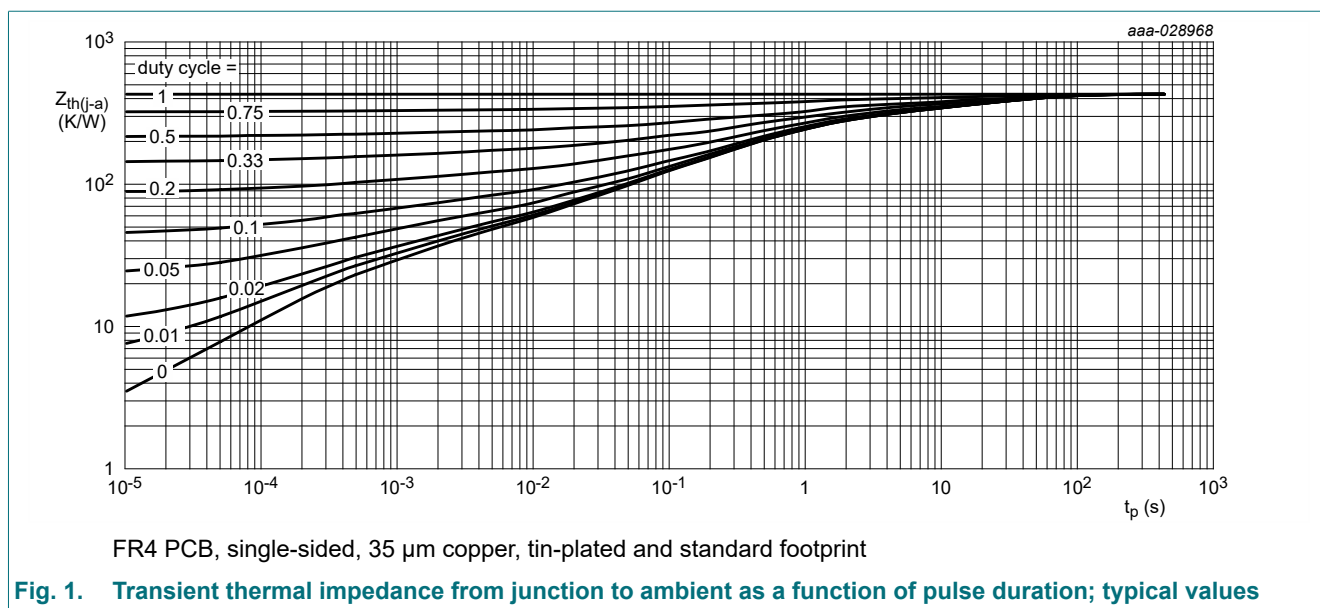
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 µm copper, tin-plated and standard footprint.

## 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.

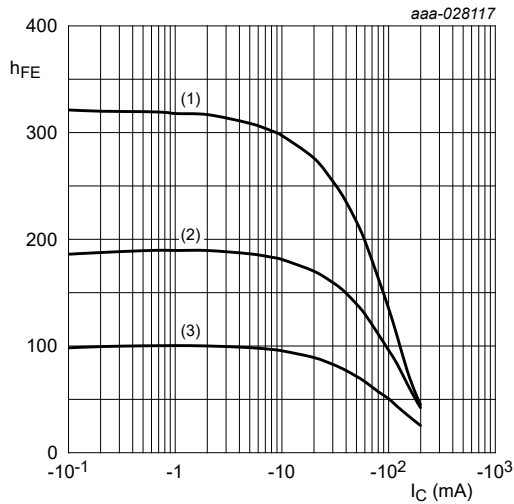


## 10. Characteristics

**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
		$I_C = -100\ \text{mA}; I_B = -5\ \text{mA}$	[1]	-	-250	-650
$V_{BEsat}$	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;  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$



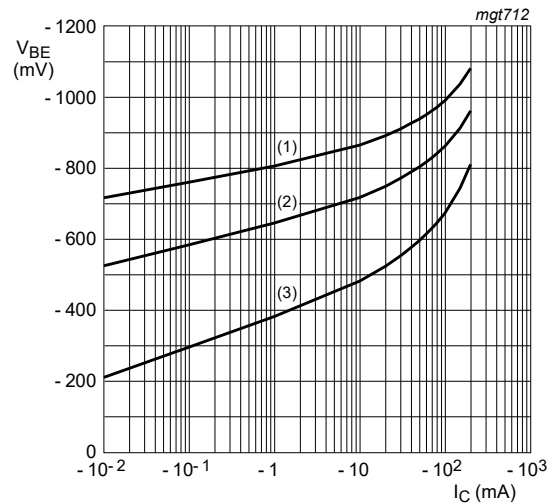
$$V_{CE} = -5 \text{ V}$$

(1)  $T_{amb} = 150 \text{ }^{\circ}\text{C}$

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

(3)  $T_{amb} = -55 \text{ }^{\circ}\text{C}$

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



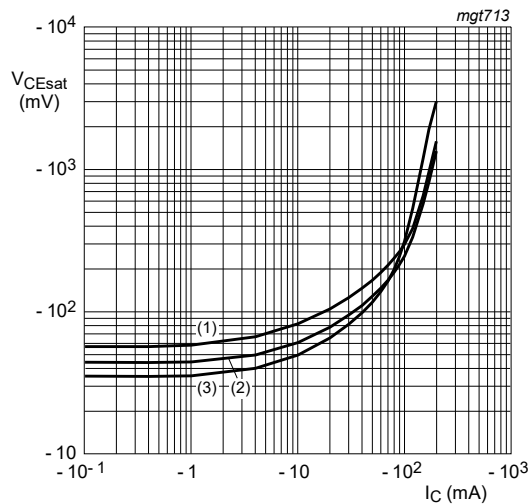
$$V_{CE} = -5 \text{ V}$$

(1)  $T_{amb} = -55 \text{ }^{\circ}\text{C}$

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

(3)  $T_{amb} = 150 \text{ }^{\circ}\text{C}$

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



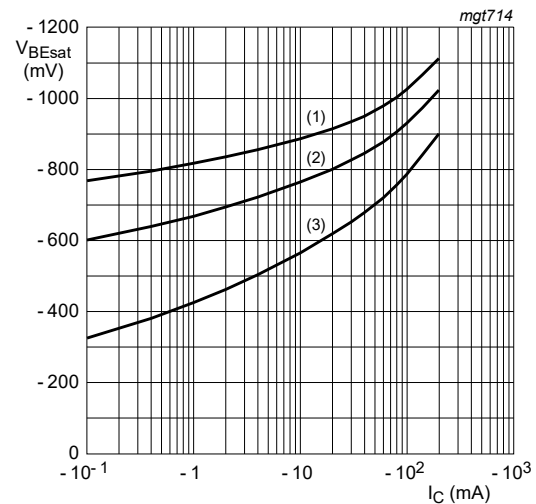
$$I_C/I_B = 20$$

(1)  $T_{amb} = 150 \text{ }^{\circ}\text{C}$

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

(3)  $T_{amb} = -55 \text{ }^{\circ}\text{C}$

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



$$I_C/I_B = 20$$

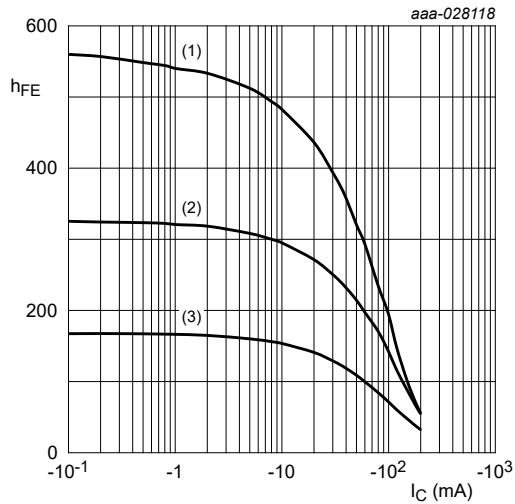
(1)  $T_{amb} = -55 \text{ }^{\circ}\text{C}$

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

(3)  $T_{amb} = 150 \text{ }^{\circ}\text{C}$

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





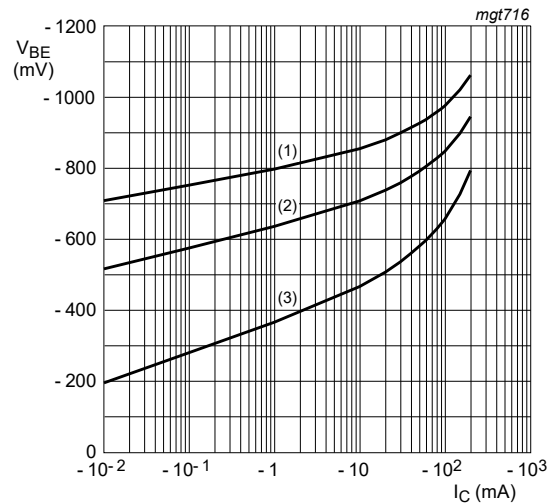
$V_{CE} = -5 \text{ V}$

(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



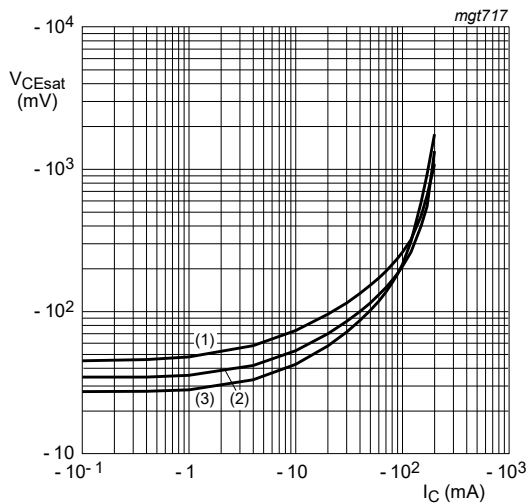
$V_{CE} = -5 \text{ V}$

(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



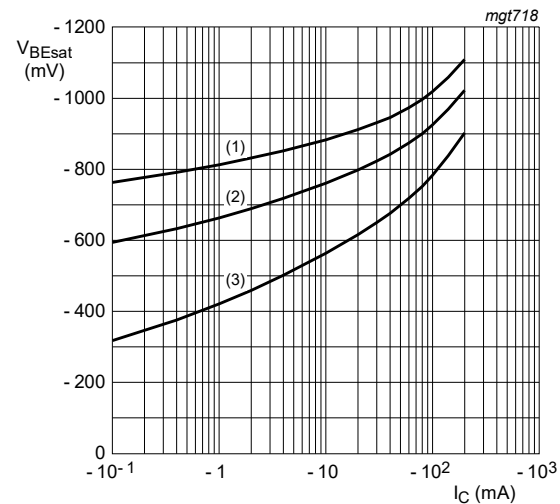
$I_C/I_B = 20$

(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



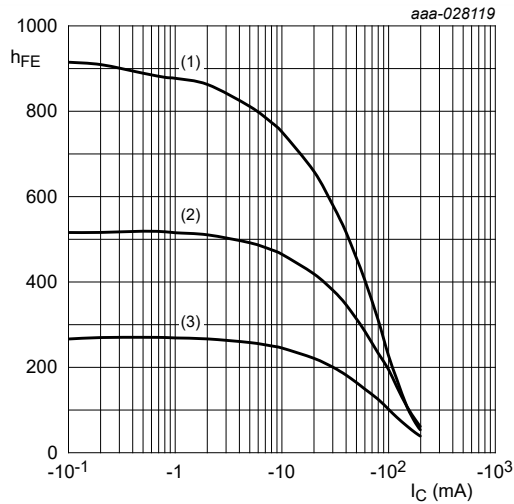
$I_C/I_B = 20$

(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



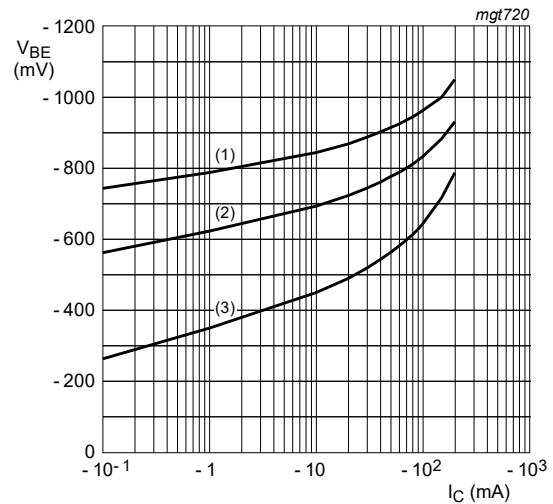
$$V_{CE} = -5 \text{ V}$$

$$(1) T_{amb} = 150 \text{ }^{\circ}\text{C}$$

$$(2) T_{amb} = 25 \text{ }^{\circ}\text{C}$$

$$(3) T_{amb} = -55 \text{ }^{\circ}\text{C}$$

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



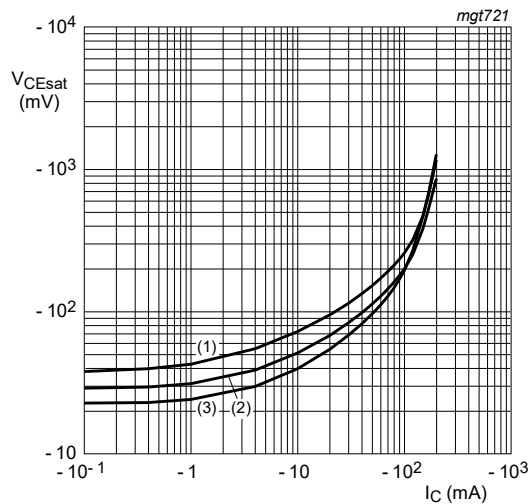
$$V_{CE} = -5 \text{ V}$$

$$(1) T_{amb} = -55 \text{ }^{\circ}\text{C}$$

$$(2) T_{amb} = 25 \text{ }^{\circ}\text{C}$$

$$(3) T_{amb} = 150 \text{ }^{\circ}\text{C}$$

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



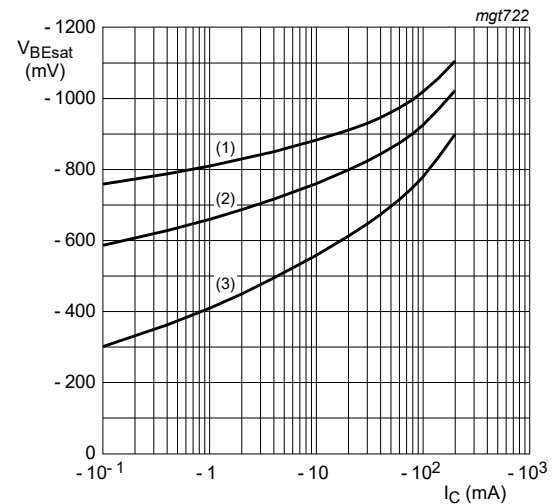
$$I_C/I_B = 20$$

$$(1) T_{amb} = 150 \text{ }^{\circ}\text{C}$$

$$(2) T_{amb} = 25 \text{ }^{\circ}\text{C}$$

$$(3) T_{amb} = -55 \text{ }^{\circ}\text{C}$$

**Fig. 12. BC857C: Collector-emitter saturation voltage as a function of collector current; typical values**



$$I_C/I_B = 20$$

$$(1) T_{amb} = -55 \text{ }^{\circ}\text{C}$$

$$(2) T_{amb} = 25 \text{ }^{\circ}\text{C}$$

$$(3) T_{amb} = 150 \text{ }^{\circ}\text{C}$$

**Fig. 13. BC857C: Base-emitter saturation voltage as a function of collector current; typical values**

## 11. Package outline

Table 9. Package outline

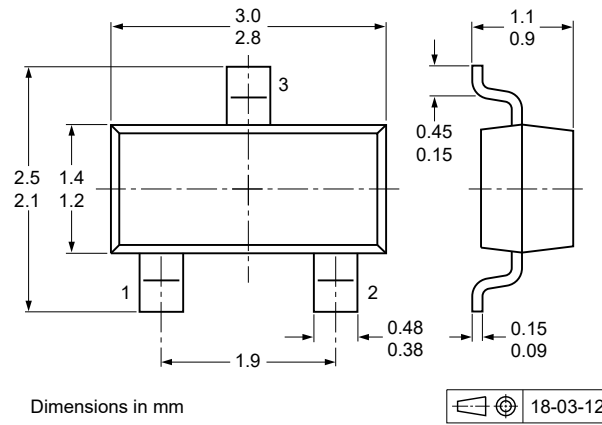
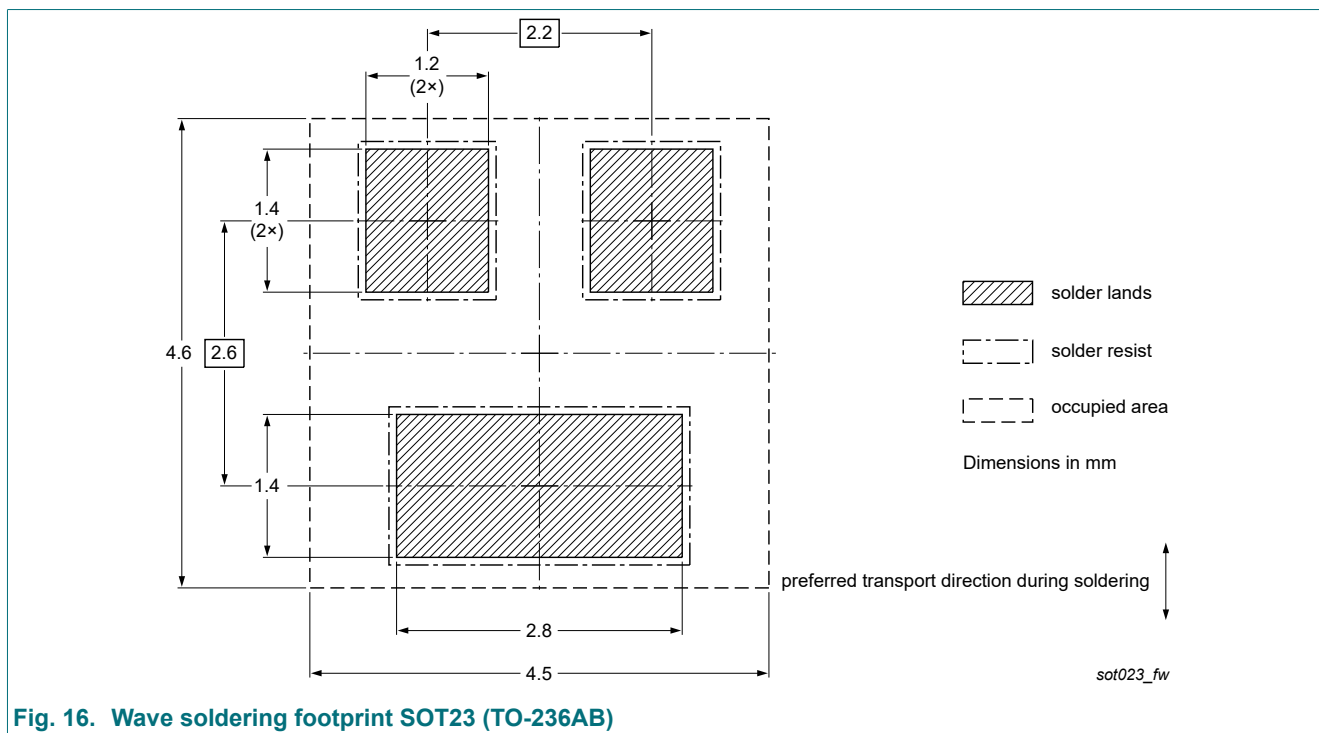
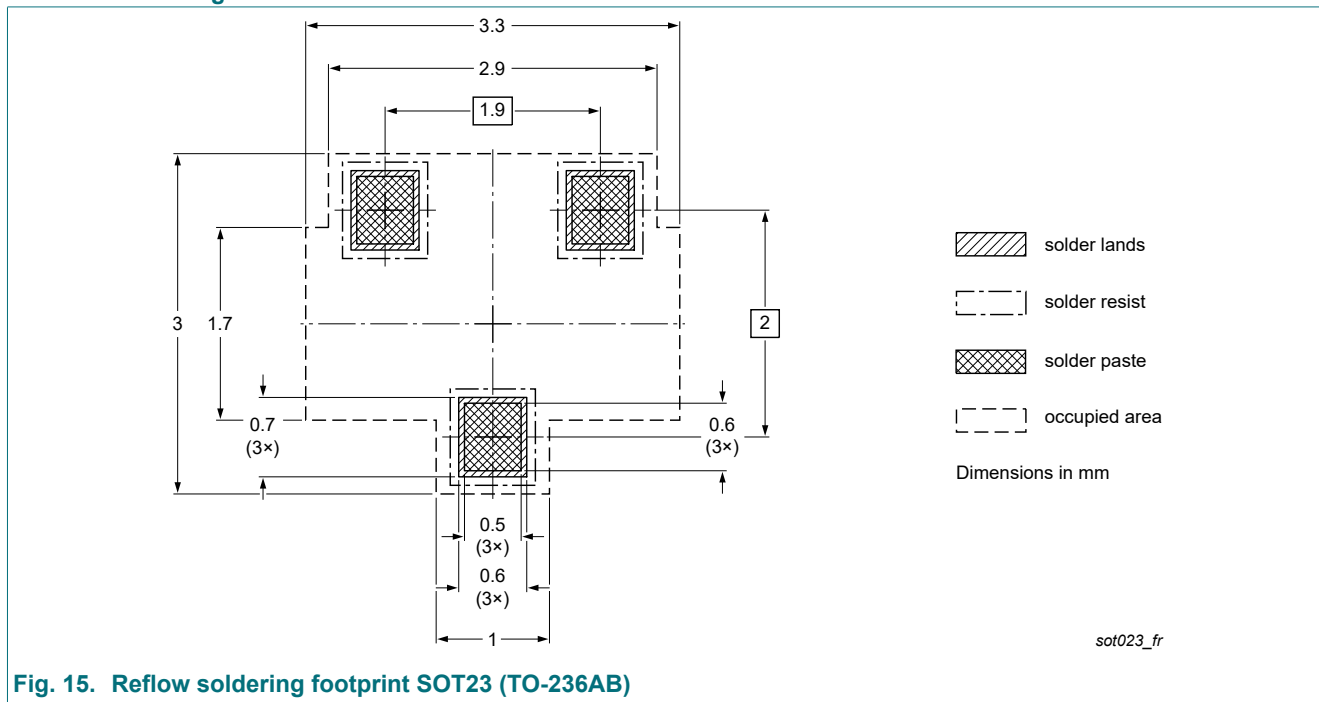


Fig. 14. Package outline SOT23 (TO-236AB)

## 12. Soldering

Table 10. Soldering



## 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 <a href="http://nexperia.com">nexperia.com</a> 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.

- [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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## 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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