



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

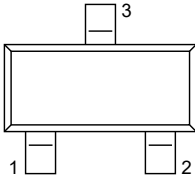
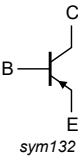
4. Quick reference data

Table 2. Quick reference data
T_{amb} = 25 °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 V; I _C = 2 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		
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC856	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BC856A			
BC856B			
BC857			
BC857A			
BC857B			
BC857C			
BC858B			

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	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[1] -	250	mW
T_j	junction temperature		-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		-65	150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-65	150	$^{\circ}\text{C}$

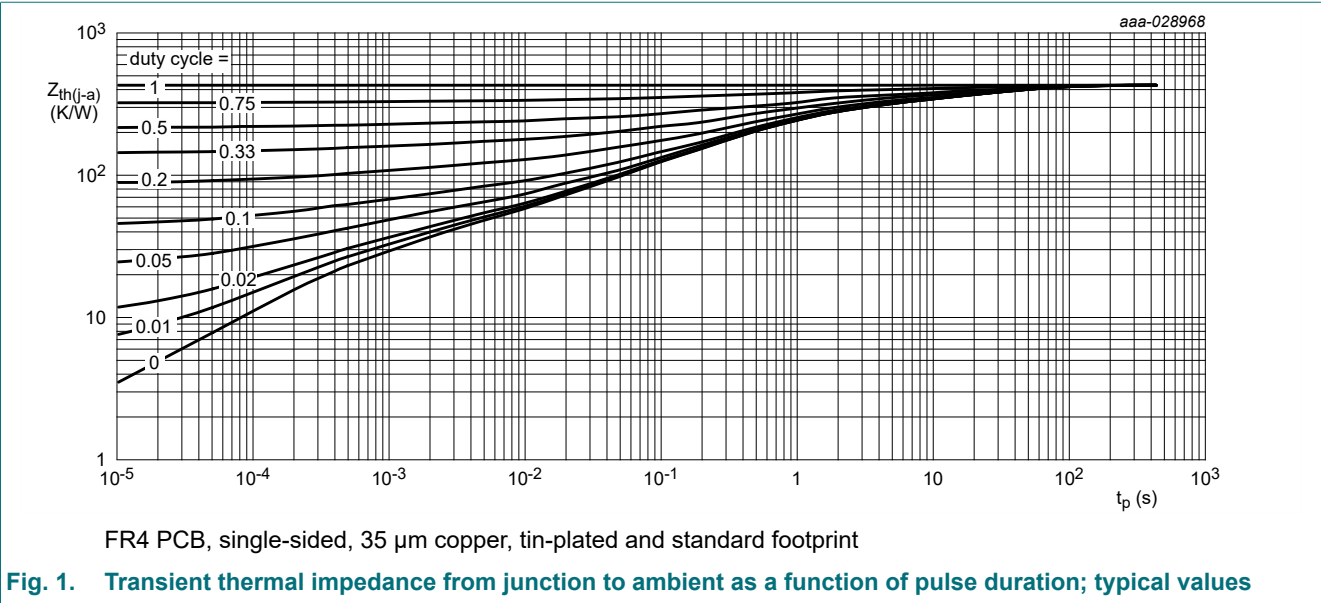
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided, 35 μm copper, tin-plated and standard footprint.

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 µm 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	$I_C = -100\text{ }\mu\text{A}; I_E = 0\text{ A}$	-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	$I_C = 0\text{ A}; I_E = -100\text{ }\mu\text{A}$	-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					
	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	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	$V_{CB} = -10\text{ V}; I_E = I_B = 0\text{ A}; f = 1\text{ MHz}$	-	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	$I_C = -200\text{ }\mu\text{A}; V_{CE} = -5\text{ V}; R_S = 2\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	-	2	10	dB

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

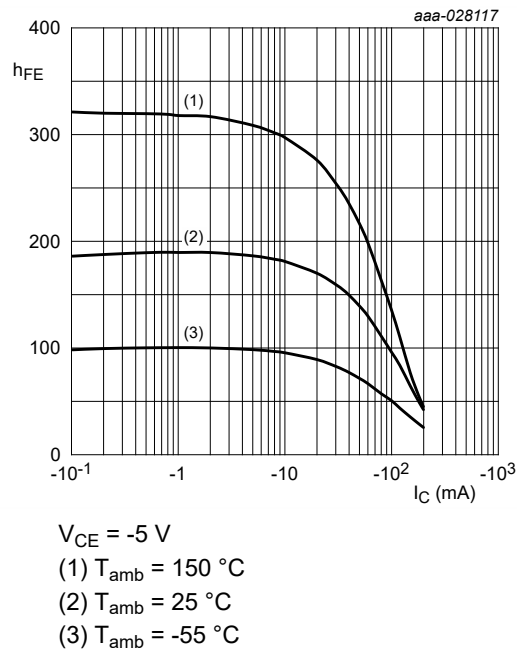


Fig. 2. BC856A; BC857A: DC current gain as a function of collector current; typical values

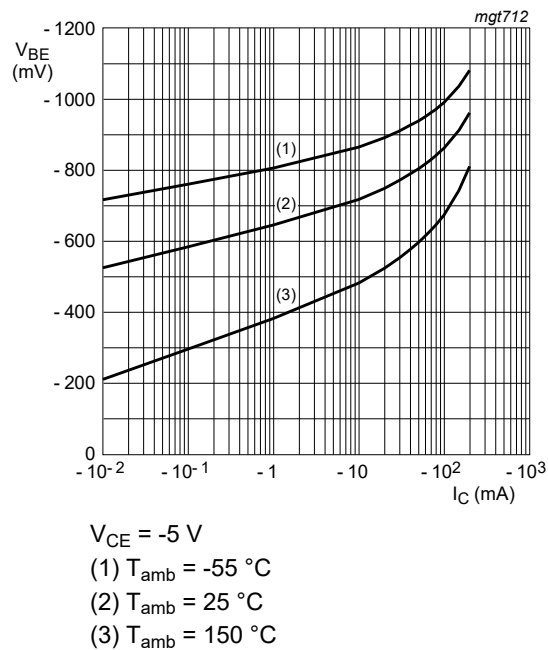


Fig. 3. BC856A; BC857A: Base-emitter voltage as a function of collector current; typical values

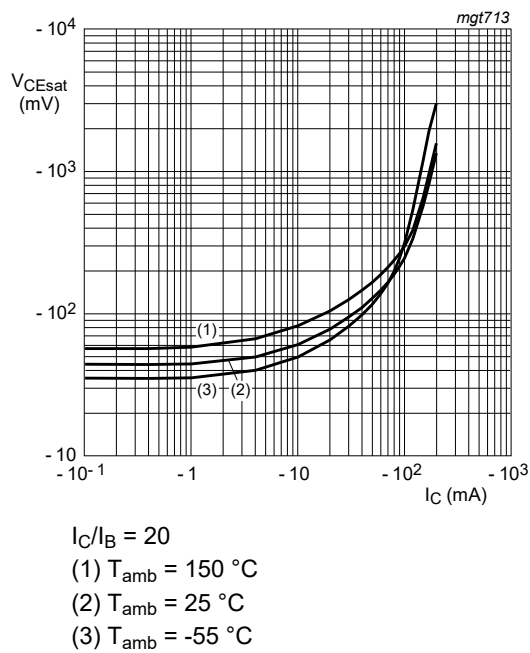


Fig. 4. BC856A; BC857A: Collector-emitter saturation voltage as a function of collector current; typical values

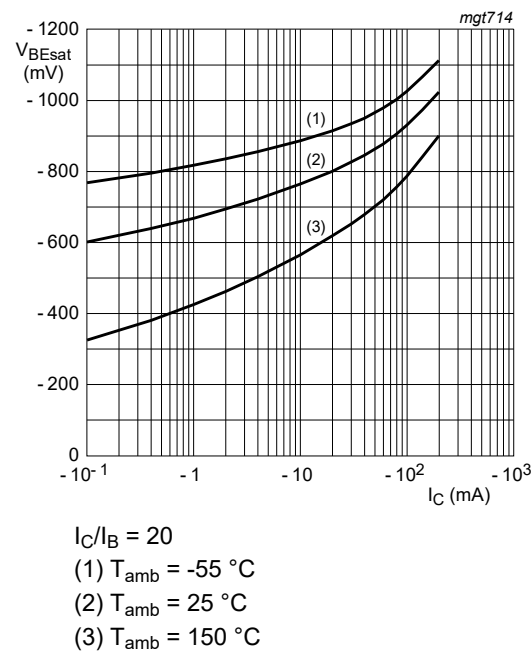
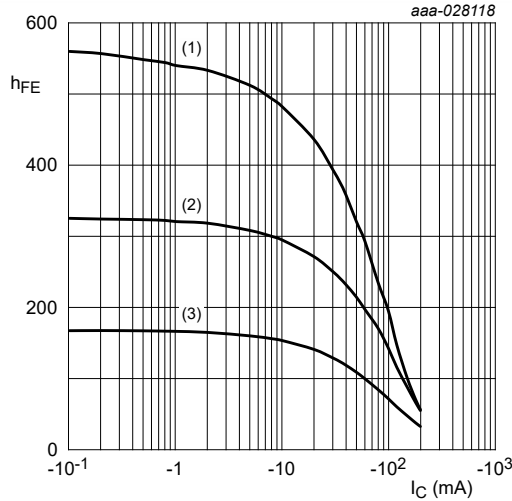
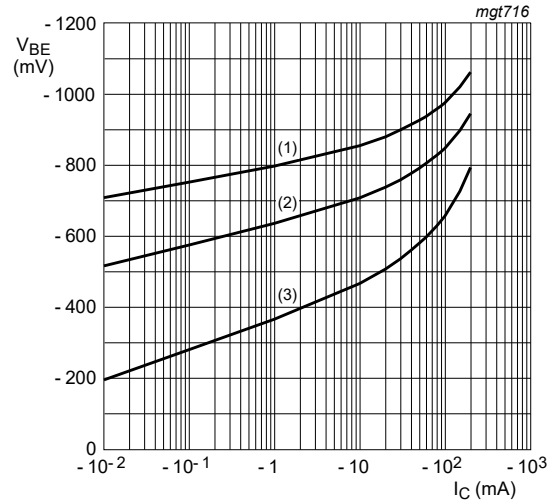


Fig. 5. BC856A; BC857A: Base-emitter saturation voltage as a function of collector current; typical values



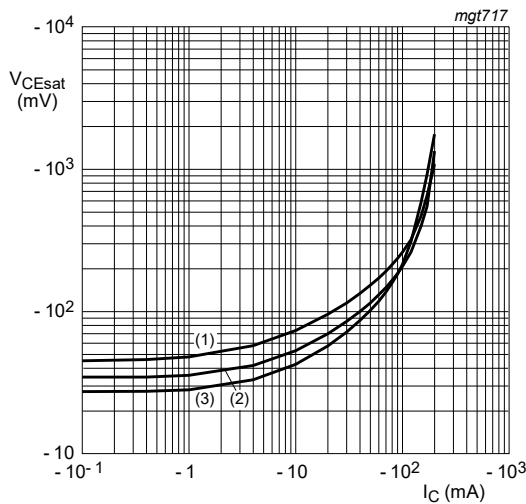
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

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



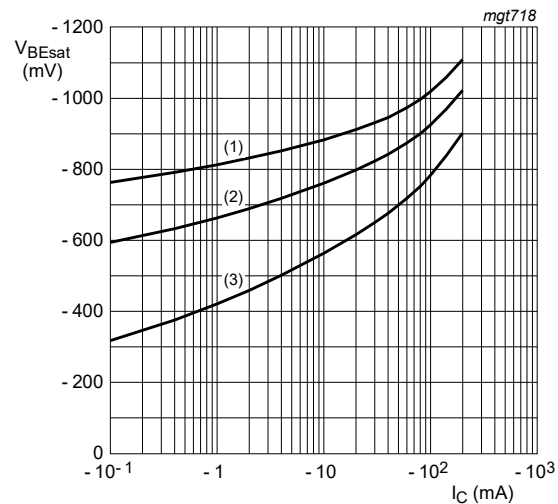
$V_{CE} = -5 \text{ V}$
 (1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

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

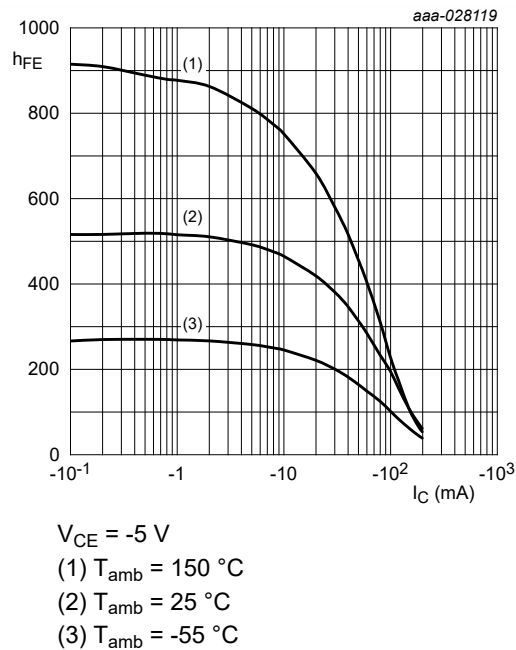


Fig. 10. BC857C: DC current gain as a function of collector current; typical values

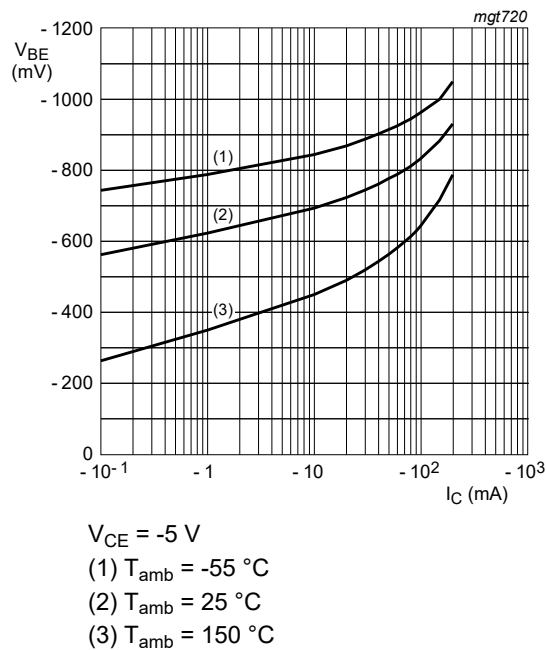


Fig. 11. BC857C: Base-emitter voltage as a function of collector current; typical values

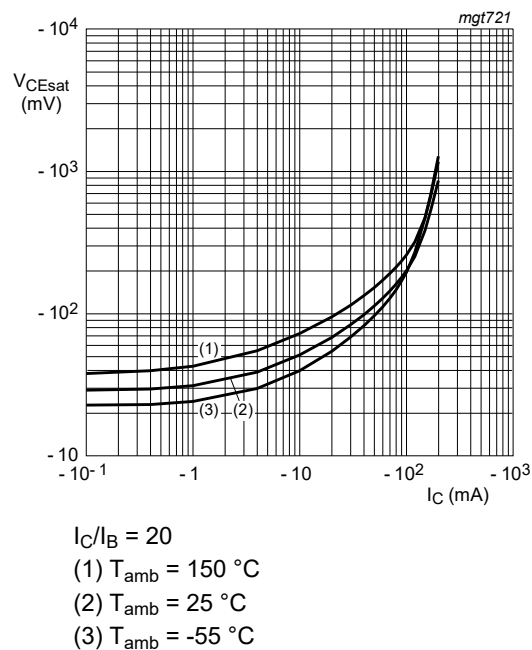


Fig. 12. BC857C: Collector-emitter saturation voltage as a function of collector current; typical values

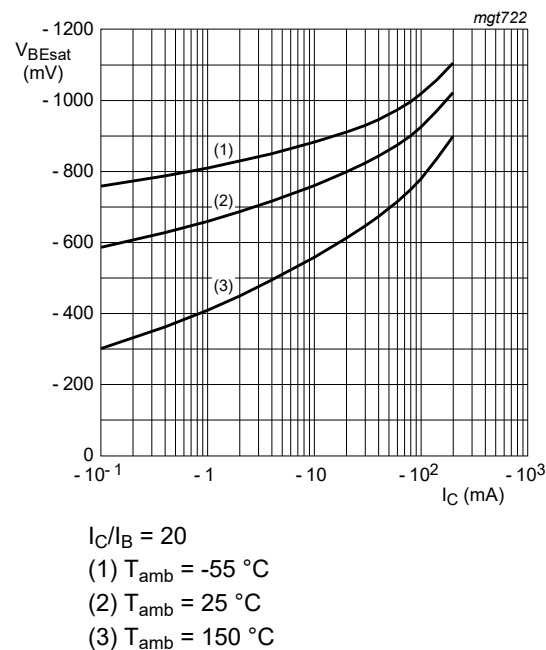


Fig. 13. BC857C: Base-emitter saturation voltage as a function of collector current; typical values

11. Package outline

Table 9. Package outline

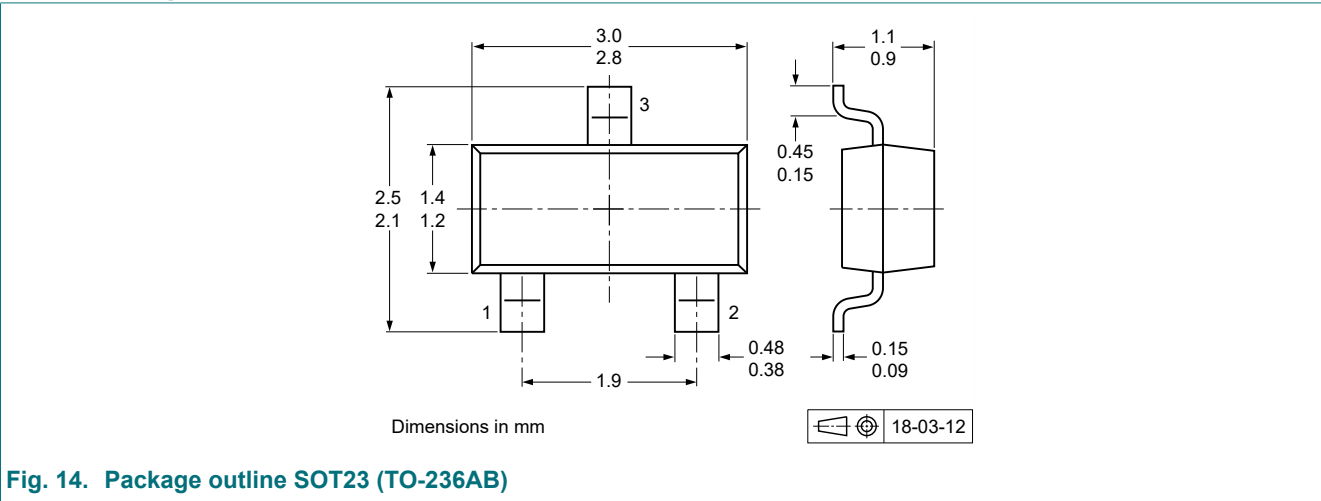


Fig. 14. Package outline SOT23 (TO-236AB)

12. Soldering

Table 10. Soldering

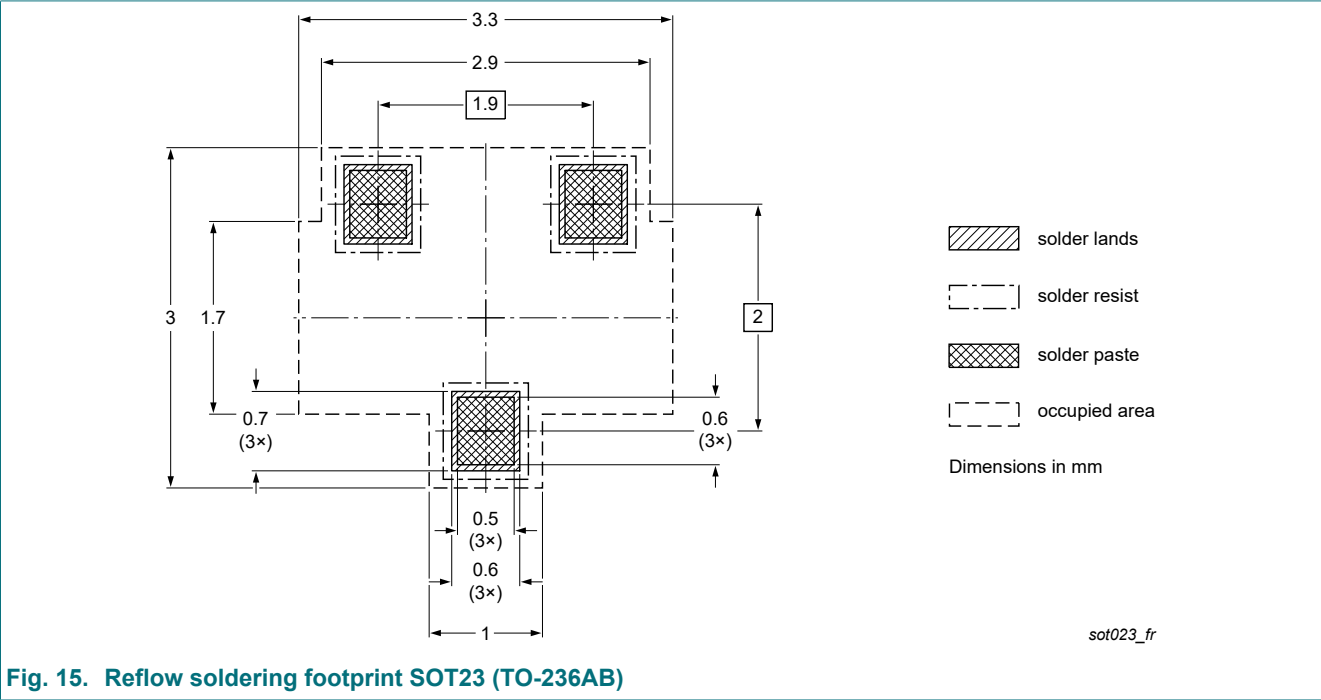


Fig. 15. Reflow soldering footprint SOT23 (TO-236AB)

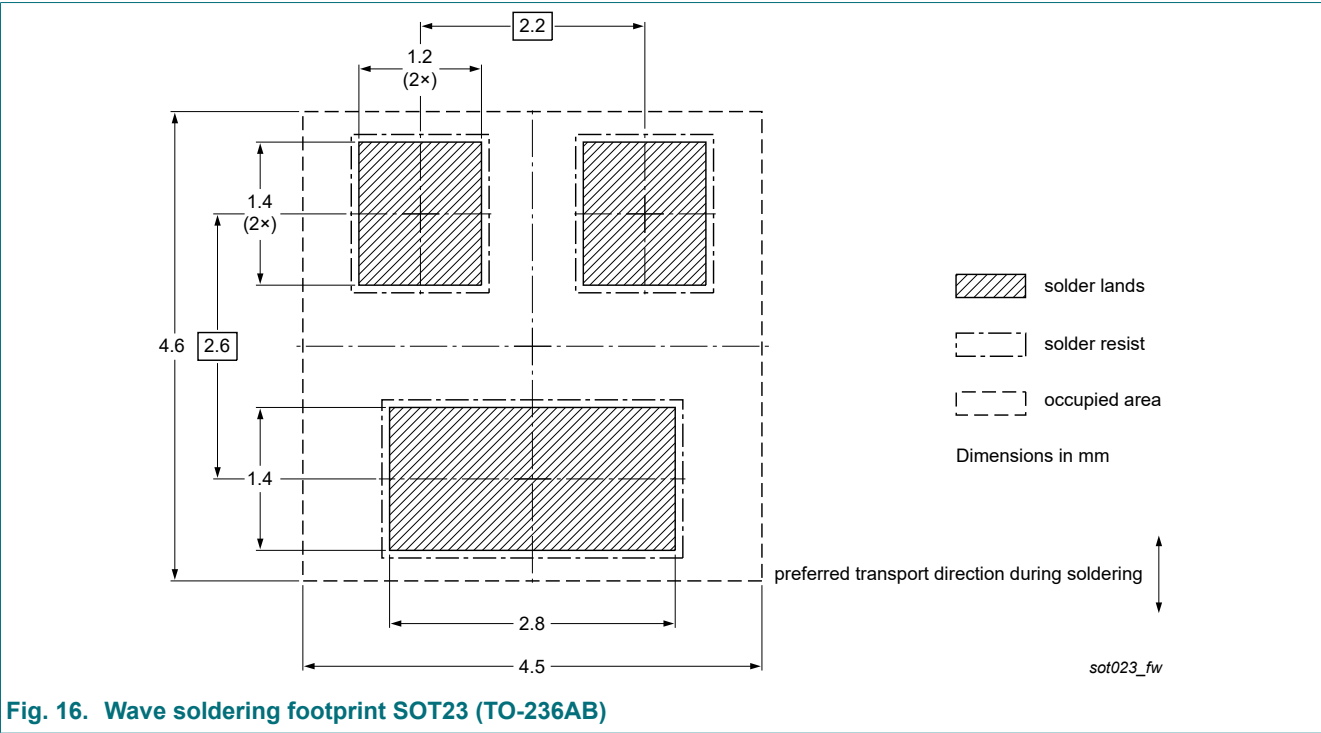


Fig. 16. Wave soldering footprint SOT23 (TO-236AB)

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:	• Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
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".
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