

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

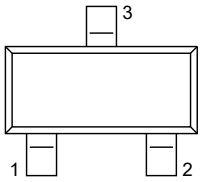
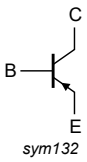
Table 2. Quick reference data

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	Descrition	Simlified 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			

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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	$T_{amb} \leq 25$ °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.

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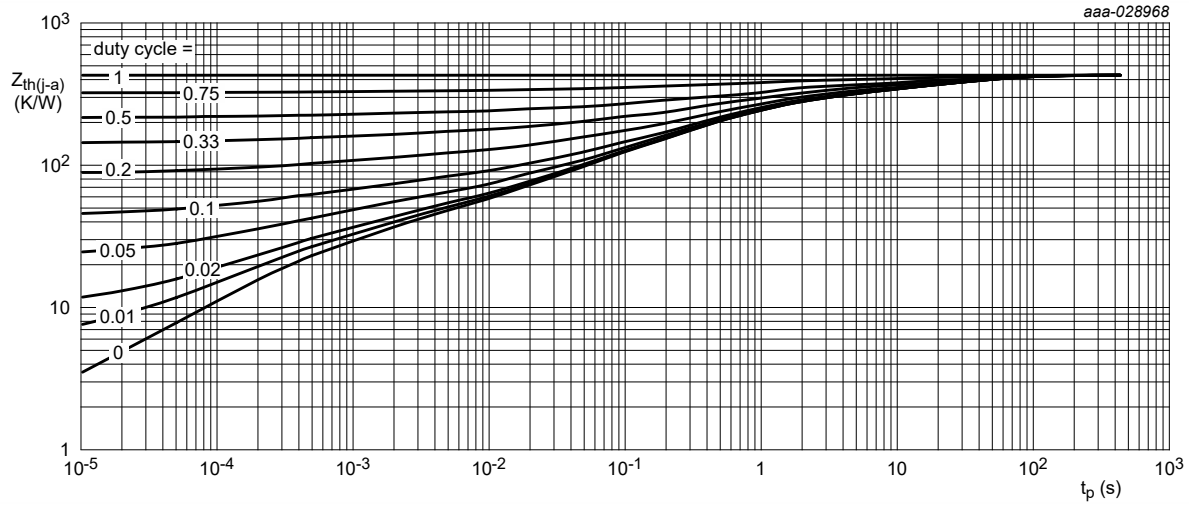
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9. Thermal characteristics

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.



FR4 PCB, single-sided, 35 µm copper, tin-plated and standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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10. Characteristics

Table 8. Characteristics

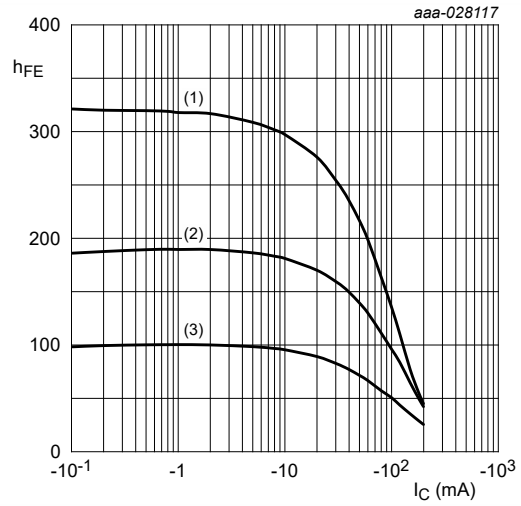
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage						
	BC856; BC856A; BC856B	I_C = -100 µA; I_E = 0 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 mA; I_B = 0 A		-65	-	-	V
	BC857; BC857A; BC857B; BC857C			-45	-	-	V
	BC858B			-30	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_C = 0 A; I_E = -100 µA		-5	-	-	V
I_{CBO}	collector-base cut-off current	V_{CB} = -30 V; I_E = 0 A		-	-1	-15	nA
		V_{CB} = -30 V; I_E = 0 A; T_j = 150 °C		-	-	-4	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A		-	-	-100	nA
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	
V_{CEsat}	collector-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA		-	-75	-300	mV
		I_C = -100 mA; I_B = -5 mA	[1]	-	-250	-650	mV
V_{BEsat}	base-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA	[1]	-	-700	-	mV
		I_C = -100 mA; I_B = -5 mA	[1]	-	-850	-	mV
V_{BE}	base-emitter voltage	V_{CE} = -5 V; I_C = -2 mA		-600	-650	-750	mV
		V_{CE} = -5 V; I_C = -10 mA		-	-	-820	mV
C_c	collector capacitance	V_{CB} = -10 V; I_E = i_e = 0 A; f = 1 MHz		-	4.5	-	pF
f_T	transition frequency	V_{CE} = -5 V; I_C = -10 mA; f = 100 MHz		100	-	-	MHz
NF	noise figure	I_C = -200 µA; V_{CE} = -5 V; R_S = 2 kΩ; f = 1 kHz; B = 200Hz		-	2	10	dB

[1] pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$

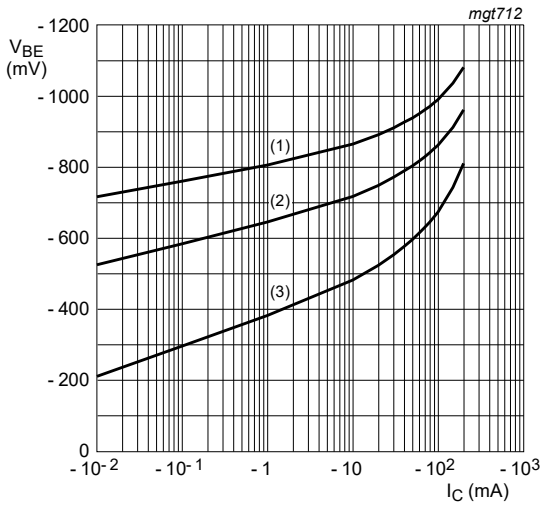
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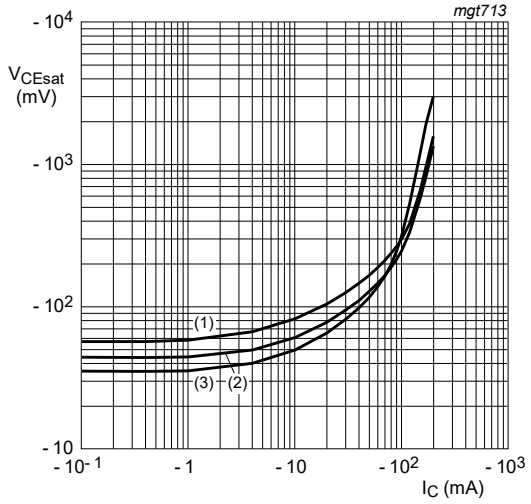
V_{CE} = -5 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



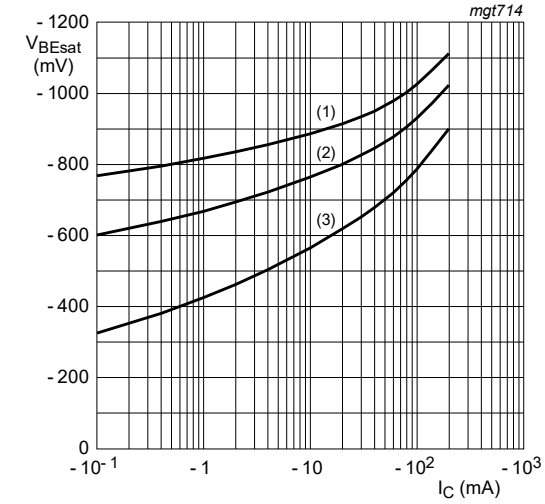
V_{CE} = -5 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



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

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

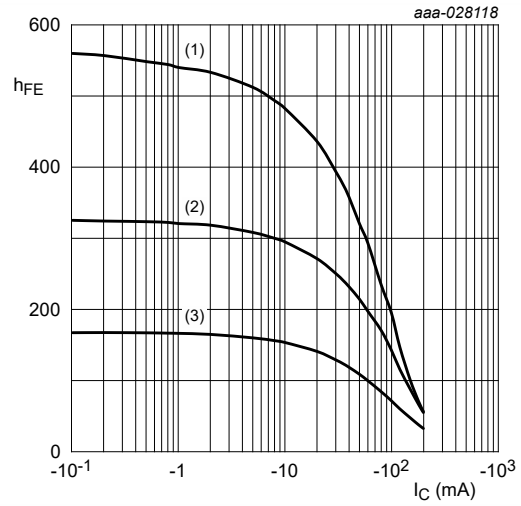


I_C/I_B = 20
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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

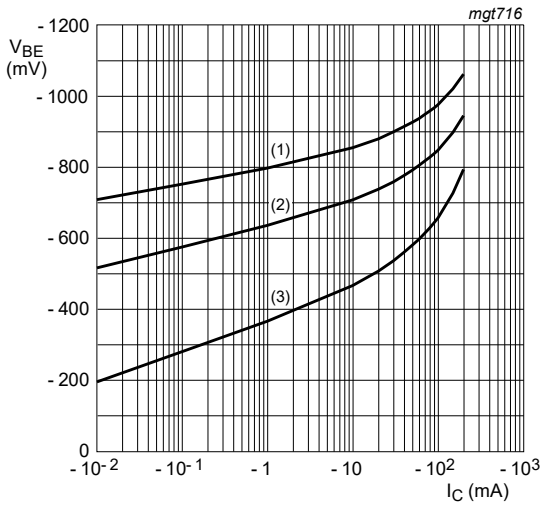
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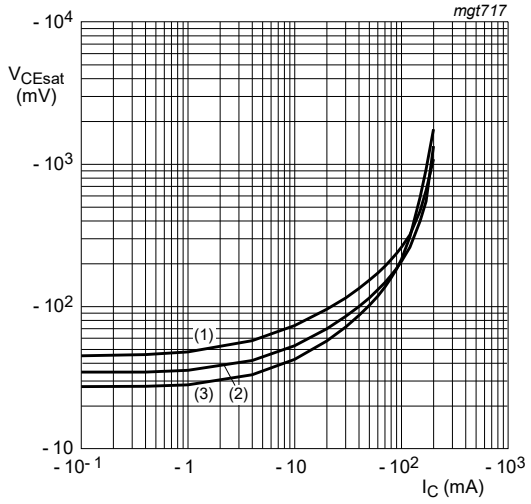
V_{CE} = -5 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



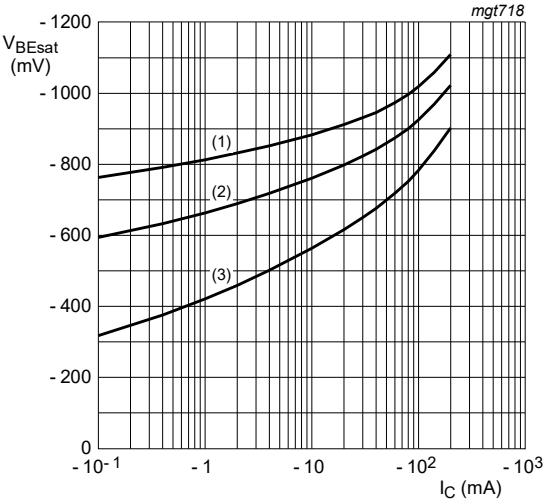
V_{CE} = -5 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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

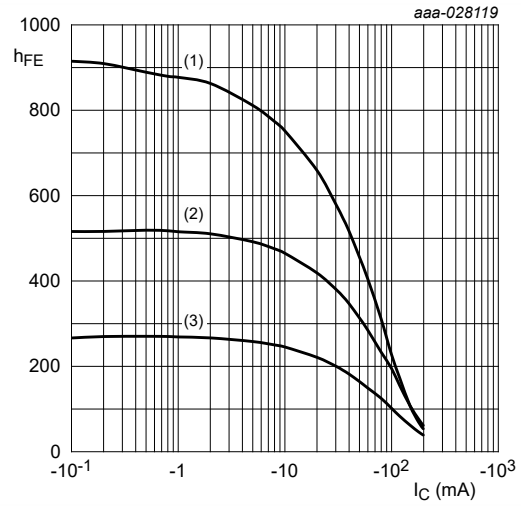


I_C/I_B = 20
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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

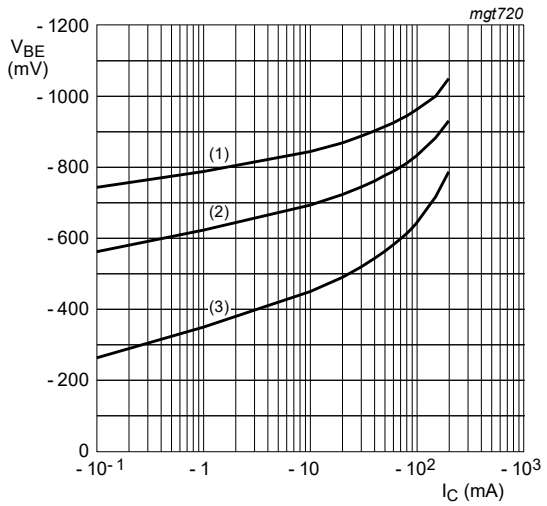
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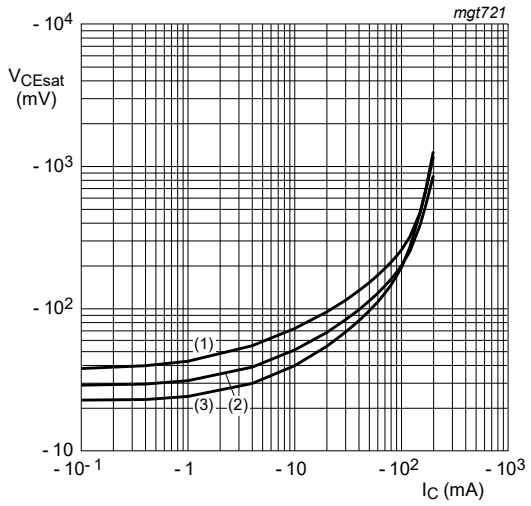
V_{CE} = -5 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

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



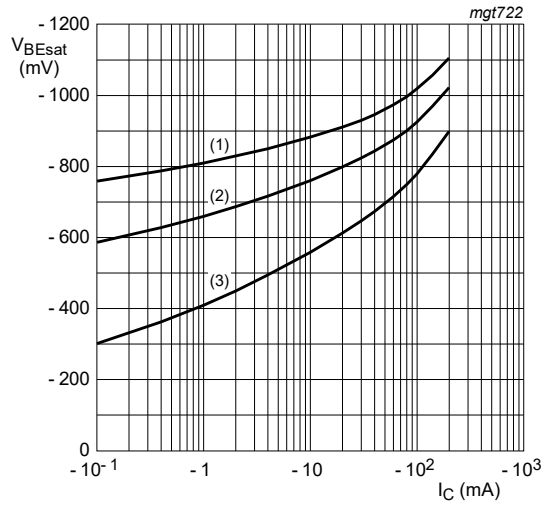
V_{CE} = -5 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



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

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

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11. Package outline

Table 9. Package outline

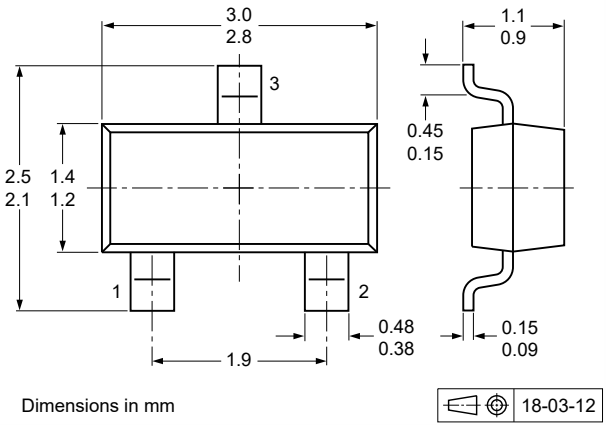


Fig. 14. Package outline SOT23 (TO-236AB)

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12. Soldering

Table 10. Soldering

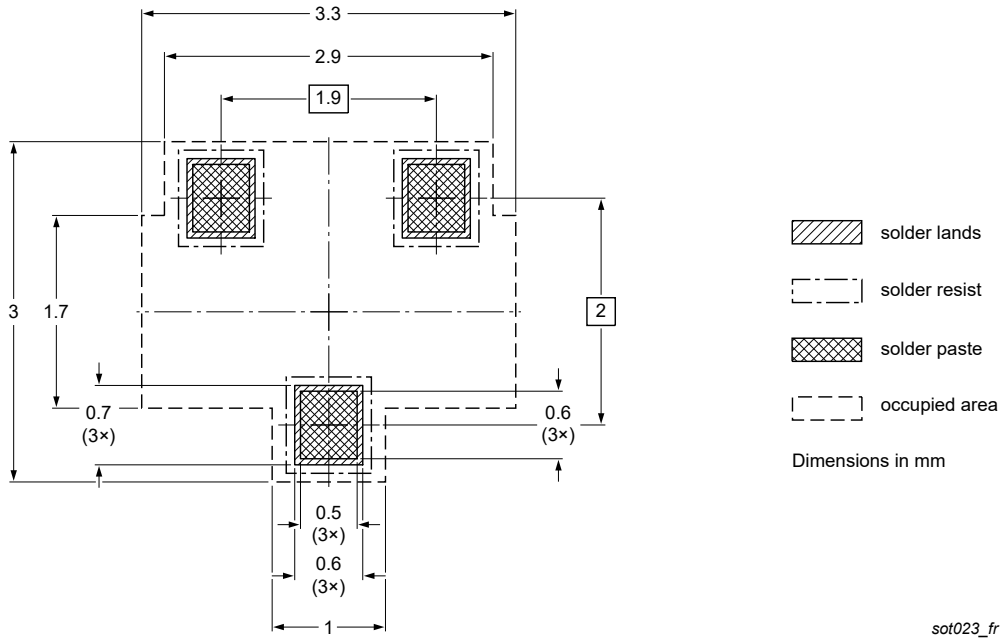


Fig. 15. Reflow soldering footprint SOT23 (TO-236AB)

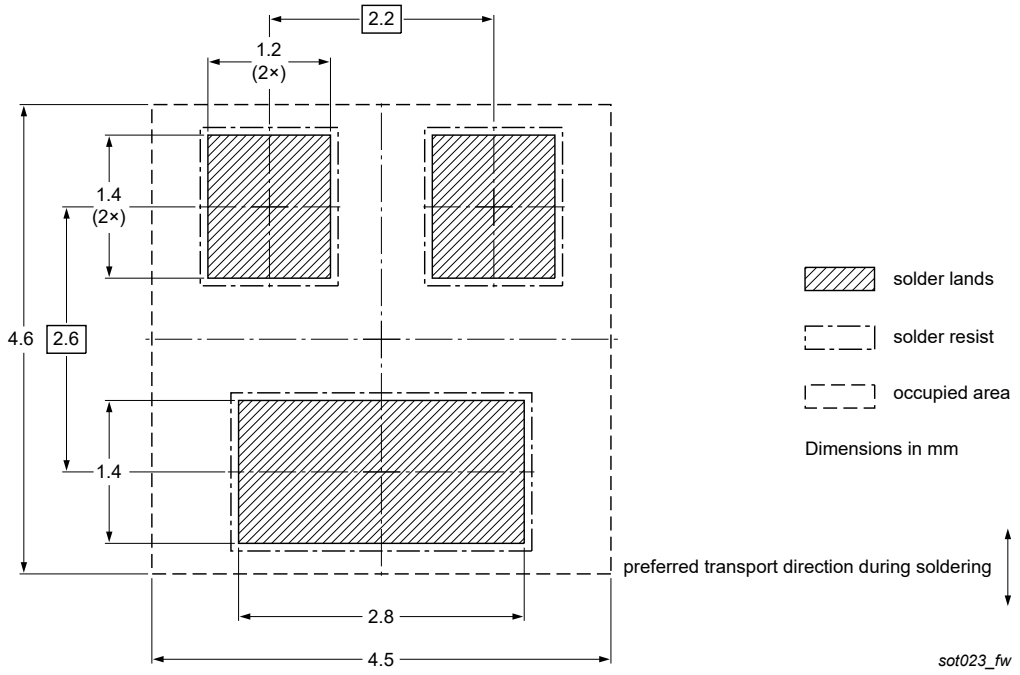


Fig. 16. Wave soldering footprint SOT23 (TO-236AB)

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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

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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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