



BC847x series

45 V, 100 mA NPN general-purpose transistors

Rev. 13 — 1 July 2022

Product data sheet

1. General description

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

Table 1. Product overview

Type number[1]	Package			PNP complement
	Nexperia	JEITA	JEDEC	
BC847	SOT23	-	TO-236AB	BC857
BC847A				BC857A
BC847B				BC857B
BC847C				BC857C

[1] Valid for all available selection groups.

2. Features and benefits

- General-purpose transistors
- SMD plastic packages
- Three different gain selections

3. Applications

- General-purpose switching and amplification

4. Quick reference data

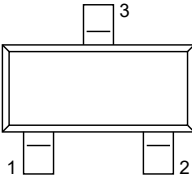
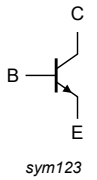
Table 2. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
I_C	collector current		-	-	100	mA
h_{FE}	DC current gain					
	BC847	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	110	-	800	
	BC847A		110	180	220	
	BC847B		200	290	450	
	BC847C		420	520	800	

5. Pinning information

Table 3. Pinning information

Pin	Symbol	Description	Simlified outline	Graphic symbol
1	B	base		 sym123
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC847	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BC847A			
BC847B			
BC847C			

7. Marking

Table 5. Marking codes

Type number		Marking code
BC847	[1]	1H%
BC847A	[1]	1E%
BC847B	[1]	1F%
BC847C	[1]	1G%

[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	-	50	V
V _{CEO}	collector-emitter voltage	open base	-	45	V
V _{EBO}	emitter-base voltage	open collector	-	6	V
I _C	collector current		-	100	mA
I _{CM}	peak collector current	single pulse; t _p ≤ 1 ms	-	200	mA
I _{BM}	peak base current	single pulse; t _p ≤ 1 ms	-	100	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

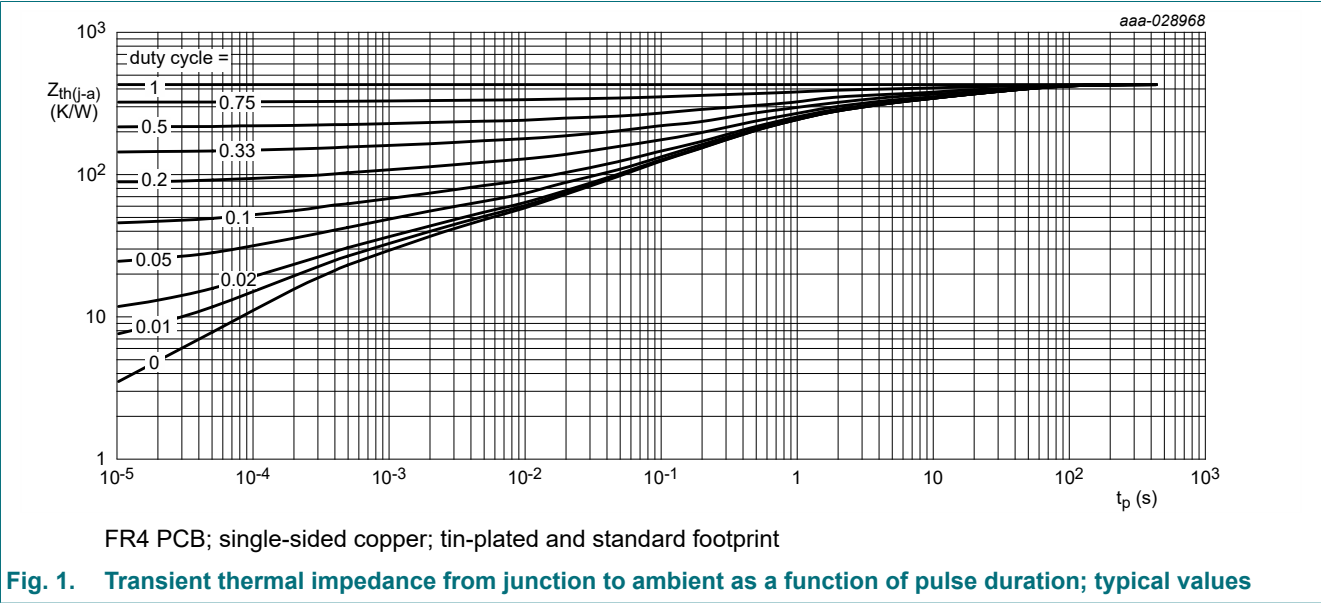
[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.

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 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	I _C = 100 μA; I _E = 0 A		50	-	-	V
V _{(BR)CES}	collector-emitter breakdown voltage	I _C = 2 mA; V _{BE} = 0 A		45	-	-	V
V _{(BR)EBO}	emitter-base breakdown voltage	I _C = 0 A; I _E = 100 μA		6	-	-	V
I _{CBO}	collector-base cut-off current	V _{CB} = 30 V; I _E = 0 A		-	-	15	nA
		V _{CB} = 30 V; I _E = 0 A; T _J = 150 °C		-	-	5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A		-	-	100	nA
h _{FE}	DC current gain						
	BC847A	V _{CE} = 5 V; I _C = 10 μA		-	170	-	
	BC847B			-	280	-	
	BC847C			-	420	-	
	BC847	V _{CE} = 5 V; I _C = 2 mA		110	-	800	
	BC847A			110	180	220	
	BC847B			200	290	450	
	BC847C			420	520	800	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA		-	90	200	mV
		I _C = 100 mA; I _B = 5 mA	[1]	-	200	400	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA	[2]	-	700	-	mV
		I _C = 100 mA; I _B = 5 mA	[2]	-	900	-	mV
V _{BE}	base-emitter voltage	V _{CE} = 5 V; I _C = 2 mA	[2]	580	660	700	mV
		V _{CE} = 5 V; I _C = 10 mA		-	-	770	mV
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz		100	-	-	MHz
C _c	collector capacitance	V _{CB} = 10 V; I _E = i _e = 0 A; f = 1 MHz		-	-	1.5	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = i _c = 0 A; f = 1 MHz		-	11	-	pF
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; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$

[2] V_{BE} decreases by approximately 2 mV/K with increasing temperature

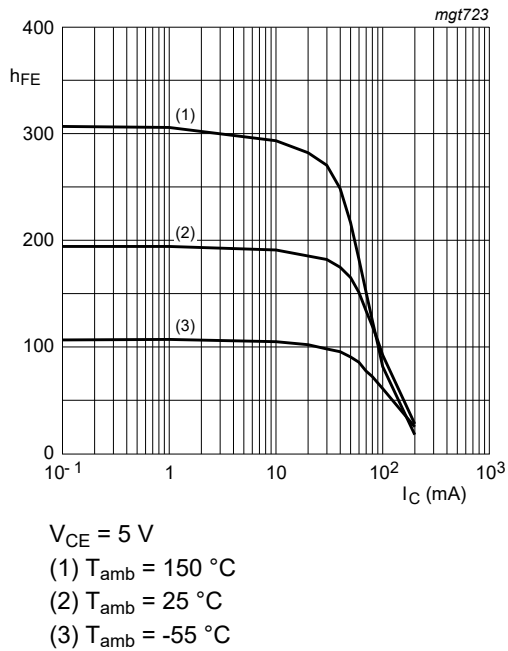


Fig. 2. BC847A: DC current gain as a function of collector current; typical values

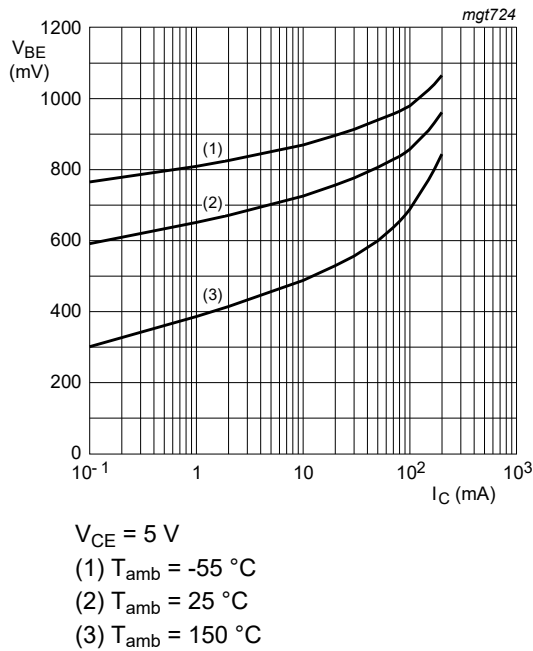


Fig. 3. BC847A: Base-emitter voltage as a function of collector current; typical values

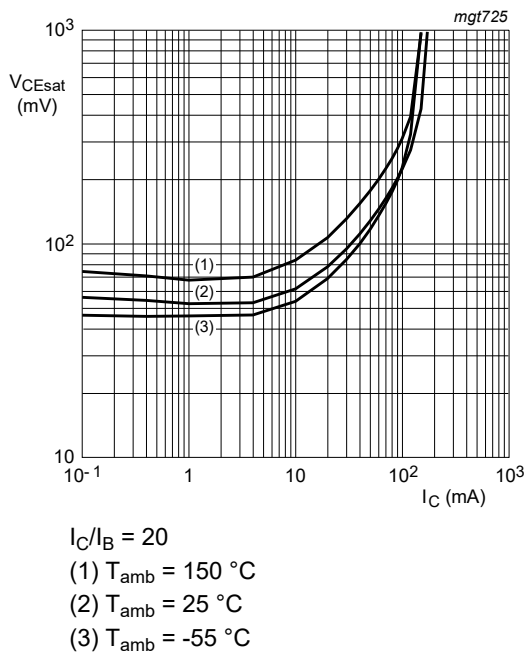


Fig. 4. BC847A: Collector-emitter saturation voltage as a function of collector current; typical values

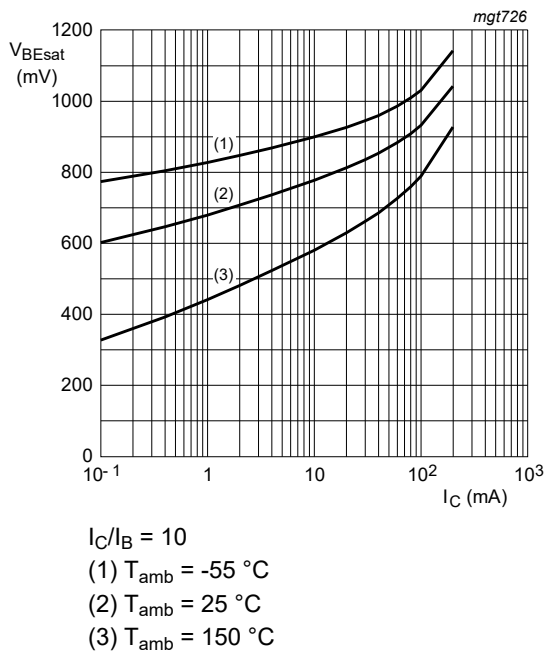


Fig. 5. BC847A: Base-emitter saturation voltage as a function of collector current; typical values

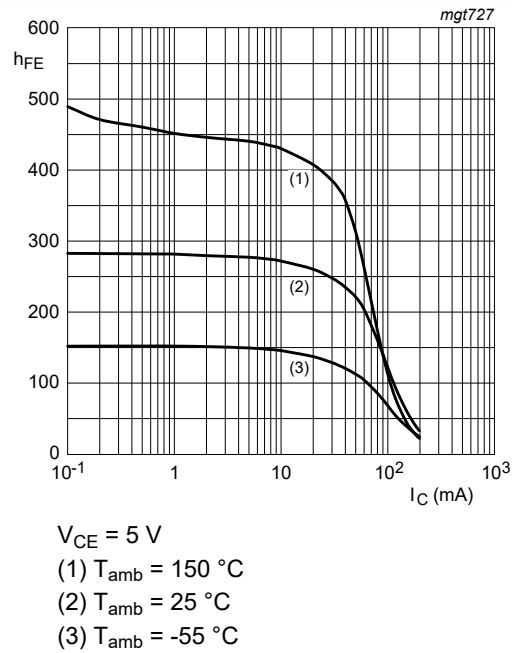


Fig. 6. BC847B: DC current gain as a function of collector current; typical values

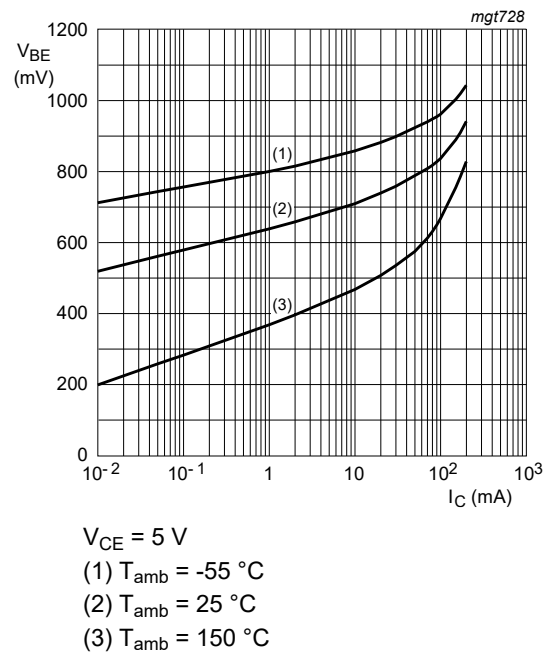


Fig. 7. BC847B: Base-emitter voltage as a function of collector current; typical values

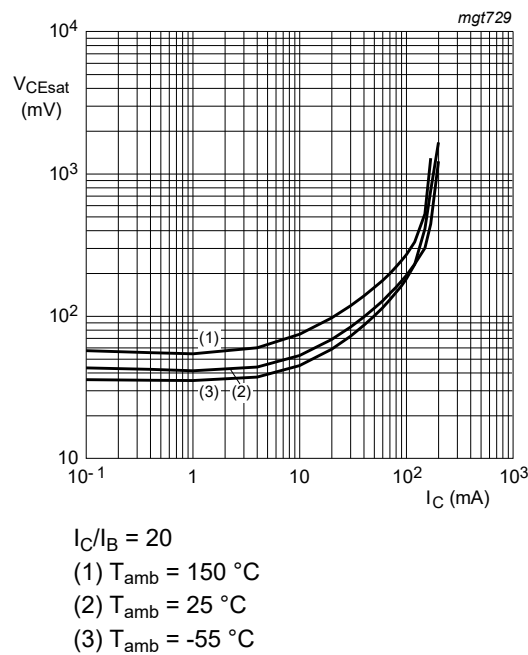


Fig. 8. BC847B: Collector-emitter saturation voltage as a function of collector current; typical values

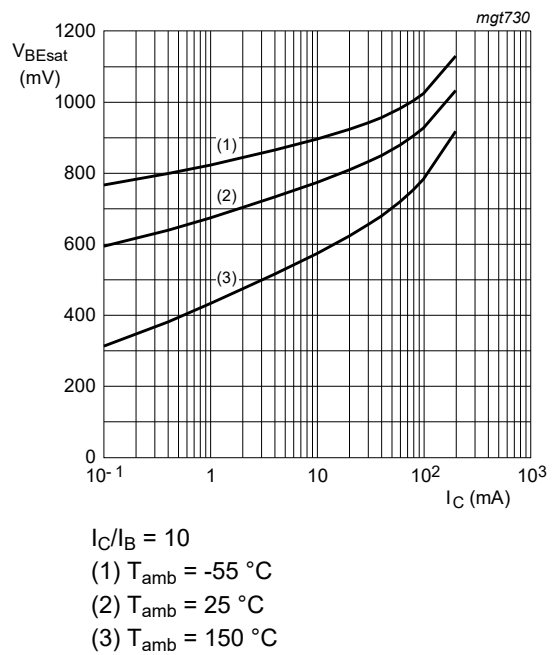


Fig. 9. BC847B: Base-emitter saturation voltage as a function of collector current; typical values

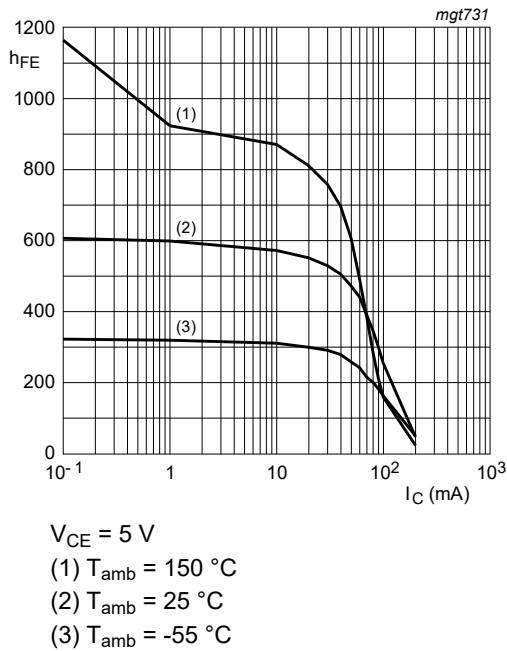


Fig. 10. BC847C: DC current gain as a function of collector current; typical values

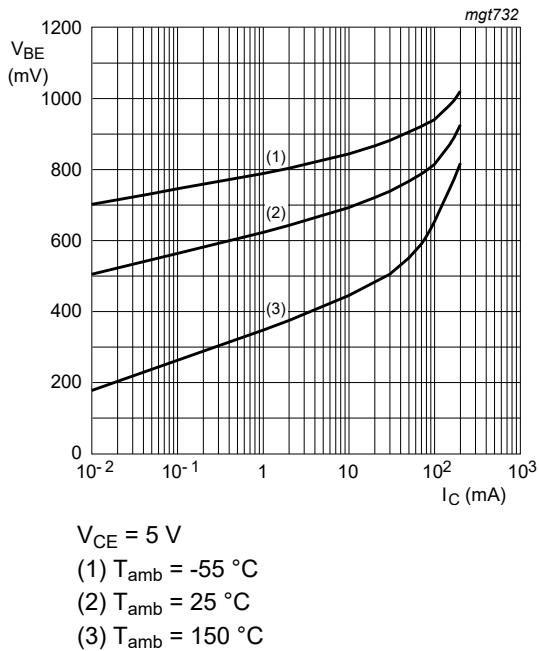


Fig. 11. BC847C: Base-emitter voltage as a function of collector current; typical values

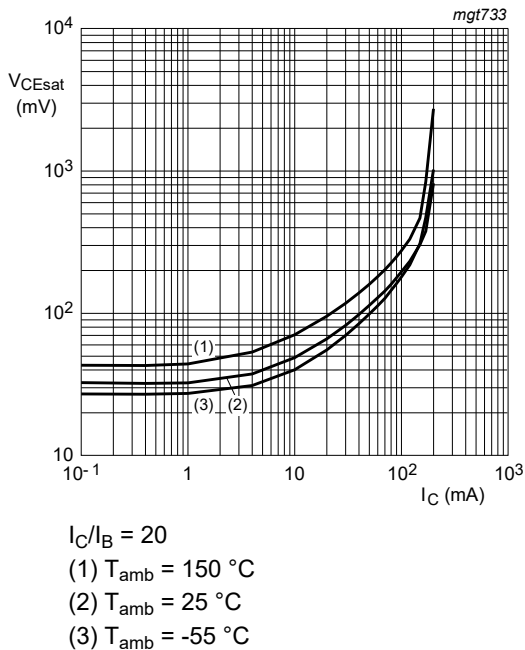


Fig. 12. BC847C: Collector-emitter saturation voltage as a function of collector current; typical values

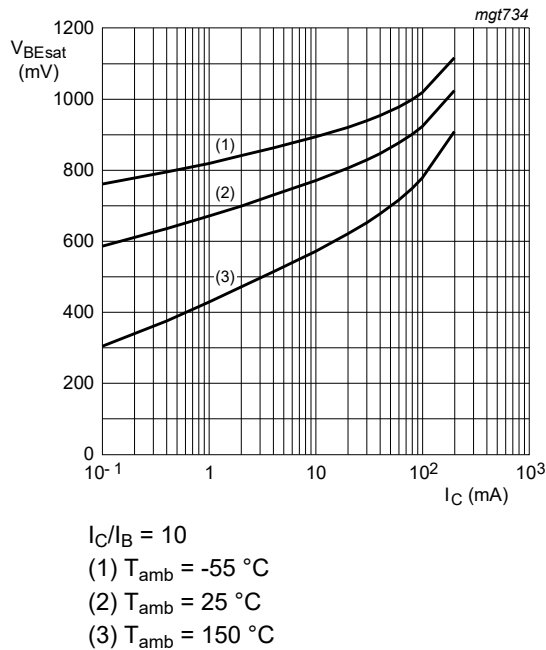
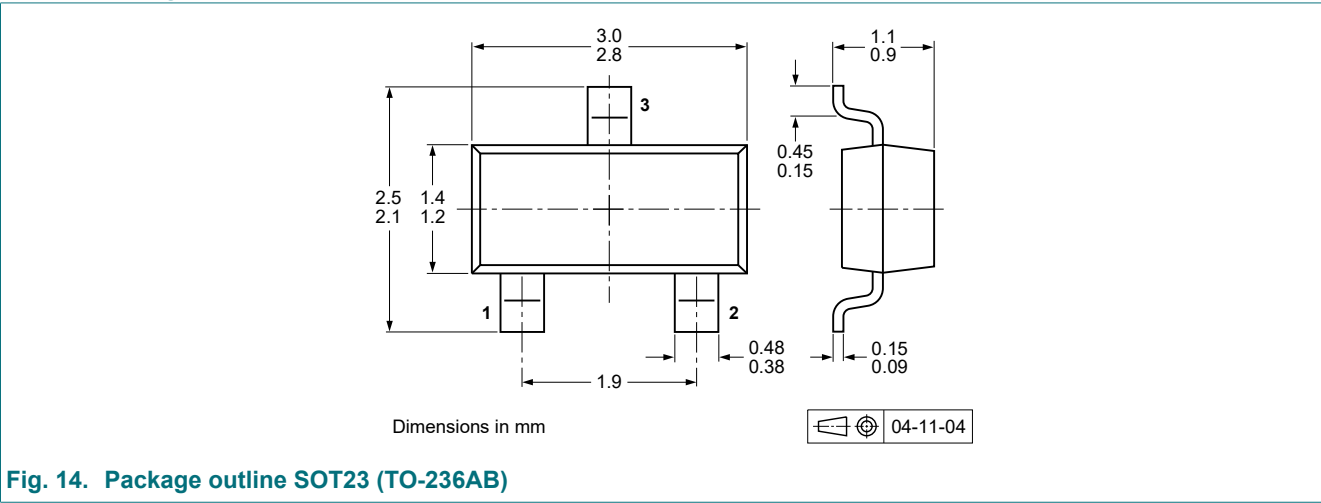


Fig. 13. BC847C: Base-emitter saturation voltage as a function of collector current; typical values

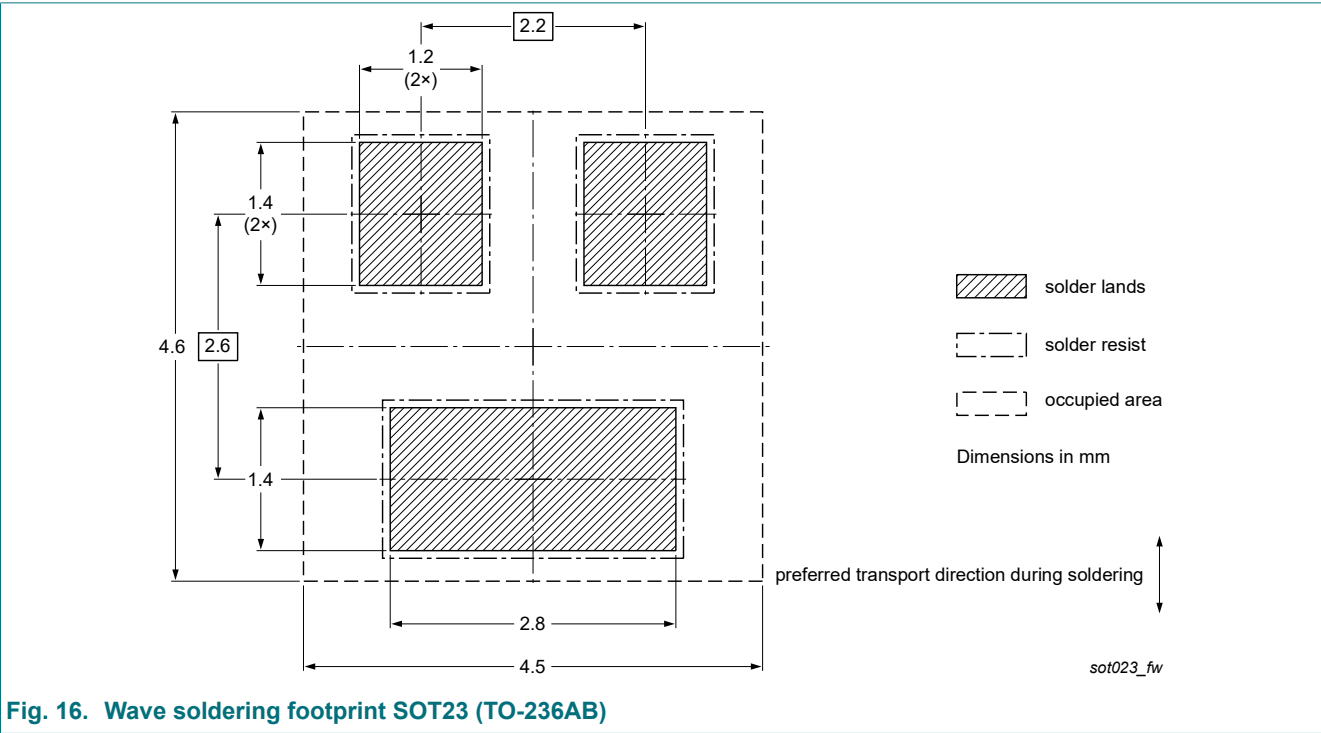
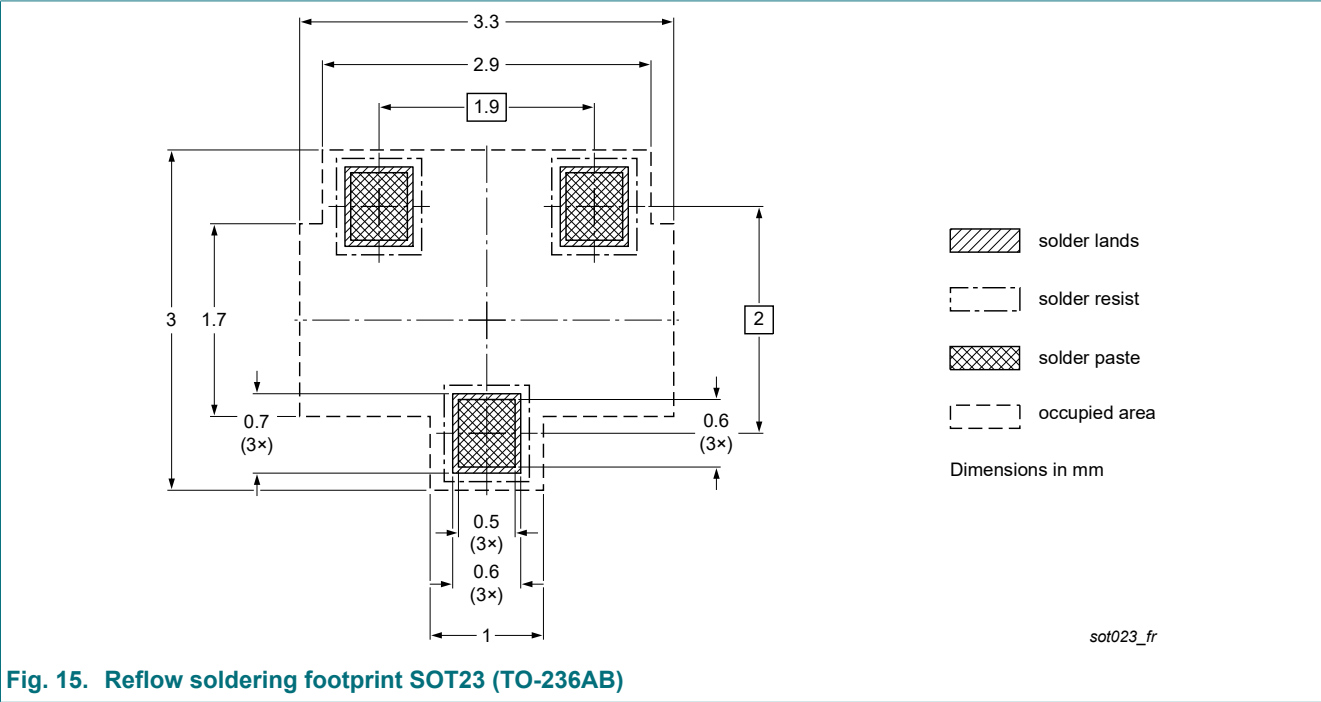
11. Package outline

Table 9. Package outline



12. Soldering

Table 10. Soldering



13. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC847X_SER v.13	20220701	Product data sheet	-	BC847_SER v.12
Modifications:	- Series data sheet reduced to 3 data sheets per package - Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BC847_SER v.12	20191024	Product data sheet	-	BC847_SER v.11
BC847_SER v.11	20181205	Product data sheet	-	BC847_SER v.10
BC847_SER v.10	20180302	Product data sheet	-	BC847_SER v.9
BC847_SER v.9	20140923	Product data sheet	-	BC847_SER v.8
BC847_SER v.8	20120820	Product data sheet	-	BC847_BC547_SER v.7
BC847_BC547_SER v.7	20081210	Product data sheet	-	BC847_BC547_SER v.6
BC847_BC547_SER v.6	20050519	Product data sheet	-	-

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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